Matoshri Shaikshanik Pratishthan's
RAJIV GANDHI COLLEGE OF ENGINEERING
Estd. 2012
Recognised by Govt.of Maharashtra, Approved by AICTE & to Savitribai Phule Pune University/MSBTE, Mumbai.
Vitthalnagar, Kokate Vasti, Karjule Harya, (Takali Dhokeshwar) Nagar Kalyan Highway, Tal.Parner, Dist.Ahmednagar, Pin-414304.
Phone : 8975578687, 8975178687, 7447275353 Visit us at : www.rgcoe.org / email : rajivgandhi.iot@gmail.com

1.1.1. The Institution ensures effective curriculum planning and delivery through a well planned and documented process including Academic calendar and conduct of continuous internal Assessment.

Various Supporting documents required for the effective implementation of curriculum are listed as below.

Sr. No.	Description
1.	AICTE Latter
2.	SPPU affiliation letter
3.	University Academic Calendar
4.	Institute Academic calendar
5.	Department Academic Calendar
6.	College Vision & Mission
7.	Vision & Mission (All Department)
8.	Principal Minutes of Meeting
9.	HOD Minutes of Meeting
10.	SPPU Syllabus
11.	Load Distribution
12.	Time Table
13.	Course File Index
14.	Theory and Practical Attendance
15.	Class Test
16.	Internal Assessment
17.	Project Guide Allocation
18.	Student feedback

All supporting documents are attached with this page

IQAC In-charge
Rajiv Gandhi College of Engineering

Rajiv Gandhi College of Engineering, Tal. Parner, Dist. Ahmednagar

Principal

All India Council for Technical Education

(A Statutory body under Ministry of Education, Govt. of India)

Nelson Mandela Marg,Vasant Kunj, New Delhi-110070 Website: www.aicte-india.org

APPROVAL PROCESS 2022-23

Extension of Approval (EoA)

F.No. Western/1-10974373757/2022/EOA

Date: 02-Jun-2022

To,

The Secretary,
Tech. & Higher Education Deptt.
Govt. of Maharashta, Mantralaya,
Annexe Building, Mumbai-400032

Sub: Extension of Approval for the Academic Year 2022-23

Ref: Application of the Institution for Extension of Approval for the Academic Year 2022-23

Sir/Madam,

In terms of the provisions under the All India Council for Technical Education (Grant of Approvals for Technical Institutions) Regulations, 2022 Notified on 4th February, 2022 and amended on 24th February 2022 and norms standards, procedures and conditions prescribed by the Council from time to time, I am directed to convey the approval to

Permanent Id	1-727961251	**Application Id**	1-10974373757
Name of the Institution	RAJIV GANDHI COLLEGE OF ENGINEERING	**Name of the Society/Trust**	MATOSHRI SHAIKSHANIK PRATISHTHAN,ANE
Institution Address	VITTHAL NAGAR ,KOKATE VASTI, AT POST-KARJULE HARYA,TAL-PARNER,DIST-AHMEDNAGAR, KARJULE HARYA, AHMEDNAGAR, Maharashtra, 414304	**Society/Trust Address**	425/144,ANE,TAL-JUNNAR,DIST-PUNE,ANE,PUNE,Maharashtra,412410
Institution Type	Private-Self Financing	**Region**	Western
Year of Establishment	2012		

To conduct following Courses with the Intake indicated below for the Academic Year 2022-23

Level	Program	Course	Affiliating Body (University /Body)	Intake Approved for 2021-22	Intake Approved for 2022-23	NRI Approval Status	FN / Gulf quota/ OCI/ Approval Status
DIPLOMA	ENGINEERING AND TECHNOLOGY	ELECTRONICS AND TELECOMMUNICATION ENGINEERING	Maharashtra State Board of Technical Education, Mumbai	60	60	NA	NA
DIPLOMA	ENGINEERING AND TECHNOLOGY	MECHANICAL ENGINEERING	Maharashtra State Board of Technical Education, Mumbai	60	60	NA	NA
UNDER GRADUATE	ENGINEERING AND TECHNOLOGY	COMPUTER ENGINEERING	University of Pune, Pune	30	30	NA	NA

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Dist. Ahmednagar 414304

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PRINCIPAL
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner, Dist. Ahmednagar

Level	Program	Course	Affiliating Body (University /Body)	Intake Approved for 2021-22	Intake Approved for 2022-23	NRI Approval Status	FN / Gulf quota/ OCI/ Approval Status
UNDER GRADUATE	ENGINEERING AND TECHNOLOGY	ELECTRICAL ENGINEERING	University of Pune, Pune	30	30	NA	NA
UNDER GRADUATE	ENGINEERING AND TECHNOLOGY	ELECTRONICS AND TELECOMMUNICATION ENGINEERING	University of Pune, Pune	30	30	NA	NA
UNDER GRADUATE	ENGINEERING AND TECHNOLOGY	MECHANICAL ENGINEERING	University of Pune, Pune	60	60	NA	NA

It is mandatory to comply with all the essential requirements as given in APH 2022-23 (Appendix 6)

Important Instructions

1. The State Government/ UT/ Directorate of Technical Education/ Directorate of Medical Education shall ensure that 10% of reservation for Economically Weaker Section (EWS) as per the reservation policy for admission, operational from the Academic year 2019-20 is implemented without affecting the reservation percentages of SC/ ST/ OBC (NCL)/ General. However, this would not be applicable in the case of Minority Institutions referred to the Clause (1) of Article 30 of Constitution of India. Such Institution shall be permitted to increase in annual permitted strength over a maximum period of two years.

2. The Institution offering courses earlier in the Regular Shift, First Shift, Second Shift/Part Time are now amalgamated as total intake and shall have to fulfil all facilities such as Infrastructure, Faculty and other requirements as per the norms specified in the Approval Process Handbook 2022-23 for the Total Approved Intake. Further, the Institutions Deemed to be Universities/ Institutions having Accreditation/ Autonomy status shall have to maintain the Faculty: Student ratio as specified in the Approval Process Handbook. All such Institutions/ Universities shall have to create the necessary Faculty, Infrastructure and other facilities WITHIN 2 YEARS to fulfil the norms based on the Affidavit submitted to AICTE beginning with the Academic Year 2022-23

3. Strict compliance of Anti-Ragging Regulation, Establishment of Committee for SC/ ST, Establishment of Internal Complaint Committee (ICC), Establishment of Online Grievance Redressal Mechanism, Barrier Free Built Environment for disabled and elderly persons, Fire and Safety Certificate should be maintained as Approval Process Handbook and provisions made in AICTE Regulation notified from time to time.

4. In case of any differences in content in this Computer generated Extension of Approval Letter, the content/information as approved by the Executive Council / General Council as available on the record of AICTE shall be final and binding.

Pharmacy Institute: In compliance with the order dated 05.03.2020 passed by the Hon'ble Supreme Court of India in Transferred Petitions (CIVIL) No 87-101 of 2014, for the existing institutions offering courses in Pharmacy Programme, approval of Pharmacy Council of India (PCI) is mandatory and AICTE approval is NOT required. The requirements for running the Programme (Diploma / UG / PG) such as Land & Build-up Area, Student-faculty ratio, Intake etc. will be as per the respective regulatory body (PCI).
In case of any inconsistency in the course name and intake for EoA issued by AICTE and the approval by PCI, the approval of PCI shall prevail.

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner

Rajiv Gandhi College of Engineering Tal. Parner, Dist. Ahmednagar Karjule Harya

PRINCIPAL
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Karjule Harya, Tal. Parner, Dist. A'Nagar

Architecture Institute: In compliance with the order dated 08.11.2019 passed by the Hon'ble Supreme Court of Indian CA No.364/ 2005, for the existing Institutions offering Courses in Architecture Programme, approval by the Council of Architecture (CoA) is mandatory and AICTE approval is NOT required. The requirements for running the Programme (Diploma / UG / PG) such as Land & Build-up Area, Student-faculty ratio, Intake etc. will be as per respective regulatory body (CoA). In case of any inconsistency in the course name and intake for EoA issued by AICTE and the approval by CoA, the approval of CoA shall prevail.

Deemed to be University: Institutions Deemed to be Universities (Running Technical Education Programmes), it is mandatory to have AICTE approval from the Academic Year 2018-19 in compliance of the Hon'ble Supreme Court Order dated 03-11-2017 passed in CA No.17869- 17870 /2017.

Prof.Rajive Kumar
Member Secretary, AICTE

Copy to:

1. **The Director Of Technical Education**, Maharashtra**

2. **The Registrar**,**
   Maharashtra State Board Of Technical Education, Mumbai

3. **The Principal / Director,**
   RAJIV GANDHI COLLEGE OF ENGINEERING
   Vitthal Nagar ,Kokate Vasti, At Post-Karjule Harya,Tal-Parner,Dist-Ahmednagar,
   Karjule Harya,Ahmednagar,
   Maharashtra,414304

4. **The Secretary / Chairman,**
   425/144,ANE,TAL-JUNNAR,DIST-PUNE
   ANE,PUNE
   Maharashtra,412410

5. **The Regional Officer,**
   All India Council for Technical Education
   Industrial Assurance Building
   2nd Floor, Nariman Road
   Mumbai - 400 020, Maharashtra

6. **Guard File(AICTE)**

Note: Validity of the Course details may be verified at http://www.aicte-india.org/

** Individual Approval letter copy will not be communicated through Post/Email. However, consolidated list of Approved Institutions(bulk) will be shared through official Email Address to the concerned Authorities mentioned above.

This is a computer generated Statement. No signature Required

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Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering
Tal. Parner, Dist. Ahmednagar
Karjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner, Dist. A'Nagar

दूरध्वनी क्रमांक :
०२०- २५६२ ११८८
२५६२ ११९७

सावित्रीबाई फुले पुणे विद्यापीठ

(पूर्वीचे पुणे विद्यापीठ)

शैक्षणिक विभाग
(संलग्नता कक्ष)
गणेशखिंड, पुणे-४११००७.

टेलिग्राफ : 'युनिपुणे'
फॅक्स : ०२०-२५६९१२३३
वेबसाइट : www.unipune.ac.in
इ-मेल : affiliation@pun.unipune.ac.in

220700253

संदर्भ क्र.:CA/१३५२

दि.:२२/०८/२०२२

प्रति,
मा. प्राचार्य,
मातोश्री शैक्षणिक प्रतिष्ठाण अणे राजीव गांधी कॉलेज ऑफ
इंजिनियरिंग पत्ता: कर्जुले हर्या ता.: पारनेर जि: अहमदनगर
पिनकोड: 414304
[CEGA019620]

विषय:- शैक्षणिक वर्ष २०२२-२०२३ या वर्षाकरिता संलग्नीकरणाचे नूतनीकरण / नैसर्गिकवाढीबाबत

महोदय,

वरील विषयासंदर्भात विद्यापीठ अधिकार मंडळाने घेतलेल्या निर्णयानुसार आपणास कळविण्यात येते की, आपल्या महाविद्यालयास शैक्षणिक वर्ष २०२२-२०२३ करिता खालील रकान्यात नमूद केलेल्या अभ्यासक्रमांच्या संलग्नीकरणाच्या नूतनीकरणास / नैसर्गिकवाढीस महाराष्ट्र सार्वजनिक विद्यापीठ अधिनियम २०१६ तसेच अखिल भारतीय तंत्रशिक्षण परिषद (AICTE)/ राष्ट्रीय शिक्षक शिक्षण परिषद (NCTE)/ बार कौन्सिल ऑफ इंडिया (BCI)/ फार्मसी कौन्सिल ऑफ इंडिया (PCI)/ कौन्सिल ऑफ आर्किटेक्चर (COA)/ विद्यापीठ अनुदान आयोग/संबंधित शिखर संस्था/परिषद/नियामक मंडळ इ.तसेच केंद्र शासन महाराष्ट्र शासन आणि सावित्रीबाई फुले पुणे विद्यापीठ यांचेकडून वेळोवेळी विहित करण्यात आलेल्या आणि येणाऱ्या नियम/आदेश/मार्गदर्शक तत्वे/परिनियम/अध्यादेश इ.तरतूदींनुसार तसेच संबंधित अभ्यासक्रम व प्रवेश क्षमता मान्यतेच्या अधीन राहून तसेच स्वयं मूल्यमापन अहवालातील सोबत जोडलेल्या यादीतील अटी व शर्तींची पूर्तता (लागू असल्यास) विद्यापीठाचे पत्र निर्गमित झाल्याच्या दिनांकापासून सहा महिन्यांच्या आत पूर्ण करण्याच्या अटीवर परवानगी देण्यात येत आहे.

अनु.क्र.	अभ्यासक्रमाचा तपशील	विद्यार्थी संख्या	वर्ष व तुकडी	संलग्नीकरणाचा प्रकार
1	बी.ई. (इलेक्ट्रिकल)	30	वर्ष पहिले ते चौथे- Div No.1,	नूतनीकरण
2	बी.ई. (इलेक्ट्रॉनिक्स अँड टेलिकम्यूनिकेशन)	30	वर्ष पहिले ते चौथे- Div No.1,	नूतनीकरण
3	बी.ई. (कॉमप्यूटर)	30	वर्ष पहिले ते चौथे- Div No.1,	नूतनीकरण
4	बी.ई. (मेकॅनिकल)	60	वर्ष पहिले ते चौथे- Div No.1,	नूतनीकरण

अटी व शर्तींची यादी

अनु.क्र.	अटी व शर्ती
१	1. AICTE Extension Letter Not Available. 2. Teacher Releaving And Transfer Letter Not Available. 3. NAAC NBA details not available . 4. Physical Director details not Available . 5. Physical Director details not Available .

IQAC In-charge
Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering
Tal. Parner, Dist. Ahmednagar
Kanjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Parner, Dist. A'Nagar

स. द. डावखर
उपकुलसचिव

IQAC In-charge
Rajiv Gandhi College of Engineering
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Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering
Tal. Pamer, Dist. Ahmednagar
Karjule Harya

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Savitribai Phule Pune University

(formerly University of Pune)

Circular No. 07 of 2023

Important Notification

Revised Dates of Commencement and Conclusion of terms of U.G. / P.G. Courses for the Academic Year 2022-23 for Affiliated Colleges / Recognised Institutes.

In view of changes in the dates of commencement and conclusion of First Term and commencement of Second Term in the academic calendar for the academic year 2022-23, it is observed that some dates are not suitable. Therefore, considering the issue, the earlier circular issued by the University bearing no. 484 dated 29.12.2022 revised as per below:

Sr.No.	Name of the Courses, Faculties & Year	2022 - 2023			
		First Term		Second Term	
		Commencement	Conclusion	Commencement	Conclusion
1	**Science & Technology**				
	B.Engineering : I	04/11/2022	06/03/2023	01/04/2023	22/07/2023
	B.Engineering : II	17/08/2022	10/12/2022	06/02/2023	31/05/2023
	B.Engineering : III & IV	18/07/2022	30/11/2022	23/01/2023	20/05/2023
	B. Arch. : I	22/11/2022	25/03/2023	10/04/2023	29/07/2023
	M. Arch. : I	22/10/2022	25/02/2023	13/03/2023	01/07/2023

Deputy Registrar
(P.G.Admission)

Ganeshkhind, Pune-07
Ref. No. PGS/ 390
Date: 18/01/2023

Copy to: for Information and necessary action

The Members of the Management Council.
The Deans of Faculties.
The Registrar, Savitribai Phule Pune University, Pune.
The Director, Examinations & Evaluation, Savitribai Phule Pune University, Pune.
The Heads of all University Departments.
The Principals of all Affiliated Colleges.
The Directors of all Recognized Institutes.
The Heads of all the Administrative Sections of the University Office.
Asstt. Registrar, office of the Hon. Vice-Chancellor, Savitribai Phule Pune University
Asstt. Registrar, office of the Hon. Pro-Vice-Chancellor, Savitribai Phule Pune University

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar 414304

Rajiv Gandhi College of Engineering Tal. Parner, Dist. Ahmednagar Karjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner, Dist. A'Nagar

Savitribai Phule Pune University
(Formerly University of Pune)

Circular No.484of 2022

Dates of Commencement and Conclusion of terms for the Academic Year 2022-23 for University Department / Affiliated Colleges / Recognised Institutes.

It is hereby informed that, the dates of commencement and conclusion of the First and Second term of University Courses, under various faculties, for the academic year 2022-23 shall be as under as per DTE & CET Cell admission notification:

Sr No	Name of the Courses , Faculties & Year	2022 - 2023			
		First Term		Second Term	
		Commencement	Conclusion	Commencement	Conclusion
1	**Science & Technology**				
	B.E./B.Tech : Ist Year	04/11/2022	20/02/2023	20/03/2023	15/07/2023
	M.E./M.Tech : Ist Year	27/10/2022	20/02/2023	20/03/2023	15/07/2023
2	**Commerce & Management**				
	M.B.A. : Ist Year	10/11/2022	03/03/2023	20/03/2023	15/07/2023
	M.C.A. : Ist Year	09/11/2022	03/03/2023	20/03/2023	15/07/2023
3	**Humanities**				
	L.L.B. : Ist Year (3 Years)	13/12/2022	04/04/2023	24/04/2023	12/08/2023
	L.L.B. : Ist Year (5 Years)	13/12/2022	04/04/2023	24/04/2023	12/08/2023
	L.L.M. : Ist & IInd Year	03/10/2022	28/01/2023	20/02/2023	17/06/2023
4	**Inter-disciplinary Studies**				
	B.Ed. : Ist Year	19/12/2022	12/04/2023	24/04/2023	12/08/2023
	B.P.Ed. : Ist Year	12/12/2022	04/04/2023	24/04/2023	12/08/2023
	M.Ed. /M. P. Ed.	14/12/2022	04/04/2023	18/04/2023	05/08/2023
	Fine Arts	12/12/2022	04/04/2023	24/04/2023	12/08/2023

NOTE :

1. In case, the Principal of the Affiliated Colleges require to give additional holiday in exceptional circumstances, he/she may do so by compensating the same by keeping the College working on Sunday.

29/11/2022

Assistant Registrar
(P.G.Admission)

Ganeshkhind, Pune-07
Ref. No. PGS/ 6275
Date: 29/12/2022

Incharge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering
Tal. Parner, Dist. Ahmednagar
Karjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner, Dist. A'Nagar

Copy to: for Information and necessary action

The Members of the Management Council.
The Deans of Faculties.
The Registrar, Savitribai Phule Pune University, Pune.
The Director, Examinations & Evaluation, Savitribai Phule Pune University, Pune.
The Heads of all University Departments.

The Principals of all Affiliated Colleges.
The Directors of all Recognized Institutes.
The Heads of all the Administrative Sections of the University Office.
Asstt. Registrar, office of the Hon. Vice-Chancellor, Savitribai Phule Pune University
Asstt. Registrar, office of the Hon. Pro-Vice-Chancellor, Savitribai Phule Pune University

IQAC In-charge
Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering
Tal. Parner, Dist. Ahmednagar
Kanjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Parner, Dist. A'Nagar

Savitribai Phule Pune University

(Formerly University of Pune)

Circular No. 302 of 2022

Important Notification

Revised Dates of Commencement and Conclusion of terms of U.G. / P.G. Courses for the Academic Year 2022-23 for Affiliated Colleges / Recognised Institutes.

In reference to the earlier circular issued by the University bearing no. 173 dated 10.06.2022 the dates of commencement and conclusion of First Term and Second Term in the academic calendar for the academic year 2022-23, for the following courses are being revised as under.

Sr No	Name of the Courses , Faculties & Year	2022 - 2023			
		First Term		Second Term	
		Commencement	Conclusion	Commencement	Conclusion
1	Science & Technology				
	Science	20/06/2022	30/11/2022	26/12/2022	04/05/2023
	B.Engineering : II	17/08/2022	10/12/2022	02/01/2023	29/04/2023
	B.Engineering : III IV	18/07/2022	30/11/2022	02/01/2023	29/04/2023
	M.Engineering : II	18/07/2022	12/11/2022	09/01/2023	06/05/2023
	B.Architecture : II	08/08/2022	04/12/2022	19/12/2022	04/05/2023
	B.Architecture : III IV V	20/06/2022	08/11/2022	30/12/2022	15/05/2023
	M.Architecture:II	19/09/2022	07/01/2023	23/01/2023	20/05/2023
	B. Pharmacy: II III	01/08/2022	10/12/2022	02/01/2023	10/05/2023
	B. Pharmacy: IV	15/07/2022	03/12/2022	02/01/2023	10/05/2023
	M. Pharmacy : II	01/08/2022	10/12/2022	26/12/2022	30/06/2023
2	Commerce & Management				
	Commerce	20/06/2022	30/11/2022	26/12/2022	04/05/2023
	MBA II (Including SIP project of 8	01/09/2022	30/01/2023	15/02/2023	26/05/2023
	MCA II	01/09/2022	16/12/2022	02/01/2023	15/04/2023
	BHMCT II III IV	01/09/2022	16/12/2022	02/01/2023	15/04/2023
3	Humanities				
	Arts	20/06/2022	30/11/2022	26/12/2022	04/05/2023
	Mental Moral and Social Sciences				
	L.L.B. II	31/10/2022	31/01/2023	06/02/2023	15/05/2023
	L.L.B. III	04/07/2022	12/12/2022	08/01/2023	15/05/2023
	B.A. L.L.B. II	31/10/2022	31/01/2023	06/02/2023	15/05/2023
	B.A. L.L.B. III IV V	04/07/2022	12/12/2022	08/01/2023	15/05/2023
4	Inter disciplinary Studies				
	Education : II	15/09/2022	06/01/2023	17/01/2023	10/05/2023
	Physical Education : II	15/09/2022	06/01/2023	17/01/2023	10/05/2023
	B.Lib & M.Lib	15/07/2022	30/11/2022	02/01/2023	04/05/2023
	Fine Arts & Performing Art	20/06/2022	30/11/2022	26/12/2022	04/05/2023
	Journalism PG	15/07/2022	30/11/2022	02/01/2023	04/05/2023

Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering Tal. Parner Dist. Ahmednagar Kanjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Parner, Dist. A'Nagar

NOTE :

1. The dates of commencement and conclusion of the University concerned Department / Affiliated Colleges / Recognised Institutes for the Academic year of all those courses whose admission was made under Common Entrance Test (CET) conducted by Government of Maharashtra / Savitribai Phule Pune University will be decleared separately.

Ganeshkhind, Pune-07
Ref. No. PGS/4929
Date: 15/10/2022

Deputy Registrar
(P.G.Admission)

Copy to: for Information and necessary action

The Deans of Faculties.
The Registrar, Savitribai Phule Pune University, Pune.
The Director, Examinations & Evaluation, Savitribai Phule Pune University, Pune.
The Heads of all University Departments.
The Principals of all Affiliated Colleges.
The Directors of all Recognized Institutes.
The Heads of all the Administrative Sections of the University Office.
Asstt. Registrar, office of the Hon. Vice-Chancellor, Savitribai Phule Pune University
Asstt. Registrar, office of the Hon. Pro-Vice-Chancellor, Savitribai Phule Pune University

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar 414304

Rajiv Gandhi College of Engineering
Tal. Parner, Dist. Ahmednagar
Karjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner, Dist. A'Nagar

Savitribai Phule Pune University
(formerly University of Pune)

Circular No. 265 of 2022

Dates of Commencement and Conclusion of the academic session of the First Year for the Academic Year 2022-23 for University Departments

It is hereby informed that, the dates of commencement and conclusion of the First Year of all those University courses whose admission are through Online Entrance Examination (OEE) conducted by the Savitribai Phule Pune University, under various faculties, for the academic year 2022-23 shall be as under:

Sr. No.	Name of the Courses	2022 - 2023			
		First Term		Second Term	
		Commencement	Conclusion	Commencement	Conclusion
1	**Science & Technology**	12/09/2022	31/12/2022	09/01/2023	20/05/2023
	Science				
	Technology				
2	**Commerce & Management**				
	Commerce				
	Management				
3	**Humanities**				
	Arts & Fine Arts				
	Mental Moral and Social Sciences				
	Law				
4	**Inter-disciplinary Studies**				
	Education				
	Physical Education				
	Library Science				
	Journalism				
	Performing Arts				

NOTE

1. In case, the Head of the Department requires to give additional holiday in exceptional circumstances, he may do so by compensating the same by keeping Department working on Sundays.
2. Commencement date of next Academic Year 2023-24 will be 03rd July, 2023.

Deputy Registrar
(P.G. Admission)

Ganeshkhind, Pune-07
Ref. No. PGS/4439
Date: 12/09/2022

Copy to: for Information and necessary action
The Deans of all Faculties.
The Registrar, Savitribai Phule Pune University.
The Director, Board of Examinations & Evaluation, Savitribai Phule Pune University.
The Director, all campus Schools, Savitribai Phule Pune University.
The Head of all University Departments.
The Head of the Administrative Sections of the University office.

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering Tal. Parner, Dist. Ahmednagar Karjule Harya

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PRINCIPAL
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner, Dist. A'Naga

Savitribai Phule Pune University

(Formerly University of Pune)

Circular No. 277 of 2021

Important Notification

Dates of Commencement and Conclusion of I[st] Year of PG Courses for the Academic Year 2021-2022
For University Departments

It is hereby informed that, the dates of Commencement and Conclusion of I[st] Year of PG Courses for the Academic Year 2021-2022 University Courses, under various faculties shall be as under :

Sr. No	Name of the Courses and Faculties	2021 - 2022			
		First Term		Second Term	
		Commencement	Conclusion	Commencement	Conclusion
1	**Science & Technology**	05/10/2021	25/01/2022	01/02/2022	31/05/2022
	Science (I[st] Yr)				
	M.Tech (I[st] Yr)				
2	**Commerce & Management**				
	Commerce (I[st] Yr)				
	MBA Executive (Ist Yr)				
	MBA (Pharma BT) (Ist Yr)				
3	**Humanities**				
	Arts (I[st] Yr)				
	Mental Moral and Social Sciences (I[st] Yr)				
	LL.M. (I[st] Yr)				
4	**Inter- disciplinary Studies**				
	M.A.Education (I[st] Yr)				
	B.Sc. B.Ed. Integrated (I[st] Yrs)				
	M. Lib. I. Sc. (Ist Yr)				
	Fine Arts/ Performing Arts (Ist Yr)				
	M. A. Journalism and Mass Communication (Ist Yr)				
	M.A Yoga (Ist Yr)				

NOTE

1. **All Programmes shall be conducted in Online Mode until further notice.**
2. **In view of prevailing COVID-19 situation in the Country, Colleges / Institutes shall required to follow the guidelines / instructions issued by the Government of Maharashtra from time to time.**
3. **The Commencement and Conclusion shall include teaching & Examinations.**
4. **Teching work must commence with immideate effect.**

Deputy Registrar
(P.G.Admission)

Ganeshkhind, Pune-07
Ref. No. PGS/3569
Date: 29/09/2021

Copy to:
The Heads of all University Departments, Savitribai Phule Pune University, Pune.
The Principals of all Affiliated Colleges, Savitribai Phule Pune University, Pune.
The Directors of all Recognized Institutes, Savitribai Phule Pune University, Pune.

Copy to: for information
The Members of the Management Council, Savitribai Phule Pune University, Pune.
The Registrar, Savitribai Phule Pune University, Pune.
The Deans of Faculties, Savitribai Phule Pune University, Pune.
The Director, Examinations & Evaluation, Savitribai Phule Pune University, Pune.

PRINCIPAL
Rajiv Gandhi College of Engineering

Savitribai Phule Pune University
(Formerly University of Pune)

Circular No. 92 of 2022

Important Notification

Revised Dates of Commencement and Conclusion of terms of U.G. / P.G. Courses for the Academic Year 2021-22 for Affiliated Colleges / Recognised Institutes.

1. The dates of commencement and conclusion of First Term and commencement of Second Term shall remain same as notified in the circular no. 134 of 2021 dated 14/05/2021 for UG/PG courses in the **faculties of Humanities, Commerce and Science.** The revised dates of conclusion of Second Term shall be **25/05/2022** for UG/PG courses in the **faculties of Humanities, Commerce and Science.** Commencement of academic year 2022-23 shall be **20/06/2022** for **Humanities, Commerce and Science faculties.**

2. The dates of commencement and conclusion of Affiliated Colleges / Recognised Institutes for the Academic year 2021-22 of all those courses whose admission was made under Common Entrance Test (CET) conducted by Government of Maharashtra shall be as under :

Sr. No.	Name of the Faculty	Name of the Courses	Year	2021 – 2022			
				First Term		Second Term	
				Commencement	Conclusion	Commencement	Conclusion
1	Commerce & Management	MBA	I	10/12/2021	18/04/2022	02/05/2022	16/08/2022
		MCA	I	10/12/2021	18/04/2022	02/05/2022	20/08/2022
		MCA	II, III	15/11/2021	03/03/2022	18/04/2022	06/08/2022
2	Science & Technology	B. Pharmacy	I	03/01/2022	30/03/2022	01/04/2022	15/06/2022
		M. Pharmacy	I	27/12/2021	30/03/2022	01/04/2022	15/06/2022
		Engineering	I	13/12/2021	06/04/2022	11/04/2022	30/07/2022
		Engineering	II	20/08/2021	11/12/2021	03/01/2022	15/05/2022
		B.Architecture	I	10/12/2021	25/03/2022	04/04/2022	23/07/2022
		M. Architecture	I	10/12/2021	31/03/2022	04/04/2022	23/07/2022
4	Inter-disciplinary Studies	Physical Education (M.P.Ed.)	I	10/01/2022	30/04/2022	02/05/2022	30/09/2022
		B. Ed. (Annual)	I	14/02/2022	--------		31/08/2022
		M. Ed.	I	10/01/2022	30/04/2022	02/05/2022	30/09/2022
		B. P. Ed.	I	14/02/2022	07/06/2022	08/06/2022	26/09/2022
		B. Lib. / M. Lib.	UG/PG	25/10/2021	21/02/2022	07/03/2022	25/06/2022
		M.A. (JMC)	I, II	11/10/2021	25/01/2022	01/02/2022	25/05/2022
		M.S.W.	PG	15/11/2021	11/03/2022	20/05/2022	30/09/2022
		M.F.A.	PG	25/10/2021	24/01/2022	03/02/2022	03/05/2022
		B.F.A.	UG	25/10/2021	21/02/2022	07/03/2022	25/06/2022

IQAC In-charge
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Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering Tal. Parner Dist. Ahmednagar Kanjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Parner, Dist. A'Nagar

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NOTE :

1. The Principals and Teachers are requested to complete the theory and practical syllabus of current term of the academic year 2021-22 within stipulated period.
2. It is to be informed that circular issued by the University bearing no. **74 of 2022 dated 28.03.2022** stands cancelled.

Deputy Registrar
(P.G.Admission)

Ref. No.PGS/ 2344
Date : 30/04/2022.

Copy for favour of necessary action to :

1. The Principals of all Affiliated Colleges, Savitribai Phule Pune University, Pune.
2. The Directors of all Recognized Institutes, Savitribai Phule Pune University, Pune.

Copy for favour of information to :

1. The Members of the Management Council, Savitribai Phule Pune University, Pune.
2. The Registrar, Savitribai Phule Pune University, Pune.
3. The Deans of Faculties, Savitribai Phule Pune University, Pune.
4. The Director, Board of Examinations & Evaluation, Savitribai Phule Pune University, Pune.

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering
Tal. Parner, Dist. Ahmednagar
Karjule Harya

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Savitribai Phule Pune University

(Formerly University of Pune)

Circular No. 134 of 2021

Important Notification

Dates of Commencement and Conclusion of terms of U.G. / P.G. Courses for the Academic Year 2021-22 For affiliated Colleges/recognised Institutes.

It is hereby informed that, the dates of Commencement and conclusion of terms of U.G. / P.G. Courses for the Academic Year 2021-2022, under various faculties shall be as under :

The date of Commencement and Conclusion of the academic session of the first year of all those courses whose admission was made/ will be made under Common Entrance Examination (CET) conducted by the Government/SPPU will be announced seperatly.

Sr. No.	Name of the Faculty	Name of the Courses	Year	2021 - 2022			
				First Term		Second Term	
				Commencement	Conclusion	Commencement	Conclusion
1	Science & Technology	Science	I, III	15/06/2021	20/10/2021	15/11/2021	30/04/2022
			II	01/07/2021	20/10/2021	15/11/2021	30/04/2022
		Engineering	TE, BE	15/06/2021	20/10/2021	15/11/2021	30/04/2022
			SE	20/08/2021	12/11/2021	03/01/2022	15/05/2022
		ME, MCA	II	20/08/2021	12/11/2021	03/01/2022	15/05/2022
		B.Architecture	III, IV & V	15/06/2021	20/10/2021	15/11/2021	30/04/2022
			II	20/08/2021	12/11/2021	03/01/2022	15/05/2022
		M. Architecture	II	20/08/2021	12/11/2021	03/01/2022	15/05/2022
		B. Pharmacy	III & IV	15/06/2021	20/10/2021	15/11/2021	30/04/2022
			II	20/08/2021	12/11/2021	03/01/2022	15/05/2022
		M. Pharmacy	II	20/08/2021	12/11/2021	03/01/2022	15/05/2022
2	Commerce & Management	Commerce	I, III	15/06/2021	20/10/2021	15/11/2021	30/04/2022
			II	01/07/2021	20/10/2021	15/11/2021	30/04/2022
		Management	II	15/11/2021	03/03/2022	11/03/2022	30/06/2022

IQAC In-charge
Rajiv Gandhi College of Engineering
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Dist. Ahmednagar-414304

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Karjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner, Dist. A'Nagar

Sr. No.	Name of the Faculty	Name of the Courses	Year	2021 - 2022			
				First Term		Second Term	
				Commencement	Conclusion	Commencement	Conclusion
3	Humanities	Arts & Fine Arts	I, III	15/06/2021	20/10/2021	15/11/2021	30/04/2022
			II	01/07/2021	20/10/2021	15/11/2021	30/04/2022
		Mental,Moral and Social Sciences	I, III	15/06/2021	20/10/2021	15/11/2021	30/04/2022
			II	01/07/2021	20/10/2021	15/11/2021	30/04/2022
		Law : UG & PG	III, IV & V	01/07/2021	11/12/2021	01/01/2022	20/05/2022
		B.A. LL.B. 5 Yrs	II	11/10/2021	31/01/2022	05/2/2022	31/05/2022
		LL.B. 3 Years	II	11/10/2021	31/01/2022	05/2/2022	31/05/2022
4	Inter-disciplinary Studies	Education (B.Ed.)	II	15/09/2021	06/01/2022	17/01/2022	10/05/2022
		Education (M.Ed.)	II	15/09/2021	06/01/2022	17/01/2022	10/05/2022
		Physical Education (B.P.Ed.)	II	15/09/2021	06/01/2022	17/01/2022	10/05/2022
		Physical Education (M.P.Ed.)	II	15/09/2021	06/01/2022	17/01/2022	10/05/2022

NOTE

1. In view of prevailing COVID-19 situation in the Country, Colleges / Institutes shall required to follow the guidelines / instructions issued by the Government of Maharashtra time to time.
2. In case the Principal of the Affiliated Colleges require to give additional holiday in exceptional circumstances, he may do by the compensative the same by keeping the college working on Sunday.
3. The college are required to complete the theory and practical remaining syllabus of current term of academic year 2020-21.

14/5/2021.

Uttam R. Chavan
Deputy Registrar
(P.G.Admission)

Ganeshkhind, Pune-07
Ref. No. PGS/ 1961
Date: 14/05/2021

Copy to:
The Heads of all University Departments, Savitribai Phule Pune University, Pune.
The Principals of all Affiliated Colleges, Savitribai Phule Pune University, Pune.
The Directors of all Recognized Institutes, Savitribai Phule Pune University, Pune.

Copy to: for information
The Members of the Management Council , Savitribai Phule Pune University, Pune.
The Registrar, Savitribai Phule Pune University, Pune.
The Deans of Faculties, Savitribai Phule Pune University, Pune.
The Director, Examinations & Evaluation, Savitribai Phule Pune University, Pune.

Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering Karjule Harya Tal. Parner, Dist. Ahmednagar

PRINCIPAL
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner, Dist. A'Nagar

SAVITRIBAI PHULE PUNE UNIVERSITY

(Formerly University of Pune)

Circular No. 03/2021

Important Notification

Regarding Commencement and Conclusion of Teaching of First & Second terms for the Academic Year 2020-2021

In continuation with Circular No. 284 and 285 dated 15/10/2020 regarding Commencement & Conclusion for First and Second terms for the Academic Year 2020-21 and Circular No. 323/2020 dated 03/12/2020, it is hereby informed to all the concerns that the University issues following guidelines to conduct theory and practical classes in offline mode:

P.G. Programme:

1. The practical / Summer Internship Project / Dissertation (Theory if required) classes of Odd Semesters of second year and onwards of Engineering / Architecture / Pharmacy / Management / Hotel Management / Education / Physical Education / Law and other similar programs shall begin from 11th January 2021 in offline mode.
2. The practical/ Dissertation / Industrial Training Project (Theory if required) classes of Odd Semesters of second year and onwards of Arts / Fine Arts / Science / Commerce/ Social Sciences / Library Science / Communication & Journalism and other similar programs shall begin from 11th January 2021 in offline mode.
3. The Theory and Practical classes of odd semesters of First year of Arts / Fine Arts / Science / Commerce / Social Sciences / Library Science / Communication & Journalism and other similar programs shall begin from 11th January 2021 in offline mode.
4. The Theory and Practical classes of even semesters of all programs shall be conducted in offline mode immediately after completion of odd semester examination in accordance with the guidelines issued by University Grants Commission, Government of Maharashtra and Local Authorities from time to time.

U.G. Programme:

1. Practical classes of Odd Semesters of Second year and onwards of Engineering / Architecture / Pharmacy / Management / Hotel Management / Education / Physical Education / Law and other similar programs shall begin from 11th January 2021 in offline mode.
2. Practical classes of Odd Semesters of Second year and onwards for Science courses shall begin from 11th January 2021 in offline mode.
3. Practical of Odd Semesters of Second year and onwards of Arts / Fine Arts / Commerce / Social Sciences / Library Science / Communication & Journalism and other similar programs (if applicable) shall begin from 11th January 2021 in offline mode.
   The practical of T Y. B. A. and T Y B. Com. (Annual Pattern), if applicable shall also begin from 11th January 2021 in offline mode.
4. Theory and Practical classes of even semesters of all programs shall be conducted immediately after completion of odd semester examination shall be conducted in offline mode in accordance with the guidelines issued by University Grants Commission, Government of Maharashtra and Local Authorities from time to time.

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering
Tal. Parner, Dist. Ahmednagar
Karjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner, Dist. A'Nagar

First year of P.G. / U.G. of Non-Professional Programs:

1. Commencement of theory and practical classes of all P.G. programs of the First year (whose admissions were not made under the Common Entrance Test (CET) Examination conducted by Government of Maharashtra or Competent Authority) shall begin from 11th January 2021 in offline mode.

2. Commencement of practical of all U.G. programs of First year (whose admissions were not made under the Common Entrance Test (CET) Examination conducted by Government of Maharashtra or Competent Authority) shall begin from 11th January 2021 in offline mode.

First year of P.G. / U.G. of Professional Programs:

Commencement of theory and practical classes of first year of Professional programs (whose admissions are being made under the Common Entrance Test (CET) Examination conducted by the Competent Authorities) shall begin in offline mode as per the dates declared by the competent authorities.

M. Phil. / Ph.D. Programs:

The research work of M. Phil. / Ph.D. program shall begin from 11th January 2021 in offline mode.

General Instructions:

1. The Principals / Directors and Heads of the University Departments should follow the guidelines issued by the University Grants Commission vide its letter No. F.2-30/14 (General Circular/WRO) dated 6th November 2020 for Re-opening the Universities and Colleges Post Lockdown due to COVID-19 pandemic, Govt. Circular No. Sankirna2020/Pra.Kra.140/SD-6 dated 10th November 2020 and guidelines issued by Local Authorities from time to time. Attached herewith copies for ready reference.

2. The schedule of Commencement and Conclusion of Academic Year 2020-21 as per Circular No. 284/2020 and 285/2020 dated 15/10/2020 shall remain unchanged. Attached herewith copies for ready reference.

4/1/2021.

Deputy Registrar
(P.G. Admissions)

Ganeshkhind, Pune
Ref. No. PGS/13
Date: 04/01/2021

Copy to: for information & necessary action
The Members of the Management Council, SPPU, Pune.
The Deans of Faculties, SPPU, Pune.
The Registrar, Savitribai Phule Pune University, Pune.
The Director, Examinations & Evaluation, SPPU, Pune.
The Heads of all University Departments, Savitribai Phule Pune University, Pune.
The Principals of all Affiliated Colleges, Savitribai Phule Pune University, Pune.
The Directors of all Recognized Institutes, Savitribai Phule Pune University, Pune.
The Heads of all the Administrative Sections of the University Office.
Office of the Hon. Vice-Chancellor, Savitribai Phule Pune University, Pune.
Office of the Hon. Pro-Vice-Chancellor, Savitribai Phule Pune University, Pune.

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
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Rajiv Gandhi College of Engineering
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Karjule Harya

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Rajiv Gandhi College of Engineering
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डॉ. आर. मनोज कुमार
संयुक्त सचिव
Dr. R. Manoj Kumar
Joint Secretary

सत्यमेव जयते

विश्वविद्यालय अनुदान आयोग
University Grants Commission
(शिक्षा मंत्रालय, भारत सरकार)
(Ministry of Education , Govt. of India)
पश्चिम क्षेत्रीय कार्यालय, गणेशखिंड, पुणे- ४११००७
Western Regional Office, Ganeshkhind, Pune – 411007
Ph: 020 – 25696896, 25696897
Email: wrougc@gmail.com

By Email

No.F.2-30/14(General Circular/WRO)

November 6, 2020

To,

The Vice Chancellors/Directors of
(All the Universities/HEIs in the States of
Maharashtra, Gujarat, and Goa) and

The Principals of
(All the Colleges of Maharashtra, Gujarat, Goa and
UTs of Daman & Diu and Dadra & Nagar Haveli)

Subject : **UGC Guidelines for Re-opening the Universities and Colleges Post Lockdown due to COVID-19 Pandemic - reg.**

Dear Madam/Sir,

Please find enclosed herewith a copy of letter D.O.No.14-8/2020(CPP-II) dated 5th November, 2020 from the Secretary, UGC regarding UGC Guidelines for Re-opening the Universities and Colleges post Lockdown due to COVID-19 Pandemic. The attached letter is self-explanatory. You are requested to comply with the instructions contained in the letter and take necessary action in this regard.

A copy of UGC Guidelines for Re-opening the Universities and Colleges post Lockdown due to COVID-19 Pandemic is also attached herewith.

With regards,

Yours sincerely,

(Dr. R. Manoj Kumar)
Joint Secretary

Encl:-

1. Letter of Secretary, UGC, dated 05/11/2020
2. UGC Guidelines

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Pamer
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering
Tal. Pamer, Dist. Ahmednagar
Karjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Pamer, Dist. A'Nagar

ज्ञान-विज्ञान विमुक्तये

प्रो. रजनीश जैन
सचिव
Prof. Rajnish Jain
Secretary

सत्यमेव जयते

विश्वविद्यालय अनुदान आयोग
University Grants Commission
(शिक्षा मंत्रालय, भारत सरकार)
(Ministry of Education, Govt. of India)
बहादुरशाह जफ़र मार्ग, नई दिल्ली-110002
Bahadur Shah Zafar Marg, New Delhi-110002
Ph :. 011-23236288 /23239337
Fax : 011-2323 8858
E-mail : secy.ugc@nic.in

D.O. 14-8/2020(CPP-II)

5th November, 2020

Subject: UGC guidelines for Re-Opening the Universities and Colleges Post Lockdown due to COVID-19 Pandemic

Respected Madam /Sir,

Universities and other educational institutions across the country have been closed since 16th March, 2020 when the Government of India announced a countrywide lockdown as one of the measures to contain the COVID-19 outbreak. Keeping in view of the COVID-19 pandemic and subsequent lockdown, the University Grants Commission issued *"Guidelines on Examinations and Academic Calendar for the Universities in View of Covid-19 pandemic and subsequent Lockdown"* on 29th April, 2020 and then, on 6th July, 2020. The universities and colleges have put in their best efforts to continue their academic programmes and complete the syllabi using various ICT tools of teaching and learning since their closure from mid-March onwards.

The new academic session is going on and the universities and colleges need a customized plan, as per the local conditions where they are located, to deal with any eventuality arising due the COVID -19before resuming the activities on campuses. The top priority, while opening the institutions, should be the safety, health and well-being of the students, teachers and staff. In view of this, UGC has framed "Guidelines for Re-Opening the Universities and Colleges Post Lockdown due to COVID-19 Pandemic" **(Annexure-I)** which provide in detail the measures to be taken before re-opening of campuses. These Guidelines have also been vetted by the Ministry of Health & Family Welfare and approved by the Ministry of Home Affairs and the Ministry of Education. The Guidelines may be adopted by the institutions as per the local conditions and directives of the Government authorities.

You are requested to adopt these guidelines and take necessary steps to implement them accordingly. Further, the universities/colleges have to ensure that it is prepared in all respects to carry out the academic activities following necessary advisories / guidelines / directions issued by the Central / State Government, Ministry of Education (MoE) or UGC from time to time to prevent the spread of COVID-19.

With kind regards,

Yours sincerely,

(Rajnish Jain)

Encl : As above

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To

1. The Vice-Chancellor of All Universities

UGC GUIDELINES
FOR
RE-OPENING THE UNIVERSITIES AND COLLEGES POST LOCKDOWN DUE TO COVID-19 PANDEMIC

ज्ञान-विज्ञान विमुक्तये

UNIVERSITY GRANTS COMMISSION
BAHADUR SHAH ZAFAR MARG
NEW DELHI

NOVEMBER 2020

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Generic Preventive Measures/COVID-19 Appropriate Behaviour

The following public health measures are to be followed to reduce the risk of COVID-19 by all (faculty members, employees, students and visitors) in these places at all times:

i. **Physical distancing of at least 6 feet to be followed as far as feasible.**

ii. **Use of face covers/masks to be made mandatory.**

iii. **Frequent hand washing with soap (for at least 40-60 seconds) even when hands are not visibly dirty. Use of alcohol-based hand sanitizers (for at least 20 seconds) can be done wherever feasible.**

iv. **Respiratory etiquettes to be strictly followed. This involves strict practice of covering one's mouth and nose while coughing/sneezing with a tissue/handkerchief/flexed elbow and disposing of used tissues properly.**

v. **Self-monitoring of health by all and reporting any illness at the earliest.**

vi. **Spitting shall be strictly prohibited.**

vii. **Installation & use of Aarogya Setu App shall be advised wherever feasible.**

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1. Introduction

Universities and other educational institutions across the country have been closed since 16th March, 2020 when the Government of India announced a countrywide lockdown as one of the measures to contain the COVID-19 outbreak. The Government of India through its Ministries, *viz.*, Ministry of Home Affairs, Ministry of Health, Ministry of Ayush and Ministry of Education took several initiatives to contain the spread of the virus and issued directives and advisories to educate the people about the gravity of the infection from Coronavirus and the measures to protect from it. Specific instructions were also issued to the universities and colleges by the Ministry of Education and the UGC in this regard.

The University Grants Commission issued "Guidelines on Examinations and Academic Calendar for the Universities in View of COVID-I9 Pandemic and Subsequent Lockdown" on 29th April, 2020 and then, on 6th July, 2020. These Guidelines covered important dimensions related to examinations, academic calendar, admissions, online teaching-learning and provided flexibility for adoption by the universities. Later "UGC Guidelines on Academic Calendar for the First Year of Under-Graduate and Post-Graduate Students of the Universities for the Session 2020-21 in View of COVID-19 Pandemic" were issued on 24th September, 2020.

In order to contain the spread of COVID-19 pandemic in the educational institutions and to ensure continuity in teaching- learning process, Ministry of Education and UGC issued several directives/ advisories/ guidelines to the universities and colleges, including the one to impart online education by making the best use of e-resources. Through all the communications made by Ministry of Education and UGC, it was emphasized to continue with teaching-learning processes using online modes such as Google Classroom, Cisco Webex Meeting, You Tube streaming, OERs, SWAYAM platform (www.swayam.gov.in), Swayam Prabha (www.swayamprabha.gov.in) (available on Doordarshan (Free dish) and Dish TV), e-yantra (www.e-yantra.org), Virtual Labs (www.vlab.co.in), FOSSEE (https://fossee.in), application of spoken tutorials (www.spoken-tutorial.org), National Digital Library (NDL) (https://ndl.iitkgp.ac.in), electronic journals (https://ess.inflibnet.ac.in) etc.

The new academic session is going on and the universities and colleges need a customized plan, as per the local conditions where they are located, to deal with any eventuality arising due the COVID -19 before resuming activities on campuses. Besides above, reopening of universities and colleges will relieve the students from uncertainties regarding their career, mode of functioning of universities and colleges, including the conduct of physical classes. Also, it will relieve teaching and other staff from any uncertainty regarding the continuity of their services and salary etc.

It is felt that even after the spread of Coronavirus is contained, certain preventive measures will be required to be followed for quite some time to avoid its recurrence. This will be all the more necessary for educational institutions as large numbers of students gather on the campuses. Keeping all these factors in view, the University Grants Commission has framed Guidelines for the universities and colleges which they may follow, while reopening their campuses after lockdown and the summer vacations. These Guidelines have been vetted by the Ministry of Health & Family Welfare and approved by the Ministry of Home Affairs and the Ministry of Education. The Guidelines may be adopted by the institutions as per the local conditions and directives of the Government authorities.

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2. Re-Opening the Campuses - Issues and Challenges

Indian higher education system is very large and diverse. There are various types of universities, colleges and institutions offering programmes ranging from engineering, technical, medical, sciences, humanities and social sciences at undergraduate, postgraduate, and doctoral level, besides research and extension activities. Also, they vary in their geographical conditions, size, infrastructural capacity, types and duration of programmes etc. Therefore, the issues and challenges faced by them in reopening their campus also vary considerably.

Keeping in view the uncertainties of future due to COVID-19 pandemic and its impact on the functioning of universities and colleges, they may plan to reopen their campuses in a phased manner, ensuring safety, health and well-being of all students and staff. They should be flexible in their plan and should be ready to handle any eventuality arising due to COVID-19.

It may be difficult to comprehend all the challenges/ situations which the higher education institutions may be required to handle while they plan to reopen. However, some of the issues which they may be required to handle instantly are given below:

i. To follow the advisories/guidelines/directions issued by the Central/State Government, Ministry of Education and UGC from time to time to prevent the spread of COVID-19.

ii. Uncertainty among students regarding admissions, modes of teaching-learning, completion of courses, examinations, evaluation, declaration of results and the academic calendar, etc.

iii. Anxiety, mental health and psychological issues of students developed during the lockdown period and fear of infection after the opening of campuses.

iv. Safety measures including sanitisation of premises, thermal screening, ensuring physical distancing, face-cover/mask wearing, respiratory hygiene and hand-hygiene etc.

v. Preparation for risk assessment and subsequent actions which may be required depending upon the residential status of the institution - whether fully residential, partially residential or non-residential.

vi. Varied conditions of the pandemic in the state, area and environment where the students mainly live while making risk assessment and planning to address these challenges.

vii. Besides students, a serious risk of infection will also be faced by the faculty, counsellors and other technical and non-teaching staff also who face/ interact with the students and also among themselves regularly.

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3. Measures Required before Re-Opening of Campuses

As the universities and colleges are likely to face a number of issues at the time of reopening, they will be required to plan in advance. Some of the measures, which the institutions may have to take prior to reopening, are given below:

3.1 Pre-requisites

i. Before reopening of any campus, the Central or the concerned State Government must have declared the area safe for reopening of educational institutions. The directions, instructions, guidelines and orders issued by the Central and State Government concerned regarding safety and health in view of COVID-19 must be fully abided by the higher education institutions.

ii. However, they may develop stricter provisions and guidelines, if they feel it necessary. The universities and colleges have to make adequate arrangements to ensure the safety and health of students, faculty and staff.

iii. The universities and colleges shall be allowed to open only if they are outside the containment zones. Further, students and staff living in containment zones will not be allowed to attend the colleges. Students and staff shall also be advised not to visit areas falling within containment zones.

iv. The faculty, staff and students of the university and college should be encouraged to download 'Aarogya Setu App'.

v. The institutions should be ready with a plan for handling the inflow of students, faculty and staff in the campus, monitoring disinfecting measures, safety and health conditions, screening and detecting the infected persons, containment measures to prevent the spread of the virus in the campus, and also alternative plan(s), in case the campus needs to be closed again due to spread of the virus in campus or in the surrounding area(s) in near future.

3.2 Modalities for Physical Opening of Colleges/Higher Education Institutions

The following modalities regarding the physical opening of Colleges/Higher Education Institutions, in a graded manner, may be adopted:

The Colleges/Higher Education Institutions outside the containment zones may be opened in a graded manner after consultations with concerned State/UT Governments and subject to adherence to the guidelines/SOP for safety and health protocol prepared by UGC, duly incorporating the view/comments of the Ministry of Health & Family Welfare, as under:

i. For Centrally Funded Higher Education Institutions, the Head of the Institution should satisfy herself/himself regarding the feasibility of the opening of physical classes and decide accordingly.

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ii. For all other Higher Educational Institutions, e.g., State Universities, Private Universities etc., opening of physical classes to be done as per the decision of the respective State/UT Governments.

3.3 Measures

i. Universities and colleges may plan opening the campuses in phases, with such activities where they can easily adhere to social distancing, use of face masks and other protective measures. This may include administrative offices, research laboratories and libraries etc.

ii. Thereafter, students of all research programmes and post-graduate students in science & technology programmes may join as the number of such students is comparatively less and norms of physical distancing and preventive measures can be easily enforced.

iii. Further, final year students may also be allowed to join for academic and placement purposes, as per the decision of the head of the institution.

However, for (i), (ii) and (iii) above, it should be ensured that not more than 50% of the total students should be present at any point of time and necessary guidelines/protocols to prevent the spread of COVID-19 are observed.

iv. For the programmes, other than those mentioned in paras 3.3 (ii) and (iii) above, online/distance learning shall continue to be the preferred mode of teaching and shall be encouraged.

v. However, if required, students may visit their respective departments in a small number for consultation with the faculty members, after seeking prior appointments to avoid crowding, while maintaining physical distancing norms and other safety protocols.

vi. Some students may opt not to attend classes and prefer to study online while staying at home. Institutions may provide online study material and access to e-resources to such students for teaching-learning.

vii. Institutions should have a plan ready for such international students who could not join the programme due to international travel restrictions or visa-related issues. Online teaching-learning arrangements should also be made for them.

3.4 Safety concerns

i. The institutions should train their staff and students to assist and undertake the work related to safety and health to prevent an outbreak of the pandemic in their campuses. Non-resident students should be allowed in campuses only after thermal scanning, sanitization of their hands, wearing of face masks and gloves. Symptomatic persons should not be permitted to enter the campus and should be advised to contact the nearest hospital for clinical assessment.

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ii. Regular visits of a counsellor may be arranged so that students can talk with the counsellor about their anxiety, stress or fear.

iii. To avoid the risk of transmission, the students, faculty and staff should be screened and symptomatic ones be advised to get clinically assessed before allowing them entry into the campus.

iv. Isolation facilities for symptomatic persons and quarantine facilities for those who were in contact with the positively tested persons should be there on campus or a tie-up may be made in advance with some Government hospital or approved premises or as advised by the local authorities so that, in case of necessity, prompt action may be taken. Proper arrangement of safety, health, food, water etc. should be ensured for those in quarantine and isolation facilities.

v. For those who have tested positive, isolation facilities should be in place either on campus itself or as a prior arrangement with some nearby hospital(s) or as advised by the local authorities.

vi. Universities and colleges should prepare a policy for restricting the outside experts on campuses, study tours, field works etc., keeping in mind the COVID-19 situation.

vii. All such programmes and extracurricular activities should be avoided where physical distancing is not possible.

viii. Clean and hygienic conditions, as per safety and health advisories of the concerned government departments, are to be maintained at all places, including hostel kitchens, mess, washrooms, libraries, class rooms etc.

ix. Proper signages, symbols, posters etc. should be prominently displayed at appropriate places to remind the students, faculty and staff for maintaining physical distancing. The details of COVID-19 cell established by the institution be prominently displayed containing the emergency number, helpline number, email id and contact details of persons to be contacted in case of any emergency in the institution.

x. Ensure the norms of physical distancing, sanitization and hygienic conditions for use of common facilities, *viz.*, Auditorium, Conference/ Seminar halls, Sports, Gymnasium, Canteen, Parking Area etc.

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4. Institutional Planning

Institutional planning is the key for the successful reopening of the campuses and smooth conduct of the teaching-learning process during these difficult times. The universities and colleges will, therefore, be required to develop their plans very cautiously for reopening of their campuses and this planning has to be done well in advance. The plan may, inter-alia include the following points:

i. Institutions should prepare details of opening the campus in a phased manner with a complete roster for all departments and batches of students in different programmes. Para 3.2 (i) & (ii) of the Guidelines may be referred.

ii. The institutions must ensure appropriate sanitization and disinfection process and procedures.

iii. It should be made mandatory for the Teachers, Officers, Staff and Students to wear the Id cards.

iv. The faculty, student, staff should be screened regularly to protect and avoid infecting one another.

v. All preventive measures, preparedness and necessary support system to deal with the COVID -19 positive cases should be monitored and reported to local authorities on a day to day basis.

vi. Teaching hours in a day may be extended, as per requirements of the institution.

vii. Six-day schedule may be followed so that classes can be conducted in phases and the seating arrangement be made keeping in view the requirements of physical distancing.

viii. Universities and colleges may consider reducing the class size and break them in multiple sections to maintain physical distancing during the classes.

ix. Depending on the availability of space in class rooms or learning sites, up to 50% students may be allowed on a rotation basis to attend the classes.

x. Faculty should be trained for online teaching-learning practices.

xi. The visitors should either not be allowed at all or their entry should be drastically restricted. The conditions of the entry for visitors should be strictly laid down and displayed on the entry point(s). Complete contact details of the visitors be maintained along with the names of persons whom he/ she meets.

xii. There should be adequate isolation arrangements for those having symptoms and also for those who test positive for COVID-19 (however the two need to be kept separately), either at the level of the institution or in collaboration with the Government authorities.

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4.1 Safety Measures at Entry/ Exit Point(s)

i. Adequate arrangements of thermal scanners, sanitizers, face masks should be made available at all entry and exit points, including the reception area.

ii. Crowding must be avoided at entry/ exit points. Staggered timings of entry and exit with limited strength for different programmes should be followed.

iii. For ensuring queue management, inside and outside the premises, specific markings on the floor with a gap of 6 feet may be made and be adhered to.

iv. In case the institution has more than one gate for entry/ exit, all the gates should be used, with adequate care, to avoid crowding.

v. Monitoring of the entry and exit of the students should be done.

vi. Screening of students, faculty and staff, wearing of face covers/ mask, sanitizing of hands etc. must be ensured at all entry points.

vii. Those having symptoms of fever, cough or difficulty in breathing should not be allowed to enter.

4.2 Safety Measures during Working Hours

4.2.1 Classrooms and other Learning Sites

i. Proper sanitization at all learning sites should be ensured. Cleaning and regular disinfection (using 1% sodium hypochlorite) of frequently touched surfaces (door knobs, elevator buttons, hand rails, chairs, benches, washroom fixtures, etc.) to be made mandatory in all class rooms, laboratories, (and also) lockers, parking areas, other common areas etc. before the beginning of classes and at the end of the day. Teaching materials, computers, laptops, printers, shall be regularly disinfected with 70% alcohol swipe.

ii. Sitting places in classes, laboratories, computer labs, libraries etc. should be clearly marked, keeping in view the norms of physical distancing. At least one seat should be left vacant between two seats.

iii. Wearing face cover/ mask is a must at all times and at all places inside the campus.

4.2.2 Inside the Campus

i. Cultural activities, meeting etc. may be avoided. However, such extra-curricular and sports activities may be allowed where physical distancing is feasible and is in accordance with the Ministry of Home Affairs guidelines, issued under Disaster Management Act, 2005 from time to time

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ii. Adequate arrangements for safe drinking water should be made on the campus.

iii. Hand washing stations with facilities of liquid soap should be created so that every student can wash her/ his hands frequently.

iv. Regular and sufficient supply of face covers/ masks, heavy duty gloves, disinfecting material, sanitizer, soaps etc. to sanitation workers should be ensured.

v. Wearing of face cover/ mask by all students and staff should be ensured.

vi. Proper cleanliness should be maintained inside the entire campus.

vii. Adequate arrangements should be made for sanitizing the entire campus, including administrative and academic buildings, classrooms, laboratories, libraries, common rooms, toilets, water stations, furniture, learning material, teaching aids, sports equipment, computers etc.

viii. Physical distancing should be maintained at all places and crowding must not be allowed at any place under any circumstances.

ix. An adequate supply of water in toilets and for hand- washing should be ensured.

x. Proper sanitization of buses, other transport and official vehicles of the institution should be done.

xi. Spitting in the campus must be made a punishable offence.

xii. Dustbins must be cleaned and covered properly.

xiii. Dustbin for collection of used facemasks, personal protective equipment, hand gloves and their disposals should be ensured as per safety norms. Provision for proper disposal of used personal protection items and general waste should be followed in accordance with CPCB guidelines (available at: https://cpcb.nic.in/uploads/Projects/Bio-Medical-Waste/BMW-GUIDELINES-COVID_1.pdf).

xiv. For air-conditioning/ventilation, the guidelines of CPWD shall be followed which emphasizes that the temperature setting of all air conditioning devices should be in the range of 24-30°C, relative humidity should be in the range of 40-70%, intake of fresh air should be as much as possible and cross ventilation should be there.

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xv. Gymnasiums shall follow MoHFW guidelines (available at: https://www.mohfw.gov.in/pdf/Guidelinesonyogainstitutesandgymnasiums03082020.pdf).

xvi. Swimming Pool (wherever applicable) shall remain closed.

xvii. All employees who are at higher risk, i.e., older employees, pregnant employees and employees who have underlying medical conditions to take extra precautions. They should preferably not be exposed to any front-line work requiring direct contact with the students.

4.2.3 Hostels

i. Hostels may be opened only in such cases where it is necessary while strictly observing the safety and health preventive measures. However, the sharing of rooms may not be allowed in hostels. Symptomatic students should not be permitted to stay in the hostels under any circumstances.

ii. Since residential students may be coming from different locations, they shall remain in quarantine and self-monitor their health for a period of 14 days before being allowed to attend classes or as per the policy opted by the State Government for quarantine (even if they bring a negative test report or the university/college plan to test them on arrival).

iii. There should be no crowding in hostel areas where students live in close proximity and share common facilities and utilities. Hence, their numbers need to be limited appropriately to avoid crowding. Also, hostel students should be called in phases.

iv. Thermal Screening of all resident students should be ensured.

v. They will be referred to the nearest COVID treatment facility for clinical assessment and treatment.

vi. Density in dining halls, common rooms, playing areas should be limited, keeping in view the requirement of physical distancing.

vii. Hygiene conditions should be regularly monitored in kitchens, dining halls, bathrooms and toilets etc.

viii. Cleanliness is to be maintained in dining areas. Meals should be served in small batches, avoiding over-crowding. Take away options should be available for students and staff.

ix. It must be ensured that the meals are freshly cooked. A senior staff should monitor the same.

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x. Utensils should be properly cleaned.

xi. Wearing of face covers/ masks and proper sanitization of hands of the staff engaged for the preparation and distribution of meals should be ensured.

xii. Resident students and staff should avoid or limit visiting the markets. As far as possible, essential items may be made available within the campus.

xiii. Hostels may define the number of students in dining halls at any point in time. Mess timings may be increased to avoid overcrowding.

4.2.4 Regular Monitoring of Health

i. Every institution should regularly monitor the health of its students, faculty, and staff.

ii. Faculty, staff and students should also be sensitized on self-monitoring of their health.

iii. Faculty, Staff and students should submit self-disclosure, if any of their family members have been infected/availed treatment for COVID-19.

4.2.5 Counselling & Guidance for Mental Health

In order to reassure the students' community to avoid any kind of stress or panic in the prevailing situation *vis-a-vis* their studies, health and related issues, Universities and Colleges should take the following measures for the mental health, psychological aspects and well-being of the students:

i. All the faculty members, students and staff should be made aware of the Web page named "Manodarpan" – created on the Ministry of Education website to provide psychosocial support for Mental Health & Well-being during the COVID – 19 outbreak and beyond. The web page contains advisory, practical tips, posters, videos, do's and don'ts for Psychosocial support, FAQ and online query system. Also, a National Toll Free Helpline (8445440632) for country wide outreach to students from schools, colleges and universities has also been set up which will provide tele-counselling to address their mental health and psychosocial issues.

ii. Set up helplines for mental health, psychological concerns and well-being of students in Universities/ Colleges which need to be regularly monitored by Counsellors and other identified faculty.

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iii. Regular mentoring of students through interactions, and appeals/letters by the Universities/ Colleges to remain calm and stress-free. This can be achieved through telephones, e-mails, digital and social media platforms.

iv. Form COVID-19 help groups of students headed by hostel wardens / senior faculty who can identify friends/ classmates in need of help and provide the immediate necessary help.

v. Share the following video links of Ministry of Health & Family Welfare https://www.mohfw.gov.in/on the University/ College website and with students and faculty via e-mail, through social media like Facebook, WhatsApp and twitter etc.

Practical tips to take care of your Mental Health during the Stay In
https://www.youtube.com/watch?v=uHB3WJsLJ8s&feature=youtu.be

Minding our minds during the COVID-19
https://www.mohfw.gov.in/pdf/MindingourmindsduringCoronaeditedat.pdf

Various Health Experts on how to manage Mental health & Well Being during COVID-19 outbreak
https://www.youtube.com/watch?v=iuKhtSchp24&feature=youtu.be

Behavioural Health: Psycho-Social toll free helpline - 0804611007

4.2.6 Measures for Containment

i. As soon as a student, faculty or staff is detected COVID-19 positive, such person should be immediately isolated as per the directive/advisory of the Government. Room-mates and close contacts should be quarantined and symptomatic ones to be immediately tested.

ii. Universities and colleges should have a ready plan to provide healthcare support to those resident students and staff who test positive and are isolated.

iii. The guidelines restricting social and physical contacts and mobility in such parts of residential places in the campus, where positive cases have been found, should be strictly enforced. Measures like holding no class, not leaving the rooms for hostellers, if applicable, no take away arrangement of food from mess etc. may be enforced, depending upon the severity of the situation.

iv. Universities and colleges should also plan in advance, in case shut down are ordered by the Government due to outbreak in campus or the surrounding region.

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4.2.7 Sensitization of Students, Teachers and Staff

i. Awareness programmes regarding COVID-19 as to how the infection spreads, common symptoms, and precautions and measures required to contain its spread may be launched.

ii. Maintaining hygiene, e.g., how to wash hands, how to cough or sneeze into a tissue or elbow, avoid touching of face, eyes, mouth and nose should be regularly told to the students and the staff.

iii. The necessity of physical distancing, wearing face covers/ masks, hygiene etc. should be brought home to all.

iv. Activities to stay fit, physically and mentally, should be encouraged like doing exercises, yoga, breathing exercises, meditation, etc.

v. To improve resilience and mental health, students should be encouraged to share their feelings with friends, teachers and parents, remain positive, grateful, helpful, have focussed approach, take a break from work, eat healthy and sleep timely etc.

vi. Eating healthy food and fruits, avoiding junk food, frequently drinking warm water, adopting ways to increase immunity etc. should be encouraged.

vii. Students should be told to regularly sanitize their laptops, audio, video and other media accessories.

viii. Factual information regarding COVID-19 and consequences of infection, without making them stressed or fearful, should be disseminated.

ix. Posters and stickers should be pasted at appropriate places in the campus to create awareness about the risk of infection from Coronavirus.

x. All support and facilities should be provided to persons with disabilities (*Divyangjan*).

xi. No discrimination based on caste, creed or gender should be allowed to take place.

xii. Sharing of books, other learning material and eatables be discouraged.

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5. Role of Stakeholders

5.1 Central/ State Government(s)

i. The Government should help educational institutions to prepare an effective plan for reopening their campuses. The plan may vary from institution to institution, keeping in view the situation regarding spread of COVID-19 pandemic in a particular area/region/zone.

ii. The Governments may issue clear instructions to the universities and colleges to ensure the safety and health of all concerned. This may include instructions for wearing of face masks, physical distancing, and the number of students in a class, library, hostels, and dining halls etc.

iii. State governments, in consultations with higher education institutions, should prepare an estimate of requirement in each of their districts and zones, of disinfectants, facemasks and prepare a plan in advance for their procurement and distribution. Universities and colleges should ensure sufficient supplies of these items to their students, faculty and staff.

iv. Keeping in view the varying conditions in any state at district and zonal levels, the Government concerned should prepare a region-specific plan, instead of a uniform plan for the entire state.

v. State health departments should remain in touch with the universities and colleges and work to ensure that the campuses are well prepared to maintain the safe and healthy conditions and also to deal with the COVID-19 related unexpected situations.

vi. The Governments should keep a constant touch with the universities and colleges regarding the status of COVID-19. The government may call information regarding COVID-19 related condition in the campuses and also call meetings at appropriate intervals with the Head of institutions through video conferencing.

5.2 Head of the Institution

i. Vice- Chancellors/ Principals may get Standard Operating Procedures(SOPs) worked out in view of COVID-19 outbreak, in accordance with the Government orders and guidelines.

ii. A detailed institutional plan which may, inter alia, include sanitization, safety and health measures should be prepared and kept ready, before reopening of campus. Proper implementation of the institutional plan should be ensured and regular monitoring should be done with the help of faculty and the staff.

iii. Tie-ups may be established with nearby hospitals, health centres, NGOs, health experts for help and support in fighting COVID-19.

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iv. A plan for all academic activities, i.e., the academic calendar, teaching-learning modes, examinations, evaluation etc. should be kept ready well in advance.

v. A Task Group should be created to handle varied situations and issues related to the COVID-19 pandemic. Such Task Group may consist of senior persons from faculty and staff, students, volunteers from communities, NGOs, health organisations and Government officials etc. as the case may be.

vi. Teachers, students and staff should be made aware of all relevant plans and activities on the campus.

5.3 Teachers

i. Teachers should make themselves fully aware of institutional plans and Standard Operating Procedures.

ii. Every teacher should prepare a detailed teaching plan for the subjects taught by him/her, including time table, class size, modes of delivery, assignments, theory, practical, continuous evaluation, end- semester evaluation etc.

iii. Teachers should keep themselves updated with the latest teaching- learning methods and availability of e-resources.

iv. Teachers should make the students aware of the COVID-19 related situation, precautions and steps to be taken to stay safe and healthy.

v. Teachers should monitor and keep track of the physical and mental health of their students.

5.4 Parents

i. The parents should ensure that their children observe safety norms at home and whenever they go out.

ii. Parents should not allow their children to go out, if they are not feeling well.

iii. Parents may be advised that the 'Aarogya Setu App' has been downloaded by their children.

iv. Parents should sensitize them of healthy food habits and measures to increase immunity.

v. Parents should ask them to do exercise, yoga, meditation and breathing exercises to keep them mentally and physically fit.

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5.5. Students

i. Self-discipline is most important to contain the spread of COVID-19 pandemic through social distancing and maintaining hygienic condition.

ii. All students should wear face covers/ masks and take all preventive measures.

iii. May consider installing 'Aarogya Setu App' in the mobile.

iv. It is important for the students to be physically and mentally fit to handle any exigencies. By remaining fit, they can take care of others also.

v. The students must inculcate activities that will increase immunity-boosting mechanism which may include exercise, yoga, eating fresh fruits and healthy food (avoid fast food), sleep timely.

vi. Discrimination of fellow students in respect of whom there is a history of COVID-19 disease in the family be avoided.

vii. Give support to your friends under stress due to COVID-19 pandemic.

viii. Students should follow the guidelines, advisories and instructions issued by the Government authorities as well as by the universities and colleges regarding health and safety measures in view of COVID-19 pandemic.

6. In view of the present scenario and future uncertainties:

i. The universities may adopt and implement these Guidelines in a transparent manner by making alterations/ additions/ modifications/ amendments to deal with particular situation(s) in the best interest of students, educational institution and the entire education system, except in respect of those guidelines that are mandatory.

ii. In case of educational institutions located at places where the Government (Centre/ State) have imposed restrictions on gathering of public, the institutions may plan accordingly. In any case, the above recommendations shall not cause any restrictions on the guidelines/directions issued by the appropriate Government/ competent authority.

Notwithstanding the above Guidelines, every university/ college has to ensure that it is prepared in all respects to carry out the academic activities following necessary advisories/guidelines/directions issued by the Central/State Government, Ministry of Education (earlier referred to as MHRD) or UGC from time to time to prevent the spread of COVID-19.

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राज्यातील शाळा सुरक्षितपणे सुरु करण्यासाठी मार्गदर्शक सूचना निर्गमित करण्याबाबत.

महाराष्ट्र शासन
शालेय शिक्षण व क्रीडा विभाग
शासन परिपत्रक क्रमांक संकीर्ण २०२०/प्र.क्र.१४०/एसडी-६
मादम कामा मार्ग, हुतात्मा राजगुरू चौक,
मंत्रालय,मुंबई-४०० ०३२.
दिनांक :- १० नोव्हेंबर, २०२०

वाचा :- १) शासन परिपत्रक क्र.संकीर्ण २०२०/प्र.क्र.८६/एसडी-६; दिनांक १५ जुन, २०२०.

२) शासन परिपत्रक क्र.संकीर्ण २०२०/प्र.क्र.८६/एसडी-६; दिनांक २४ जुन, २०२०.

३) शासन परिपत्रक क्र.संकीर्ण २०२०/प्र.क्र.८६/एसडी-६; दिनांक २२ जूलै, २०२०.

४) शासन परिपत्रक क्र.संकीर्ण २०२०/प्र.क्र.८६/एसडी-६; दिनांक १७ ऑगस्ट, २०२०.

५) शासन परिपत्रक क्र.संकीर्ण २०२०/प्र.क्र.८६/एसडी-६; दिनांक २९ ऑक्टोबर, २०२०.

६) केंद्र शासनाच्या दि.०८.०९.२०२० रोजीच्या मार्गदर्शक सूचना.

पार्श्वभूमी :-

या विभागाच्या संदर्भ क्र. ०१ येथील शासन परिपत्रकानुसार राज्यात कोव्हीड- १९ च्या प्रादूर्भावामुळे उद्भवलेल्या परिस्थितीत राज्यातील शाळा प्रत्यक्षात सुरु करणे शक्य नसल्याने दि.१५ जुन, २०२० पासून शैक्षणिक वर्ष सुरु करुन स्थानिक परिस्थितीनुसार प्रत्यक्ष शाळा टप्प्या-टप्प्याने सुरु करण्याबाबत निर्णय घेण्याचे अधिकार संबंधित जिल्हाधिकारी, महानगरपालिका आयुक्त यांच्या सहाय्याने संबंधित शाळा व्यवस्थापन समिती यांना प्रदान करण्यात आले आहेत. त्याचबरोबर शाळांमध्ये शिक्षकांच्या उपस्थितीबाबत दिनांक २४ जून, २०२० रोजीच्या परीपत्रकान्वये मार्गदर्शक सूचना निर्गमित करण्यात आल्या आहेत. कोरोनाच्या प्रादुर्भावामुळे विद्यार्थ्यांचे शिक्षण थांबू नये यासाठी वरील संदर्भ क्रमांक ०३ येथील परिपत्रकान्वये पूर्व प्राथमिक ते इयत्ता १२ वी पर्यंतच्या विद्यार्थ्यासाठी ऑनलाईन शिक्षणाचा कालावधी व शिक्षणाच्या स्वरूपाबाबत मार्गदर्शक सूचना निर्गमित करण्यात आल्या होत्या.

राज्यात Mission Begin Again अंतर्गत राज्यातील सर्व आस्थापना टप्प्या - टप्प्याने सुरु करण्यासाठी मार्गदर्शक सूचना (SOP) निर्गमित करण्यात येत आहेत. त्याच धर्तीवर शैक्षणिक वर्ष दि.१५ जून, २०२० पासून सुरू झाले असले तरी प्रत्यक्ष प्रथम: इयत्ता ९ वी ते इयत्ता १२ वी साठी शाळा सुरु करण्याबाबतचा प्रस्ताव शासनाच्या विचाराधीन होता.

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परिपत्रकः-

१. राज्यातील इयत्ता ९ वी ते इयत्ता १२ वी चे वर्ग दिनांक २३ नोव्हेंबर, २०२० पासून सुरू करण्यास मान्यता देण्यात येत आहे. तसेच इयत्ता ९ वी ते १२ वी चे वसतिगृह व आश्रमशाळा विशेषत: आंतरराष्ट्रीय विद्यार्थ्यांचे वसतिगृह सुरु करण्यास मान्यता देण्यात येत आहे. शाळा सुरु करण्यापूर्वी व शाळा सुरु झाल्यानंतर आरोग्य, स्वच्छत्ता व इतर सुरक्षाविषयक उपाययोजनांबाबतच्या मार्गदर्शक सूचना सोबत जोडलेल्या परिशिष्ट-अ व परिशिष्ट-ब मध्ये देण्यात आल्या आहेत.

२. कोविड-१९ बाबत केंद्र व राज्य शासनाच्या सूचनांचे पालन करण्यात यावे. विद्यार्थ्यांच्या उपस्थितीबाबत पालकांकडून आवश्यक ती लेखी संमती घेण्यात यावी.

३. या विभागाच्या संदर्भाधीन दिनांक १५ जुन, २०२० व दिनांक २९ ऑक्टोबर,२०२० रोजीच्या परिपत्रकातील सुचनांचे पालन करण्यात यावे.

४. सदर शासन परिपत्रक महाराष्ट्र शासनाच्या www.maharashtra.gov.in या संकेत स्थळावर उपलब्ध करण्यात आले असून त्याचा संगणक संकेतांक २०२०१११०१६४२४८३६२१ असा आहे. सदर परिपत्रक डिजिटल स्वाक्षरीने साक्षांकित करुन निर्गमित करण्यात येत आहे.

महाराष्ट्राचे राज्यपाल यांच्या आदेशानुसार व नावाने.

RAJENDRA SHANKARRAO PAWAR

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Date: 2020.11.10 16:52:07 +05'30'

(राजेंद्र पवार)

उप सचिव, महाराष्ट्र शासन

प्रति,

१) मा. राज्यपालांचे सचिव, राजभवन, मुंबई.
२) मा. मुख्यमंत्री, महाराष्ट्र राज्य यांचे प्रधान सचिव.
३) मा. उप मुख्यमंत्री, महाराष्ट्र राज्य यांचे सचिव.
४) मा. अध्यक्ष व मा. उपाध्यक्ष, विधान परिषद, विधान भवन, मुंबई.
५) मा. सभापती व मा. उपसभापती, विधान सभा, विधान भवन, मुंबई.
६) मा. मंत्री, (शालेय शिक्षण) यांचे खाजगी सचिव.
७) मा. राज्यमंत्री, (शालेय शिक्षण) यांचे खाजगी सचिव.
८) आयुक्त (शिक्षण), महाराष्ट्र राज्य, पुणे.
९) राज्य प्रकल्प संचालक, महाराष्ट्र प्राथमिक शिक्षण परिषद, मुंबई.

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१०) संचालक, राज्य शैक्षणिक संशोधन व प्रशिक्षण परिषद, महाराष्ट्र, पुणे.
११) शिक्षण संचालक (माध्यमिक व उच्च माध्यमिक), शिक्षण संचालनालय, महाराष्ट्र राज्य, पुणे.
१२) शिक्षण संचालक (प्राथमिक), शिक्षण संचालनालय, महाराष्ट्र राज्य, पुणे.
१३) प्रभारी संचालक, बालभारती,
१४) सर्व विभागीय शिक्षण उपसंचालक.
१५) मुख्य कार्यकारी अधिकारी, जिल्हा परिषद, सर्व
१६) शिक्षणाधिकारी प्राथमिक/माध्यमिक (सर्व)
१७) प्राचार्य, जिल्हा शिक्षण व प्रशिक्षण संस्था (सर्व).
१८) प्रशासन अधिकारी, महानगरपालिका (सर्व)
१९) निवडनस्ती(कार्या.एसडी-६)

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शासन परिपत्रक क्रमांक संकीर्ण २०२०/प्र.क्र.१४०/एसडी-६; दि. १० नोव्हेंबर, २०२० सोबतचे

परिशिष्ट-अ

शाळा सुरु करण्यापूर्वी आरोग्य, स्वच्छत्ता व इतर सुरक्षाविषयक उपाययोजनांबाबतच्या मार्गदर्शक सूचना

१) शाळेत स्वच्छता व निर्जंतुकीकरण विषयक सुविधा सुनिश्चित करणे:-

- शाळेत हात धुण्यासाठी सुविधा उपलब्ध करुन देणे.
- Thermometer, Thermal Scanner/Gun, Pulse Oxymeter, जंतूनाशक, साबण, पाणी इत्यादी आवश्यक वस्तुंची उपलब्धता तसेच शाळेची स्वच्छता व निर्जंतुकीकरण स्थानिक प्रशासनाने (ग्रामीण व शहरी) सुनिश्चित करावी. वापरण्यात येणारे thermometer हे calibrated contactless infrared digital thermometer असावे.
- शाळा वाहतुक सुविधांचे निर्जंतुकीकरण सुनिश्चित करावे.
- एखाद्या शाळेत क्वारंटाईन सेंटर असल्यास स्थानिक प्रशासनाने ते इतर ठिकाणी स्थानापन्न करावे. स्थानिक प्रशासनाने अशा शाळेचे हस्तांतरण शाळा व्यवस्थापनाकडे करण्यापूर्वी त्याचे पूर्णत: निर्जंतुकीकरण करावे.
- क्वारंटाईन सेंटर इतर ठिकाणी नेणे शक्य नसल्यास शाळा खुल्या परिसरात किंवा इतर ठिकाणी भरवावी.

२) शिक्षकांची कोविड-१९ बाबतची चाचणी:-

- शाळेतील सर्व शिक्षक व शिक्षकेत्तर कर्मचाऱ्यांनी दि. १७ ते २२ नोव्हेंबर, २०२० या दरम्यान कोविड-१९ साठीची RTPCR चाचणी करणे बंधनकारक असेल.शिक्षक व शिक्षकेत्तर कर्मचाऱ्यांनी सदर चाचणीचे प्रयोगशाळेने दिलेले प्रमाणपत्र शाळा व्यवस्थापनास सादर करावे. सदर प्रमाणपत्राची शाळा व्यवस्थापनाने पडताळणी करावी.
- ज्या शिक्षक व शिक्षकेत्तर कर्मचाऱ्यांचे चाचणी अहवाल positive असतील त्यांनी डॉक्टरांनी प्रमाणित केल्यानंतरच शाळेत उपस्थित राहवे.
- ज्या शिक्षक व शिक्षकेत्तर कर्मचाऱ्यांचे चाचणी अहवाल negative आहेत त्यांनी शाळेत उपस्थित राहताना कोविड-१९ संदर्भातील सर्व मार्गदर्शक सूचनांचे पालन करणे आवश्यक राहील. तसेच कोविड-१९ बाबतची लक्षणे आढळल्यास त्यांनी त्वरीत चाचणी करावी.

३) कार्यगट गठीत करणे:- सर्व भागधारकांचे त्यांच्या विशिष्ट जबाबदाऱ्यांसहित विविध कार्यगट गठित करावे जसे आपत्कालीन गट, स्वच्छता पर्यवेक्षण गट, इत्यादी. शिक्षक, विद्यार्थी व इतर भागधारक या गटांचे सभासद म्हणून सहकार्याने काम करतील.

४) बैठक व्यवस्था :-

- वर्गखोली तसेच स्टाफ रुम मधील बैठक व्यवस्था शारीरिक अंतर (Physical Distancing) च्या नियमांनुसार असावी.
- वर्गामध्ये एका बाकावर एक विद्यार्थी याप्रमाणे नावानिशी बैठक व्यवस्था असावी.

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५) शारीरिक अंतर (Physical distancing) च्या नियमांच्या अंमलबजावणीकरिता विविध चिन्हे व खुणा प्रदर्शित करणे :-

- शाळेत दर्शनी भागावर Physical distancing, मास्कचा वापर इत्यादी संदर्भात मार्गदर्शक सूचना असणारे posters/stickers प्रदर्शित करावे.
- थूंकण्यावरील बंदीची काटेकोरपणे अंमलबजावणी करावी.
- शाळेच्या अंतर्गत व बाह्य परिसरामध्ये रांगेत उभे राहण्याकरिता किमान सहा फूट इतके शारीरिक अंतर (Physical distance) राखले जाईल याकरिता विशिष्ट चिन्हे जसे चौकोन, वर्तुळ इत्यादींचा वापर गर्दी होणारी ठिकाणे जसे पाणी पिण्याच्या सुविधा , हात धुण्याच्या सुविधा, स्वच्छतागृहे इत्यादी ठिकाणी करण्यात यावा.
- शारीरिक अंतर (Physical distance) राखण्यासाठी येण्या व जाण्याचे वेगवेगळे मार्ग निश्चित करणाऱ्या बाणांच्या खुणा दर्शविण्यात याव्यात.

६) शाळेतील कार्यक्रम आयोजनावरील निर्बंध :- परिपाठ, स्नेह संम्मेलन, क्रीडा व इतर तत्सम कार्यक्रम ज्यामुळे अधिक गर्दी होऊ शकते अशा कार्यक्रमांच्या आयोजनावर कडक निर्बंध असेल. शिक्षक- पालक बैठका ऑनलाईन घ्याव्यात.

७) पालकांची संमती:-

- विद्यार्थ्यांनी शाळेत उपस्थित राहण्यापूर्वी त्यांच्या पालकांची लेखी संमती आवश्यक असेल. शाळा व्यवस्थापन समितीने पालकांशी वरील विषयी चर्चा करावी.
- आजारी असलेल्या मुलांना पालकांनी शाळेत पाठवू नये.
- विद्यार्थ्यांना त्यांच्या पालकांच्या संमतीने घरी राहुन देखील अभ्यास करता येईल. अशा विद्यार्थ्यांच्या शैक्षणिक प्रगतीच्या मुल्यांकनाकरिता विशिष्ठ योजना राज्य शैक्षणिक संशोधन व प्रशिक्षण परिषद, महाराष्ट्र यांनी तयार करण्यात यावी.

८) विद्यार्थी, पालक, शिक्षक व समाजातील सदस्य यांना कोविड-१९ च्या संदर्भातील आव्हाने व त्याबाबतची त्यांची भूमिका याबाबत जागरुक करणे:-

- शाळा सुरु करण्यापूर्वीच विद्यार्थी, पालक, शिक्षक व समाजातील सदस्य यांच्यात जागरुकता निर्माण करण्याकरिता शाळा व्यवस्थापन समितीने पत्रके, पत्रे व सार्वजनिक घोषणांच्या माध्यमांचा वापर करुन पुढील मुद्द्यांबाबत कार्यवाही करावी:-
  i. वैयक्तिक स्वच्छता व नेहमी वापरण्यात येणारे पृष्ठभागांचे निर्जंतुकीकरण इत्यादीबाबत काय करावे किंवा काय करु नये याबाबतच्या सुचना.
  ii. शारीरिक अंतर पालनाचे (Physical distancing) चे महत्व.
  iii. कोविड-१९ च्या प्रतिबंधासाठी आवश्यक स्वच्छताविषयक सवयी.
  iv. कोविड-१९ बाबतच्या गैरसमजुती.
  v. कोविड-१९ ची लक्षणे आढळल्यास शाळेत जाणे टाळणे.
- केंद्रीय आरोग्य व कुटुंब कल्याण मंत्रालय यांच्या सुचनांनुसार, सर्वच कर्मचारी जे (कोविड-१९च्या अनुषंगाने) अधिक उच्च धोक्याच्या पातळीमध्ये आहेत, जसे वयोवृद्ध कर्मचारी, दिव्यांग कर्मचारी, गरोदर महिला कर्मचारी व जे कर्मचारी औषध-उपचार

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घेत आहेत, त्यांनी अधिक काळजी घ्यावी. त्यांनी शक्यतो विद्यार्थ्यांच्या प्रत्यक्ष संपर्कात येऊ नये.

९) शाळेतील उपस्थिती व वैद्यकीय रजा याबाबतच्या धोरणांमध्ये सुधारणा करणे:-

- विद्यार्थ्यांची शाळेतील उपस्थिती बंधनकारक नसून पूर्णतः पालकांच्या संमती वर अवलंबून असेल.
- पूर्ण उपस्थितीबाबतची पारितोषिके बंद करण्यात यावी.
- शाळेतील कर्मचाऱ्यांना त्यांना नेमून दिलेल्या कामाव्यतिरिक्त आणिबाणीच्या प्रसंगी इतर कर्मचाऱ्यांची कामे करण्यासाठी प्रशिक्षित करावे.

१०) माहितीचे एकत्रिकरण :-

- विद्यार्थी, पालक व शिक्षकांकडून पुढील माहिती स्वयंघोषित करुन घ्यावी:-
  त्यांची आरोग्याची स्थिती, आरोग्य सेतू ॲप वरील तपासणी अहवाल, तसेच अलीकडील आंतरराष्ट्रीय व आंतरराज्य प्रवासाची माहिती.
- स्थानिक प्रशासनाकडून राज्य व जिल्हा helpline तसेच जवळील कोविड सेंटर बद्दलची माहिती.

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शासन परिपत्रक क्रमांक संकीर्ण २०२०/प्र.क्र.१४०/एसडी-६; दि. १० नोव्हेंबर, २०२० सोबतचे

परिशिष्ट-ब

शाळा सुरू झाल्यानंतर आरोग्य, स्वच्छता व इतर सुरक्षाविषयक उपायोजनाबाबतच्या मार्गदर्शक सूचना:-

१) शाळेत व शाळेच्या परिसरात स्वच्छता व आरोग्यदायी परीस्थिती सतत राखणे:-

- शाळेचा परीसर दररोज नियमितपणे स्वच्छ केला जावा.
- शाळेतील वर्गखोल्या व वर्गखोल्यांच्या बाहेरील नेहमी स्पर्श होणारा पृष्ठभाग जसे लॅचेस, अध्ययन-अध्यापन साहित्य, डेस्क, टॅबलेट्स, खुर्च्या इ.वारंवार स्वच्छता व निर्जंतुकीकरण करण्यात यावे.
- शाळेतील व शाळेच्या परीसरातील सर्व कचरा नियमितपणे विल्हेवाट लावण्यात यावी.
- हात धुण्याच्या सर्व ठिकाणी साबण, हॅन्डवॉश व स्वच्छ पाण्याची व्यवस्था करण्यात यावी. शक्य झाल्यास अल्कोहोल मिश्रित हॅन्ड सॅनिटायझर सर्व महत्त्वाच्या ठिकाणी ठेवण्यात यावा.
- शाळेतील स्वच्छतागृहाचे वारंवार निर्जंतुकीकरण करण्यात यावे.
- सुरक्षित व स्वच्छ पिण्याचे पाणी विद्यार्थ्यांना उपलब्ध होईल याची दक्षता घेण्यात यावी. विद्यार्थ्यांनी सोबत वॉटर बॉटल आणण्यासाठी त्यांना प्रोत्साहीत करावे.
- शाळा सुरू होण्यापूर्वी व शाळा सुटल्यानंतर शाळा व वर्ग खोल्यांचे नियमितपणे निर्जंतुकीकरण करण्यात यावे.
- **वरील सर्व स्वच्छतेमध्ये विद्यार्थ्यांना सहभागी करून घेऊ नये.**

२) शाळेत विद्यार्थ्यांना सुरक्षित ठेवणे :-

- सर्व विद्यार्थी, शिक्षक व कर्मचारी वर्ग यांनी शाळेत येताना व शाळेत असेपर्यंत तसेच, शाळेत कोणतीही कृती करताना मास्कचा वापर करावा. तसेच, विद्यार्थी मास्कची अदलाबदल करणार नाहीत याची दक्षता घ्यावी.
- विद्यार्थी, शिक्षक व कर्मचारी वर्गाची दररोज साधी आरोग्य चाचणी जसे Thermal Screening घेण्यात यावी.
- विद्यार्थी, शिक्षक व शाळेतील कर्मचाऱ्यांव्यतिरिक्त इतर कोणत्याही व्यक्तिला शाळेचा आवारात व शाळेच्या प्रवेशद्वारावर प्रवेश देऊ नये.
- काही विद्यार्थी सूचनांचे पालन करत नसल्यास ते त्यांच्या पालकांच्या निदर्शनांस आणावे.

३) विद्यार्थ्यांच्या सुरक्षित प्रवासाची सोय करणे :-

- कोविड-१९ संसर्ग टाळण्यासाठी पालकांनी शक्यतो विद्यार्थ्यांना स्वत: त्यांच्या वैयक्तिक वाहनाने शाळेत सोडावे.

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- शाळा वाहतुकीच्या वाहनाचे दिवसातून किमान दोनवेळा (विद्यार्थी वाहनात येतांना व वाहनातुन उतरल्यानंतर) निर्जंतुकीकरण करण्यात यावे.
- वाहनचालक व वाहक यांनी स्वत: तसेच विद्यार्थी शारीरिक अंतराचे पालन करतील, याची दक्षता घ्यावी. किमान ६ फुट अंतर राखण्यात यावे.
- बस / कार यांच्या खिडक्यांना पडदे नसावेत. सामान्यत: खिडक्या उघडया ठेवण्यात याव्यात.
- वातानुकूलित बसेस मध्ये २४ ते ३० डिग्री सेल्सिअस तापमान राखावे.
- शक्य असल्यास वाहनात हॅन्ड सॅनिटायझर ठेवण्यात यावे.

४) शिक्षक व शिक्षकेत्तर कर्मचारी व विद्यार्थी यांचा सुरक्षित प्रवेश व गमन (Entry and Exit) :-

- विद्यार्थ्यांनी शाळेने निश्चित केल्याप्रमाणे शाळेत उपस्थित रहावे. शाळेत वावरताना त्यांनी किमान ६ फुट अंतराचे पालन करावे.
- विद्यार्थी व कर्मचारी वर्गांचे आगमन व गमन (Entry and Exit) यांचे वेळापत्रक अशा प्रकारे निश्चित करावे, ज्यामुळे शाळेत होणारी गर्दी टाळली जाईल.
- विविध इयत्तांचे वर्ग सुरु होण्याच्या व संपण्याच्या वेळामध्ये किमान १० मिनिटांचे अंतर असावे.
- शाळेच्या परिसरात चार पेक्षा जास्त विद्यार्थी एकत्र जमणार नाहीत, ही मुख्यध्यापकांची जबाबदारी असेल.
- शाळेस एकापेक्षा अधिक प्रवेशद्वार असल्यास शाळेत येताना व जातांना सर्व प्रवेशद्वरांचा वापर करावा.
- शाळेच्या बाहेरील वाहनांची गर्दी टाळण्यासाठी वाहतुक पोलिस किंवा समाजातील स्वयंसेवकाची मदत घ्यावी.
- शाळेच्या प्रमुखांनी आजारी असल्याच्या कारणामुळे कर्मचाऱ्यास रजेवर राहण्याची परवानगी देण्यात यावी.
- कुटुंबातील एखादा सदस्य किंवा घराजवळील एखादी व्यक्ती ताप / खोकला यांनी आजारी असल्यास आपल्या मुलांना शाळेत न पाठविण्याबाबत पालकांना अवगत करावे.

५) वर्गखोल्या व इतर ठिकाणी सुरक्षिततेच्या मानकांची खात्री करावी :-

- शाळेत प्रात्यक्षिक कार्ये (Practicals) घेताना विद्यार्थ्यांचे लहान लहान गट करुन घेण्यात यावेत म्हणजे शारीरिक अंतराचे (Physical Distancing) पालन करणे सुलभ होईल.
- विद्यार्थ्यांनी कोणतेही साहित्य जसे पुस्तके, वही, पेन, पेन्सिल, वॉटर बॉटल, इत्यादींची अदलाबदल करू नये.
- ज्या विद्यार्थ्यांनी ऑनलाईन शिक्षणाचा पर्याय स्वीकारला असेल त्यांच्यासाठी ऑनलाईन गृहपाठाची व्यवस्था करावी.

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- शक्य असल्यास वर्ग खुल्या परिसरात घ्यावेत. शक्य नसल्यास वर्गखोल्यांची दारे व खिडक्या उघड्या ठेवण्यात याव्यात. कोणत्याही परिस्थितीत बंद खोल्यांमध्ये वर्ग भरवण्यात येऊ नये.
- उदवाहन (lift) व व्हरांड्यांतील उपस्थित व्यक्तीच्या संख्येवर निर्बंध आणावेत.
- स्वच्छतागृहामध्ये अधिक गर्दी होऊ नये, याची दक्षता घ्यावी.
- विद्यार्थ्यांनी प्रत्येक कृती केल्यानंतर हात स्वच्छ धुवावेत.
- वातानुकुलित वर्ग खोल्यांचे तापमान २४ ते ३० डिग्री सेंटिग्रेड ठेवावे.

६) अभ्यासवर्गांची व्यवस्था:-

- शाळा व्यवस्थापन समितीने शाळेतील गर्दी टाळण्यासाठी एक दिवसआड विद्यार्थ्यांना शाळेत बोलवावे (५० टक्के विद्यार्थी एका दिवशी व उर्वरित ५० टक्के विद्यार्थी दुसऱ्या दिवशी). अशाप्रकारे एकाच दिवशी ५० टक्के विद्यार्थी ऑनलाईन वर्गात व उर्वरित ५० टक्के विद्यार्थी प्रत्यक्ष वर्गात उपस्थित राहून शिक्षण घेतील.
- इयत्ता निहाय ऑनलाईन व ऑफलाईन वर्गांचे वेळापत्रक, शिक्षकांची जबाबदारी निश्चिती याची जबाबदारी संबंधित शाळेच्या मुख्याध्यापकांची असेल. शक्यतो मुख्य विषय (Core Subjects) जसे गणित, विज्ञान व इंग्रजी शाळेत शिकवावेत व उर्वरित विषय शासनाने वेळोवेळी निर्गमित केलेल्या सूचनांप्रमाणे ऑनलाईन पद्धतीने शिकवावेत.
- प्रत्यक्ष वर्गांचा कालावधी ३ ते ४ तासांपेक्षा अधिक असू नये. प्रत्यक्ष वर्गांकरिता जेवणाची सुट्टी नसेल.

७) कोविड-१९ संशयित आढळल्यास करावयाची कार्यवाही :-

- शिक्षक, कर्मचारी वर्ग किंवा विद्यार्थी संशयित आढळल्यास त्यास एका खोलीत इतरांपासून वेगळे ठेवावे.
- तात्काळ रुग्णालय किंवा जिल्हा व राज्य संपर्क क्रमांकास (Helpline) कळवावे. त्यानंतर सर्व परिसराचे व त्या जागेचे निर्जंतुकीकरण करावे. राज्य व जिल्हा helpline क्रमांक तसेच जवळील कोविड सेंटर बद्दलची माहिती मुख्याध्यापक व प्रत्येक शिक्षकांच्या मोबाईलमध्ये असावी.

८) मानसिक व सामाजिक कल्याण :-

- चिंता आणि निराशा यासारख्या मानसिक आरोग्याच्या समस्या नोंदविणाऱ्या किंवा सांगणाऱ्या विद्यार्थी आणि शिक्षकांसाठी नियमित समुपदेशन केले जाईल, याची सुनिश्चिती करावी.
- शिक्षकांनी, शालेय समुपदेशकांनी आणि शालेय आरोग्य कर्मचाऱ्यांनी विद्यार्थ्यांचे व आपले मानसिक स्थिरता निश्चित करण्यासाठी एकत्रितपणे कार्य करावे.

उपरोक्त सूचनांव्यतिरिक्त स्थानिक परिस्थितीनुसार शाळांनी आवश्यक मार्गदर्शक सुचना निश्चित कराव्यात.

XXXXXXXXXXXXXXX

IQAC In-charge
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SAVITRIBAI PHULE PUNE UNIVERSITY

(Formerly University of Pune)

Circular No. 323 / 2020

Important Notification

Regarding Commencement and Conclusion of I[st] & IInd terms for the Academic Year 2020-2021

It is hereby informed that the provision of the circular 284 & 285 of 2020 dated 15 October 2020 regarding the dates of Commencement and Conclusion of the I[st] and IInd terms for the Academic Year 2020-2021 is applicable for all Under Graduate/ Post Graduate courses under all Faculties for whom the admissions were NOT made under the Common Entrance Examination (CET) conducted by the Government or SPPU. The same is applicable for all such Under Graduate / Post Graduate courses for which the teaching commenced in August or September 2020.

The date of Commencement and Conclusion of the academic session of the first year of all those courses whose admission was made/ will be made under Common Entrance Examination (CET) conducted by the Government or SPPU will be announced shortly.

3/12/2020.

Deputy Registrar
(P.G. Admissions)

Ganeshkhind, Pune
Ref. No. PGS/2275
Date: 03/12/2020

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The Director, Examinations & Evaluation, Savitribai Phule Pune University, Pune.
The Heads of all University Departments.
The Principals of all Affiliated Colleges.
The Directors of all Recognized Institutes.
The Heads of all the Administrative Sections of the University Office.
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Asstt. Registrar, office of the Hon. Pro-Vice-Chancellor, Savitribai Phule Pune University

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Savitribai Phule Pune University
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Circular No. 284 of 2020

Important Notification

Dates of Commencement and Conclusion of Ist & IInd terms for the Academic Year 2020-2021
For affiliated Colleges/recognised Institutes Only.

It is hereby informed that, the dates of Commencement and conclusion of the Ist and IInd term of for the Academic Year 2020-2021 University Courses, under various faculties shall be as under :

Dates of Commencement and conclusion of First Year of academic session 2020-21 will be declared later.

Sr. No.	Name of the Courses and Faculties	2020-2021			
		First Term		Second Term	
		Commencement	Conclusion	Commencement	Conclusion
1	**Science & Technology**				
	Science	15/06/2020	05/12/2020	01/01/2021	15/05/2021
	Engineering : SE,TE,BE	15/06/2020	05/12/2020	01/01/2021	15/05/2021
	Engineering :ME - II Year. MCA- II & III Year	01/07/2020	24/12/2020	19/01/2021	31/05/2021
	B.Architecture II, III, IV & V Year.	15/06/2020	05/12/2020	01/01/2021	15/05/2021
	M. Architecture II Year.	01/07/2020	24/12/2020	19/01/2021	31/05/2021
	B. Pharmacy	15/06/2020	05/12/2020	01/01/2021	15/05/2021
	M. Pharmacy	01/07/2020	24/12/2020	19/01/2021	31/05/2021
2	**Commerce & Management**				
	Commerce	15/06/2020	05/12/2020	01/01/2021	15/05/2021
	Management	01/07/2020	24/12/2020	19/01/2021	31/05/2021
3	**Humanities**				
	Arts & Fine Arts	15/06/2020	05/12/2020	01/01/2021	15/05/2021
	Mental Moral and Social Sciences				
	Law : UG & PG (II/III/IV/V Year.)	01/07/2020	24/12/2020	19/01/2021	31/05/2021
4	**Inter-disciplinary Studies**				
	Education II Year (B.Ed., M.Ed.)	01/07/2020	24/12/2020	19/01/2021	31/05/2021
	Physical Education II Year. (B.P.Ed., M.P.Ed.)	01/07/2020	24/12/2020	19/01/2021	31/05/2021

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NOTE

1. **In view of prevailing COVID-19 situation in the Country, Colleges / Institutes shall required to follow the guidelines / instructions issued by the Government of Maharashtra time to time.**

2. **In case, the Principal of the affiliated Colleges require to give additional holiday in exceptional circumstances, he may do by the compensating the same by keeping the College working on Sunday.**

3. **The Term & holidays for the Post-Graduate courses coundected in the Colleges/Institutes will be as per the University Department.**

16/10/2020.
Deputy Registrar
(P.G.Admission)

Ganeshkhind, Pune-07
Ref. No. PGS/ 1817
Date: 15/10/2020

Copy to: for Information and necessary action

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The Director, Examinations & Evaluation, Savitribai Phule Pune University, Pune.
The Heads of all University Departments.
The Principals of all Affiliated Colleges.
The Directors of all Recognized Institutes.
The Heads of all the Administrative Sections of the University Office.
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Asstt. Registrar, office of the Hon. Pro-Vice-Chancellor, Savitribai Phule Pune University

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Karjule Harya

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Savitribai Phule Pune University
(Formerly University of Pune)

Circular No. 285 of 2020

Important Notification

Dates of Commencement and Conclusion of Ist & IInd terms for the Academic Year 2020-2021
U. G. / P. G. Courses for University Departments

It is hereby informed that, the dates of Commencement and Conclusion of Ist & IInd terms for the Academic Year 2020-2021 University Courses, under various faculties shall be as under :

Dates of Commencement and conclusion of First Year of academic session 2020-21 will be declared later.

Sr. No.	Name of the Courses and Faculties	2020 - 2021			
		First Term		Second Term	
		Commencement	Conclusion	Commencement	Conclusion
1	**Science & Technology**	01/07/2020	05/12/2020	01/01/2021	15/05/2021
	Science				
	Technology				
2	**Commerce & Management**				
	Commerce				
	Management				
3	**Humanities**				
	Arts & Fine Arts				
	Mental Moral and Social Sciences				
	Law				
4	**Inter- disciplinary Studies**				
	Education				
	Physical Education				

NOTE

1. **In view of prevailing COVID-19 situation in the Country, Colleges / Institutes shall required to follow the guidelines / instructions issued by the Government of Maharashtra time to time.**
2. **In case, the Head of Departments require to give additional holiday in exceptional circumstances, he may do by the compensating the same by keeping Department working on Sunday.**

16/10/2020

Deputy Registrar
(P.G.Admission)

Ganeshkhind, Pune-07
Ref. No. PGS/ 1818
Date: 15/10/2020

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The Director, Examinations & Evaluation, SPPU, Pune
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Savitribai Phule Pune University

(Formerly University of Pune)

Circular No. 26 of 2021

Important Notification

Dates of Commencement and Conclusion of Ist Year of PG Courses for the Academic Year 2020-2021 For Affiliated Colleges/Recognised Institutes

It is hereby informed that, the dates of Commencement and Conclusion of the Ist Year of PG Courses for the Academic Year 2020-2021 University Courses, under various faculties shall be as under :

Sr. No.	Name of the Courses and Faculties	2020-2021			
		First Term		Second Term	
		Commencement	Conclusion	Commencement	Conclusion
1.	**Science & Technology:**	28/01/2021	22/05/2021	15/06/2021	01/10/2021
	Science (Ist Yr)				
2.	**Commerce & Management:**				
	Commerce (Ist Yr)				
3.	**Humanities:**				
	Arts (Ist Yr)				
	Mental Moral and Social Sciences (Ist Yr)				
4.	**Inter-disciplinary Studies:**				
	M.A.Education (Ist Yr)				
	B.Sc. B.Ed. Integrated (Ist Yrs)				
	M. Lib. I. Sc. (Ist Yr)				
	Fine Arts/ Performing Arts (Ist Yr)				
	M. A. Journalism and Mass Communication (Ist Yr)				

NOTE

1. **All Programmes shall be conducted in Online Mode until further notice.**
2. **In view of prevailing COVID-19 situation in the Country, Colleges / Institutes shall required to follow the guidelines / instructions issued by the Government of Maharashtra from time to time.**

25/1/2021

Deputy Registrar
(P.G.Admission)

Ganeshkhind, Pune-07
Ref. No. PGS/ 524
Date: 25/01/2021

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Savitribai Phule Pune University

(Formerly University of Pune)

Circular No. 27 of 2021

Important Notification

Dates of Commencement and Conclusion of Ist Year of PG Courses for the Academic Year 2020-2021 For University Departments

It is hereby informed that, the dates of Commencement and Conclusion of Ist Year of PG Courses for the Academic Year 2020-2021 University Courses, under various faculties shall be as under :

Sr. No	Name of the Courses and Faculties	2020 - 2021			
		First Term		Second Term	
		Commencement	Conclusion	Commencement	Conclusion
1	**Science & Technology**	28/01/2021	22/05/2021	15/06/2021	01/10/2021
	Science (Ist Yr)				
	M.Tech (Ist Yr)				
2	**Commerce & Management**				
	Commerce (Ist Yr)				
	MBA Executive (Ist Yr)				
	MBA (Pharma BT) (Ist Yr)				
3	**Humanities**				
	Arts (Ist Yr)				
	Mental Moral and Social Sciences (Ist Yr)				
	LL.M. (Ist Yr)				
4	**Inter- disciplinary Studies**				
	M.A.Education (Ist Yr)				
	B.Sc. B.Ed. Integrated (Ist Yrs)				
	M. Lib. I. Sc. (Ist Yr)				
	Fine Arts/ Performing Arts (Ist Yr)				
	M. A. Journalism and Mass Communication (Ist Yr)				
	M.A Yoga (Ist Yr)				

NOTE

1. **All Programmes shall be conducted in Online Mode until further notice.**
2. **In view of prevailing COVID-19 situation in the Country, Colleges / Institutes shall required to follow the guidelines / instructions issued by the Government of Maharashtra from time to time.**

20/1/2021

Deputy Registrar
(P.G.Admission)

Ganeshkhind, Pune-07
Ref. No. PGS/ 525
Date: 25/01/2021

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The Heads of all University Departments, Savitribai Phule Pune University, Pune.
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The Director, Examinations & Evaluation, Savitribai Phule Pune University, Pune.

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Tal. Pamer, Dist. Ahmednagar
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Desktop/Circular Academic Calender 2020-21 (Ist Yr)

Savitribai Phule Pune University

(Formerly University of Pune)

Circular No. 234 of 2019

Dates of Commencement and Conclusion of terms for the Academic Year 2019-2020 For Enginerring (F.E. Fresh & MCA - I) & B. Architecture - I Year.

It is hereby informed that, the dates of commencement and conclusion of the First and Second term of University Courses, under F.E Fresh, B.Architechture- I, MCA - I Year for the academic year 2019-2020 for affiliated colleges shall be as under :

Sr. No.	Name of the Courses and Faculties	2019-20			
		First Term		Second Term	
		Commencement	Conclusion	Commencement	Conclusion
	Science & Technology				
1	F.E. Fresh & MCA - I Year	13/08/2019	17/12/2019	07/01/2020	09/05/2020
2	B.Architecture - I Year	01/08/2019	30/11/2019	16/12/2019	11/04/2020

Teaching will begin on the date of commencement of the terms and immediately after the finalization of admissions; however, term would stand concluded on the dates mentioned above.

NOTE

1. In case, the Principal of the Affiliated Colleges require to give additional holiday in exceptional circumstances, he/she may do so by compensating the same by keeping the College working on Sunday.

2. The Term & holidays for the Post-graduate courses conducted in the Colleges/Institutes will be as per the University Department.

3. Details of Various Activities for Engineering and Architecture Courses for the Academic Year 2019-20 attached Separately.

Deputy Registrar
(P.G.Admission)

Ganeshkhind, Pune-07
Ref. No. PGS/3151
Date: 05/09/2019

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The Deans of Faculties.
The Registrar, Savitribai Phule Pune University, Pune.
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The Principals of all Affiliated Colleges.
The Director of all Recognized Institutes.
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Savitribai Phule Pune University

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ACADEMIC CALENDAR FOR VARIOUS ACTIVITES FOR ENGINERRING (F.E. Fresh & MCA - I) & B. ARCHITECTURE - I YEAR COURSES FOR THE YEAR 2019-20

F.E. Fresh & MCA - I Year

Sr. No	Courses	Details of Activites	Date
		First term	
01	F.E. Fresh & MCA - I Year	Commencement of Teaching	13/08/2019
		Conclusion of Teaching	17/12/2019
		Commencement of (End -Semester) Examination	23/12/2019
		Second term	
01	F.E. Fresh & MCA - I Year	Commencement of Teaching	07/01/2020
		Conclusion of Teaching	09/05/2020
		Commencement of (End -Semester) Examination	18/05/2020

B. Architecture - I Year

Sr. No	Courses	Details of Activites	Date
		First term	
01	B.Architecture - I Year.	Commencement of Teaching	01/08/2019
		Conclusion of Teaching	30/11/2019
		Sessional/Viva Voce Examination	02/12/2019 to 05/12/2019
		Theory Examination	11/12/2019 onwards
		Second term	
02	B.Architecture - I Year.	Commencement of Teaching	16/12/2019
		Conclusion of Teaching	11/04/2020
		Sessional/Viva Voce Examination	13/04/2020 to 18/04/2020
		Theory Examination	27/04/2020 onwards

Ganeshkhind, Pune-07
Ref. No. PGS/3151
Date: 05/09/2019

Deputy Registrar
(P.G. Admission)

Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering
Tal. Parner, Dist. Ahmednagar
Karjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner, Dist. A'Nagar

Savitribai Phule Pune University

(Formerly University of Pune)

Circular No.103 of 2020

Important Notification

Revised Dates of Conclusion of II terms for the Academic Year 2019-2020 and Commencement for the Academic Year 2020-2021
For affiliated Colleges/recognised Institutes Only.

In view of prevailing COVID-19 situation in the Country, it is hereby informed that, the revised dates of conclusion of the Second term of 2019-2020 and Commencement for the Academic Year 2020-2021 University Courses, under various faculties shall be as under :

Sr. No.	Name of the Courses and Faculties	II Term 2019-20 Conclusion	I Term 2020-2021 Commencement
1	**Science & Technology**		
	Science	05/06/2020	15/06/2020
	Engineering : SE,TE,BE & MCA-II, & III Year	05/06/2020	15/06/2020
	Engineering :ME - II Year.	05/06/2020	01/07/2020
	B.Architecture II, III, IV & V Year.	05/06/2020	15/06/2020
	M. Architecture II Year.	05/06/2020	01/07/2020
	B. Pharmacy	05/06/2020	15/06/2020
	M. Pharmacy	05/06/2020	01/07/2020
2	**Commerce & Management**		
	Commerce	05/06/2020	15/06/2020
	Management	05/06/2020	01/07/2020
3	**Humanities**		
	Arts & Fine Arts	05/06/2020	15/06/2020
	Mental Moral and Social Sciences		
	Law : UG & PG (II, III, IV & V Year.)	05/06/2020	01/07/2020
4	**Inter-disciplinary Studies**		
	Education II Year.(B.Ed., M.Ed.)	05/06/2020	01/07/2020
	Physical Education II Year.(B.P.Ed., M.P.Ed.)	05/06/2020	01/07/2020

IQAC In-charge
Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering Tal. Parner, Dist. Ahmednagar Kanjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Parner, Dist. A'Nagar

NOTE

1. **Colleges / Institutes in the red zone / contenment zone shall required to follow the guidelines / instructions issued by the Government of Maharashtra.**

2. **Details of conclusion of Ist term and Commencement and conclusion of IInd term of academic year 2020-2021 will be declared later.**

2/6/2020.

Deputy Registrar
(P.G.Admission)

Ganeshkhind, Pune-07
Ref. No. PGS/ 779
Date: 02/06/2020

Copy to: for Information and necessary action

The Members of the Management Council.
The Deans of Faculties.
The Registrar, Savitribai Phule Pune University, Pune.
The Director, Examinations & Evaluation, Savitribai Phule Pune University, Pune.
The Heads of all University Departments.
The Principals of all Affiliated Colleges.
The Directors of all Recognized Institutes.
The Heads of all the Administrative Sections of the University Office.
Asstt. Registrar, office of the Hon. Vice-Chancellor, Savitribai Phule Pune University
Asstt. Registrar, office of the Hon. Pro-Vice-Chancellor, Savitribai Phule Pune University

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering * Karjule Harya * Tal. Parner, Dist. Ahmednagar

PRINCIPAL
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner, Dist. A'Nagar

Savitribai Phule Pune University

(Formerly University of Pune)

Circular No. 104 of 2020

Important Notification

Revised Dates of Conclusion of II terms for the Academic Year 2019-2020 and Commencement for the Academic Year 2020-2021

For University Departments

In view of prevailing COVID-19 situation in the Country, it is hereby informed that, the revised dates of conclusion of the Second term of 2019-2020 and Commencement for the Academic Year 2020-2021 University Courses, under various faculties shall be as under :

Sr. No.	Name of the Courses and Faculties	II Term 2019-20 Conclusion	I Term 2020-2021 Commencement
1	**Science & Technology**	05/06/2020	01/07/2020
	Science		
	Technology		
2	**Commerce & Management**		
	Commerce		
	Management		
3	**Humanities**		
	Arts & Fine Arts		
	Mental Moral and Social Sciences		
	Law		
4	**Inter- disciplinary Studies**		
	Education		
	Physical Education		

NOTE

1. **Colleges / Institutes in the red zone / contenment zone shall required to follow the guidelines / instructions issued by the Government of Maharashtra.**
2. **Details of conclusion of Ist term and Commencement and conclusion of IInd term of academic year 2020-2021 will be declared later.**

2/6/2020.

Deputy Registrar
(P.G.Admission)

Ganeshkhind, Pune-07
Ref. No. PGS/ 780
Date: 02/06/2020

Copy to: for Information and necessary action

The Members of the Management Council.
The Deans of Faculties.
The Registrar, Savitribai Phule Pune University, Pune.
The Director, Examinations & Evaluation, SPPU, Pune
The Heads of all University Departments.
The Principals of all Affiliated Colleges.
The Directors of all Recognized Institutes.
The Heads of all the Administrative Sections of the University Office.
Asstt. Registrar, office of the Hon. Vice-Chancellor SPPU, Pune
Asstt. Registrar, office of the Hon. Pro-Vice-Chancellor, SPPU, Pune.

IQAC In-charge

PRINCIPAL
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner, Dist. A'Nagar

Savitribai Phule Pune University

(Formerly University of Pune)

Circular No. 77 of 2019

Dates of Commencement and Conclusion of terms for the Academic Year 2019-2020
For affiliated Colleges/recognised Institutes Only.

It is hereby informed that, the dates of commencement and conclusion of the First and Second term of University Courses, under various faculties, for the academic year 2019-2020 shall be as under :

Sr. No.	Name of the Courses and Faculties	2019-2020			
		First Term		Second Term	
		Commencement	Conclusion	Commencement	Conclusion
1	**Science & Technology**				
	Science	15/06/2019	24/10/2019	20/11/2019	30/04/2020
	Engineering : SE,TE,BE & MCA- II, & III Year	15/06/2019	05/11/2019	16/12/2019	27/04/2020
	Engineering :ME - II Year.	01/07/2019	09/11/2019	13/01/2020	23/05/2020
	B.Architecture II, III, IV & V Year.	15/06/2019	16/10/2019	09/12/2019	04/04/2020
	M. Architecture II Year.	08/07/2019	02/11/2019	09/12/2019	04/04/2020
	B. Pharmacy	15/06/2019	24/10/2019	20/11/2019	30/04/2020
	M. Pharmacy	01/07/2019	07/12/2019	01/01/2020	15/05/2020
2	**Commerce & Management**				
	Commerce	15/06/2019	24/10/2019	20/11/2019	30/04/2020
	Management	01/07/2019	07/12/2019	01/01/2020	15/05/2020
3	**Humanities**				
	Arts & Fine Arts	15/06/2019	24/10/2019	20/11/2019	30/04/2020
	Mental Moral and Social Sciences				
	Law : UG & PG (II/III/IV/V Year.)	01/07/2019	07/12/2019	17/01/2020	31/05/2020
4	**Inter-disciplinary Studies**				
	Education II Year. (B.Ed., M.Ed.)	01/07/2019	07/12/2019	01/01/2020	15/05/2020
	Physical Education II Year. (B.P.Ed., M.P.Ed.)	01/07/2019	07/12/2019	01/01/2020	15/05/2020

Teaching will begin on the date of commencement of the terms and immediately after the finalization of admissions; however, term would stand concluded on the dates mentioned above.

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar 414304

Rajiv Gandhi College of Engineering
Tal. Parner, Dist. Ahmednagar
Karjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner, Dist. A'Nagar

NOTE

1. In case, the Principal/Director of the affiliated Colleges/recognised Institutes require to give additional holiday in exceptional circumstances, he/she may do so by compensating the same by keeping the College working on Sunday.

2. The Term & holidays for the Post-graduate courses conducted in the Colleges/Institutes will be as per the University Department.

3. Details of Various Activities for Engineering and Architecture Courses for the Academic Year 2019-20 attached Separately.

26/4/2019

Deputy Registrar
(P.G.Admission)

Ganeshkhind, Pune-07
Ref. No. PGS/1355
Date: 26/04/2019

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The Members of the Management Council.
The Deans of Faculties.
The Registrar, Savitribai Phule Pune University, Pune.
The Director, Examinations & Evaluation, Savitribai Phule Pune University, Pune.
The Heads of all University Departments.
The Principals of all Affiliated Colleges.
The Directors of all Recognized Institutes.
The Heads of all the Administrative Sections of the University Office.
Asstt. Registrar, office of the Hon. Vice-Chancellor, Savitribai Phule Pune University
Asstt. Registrar, office of the Hon. Pro-Vice-Chancellor, Savitribai Phule Pune University

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering
Tal. Parner, Dist. Ahmednagar
Karjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner, Dist. A'Nagar

Savitribai Phule Pune University
(Formerly University of Pune)

ACADEMIC CALENDAR FOR VARIOUS ACTIVITES FOR ENGINERRING COURSES FOR THE YEAR 2019-20

FIRST TERM

Sr. No	Courses	Details of Activites	Date
01	S.E./T.E./ B.E. & MCA – II / III Year	Commencement of Teaching	15/06/2019
		Conclusion of Teaching	16/10/2019
		Practical/Oral /Project Stage-I Examination	18/10/2019 To 05/11/2019
		Theory Examination	14/11/2019 To 07/12/2019
02	M. E. II Year	Commencement of Teaching	01/07/2019
		Conclusion of Teaching	02/11/2019
		Practical Examination	04/11/2019 To 09/11/2019
		Theory Examination	09/12/2019 To 24/12/2019

SECOND TERM

Sr. No	Courses	Details of Activites	Date
01	F.E./S.E./T.E./ B.E. & MCA – I/II / III Year	Commencement of Teaching	16/12/2019
		Conclusion of Teaching	11/04/2020
		Practical/Oral /Project/ Examination	13/04/2020 To 27/04/2020
		Theory Examination	05/05/2020 To 30/05/2019
02	M. E. I & II Year	Commencement of Teaching	13/01/2020
		Conclusion of Teaching	14/05/2020
		Practical Examination	18/05/2020 To 23/05/2020
		Theory Examination	27/05/2020 To 12/06/2020

Project stage – II examniations will start three days later from conclusion of theory examination.

Deputy Registrar
(P.G. Admission)

Ganeshkhind, Pune-07
Ref. No. PGS/ 1355
Date : 25/04/2019

Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering
Tal. Parner, Dist. Ahmednagar
Karjule Harya

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Karjule Harya, Tal. Parner, Dist. A'Nagar

Savitribai Phule Pune University

(Formerly University of Pune)

Academic Calendar for Various Activities for II, III , IV & V Year **B. Arch. For the Year 2019-20.**

Sr. No.	Details of Activities	Dates	
		I[st] TERM	IInd TERM
1	Commencement of teaching	15/6/2019	09/12/2019
2	Conclusion of teaching	16/10/2019	04/04/2020
3	Sessional Exam/Viva Voce	All subjects except Practical training 18/10/2019 to 26 /10/2019 Practical Training Viva 16/12/2019 to 21/12/2019	All subjects except Arch. Project final year 06/04/2020 to 18/4/2020 Final year Arch. Project Viva 19/04/2020 to 26/4/2020
4	Preparation Time (Theory)	27/10/19 to 31/10/19	20/4/2020 to 25 /4/2020
5	Theory Examination	1/11/2019 onwards	27/4/2020 onwards

Academic Calendar for Various Activities for **IInd year M.Arch. For the Year 2019-20.**

Sr. No.	Details of Activities	Dates	
		I[st] TERM	IInd TERM
1	Commencement of teaching	08/07/2019	09/12/2019
2	Conclusion of teaching	02/11/2019	04/04/2020
3	Sessional Exam /Viva Voce	04/11/2019 to 07/11/2019	06/04/2020 to 11/04/2020 4th Semester M.Arch. Project Exam between 27th to 30th April 2020.
4	Preparation Time (Theory)	08/11/2019 to 12/11/2019	13/04/2020 to 18/04/2020
5	Theory Examination	13/11/2019 to 20/11/2019	20/04/2020 to 25/04/2020

As per the syllabus a training of 40 working days is to be competed by the student in the time between the 2nd and the 3rd Semester M.Arch.

Deputy Registrar
(P.G. Admission)

Ganeshkhind, Pune-07
Ref. No. PGS/ 1355
Date: 26/04/2019

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering
Tal. Parner, Dist. Ahmednagar
Karjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner, Dist. A'Nagar

Savitribai Phule Pune University
(Formerly University of Pune)

Circular No. 78 of 2019

Dates of Commencement and Conclusion of terms for the Academic Year 2019- 2020.
Post Graduate Courses for University Departments

It is hereby informed that, the dates of commencement and conclusion of the First and Second term of University Courses, under various faculties, for the Academic Year 2019-2020 shall be as under :

Sr. No.	Name of the Courses and Faculties	2019 - 2020			
		First Term		Second Term	
		Commencement	Conclusion	Commencement	Conclusion
1	**Science & Technology**	01/07/2019	07/12/2019	01/01/2020	15/05/2020
	Science				
	Technology				
2	**Commerce & Management**				
	Commerce				
	Management				
3	**Humanities**				
	Arts & Fine Arts				
	Mental Moral and Social Sciences				
	Law				
4	**Inter- disciplinary Studies**				
	Education				
	Physical Education				

Teaching will begin on the date of commencement of the terms. The teaching shall begin immediately after the finalization of admissions, however, term would stand concluded, on the dates mentioned above.

NOTE

1. In case, the Head of the Department require to give additional holiday in exceptional circumstances, he may do so by compensating the same by keeping Department/College working on Sundays.
2. The Term & Holidays for the Post-Graduate courses conducted in the Colleges/Institutes will be as per the University Departments.

26/4/2019

Deputy Registrar
(P.G. Admission)

Ganeshkhind, Pune-07
Ref. No. PGS/ 1356
Date: 26/04/2019

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The Members of the Management Council.
The Deans of Faculties.
The Registrar, Savitribai Phule Pune University, Pune.
The Director, Examinations & Evaluation, Savitribai Phule Pune University, Pune.
The Heads of all University Departments.
The Principals of all Affiliated Colleges.
The Directors of all Recognized Institutes.
The Heads of all the Administrative Sections of the University Office.
Asstt. Registrar, office of the Hon. Vice-Chancellor, Savitribai Phule Pune University
Asstt. Registrar, office of the Hon. Pro-Vice-Chancellor, Savitribai Phule Pune University

Dist. Ahmednagar 414304

Rajiv Gandhi College of Engineering
Karjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner, Dist. A'Nagar

Savitribai Phule Pune University

(Formerly University of Pune)

Circular No. 67 of 2018

Dates of Commencement and Conclusion of terms for the Academic Year 2018-2019
For Affiliated Colleges Only.

It is hereby informed that, the dates of commencement and conclusion of the First and Second term of University Courses, under various faculties, for the academic year 2018-2019 shall be as under :

Sr. No.	Name of the Courses and Faculties	2018-19			
		First Term		Second Term	
		Commencement	Conclusion	Commencement	Conclusion
1	**Science & Technology**				
	Science	15/06/2018	03/11/2018	29/11/2018	30/04/2019
	Engineering : SE,TE,BE & MCA- II, & III Year	15/06/2018	03/11/2018	17/12/2018	25/04/2019
	Engineering :ME - II Year.	02/07/2018	03/11/2018	15/01/2019	20/05/2019
	B.Architecture II, III, IV & V Year.	15/06/2018	03/11/2018	29/11/2018	30/04/2019
	M. Architecture II Year.	02/07/2018	03/11/2018	17/12/2018	30/04/2019
	B. Pharmacy	15/06/2018	03/11/2018	29/11/2018	30/04/2019
	M. Pharmacy	02/07/2018	03/11/2018	29/11/2018	15/05/2019
2	**Commerce & Management**				
	Commerce	15/06/2018	03/11/2018	29/11/2018	30/04/2019
	Management	02/07/2018	03/11/2018	29/11/2018	15/05/2019
3	**Humanities**				
	Arts & Fine Arts	15/06/2018	03/11/2018	29/11/2018	30/04/2019
	Mental Moral and Social Sciences				
	Law : UG & PG (II/III/IV/V Year.)	15/06/2018	03/11/2018	29/11/2018	30/04/2019
4	**Inter-disciplinary Studies**				
	Education II Year.	02/07/2018	03/11/2018	29/11/2018	15/05/2019
	Physical Education II Year.				

Teaching will begin on the date of commencement of the terms and immediately after the finalization of admissions; however, term would stand concluded on the dates mentioned above.

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering
Tal. Parner, Dist. Ahmednagar
Karjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner, Dist. A'Naga

NOTE

1. In case, the Principal of the Affiliated Colleges require to give additional holiday in exceptional circumstances, he/she may do so by compensating the same by keeping the College working on Sunday.

2. The Term & holidays for the Post-graduate courses conducted in the Colleges/Institutes will be as per the University Department.

3. Details of Various Activities for Engineering and Architecture Courses for the Academic Year 2018-19 attached Separately.

23/4/2018

Deputy Registrar
(P.G.Admission)

Ganeshkhind, Pune-07
Ref. No. PGS/ 1333
Date: 23/04/2018

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The Members of the Management Council.
The Deans of Faculties.
The Registrar, Savitribai Phule Pune University, Pune.
The Director, Examinations & Evaluation, Savitribai Phule Pune University, Pune.
The Heads of all University Departments.
The Principals of all Affiliated Colleges.
The Directors of all Recognized Institutes.
The Heads of all the Administrative Sections of the University Office.
Asstt. Registrar, office of the Hon. Vice-Chancellor, Savitribai Phule Pune University
Asstt. Registrar, office of the Hon. Pro-Vice-Chancellor, Savitribai Phule Pune University

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering
Tal. Parner, Dist. Ahmednagar
Karjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner, Dist. A'Nagar

Savitribai Phule Pune University
(Formerly University of Pune)

ACADEMIC CALENDAR FOR VARIOUS ACTIVITES FOR ENGINERRING COURSES FOR THE YEAR 2018-19

FIRST TERM

Sr. No	Courses	Details of Activites	Date
01	S.E./T.E./ B.E. & MCA – II / III Year	Commencement of Teaching	15/06/2018
		Conclusion of Teaching	17/10/2018
		Practical/Oral /Project Examination	20/10/2018 to 03/11/2018
		Theory Examination	14/11/2018 to 08/12/2018
02	M. E. II Year	Commencement of Teaching	02/07/2018
		Conclusion of Teaching	24/10/2018
		Practical Examination	26/10/2018 to 03/11/2018
		Theory Examination	12/12/2018 to 28/12/2018

SECOND TERM

Sr. No	Courses	Details of Activites	Date
01	F.E./S.E./T.E./ B.E. & MCA – I/II / III Year	Commencement of Teaching	17/12/2018
		Conclusion of Teaching	09/04/2019
		Practical/Oral /Project Examination	11/04/2019 to 25/04/2019
		Theory Examination	02/05/2019 to 27/05/2019
02	M. E. I & II Year	Commencement of Teaching	15/01/2019
		Conclusion of Teaching	11/05/2019
		Practical Examination	13/05/2019 to 20/05/2019
		Theory Examination	23/05/2019 to 08/06/2019

(*) Project examniations will start three days later from conclusion of theory examination.

Deputy Registrar
(P.G. Admission)

Ganeshkhind, Pune-07
Ref. No. PGS/1345
Date: 23/04/2018

Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering
Tal. Parner, Dist. Ahmednagar
Kanjule Harya

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Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Parner, Dist. A'Nagar

Savitribai Phule Pune University

(Formerly University of Pune)

Circular No. 145 of 2018

Dates of Commencement and Conclusion of terms for the Academic Year 2018-2019
For Enginerring (F.E. Fresh & MCA - I) & B. Architecture - I Year.

It is hereby informed that, the dates of commencement and conclusion of the First and Second term of University Courses, under F.E Fresh, B.Architechture- I, MCA - I Year for the academic year 2018-2019 for affiliated colleges shall be as under :

Sr. No.	Name of the Courses and Faculties	2018-19			
		First Term		Second Term	
		Commencement	Conclusion	Commencement	Conclusion
	Science & Technology				
1	F.E. Fresh & MCA - I Year	01/08/2018	30/11/2018	01/01/2019	23/04/2019
2	B.Architecture - I Year	06/08/2018	30/11/2018	17/12/2018	13/04/2019

Teaching will begin on the date of commencement of the terms and immediately after the finalization of admissions; however, term would stand concluded on the dates mentioned above.

NOTE

1. In case, the Principal of the Affiliated Colleges require to give additional holiday in exceptional circumstances, he/she may do so by compensating the same by keeping the College working on Sunday.

2. The Term & holidays for the Post-graduate courses conducted in the Colleges/Institutes will be as per the University Department.

3. Details of Various Activities for Engineering and Architecture Courses for the Academic Year 2018-19 attached Separately.

16/8/2018

Deputy Registrar
(P.G.Admission)

Ganeshkhind, Pune-07
Ref. No. PGS/ 3112
Date: 16/08/2018

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The Members of the Management Council.
The Deans of Faculties.
The Registrar, Savitribai Phule Pune University, Pune.
The Director, Examinations & Evaluation, Savitribai Phule Pune University, Pune.
The Heads of all University Departments.
The Principals of all Affiliated Colleges.
The Directors of all Recognized Institutes.
The Heads of all the Administrative Sections of the University Office.
Asstt. Registrar, office of the Hon. Vice-Chancellor, Savitribai Phule Pune University
Asstt. Registrar, office of the Hon. Pro-Vice-Chancellor, Savitribai Phule Pune University

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering
Tal. Parner Dist. Ahmednagar
Karjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner, Dist. A'Nagar

Savitribai Phule Pune University

(Formerly University of Pune)

ACADEMIC CALENDAR FOR VARIOUS ACTIVITES FOR ENGINERRING (F.E. Fresh & MCA - I) & B. ARCHITECTURE - I YEAR COURSES FOR THE YEAR 2018-19

F.E. Fresh & MCA - I Year

Sr. No	Courses	Details of Activites	Date
		First term	
01	F.E. Fresh & MCA - I Year	Commencement of Teaching	01/08/2018
		Conclusion of Teaching	30/11/2018
		Commencement of (End -Semester) Examination	11/12/2018
		Second term	
01	F.E. Fresh & MCA - I Year	Commencement of Teaching	01/01/2019
		Conclusion of Teaching	23/04/2019
		Commencement of (End -Semester) Examination	02/05/2019

B. Architecture - I Year

Sr. No	Courses	Details of Activites	Date
		First term	
01	B.Architecture - I Year.	Commencement of Teaching	06/08/2018
		Conclusion of Teaching	30/11/2018
		Sessional/Viva Voce Examination	04/12/2018 to 06/12/2018
		Theory Examination	11/12/2018 onwards
		Second term	
02	B.Architecture - I Year.	Commencement of Teaching	17/12/2018
		Conclusion of Teaching	13/04/2019
		Sessional/Viva Voce Examination	16/04/2019 to 18/04/2019
		Theory Examination	24/04/2019 onwards

Deputy Registrar
(P.G. Admission)

Ganeshkhind, Pune-07
Ref. No. PGS/ 3112
Date: 16/08/2018

IQAC In-charge
Rajiv Gandhi College of Engineering
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Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering
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Kanjule Harya

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Savitribai Phule Pune University
(Formerly University of Pune)

Circular No. 68 of 2018

Dates of Commencement and Conclusion of terms for the Academic Year 2018- 2019.
Post Graduate Courses for University Departments

It is hereby informed that, the dates of commencement and conclusion of the First and Second term of University Courses, under various faculties, for the Academic Year 2018-2019 shall be as under :

Sr. No.	Name of the Courses and Faculties	2018 - 2019			
		First Term		Second Term	
		Commencement	Conclusion	Commencement	Conclusion
1	**Science & Technology**	02/07/2018	08/12/2018	01/01/2019	15/05/2019
	Science				
	Technology				
2	**Commerce & Management**				
	Commerce				
	Management				
3	**Humanities**				
	Arts & Fine Arts				
	Mental Moral and Social Sciences				
	Law				
4	**Inter- disciplinary Studies**				
	Education				
	Physical Education				

Teaching will begin on the date of commencement of the terms. The teaching shall begin immediately after the finalization of admissions, however, term would stand concluded, on the dates mentioned above.

NOTE

1. In case, the Head of the Department require to give additional holiday in exceptional circumstances, he may do so by compensating the same by keeping Department/College working on Sundays.
2. The Term & Holidays for the Post-Graduate courses conducted in the Colleges/Institutes will be as per the University Departments.

23/4/2018

Deputy Registrar
(P.G. Admission)

Ganeshkhind, Pune-07
Ref. No. PGS/1334
Date: 23/04/2018

Copy to: for Information and necessary action

The Members of the Management Council.
The Deans of Faculties.
The Registrar, Savitribai Phule Pune University, Pune.
The Director, Examinations & Evaluation, Savitribai Phule Pune University, Pune.
The Heads of all University Departments.
The Principals of all Affiliated Colleges.
The Directors of all Recognized Institutes.
The Heads of all the Administrative Sections of the University Office.
Asstt. Registrar, office of the Hon. Vice-Chancellor, Savitribai Phule Pune University
Asstt. Registrar, office of the Hon. Pro-Vice-Chancellor, Savitribai Phule Pune University

Tal. Parner, Dist. Ahmednagar

PRINCIPAL

सावित्रीबाई फुले पुणे विद्यापीठ

(पूर्वीचे पुणे विद्यापीठ)

परिपत्रक क्र.३८५./२०२१

विषय : सन २०२२ च्या सार्वजनिक सुट्टया...

महाराष्ट्र शासन, अधिसूचना क्रमांक सार्वसु. ११२१/प्र.क्र.९७/कार्या-२९.-परक्राम्य संलेख अधिनियम, १८८१ (सन १८८१ चा अधिनियम २६) कलम २५ करीता जे अधिकार भारत सरकारच्या गृह मंत्रालयाची अधिसूचना क्रमांक: ३९/१/६८, जेयूडीएल/तीन, दिनांक ८ मे, १९६८ अन्वये महाराष्ट्र शासनास सोपविण्यात आल्या आहेत, त्या अधिकारांचा वापर करुन, महाराष्ट्र शासनाने दिनांक ०२ डिसेंबर, २०२१ च्या अधिसूचनेद्वारे महाराष्ट्र राज्यात शासकीय कार्यालयांना सन २०२२ साठी खाली नमूद केलेल्या सार्वजनिक सुट्टया जाहीर केल्या आहेत. सदर सार्वजनिक सुट्टया सावित्रीबाई फुले पुणे विद्यापीठ शिक्षकेतर सेवकांना व सावित्रीबाई फुले पुणे विद्यापीठाशी संलग्नित महाविद्यालये/मान्यताप्राप्त संस्थेतील शिक्षकेतर सेवकांना जाहीर केलेल्या आहेत.

अ.क्र.	सुट्टीचा दिवस	इंग्रजी तारीख	वार
१.	प्रजासत्ताक दिन	२६ जानेवारी, २०२२	बुधवार
२.	महाशिवरात्री	१ मार्च, २०२२	मंगळवार
३.	होळी (दुसरा दिवस)	१८ मार्च, २०२२	शुक्रवार
४.	महावीर जयंती	१४ एप्रिल, २०२२	गुरुवार
५.	डॉ.बाबासाहेब आंबेडकर जयंती	१४ एप्रिल, २०२२	गुरुवार
६.	गुड फ्रायडे	१५ एप्रिल, २०२२	शुक्रवार
७.	रमझान ईद (ईद-उल-फितर) (शव्वल-१)	३ मे, २०२२	मंगळवार
८.	बुध्द पौर्णिमा	१६ मे, २०२२	सोमवार
९.	मोहरम	९ ऑगस्ट, २०२२	मंगळवार
१०.	स्वातंत्र्य दिन	१५ ऑगस्ट, २०२२	सोमवार
११.	पारशी नववर्ष दिन (शहेनशाही)	१६ ऑगस्ट, २०२२	मंगळवार
१२.	गणेश चतुर्थी	३१ ऑगस्ट, २०२२	बुधवार
१३.	दसरा	५ ऑक्टोबर, २०२२	बुधवार
१४.	दिवाळी अमावस्या (लक्ष्मीपूजन)	२४ ऑक्टोबर, २०२२	सोमवार
१५.	दिवाळी (बलिप्रतिपदा)	२६ ऑक्टोबर, २०२२	बुधवार
१६.	गुरुनानक जयंती	८ नोव्हेंबर, २०२२	मंगळवार

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Rajiv Gandhi College of Engineering
Kanjule Harya Tal. Pamer Dist. A'Naga

Note

In case, the Head/ Principal/Director of the Affiliated Colleges / Recognized Institutes requires to give additional holiday in exceptional circumstances, he may do so by compensating the same by keeping the Department/ College/Institute working on Sunday.

Deputy Registrar
(P.G. Admissions)

Ganeshkhind, Pune
Ref. No. PGS/ 711
Date: 02/02/2023

Copy to : for information & necessary action
1. The Members of the Management Council.
2. The Registrar, Savitribai Phule Pune University, Pune.
3. The Deans of Faculties.
4. The Director, Board of Examinations & Evaluation, Savitribai Phule Pune University, Pune.
5. The Heads of all University Departments.
6. The Principals of all Affiliated Colleges.
7. The Directors of all Recognized Institutes.
8. The Heads of all the Administrative Sections of the University Office.
9. Statistical Analylist, office of the Hon. Vice-Chancellor, Savitribai Phule Pune University
10. Asstt. Registrar, office of the Hon. Pro-Vice-Chancellor, Savitribai Phule Pune University

IQAC In-charge
Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Pamer
Dist. Ahmednagar 414304

Rajiv Gandhi College of Engineering
Tal. Pamer, Dist. Ahmednagar
Kanjule Harya

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PRINCIPAL
Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Pamer, Dist. A'Nagar

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Savitribai Phule Pune University
(Formerly University of Pune)

Circular No. 25 of 2023

It is hereby informed to all concerned that the University has declared following days as Public Holidays for the **University Departments/Affiliated Colleges and Recognized Institutes** for teaching faculty for the calendar year 2023.

Public Holidays

Sr. No.	Day of Holiday	Date	Day
1.	Republic Day	26-01-2023	Thursday
2.	Mahashivratri	18-02-2023	Saturday
3.	Chhatrapati Shivaji Maharaj Jayanti	19-02-2023	Sunday
4.	Holi (Second Day)	07-03-2023	Tuesday
5.	Gudhi Padwa	22-03-2023	Wednesday
6.	Ram Navami	30-03-2023	Thursday
7.	Mahavir Jayanti	04-04-2023	Tuesday
8.	Good Friday	07-04-2023	Friday
9.	Dr. Babasaheb Ambedkar Jayanti	14-04-2023	Friday
10.	Ramzan-Id (Id-Ul-Fitr) (Shawal-1)	22-04-2023	Saturday
11.	Maharashtra Din	01-05-2023	Monday
12.	Buddha Pournima	05-05-2023	Friday
13.	Bakri Id (Id-Uz-Zuha)	28-06-2023	Wednesday
14.	Moharum	29-07-2023	Saturday
15.	Independence Day	15-08-2023	Tuesday
16.	Parsi New Year (Shahenshahi)	16-08-2023	Wednesday
17.	Ganesh Chaturthi	19-09-2023	Tuesday
18.	Id-E-Milad	28-09-2023	Thursday
19.	Mahatma Gandhi Jayanti	02-10-2023	Monday
20.	Dasara	24-10-2023	Tuesday
21.	Diwali Amavasya (Laxmi Pujan)	12-11-2023	Sunday
22.	Diwali (Bali Pratipada)	14-11-2023	Tuesday
23.	Bhaubeej	15-11-2023	Wednesday
24.	Guru Nanak Jayanti	27-11-2023	Monday
25.	Christmas	25-12-2023	Monday

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Dist. Ahmednagar 414304

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Tal. Parner, Dist. Ahmednagar
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PRINCIPAL
Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Parner, Dist. A'Naga

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त्याचप्रमाणे राज्य शासकीय, निमशासकीय कार्यालये, संघटना, शासनाचे उपक्रम तसेच राज्य शासनाच्या प्रशासकीय विभागांच्या नियंत्रणाखालील कार्यालये यांच्यासाठी खालील अतिरिक्त सुट्टी जाहीर केलेली आहे.

अ. क्र.	सुट्टीचा दिवस	इंग्रजी तारीख	वार
१	भाऊबीज	०९ नोव्हेंबर, २०१८	शुक्रवार

टीप :- १. मा.विभागीय आयुक्त, पुणे विभाग, पुणे हे ज्या स्थानिक सुट्टया जाहीर करतील, त्या स्थानिक सुट्टया विद्यापीठ कार्यालयास आणि पुणे जिल्हयातील संलग्न महाविद्यालये व मान्यताप्राप्त संस्था यांना देण्यात येतील. तसेच मा.विभागीय आयुक्त, नाशिक व अहमदनगर विभाग यांनी वेळोवेळी जाहीर केलेल्या स्थानिक सुट्टया नाशिक व अहमदनगर जिल्ह्यातील संलग्न महाविद्यालये व मान्यताप्राप्त संस्थांसाठी लागू होतील.

२. संलग्न महाविद्यालये/मान्यताप्राप्त संस्थेतील शिक्षकेतर सेवकांना जाहीर केलेल्या सुट्टयांमधील काही सुट्टया देता येणे शक्य नसल्यास त्यांना त्या बदल्यात कार्यालयीन सोयीनुसार पर्यायी सुट्टी देय होईल.

7/12/17

(डॉ.अरविंद शाळिग्राम)
प्रभारी कुलसचिव

गणेशखिंड, पुणे - ४११ ००७
जा.क्र. : एएन/ 4527
दिनांक : 09 DEC 2017

प्रत माहिती व योग्य त्या कार्यवाहीसाठी:-

१. मा.विभागप्रमुख, सर्व शैक्षणिक विभाग
२. मा.शाखाप्रमुख, सर्व प्रशासकीय शाखा
३. मा.प्राचार्य, विद्यापीठाशी संलग्न सर्व महाविद्यालये
४. मा.संचालक, विद्यापीठाच्या मान्यताप्राप्त सर्व संस्था
५. मा.कुलसचिव, महाराष्ट्रातील सर्व अकृषि विद्यापीठे

यांना विनंती की वरील परिपत्रकाचा आशय सर्व संबंधितांच्या निदर्शनास आणून द्यावा.

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सावित्रीबाई फुले पुणे विद्यापीठ

(पूर्वीचे पुणे विद्यापीठ)

परिपत्रक क्र.246/२०१७

विषय : सन २०१८ च्या सार्वजनिक सुट्टया...

महाराष्ट्र शासन अधिसूचना क्रमांक सार्वसु १११७/प्र.क्र.१३७/कार्या. २९-परक्राम्य संलेख अधिनियम, १८८१ (१८८१ चा २६) च्या कलम २५ खाली जे अधिकार भारत सरकारच्या गृह मंत्रालयाची अधिसूचना क्रमांक: ३९/१/६८-जेयूडीएल/तीन, दिनांक ८ मे, १९६८ अन्वये महाराष्ट्र शासनाकडे सोपविण्यात आले आहेत, त्या अधिकारांचा वापर करुन, महाराष्ट्र शासनाने दिनांक ०९ नोव्हेंबर, २०१७ च्या अधिसूचनेद्वारे महाराष्ट्र राज्यात शासकीय कार्यालयांना सन २०१८ साठी खाली नमूद केलेल्या सार्वजनिक सुट्टया सावित्रीबाई फुले पुणे विद्यापीठ शिक्षकेतर सेवकांना व सावित्रीबाई फुले पुणे विद्यापीठाशी संलग्नित महाविद्यालये/ मान्यताप्राप्त संस्थेतील शिक्षकेतर सेवकांना जाहीर केलेल्या आहेत.

अ.क्र.	सुट्टीचा दिवस	इंग्रजी तारीख	वार
१.	प्रजासत्ताक दिन	२६ जानेवारी, २०१८	शुक्रवार
२.	महाशिवरात्री	१३ फेब्रुवारी, २०१८	मंगळवार
३.	छत्रपती शिवाजी महाराज जयंती	१९ फेब्रुवारी, २०१८	सोमवार
४.	होळी (दुसरा दिवस)	०२ मार्च, २०१८	शुक्रवार
५.	महावीर जयंती	२९ मार्च, २०१८	गुरुवार
६.	गुड फ्रायडे	३० मार्च, २०१८	शुक्रवार
७.	डॉ. बाबासाहेब आंबेडकर जयंती	१४ एप्रिल, २०१८	शनिवार
८.	बुध्द पौर्णिमा	३० एप्रिल, २०१८	सोमवार
९.	महाराष्ट्र दिन	०१ मे, २०१८	मंगळवार
१०.	रमजान ईद (ईद-उल-फितर) (शव्वल-१)	१६ जून, २०१८	शनिवार
११.	स्वातंत्र्य दिन	१५ ऑगस्ट, २०१८	बुधवार
१२.	पारशी नववर्ष दिन (शहेनशाही)	१७ ऑगस्ट, २०१८	शुक्रवार
१३.	बकरी ईद (ईद-उल-झुआ)	२२ ऑगस्ट, २०१८	बुधवार
१४.	गणेश चतुर्थी	१३ सप्टेंबर, २०१८	गुरुवार
१५.	मोहरम	२० सप्टेंबर, २०१८	गुरुवार
१६.	महात्मा गांधी जयंती	०२ ऑक्टोबर, २०१८	मंगळवार
१७.	दसरा	१८ ऑक्टोबर, २०१८	गुरुवार
१८.	दिवाळी अमावस्या (लक्ष्मीपूजन)	०७ नोव्हेंबर, २०१८	बुधवार
१९.	दिवाळी (बलिप्रतिपदा)	०८ नोव्हेंबर, २०१८	गुरुवार
२०.	ईद-ए-मिलाद	२१ नोव्हेंबर, २०१८	बुधवार
२१.	गुरुनानक जयंती	२३ नोव्हेंबर, २०१८	शुक्रवार
२२.	ख्रिसमस	२५ डिसेंबर, २०१८	मंगळवार

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Rajiv Gandhi College of Engineering
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Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering
Tal. Pamer, Dist. Ahmednagar
Kanjule Harya

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Savitribai Phule Pune University

(Formerly University of Pune)

Circular No. 70 of 2019

During the Academic Year 2018 – 2019 following days are declared as holidays for the **University Departments/Affiliated Colleges and Recognized Institutes** for the **Second Term.**

Revised Holidays for Second Term

Sr. No.	Day of Holiday	Date	Day
1	Christmas	25/12/2018	Tuesday
2	Republic Day	26/01/2019	Saturday
3	Chhatrapati Shivaji Maharaj Jayanti	19/02/2019	Tuesday
4	Mahashivratri	04/03/2019	Monday
5	Holi (Second Day)	21/03/2019	Thursday
6	Gudipadwa	06/04/2019	Saturday
7	Ram Navami	13/04/2019	Saturday
8	Mahavir Jayanti	17/04/2019	Wednesday
9	Good Friday	19/04/2019	Friday
10	Maharashtra Din	01/05/2019	Wednesday
11	Buddha Pournima	18/05/2019	Saturday

Note

In case, the Head/ Principal/Directors of the Affiliated Colleges / Recognized Institutes requires to give additional holiday in exceptional circumstances, he/she may do so by compensating the same by keeping the Department/ College/Institute working on Sunday.

10/4/2019

Deputy Registrar
(P.G. Admissions)

Ganeshkhind, Pune
Ref. No. PGS/1190
Date: 10/04/2019

Copy to : for information & necessary action

1. The Members of the Management Council.
2. The Deans of Faculties.
3. The Registrar, Savitribai Phule Pune University, Pune.
4. The Director, Examinations & Evaluation, Savitribai Phule Pune University, Pune.
5. The Heads of all University Departments.
6. The Principals of all Affiliated Colleges.
7. The Directors of all Recognized Institutes.
8. The Heads of all the Administrative Sections of the University Office.
9. Asstt. Registrar, office of the Hon. Vice-Chancellor, Savitribai Phule Pune University
10. Asstt. Registrar, office of the Hon. Pro-Vice-Chancellor, Savitribai Phule Pune University

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Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering
Tal. Parner, Dist. Ahmednagar
Karjule Harya

PRINCIPAL
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Karjule Harya, Tal. Parner, Dist. A'Nagar

Savitribai Phule Pune University

(Formerly University of Pune)

Circular No. 69 of 2018

During the Academic Year 2018 – 2019 following days are declared as Holidays for the **Affiliated Colleges and Recognized Institutes** for the **First Term & Second Term.**

First Term Holidays

Sr. No.	Day of Holiday	Date	Day
1	Ramzan – Id (Id-Ul-Fitar)	16/06/2018	Saturday
2	Independence Day	15/08/2018	Wednesday
3	Bakri - Id (Id-Ul-Zua)	22/08/2018	Wednesday
4	Ganesh Chaturthi	13/09/2018	Thursday
5	Mahatma Gandhi Jayanti	02/10/2018	Tuesday
6	Dasara	18/10/2018	Thursday

Second Term Holidays

Sr. No.	Day of Holiday	Date	Day
1	Christmas	25/12/2018	Tuesday
2	Republic Day	26/01/2019	Saturday
3	Chhatrapati Shivaji Maharaj Jayanti	19/02/2019	Tuesday
4	Mahashivratri	04/03/2019	Monday
5	Holi (Second Day)	21/03/2019	Thursday
6	Gudipadwa	06/04/2019	Saturday

Note

In case, the Head/ Principal/Directors of the Affiliated Colleges / Recognized Institutes requires to give additional holiday in exceptional circumstances, he/she may do so by compensating the same by keeping the Department/ College/Institute working on Sunday.

23/4/2018

Deputy Registrar
(P.G. Admissions)

Ganeshkhind, Pune
Ref. No. PGS/1335
Date: 23/04/2018

Copy to : for information & necessary action

1. The Members of the Management Council.
2. The Deans of Faculties.
3. The Registrar, Savitribai Phule Pune University, Pune.
4. The Director, Examinations & Evaluation, Savitribai Phule Pune University, Pune.
5. The Heads of all University Departments.
6. The Principals of all Affiliated Colleges.
7. The Directors of all Recognized Institutes.
8. The Heads of all the Administrative Sections of the University Office.
9. Asstt. Registrar, office of the Hon. Vice-Chancellor, Savitribai Phule Pune University
10. Asstt. Registrar, office of the Hon. Pro-Vice-Chancellor, Savitribai Phule Pune University

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Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering Tal. Parner, Dist. Ahmednagar Karjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner, Dist. A'Nagar

Savitribai Phule Pune University

(Formerly University of Pune)

Circular No. 100 of 2019

List of Holidays during the year 2019 for University Departments/Affiliated Colleges and Recognized Institutes.

Holidays

Sr. No.	Day of Holiday	Date	Day
1	Ramzan - Id (Id-Ul-Fitr)	05-06-2019	Wednesday
2	Bakri - Id (Id-Ul-Zuha)	12-08-2019	Monday
3	Independence Day	15-08-2019	Thursday
4	Parshi New Year	17-08-2019	Saturday
5	Ganesh Chaturthi	02-09-2019	Monday
6	Gauri Poojan	06-09-2019	Friday
7	Moharum	10-09-2019	Tuesday
8	Anant Chaturdashi	12-09-2019	Thursday
9	Mahatma Gandhi Jayanti	02-10-2019	Wednesday
10	Dasara	08-10-2019	Tuesday
11	Dhanatrayodashi	25-10-2019	Friday
12	Diwali (Bali Pratipada)	28-10-2019	Monday
13	Bhaubij	29-10-2019	Tuesday
14	Guru Nanak Jayanti	12-11-2019	Tuesday
15	Christmas	25-12-2019	Wednesday

Note

In case, the Head/ Principal/Directors of the Affiliated Colleges / Recognized Institutes requires to give additional holiday in exceptional circumstances, he/she may do so by compensating the same by keeping the Department/ College/Institute working on Sunday.

25/5/2019.

Deputy Registrar
(P.G. Admissions)

Ganeshkhind, Pune
Ref. No. PGS/1620
Date: 25/05/2019

Copy to : for information & necessary action

1. The Members of the Management Council.
2. The Deans of Faculties.
3. The Registrar, Savitribai Phule Pune University, Pune.
4. The Director, Examinations & Evaluation, Savitribai Phule Pune University, Pune.
5. The Heads of all University Departments.
6. The Principals of all Affiliated Colleges.
7. The Directors of all Recognized Institutes.
8. The Heads of all the Administrative Sections of the University Office.
9. Asstt. Registrar, office of the Hon. Vice-Chancellor, Savitribai Phule Pune University
10. Asstt. Registrar, office of the Hon. Pro-Vice-Chancellor, Savitribai Phule Pune University

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Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering Tal. Parner, Dist. Ahmednagar Karjule Harya

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Savitribai Phule Pune University

(Formerly University of Pune)

Circular No. 09 of 2020

It is hereby informed to all concerned that the University has declared following days as Public Holidays for the **University Departments/Affiliated Colleges and Recognized Institutes** for teaching faculty for the calendar year 2020.

Holidays

Sr. No.	Day of Holiday	Date	Day
1	Chattrapati Shivaji Maharaj Jayanti	19-02-2020	Wednesday
2	Mahashivratri	21-02-2020	Friday
3	Holi (Second Day)	10-03-2020	Tuesday
4	Gudipadwa	25-03-2020	Wednesday
5	Ram Navmi	02-04-2020	Thursday
6	Mahavir Jayanti	06-04-2020	Monday
7	Good Friday	10-04-2020	Friday
8	Dr. Babasaheb Ambedkar Jayanti	14-04-2020	Tuesday
9	Maharashtra Din	01-05-2020	Friday
10	Buddha Pournima	07-05-2020	Thursday
11	Ramzan Eid (Id-Ul-Fitr) (Shawal - 1)	25-05-2020	Monday
12	Bakri - Id (Id-Ul-Zuha)	01-08-2020	Saturday
13	Independence Day	15-08-2020	Saturday
14	Ganesh Chaturthi	22-08-2020	Saturday
15	Mahatma Gandhi Jayanti	02-10-2020	Friday
16	Id-E-Milad	30-10-2020	Friday
17	Diwali Amavasaya (Laxmi Pujan)	14-11-2020	Saturday
18	Diwali (Bali Pratipada)	16-11-2020	Monday
19	Gurunanak Jayanti	30-11-2020	Monday
20	Christmas	25-12-2020	Friday

Note

In case, the Head/ Principal/Director of the Affiliated Colleges / Recognized Institutes requires to give additional holiday in exceptional circumstances, he may do so by compensating the same by keeping the Department/ College/Institute working on Sunday.

20/1/2020.

Deputy Registrar
(P.G. Admissions)

Ganeshkhind, Pune
Ref. No. PGS/253
Date: 20/01/2020

Copy to : for information & necessary action

1. The Members of the Management Council.
2. The Deans of Faculties.
3. The Registrar, Savitribai Phule Pune University, Pune.
4. The Director, Examinations & Evaluation, Savitribai Phule Pune University, Pune.
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Karjule Harya, Tal. Parner, Dist. A'Naga

सावित्रीबाई फुले पुणे विद्यापीठ
(पूर्वीचे पुणे विद्यापीठ)

परिपत्रक क्र.३०./२०२०.

विषय : सन २०२० च्या स्थानिक सुट्टया...

सर्व संबंधितांना या परिपत्रकाद्वारे कळविण्यात येते की, मा.विभागीय आयुक्त, पुणे विभाग, पुणे यांनी पुणे जिल्हयातील शासनाच्या सर्व कार्यालयांना जाहीर केलेल्या खालील स्थानिक सुट्टया विद्यापीठ कार्यालयास देखील स्थानिक सुट्टया म्हणून जाहीर करण्यात येत आहेत.

अ.क्र.	दिनांक	वार	स्थानिक सुट्टया
१	०३ ऑगस्ट, २०२०	सोमवार	रक्षाबंधन
२	०१ सप्टेंबर, २०२०	मंगळवार	अनंत चतुर्दशी
३	१७ ऑक्टोबर, २०२०	शनिवार	घटस्थापना

तसेच मा.विभागीय आयुक्त, नाशिक विभाग, नाशिक यांनी नाशिक व अहमदनगर जिल्हयातील शासनाच्या सर्व कार्यालयांना जाहिर केलेल्या खालील स्थानिक सुट्टया नाशिक व अहमदनगर जिल्हयातील सावित्रीबाई फुले पुणे विद्यापीठाची उपकेंद्रे यांना देखील स्थानिक सुट्टया म्हणून जाहीर करण्यात येत आहेत.

अ.क्र.	दिनांक	वार	स्थानिक सुट्टया
१	०१ सप्टेंबर, २०२०	मंगळवार	अनंत चतुर्दशी
२	१७ ऑक्टोबर, २०२०	शनिवार	घटस्थापना
३	१३ नोव्हेंबर, २०२०	शुक्रवार	धनत्रयोदशी

(डॉ.प्रफुल्ल पवार)
कुलसचिव

गणेशखिंड, पुणे - ४११ ००७
जा.क्र. : एएन/९९६
दिनांक : 14 FEB 2020

प्रत माहिती व योग्य त्या कार्यवाहीसाठी :-

१. मा.विभागप्रमुख, सर्व शैक्षणिक विभाग
२. मा.शाखाप्रमुख, सर्व प्रशासकीय शाखा
३. मा.प्राचार्य, विद्यापीठाशी संलग्न सर्व महाविद्यालये
४. मा.संचालक, विद्यापीठाच्या मान्यताप्राप्त सर्व संस्था
५. मा.कुलसचिव, महाराष्ट्रातील सर्व अकृषि विद्यापीठे
६. उपकुलसचिव, जनसंपर्क कार्यालय

यांना विनंती की, वरील परिपत्रकाचा आशय सर्व संबंधितांच्या निदर्शनास आणून द्यावा.

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D:\2020\Circular 2020\Annual Holiday Circular & EC Item 2019.docx

सावित्रीबाई फुले पुणे विद्यापीठ

(पूर्वीचे पुणे विद्यापीठ)

परिपत्रक २२०/२०२०

विषय : सन २०२० च्या स्थानिक सुट्टया.

या परिपत्रकाव्दारे सर्व संबंधितांना कळविण्यात येते की, मा. विभागीय आयुक्त, पुणे विभाग व नाशिक विभाग यांनी जाहीर केलेल्या स्थानिक सुट्टया विद्यापीठ परिपत्रक क्र. ३०/२०२० दि. ०४ फेब्रुवारी २०२० अन्वये लागू केलेल्या आहेत. सदर परिपत्रकानुसार जाहीर केलेल्या स्थानिक सुट्टया विद्यापीठ विभाग, पुणे, नाशिक व अहमदनगर जिल्हयातील सर्व संलग्नित महाविद्यालय/परिसंस्था येथिल शिक्षक संवर्गांना देखील लागू राहतील, याची सर्व संबंधितांनी नोंद घ्यावी.

31/7/2020

उपकुलसचिव

शैक्षणिक प्रवेश विभाग

गणेशखिंड, पुणे ४११ ००७.)
संदर्भ क्र. शै.प्रवेश/१२०८)
दिनांक : ३१/०७/२०२०)

प्रत माहिती व योग्य त्या कार्यवाहीसाठी :—

मा. विभागप्रमुख, सर्व शैक्षणिक विभाग, सावित्रीबाई फुले पुणे विद्यापीठ
मा. प्राचार्य, विद्यापीठाशी संलग्न सर्व महाविद्यालये
मा. संचालक, विद्यापीठाच्या मान्यताप्राप्त सर्व संस्था

आपणांस विनंती की, वरील परिपत्रकाचा आशय सर्व संबंधितांच्या निदर्शनास आणून द्यावा.

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शासनाने जाहीर केलेल्या अधिसूचनान्वये पाच सुट्टया (क) या शनिवारी तसेच रविवारी आलेल्या आहेत. शासनास पाच दिवसांचा आठवडा त्याचप्रमाणे राज्य शासकीय, निमशासकीय कार्यालये, संघटना, शासनाचे उपक्रम तसेच राज्य शासनाच्या प्रशासकीय विभागांच्या नियंत्रणाखालील कार्यालये यांच्यासाठी खालील अतिरिक्त सुट्टी जाहीर केलेली आहे.

अ.क्र.	सुट्टीचा दिवस	इंग्रजी तारीख	वार
१	भाऊबीज	०६ नोव्हेंबर, २०२१	शनिवार

टीप :- १. मा.विभागीय आयुक्त, पुणे विभाग, पुणे हे ज्या स्थानिक सुट्टया जाहीर करतील, त्या स्थानिक सुट्टया विद्यापीठ कार्यालयास आणि पुणे जिल्ह्यातील संलग्न महाविद्यालये व मान्यताप्राप्त संस्था यांना देण्यात येतील. तसेच मा.विभागीय आयुक्त, नाशिक व अहमदनगर विभाग यांनी वेळोवेळी जाहीर केलेल्या स्थानिक सुट्टया नाशिक व अहमदनगर जिल्ह्यातील सावित्रीबाई फुले पुणे विद्यापीठाची उपकेंद्रे, संलग्न महाविद्यालये व मान्यताप्राप्त संस्थांसाठी लागू होतील.

२. संलग्न महाविद्यालये/मान्यताप्राप्त संस्थेतील शिक्षकेतर सेवकांना जाहीर केलेल्या सुट्टयांमधील काही सुट्टया देता येणे शक्य नसल्यास त्यांना त्या बदल्यात कार्यालयीन सोयीनुसार पर्यायी सुट्टी देय होईल.

(डॉ.प्रफुल्ल पवार)
कुलसचिव

गणेशखिंड, पुणे - ४११ ००७
जा.क्र. : एएन/5425
दिनांक : 30 DEC 2020

प्रत माहिती व योग्य त्या कार्यवाहीसाठी :-

१. मा.विभागप्रमुख, सर्व शैक्षणिक विभाग
२. मा.शाखाप्रमुख, सर्व प्रशासकीय शाखा
३. मा.प्राचार्य, विद्यापीठाशी संलग्न सर्व महाविद्यालये
४. मा.संचालक, विद्यापीठाच्या मान्यताप्राप्त सर्व संस्था
५. मा.कुलसचिव, महाराष्ट्रातील सर्व अकृषि विद्यापीठे

यांना विनंती की वरील परिपत्रकाचा आशय सर्व संबंधितांच्या निदर्शनास आणून द्यावा.

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Tal. Parner, Dist. Ahmednagar
Kanjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Parner, Dist. A'Naga

सावित्रीबाई फुले पुणे विद्यापीठ

(पूर्वीचे पुणे विद्यापीठ)

परिपत्रक क्र. ३६२/२०२०

विषय : सन २०२१ च्या सार्वजनिक सुट्टया...

महाराष्ट्र शासन, अधिसूचना क्रमांक सार्वसु. ११२०/प्र.क्र.८२/कार्या-२९.-परक्राम्य संलेख अधिनियम, १८८१ (सन १८८१ चा अधिनियम २६) कलम २५ करीता जे अधिकार भारत सरकारच्या गृह मंत्रालयाची अधिसूचना क्रमांक: ३९/१/६८, जेयूडीएल/तीन, दिनांक ८ मे, १९६८ अन्वये महाराष्ट्र शासनास सोपविण्यात आल्या आहेत, त्या अधिकारांचा वापर करुन, महाराष्ट्र शासनाने दिनांक ०१ डिसेंबर, २०२० च्या अधिसूचनेद्वारे महाराष्ट्र राज्यात शासकीय कार्यालयांना सन २०२१ साठी खाली नमूद केलेल्या सार्वजनिक सुट्टया जाहीर केल्या आहेत. सदर सार्वजनिक सुट्टया सावित्रीबाई फुले पुणे विद्यापीठ शिक्षकेतर सेवकांना व सावित्रीबाई फुले पुणे विद्यापीठाशी संलग्नित महाविद्यालये/मान्यताप्राप्त संस्थेतील शिक्षकेतर सेवकांना जाहीर केलेल्या आहेत.

अ.क्र.	सुट्टीचा दिवस	इंग्रजी तारीख	वार
१.	प्रजासत्ताक दिन	२६ जानेवारी, २०२१	मंगळवार
२.	छत्रपती शिवाजी महाराज जयंती	१९ फेब्रुवारी, २०२१	शुक्रवार
३.	महाशिवरात्री	११ मार्च, २०२१	गुरुवार
४.	होळी (दुसरा दिवस)	२९ मार्च, २०२१	सोमवार
५.	गुड फ्रायडे	०२ एप्रिल, २०२१	शुक्रवार
६.	गुढीपाडवा	१३ एप्रिल, २०२१	मंगळवार
७.	डॉ.बाबासाहेब आंबेडकर जयंती	१४ एप्रिल, २०२१	बुधवार
८.	रामनवमी	२१ एप्रिल, २०२१	बुधवार
९.	रमझान ईद (ईद-उल-फितर) (शव्वल-१)	१३ मे, २०२१	गुरुवार
१०.	बुध्द पौर्णिमा	२६ मे, २०२१	बुधवार
११.	बकरी ईद (ईद-उल-झुआ)	२१ जुलै, २०२१	बुधवार
१२.	पारशी नववर्ष दिन (शहेनशाही)	१६ ऑगस्ट, २०२१	सोमवार
१३.	मोहरम	१९ ऑगस्ट, २०२१	गुरुवार
१४.	गणेश चतुर्थी	१० सप्टेंबर, २०२१	शुक्रवार
१५.	दसरा	१५ ऑक्टोबर, २०२१	शुक्रवार
१६.	ईद-ए-मिलाद	१९ ऑक्टोबर, २०२१	मंगळवार
१७.	दिवाळी अमावस्या (लक्ष्मीपूजन)	०४ नोव्हेंबर, २०२१	गुरुवार
१८.	दिवाळी (बलिप्रतिपदा)	०५ नोव्हेंबर, २०२१	शुक्रवार
१९.	गुरुनानक जयंती	१९ नोव्हेंबर, २०२१	शुक्रवार
२०.	ख्रिसमस	२५ डिसेंबर, २०२१	शनिवार

IQAC In-charge
Rajiv Gandhi College of Engineering
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Dist. Ahmednagar 414304

Rajiv Gandhi College of Engineering Tal. Parner, Dist. Ahmednagar Kanjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Parner, Dist. A'nagar

Savitribai Phule Pune University
(Formerly University of Pune)

Circular No. 20 of 2021

It is hereby informed to all concerned that the University has declared following days as Public Holidays for the **University Departments/Affiliated Colleges and Recognized Institutes** for teaching faculty for the calendar year 2021.

Holidays

Sr. No.	Day of Holiday	Date	Day
1	Republic Day	26-01-2021	Tuesday
2	Chhatrapati Shivaji Maharaj Jayanti	19-02-2021	Friday
3	Mahashivratri	11-03-2021	Thursday
4	Holi (Second Day)	29-03-2021	Monday
5	Good Friday	02-04-2021	Friday
6	Gudhi Padwa	13-04-2021	Tuesday
7	Dr. Babasaheb Ambedkar Jayanti	14-04-2021	Wednesday
8	Ram Navami	21-04-2021	Wednesday
9	Maharashtra Din	01-05-2021	Saturday
10	Ramzan - Id (Id-Ul-Fitr)(Shawal-1)	13-05-2021	Thursday
11	Buddha Pournima	26-05-2021	Wednesday
12	Bakri - Id (Id-Uz-Zuha)	21-07-2021	Wednesday
13	Parsi New Year (Shahenshahi)	16-08-2021	Monday
14	Moharum	19-08-2021	Thursday
15	Ganesh Chaturthi	10-09-2021	Friday
16	Mahatma Gandhi Jayanti	02-10-2021	Saturday
17	Dasara	15-10-2021	Friday
18	Id-E-Milad	19-10-2021	Tuesday
19	Diwali Amavasaya (Laxmi Pujan)	04-11-2021	Thursday
20	Diwali (Bali Pratipada)	05-11-2021	Friday
21	Diwali (Bhaubeej)	06-11-2021	Saturday
22	Guru Nanak Jayanti	19-11-2021	Friday
23	Christmas	25-12-2021	Saturday

Note

In case, the Head/ Principal/Director of the Affiliated Colleges / Recognized Institutes requires to give additional holiday in exceptional circumstances, he may do so by compensating the same by keeping the Department/ College/Institute working on Sunday.

20/1/2021.

Deputy Registrar
(P.G. Admissions)

Ganeshkhind, Pune
Ref. No. PGS/368
Date: 20/01/2021

Copy to : for information & necessary action

The Members of the Management Council.
The Registrar, Savitribai Phule Pune University, Pune.
The Deans of Faculties.
The Director, Examinations & Evaluation, Savitribai Phule Pune University, Pune.
The Heads of all University Departments.
The Principals of all Affiliated Colleges.
The Directors of all Recognized Institutes.
The Heads of all the Administrative Sections of the University Office.
Asstt. Registrar, office of the Hon. Vice-Chancellor, Savitribai Phule Pune University
Asstt. Registrar, office of the Hon. Pro-Vice-Chancellor, Savitribai Phule Pune University

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Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Parner, Dist. A'Nagar

सत्यमेव जयते
महाराष्ट्र शासन

विभागीय आयुक्त, नाशिक विभाग नाशिक यांचे कार्यालय
(सामान्य प्रशासन विभाग)

divcomnashik@gmail.com Fax-२५३-२४६१०६३ Tel-२५३-२४६२४०१

वाचले :- महाराष्ट्र शासन राजकीय सेवा विभाग क्रमांक १३ चे दिनांक १६ जानेवारी, १९५८ व दिनांक ६ ऑगस्ट, १९५८.

क्रमांक साशा.३/४३२२०/२०२१जा.क्र. २५३८७ दिनांक :-२८/१२/२०२१

अधिसुचना

महाराष्ट्र शासनाच्या उपरोक्त ठरावान्वये प्रदान करण्यात आलेल्या अधिकाराचा वापर करुन, मी विभागीय आयुक्त, नाशिक विभाग, नाशिक याद्वारे सन २०२२ या वर्षाकरीता नाशिक जिल्ह्यातील सर्व शासकीय कार्यालयांसाठी (न्यायालयीन विभाग वगळून) खालील नमुद केलेले तीन दिवस स्थानिक सुट्यांचे दिवस म्हणून जाहिर करीत आहे.

अ.क्र.	सणाचे नाव	दिनांक व वार
१	रक्षाबंधन	दि.११ ऑगस्ट-२०२२ गुरुवार
२	अनंत चतुर्दशी	दि.९ सप्टेंबर २०२२ शुक्रवार
३	घटस्थापना	दि.२६ सप्टेंबर -२०२२ सोमवार

(स्वाक्षरीत/-)
(राधाकृष्ण गमे)
विभागीय आयुक्त,नाशिक

प्रत - १. जिल्हाधिकारी नाशिक यांना नाशिक जिल्ह्यातील सर्व शासकीय कार्यालयांकरीता पाठविणेसाठी अग्रेषित.

२. मा.उपसंचालक माहिती, नाशिक विभाग, नाशिक यांचेकडेस आवश्यक त्या वृत्तपत्रीय प्रसिद्धीस्तव अग्रेषित.

२/- सदर स्थानिक सुट्यांचे दिवशी सर्व शैक्षणिक संस्था बंद राहतील, अशा आशयाची बातमी प्रसिद्धीस देण्याची विनंती आहे.

३. जिल्हा माहिती अधिकारी नाशिक यांना स्थानिक वृत्तपत्रात बातमी म्हणुन प्रसिद्ध करण्यासाठी.

४. मुख्य कार्यकारी अधिकारी, जिल्हा परिषद, नाशिक/धुळे/नंदुरबार/जळगाव/अहमदनगर

५. जिल्हाधिकारी नाशिक/धुळे/जळगाव/ अहमदनगर/ नंदुरबार

६. विभागीय आयुक्त कार्यालयातील सर्व शाखा प्रमुख यांचेकडेस माहितीस्तव

28/12/21
(रमेश काळे)
उप आयुक्त (सा.प्र)
विभागीय आयुक्त नाशिक करीता

सही प्रतिवर मा.विभागीय आयुक्त
स्वाक्षरी असे.

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Tal. Pamer, Dist. Ahmednagar
Karjule Harya

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Karjule Harya, Tal. Pamer, Dist. A'Nagar

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आधारित- महाराष्ट्र शासन राजकीय व सेवा विभाग पी- 13 एच बी - दिनांक 16 जानेवारी 1958

जिल्हाधिकारी कार्यालय अहमदनगर
क्र./सशा/ कार्या 7/ संकीर्ण/351/2022
अहमदनगर दिनांक- 27/01/2022

महाराष्ट्र शासनाच्या उपरोक्त ठरावामध्ये प्रदान केलेल्या अधिकाराचा वापर करुन मी, जिल्हाधिकारी अहमदनगर यादवारे सन 2022 या वर्षाकरीता अहमदनगर जिल्हयातील सर्व शासकीय कार्यालयासाठी (न्यायालयीन विभाग वगळुन) खालील दिवस स्थानिक सुटयांचे दिवस म्हणुन जाहीर करीत आहे

अ.क्र	सुटया	वार	दिनांक
1	रक्षाबंधन	गुरुवार	11 ऑगस्ट 2022
2	घटस्थापना	सोमवार	26 सप्टेंबर 2022
3	वसुबारस	शुक्रवार	21 आक्टोबर 2022

(डॉ.राजेन्द्र ब. भोसले)
जिल्हाधिकारी अहमदनगर

प्रत- 1 मा.विभागीय आयुक्त नाशिक विभाग नाशिक - यांना माहितीसाठी सविनय सादर .
2 शाखा प्रमुख जिल्हाधिकारी कार्यालय अहमदनगर
3 समन्वय अधिकारी , भुसंपादन अहमदनगर
4 विशेष भुसंपादन अधिकारी क्रमांक - 7,13,14,15,
5 उपविभागीय अधिकारी (सर्व)
6 तहसिलदार (सर्व)
7 जिल्हा माहिती अधिकारी ,अहमदनगर
8 अहमदनगर जिल्हयातील सर्व विभाग प्रमुख

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Rajiv Gandhi College of Engineering Tal. Parner, Dist. Ahmednagar Kanjule Harya

(स्वाक्षरीत/-)
(डॉ.राजेन्द्र ब. भोसले)
जिल्हाधिकारी अहमदनगर

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Kanjule Harya, Tal. Parner, Dist. A'Nagar

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क्र.साप्र/५/कावि/ १०/ २०२२
विभागीय आयुक्त कार्यालय
विधान भवन, पुणे विभाग.
(सामान्य प्रशासन विभाग)
दिनांक :- ०७/०१/२०२२

विषय- स्थानिक सुट्टया -२०२२ जाहीर करण्याबाबत

आदेश

शासन, राजनैतिक सेवा विभाग, निर्णय क्र.पी-१३-२ बी, दि.१६-०१-१९५८ व शासन, सामान्य प्रशासन विभाग अधिसुचना क्र.सावैसु-स्था-१०८३-१७७१-(६४)-८४-२९, दिनांक १४-०३-१९८३ अन्वये प्रदान केलेल्या अधिकाराचा वापर करुन मी, सौरभ राव, विभागीय आयुक्त, पुणे विभाग पुणे सन २०२२ या वर्षासाठी पुणे जिल्हयामधील महाराष्ट्र शासनाच्या सर्व कार्यालयांसाठी खालील दिवस सुट्टयांचे दिवस म्हणुन जाहीर करीत आहे.

अ.क्र.	दिनांक	वार	सन २०२२ मधील स्थानिक सुट्ट्या
१.	११ ऑगस्ट, २०२२	गुरुवार	रक्षाबंधन
२.	०९ सप्टेंबर, २०२२	शुक्रवार	अनंत चतुर्दशी
३.	२६ सप्टेंबर, २०२२	सोमवार	घटस्थापना

मा.विभागीय आयुक्त, पुणे विभाग, पुणे यांच्या मान्यतेने

सही/-
(संतोष पाटील)
उपायुक्त (सामान्य प्रशासन)
पुणे विभाग पुणे

प्रति,

पुणे जिल्हयातील सर्व विभाग प्रमुख / प्रादेशिक व जिल्हा प्रमुख यांचेकडे माहितीसाठी व आवश्यक त्या कार्यवाहीसाठी अग्रेषित.

त्यांनी त्यांचे प्रशासकीय नियंत्रणाखाली पुणे जिल्हयातील सर्व दुय्यम कार्यालयांना उपरोक्त सुट्टया कळवाव्यात.

प्रत- माहिती उपसंचालक, पुणे विभाग, मध्यवर्ती इमारत, पुणे -०१ यांचेकडे माहितीसाठी व आवश्यक त्या कार्यवाहीसाठी अग्रेषित.

उपरोक्त स्थानिक सुट्टयांना स्थानिक वर्तमानपत्रे, आकाशवाणी व दुरदर्शनवर बातमी या सदरात प्रसिध्दी देण्याची व्यवस्था करावी अशी विनंती आहे.

प्रत- १. मंत्रालयीन सर्व विभागांचे सचिव.
२. जिल्हाधिकारी पुणे, सातारा, सांगली, सोलापूर, कोल्हापूर.
३. मुख्य कार्यकारी अधिकारी , जिल्हा परिषद पुणे, सातारा, सांगली, सोलापूर, कोल्हापूर.
४. महानगरपालिका आयुक्त पुणे, पिंपरी-चिंचवड, सांगली-मिरज कुपवाड, सोलापूर, कोल्हापूर.
५. पुणे विभागातील सर्व नगरपरिषदांचे मुख्याधिकारी.
६. आयुक्त कार्यालयातील सर्व शाखाधिकारी, स्वीय सहाय्यक.
७. महाराष्ट्र शासनाचे पुणे येथील सर्व उपक्रमांचे प्रमुख.

(संतोष पाटील)
उपायुक्त (सामान्य प्रशासन)
पुणे विभाग पुणे

IQAC In-charge
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Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering Karjule Harya Tal. Parner Dist. Ahmednagar www.divcommpune.in

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सावित्रीबाई फुले पुणे विद्यापीठ

(पूर्वीचे पुणे विद्यापीठ)

परिपत्रक २२३/ २०२२

विषय : सन २०२२ च्या स्थानिक सुट्टया.

'सर्व संबंधितांना या परिपत्रकाव्दारे कळविण्यात येते की, मा. विभागीय आयुक्त, पुणे व मा. विभागीय आयुक्त, नाशिक विभाग, नाशिक यांनी अनुक्रमे पुणे व नाशिक जिल्हयातील शासनाच्या सर्व कार्यालयांना जाहीर केलेल्या खालील स्थानिक सुट्टया सावित्रीबाई फुले पुणे विद्यापीठ/ नाशिक उपकेंद्र शिक्षक सेवकांना व सावित्रीबाई फुले पुणे विद्यापीठाशी संलग्नित पुणे व नाशिक जिल्हयातील महाविद्यालय/मान्यताप्राप्त संस्थेतील शिक्षक सेवकांना देखील स्थानिक सुट्टया म्हणून जाहीर करण्यात येत आहेत.

अ.क्र.	दिनांक	वार	स्थानिक सुट्टया
१	११ ऑगस्ट, २०२२	गुरूवार	रक्षाबंधन
२	०९ सप्टेंबर, २०२२	शुक्रवार	अनंत चतुर्दशी
३	२६ सप्टेंबर, २०२२	सोमवार	घटस्थापना

तसेच मा. जिल्हाधिकारी, जिल्हाधिकारी कार्यालय, अहमदनगर यांनी अहमदनगर जिल्हयातील शासनाच्या सर्व कार्यालयांसाठी (न्यायालयीन विभाग वगळून) जाहीर केलेल्या खालील स्थानिक सुट्टया अहमदनगर जिल्हयातील सावित्रीबाई फुले पुणे विद्यापीठ उपकेंद्र यांना तसेच सावित्रीबाई फुले पुणे विद्यापीठाशी संलग्नित अहमदनगर जिल्हयातील महाविद्यालये/मान्यताप्राप्त संस्थेतील शिक्षक सेवकांना देखील स्थानिक सुट्टया म्हणून जाहीर करण्यात येत आहेत.

अ.क्र.	दिनांक	वार	स्थानिक सुट्टया
१	११ ऑगस्ट, २०२२	गुरूवार	रक्षावंधन
२	२६ सप्टेंबर, २०२२	सोमवार	घटस्थापना
३	२१ ऑक्टोबर, २०२२	शुक्रवार	वसुबारस

उपकुलसचिव
शैक्षणिक प्रवेश विभाग

गणेशखिंड, पुणे ४११ ००७.)
संदर्भ क्र. शै.प्रवेश/ ३९१५)
दिनांक : १०/०८/२०२२)

प्रत माहिती व योग्य त्या कार्यवाहीसाठी :–

मा. विभागप्रमुख, सर्व शैक्षणिक विभाग, सावित्रीबाई फुले पुणे विद्यापीठ
मा. प्राचार्य, विद्यापीठाशी संलग्न सर्व महाविद्यालये.
मा. सचालक, विद्यापीठाच्या मान्यताप्राप्त सर्व संस्था
मा. उपकुलसचिव, जनसंपर्क कार्यालय

} आपणांस विनंती की, वरील परिपत्रकाचा आशय सर्व संबधितांच्या निदर्शनास आणून द्यावा.

IQAC In-charge
Rajiv Gandhi College of Engineering
Kanjule Harya Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering Dist. Ahmednagar Kanjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Parner, Dist. Ahmednagar

Scanned by CamScanner

* Deputy Accountant General, Provident Fund Branch, Mumbai,
The Pay and Accounts Officer, Mumbai,
The Resident Audit Officer, Mumbai,
* The Chief Accountant, Reserve Bank of India, Mumbai,
* The Manager, Reserve Bank of India, Mumbai,
* The Secretary, Mumbai Port Trust,
All Municipal Commissioners,
* The Chief Secretaries of all State Governments,
* All Ministeries of the Government of India, New Delhi,
* The General Manager, Central Railway, Chhatrapati Shivaji Maharaj Terminus, Mumbai,
* The General Manager, Western Railway, Churchgate, Mumbai,
* The Collector of the Customs, Mumbai,
* The Commissioner of Income Tax, Mumbai,
* The Collector of Central Excise, Mumbai,
* The Regional Passport Officer, Worli, Mumbai,
* The Special Commissioner, Maharashtra Sadan, New Delhi,
* Director, Maharashtra Information Centre, New Delhi,
* The Manager, Industrial Development Bank of India, I.D.B.I.Tower, Cuffe Parade, Colaba, Mumbai-05,
* The Secretary, Election Commission of India, Nirvachan Sadan, Ashoka Road, New Delhi 110 001,
* The Secretary, State Election Commission, New Administrative Building, Mumbai,
* The Secretary, Indian Bank's Association, Stadium House, 6th Floor, Veer Nariman Road, Mumbai-20.

The Director General of Information and Public Relations, Mumbai 400 032,
(With a Request to give wide publicity by issuing a press note as also through TV and Radio.)
Select File, General Administration Department, Desk-XXIX.

---

* By letter

S. J. TUMRAM,
Desk Officer/G.A.D.

IQAC In-charge
Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Parner
Dist. Ahmednagar 414304

Rajiv Gandhi College of Engineering
Tal. Parner, Dist. Ahmednagar
Kanjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Parner, Dist. A'Nagar

No. 1121/C.R. 97/Desk-29,
GENERAL ADMINISTRATION DEPARTMENT
Hutatma Rajguru Chowk,
Madam Cama Road,
Mantralaya, Mumbai 400 032,
dated 2nd December 2021.

To,

The Principal Secretary to the Hon. Governor,

The Comptroller, Hon. Governor's Household, Mumbai,

The Secretary to Hon. Chairman/Hon. Speaker, Maharashtra Legislative Council/Assembly,

The Private Secretary to Hon. Deputy Chairman/Hon. Deputy Speaker, Maharashtra Legislative Council/Assembly,

The Principal Secretary to the Hon. Chief Minister, Mantralaya, Mumbai,

The Secretary to the Hon. Deputy Chief Minister, Mantralaya, Mumbai,

The Private Secretaries / Personal Assistants to all Hon. Ministers / Hon. Ministers of State,

The Private Secretaries / Personal Assistants to Hon. Leader of Opposition, Maharashtra Legislative Assembly / Council,

The Chief Secretary, General Administration Department, Mantralaya, Mumbai,

All Additional Chief Secretaries, Principal Secretaries and Secretaries to all Departments of Mantralaya, Mumbai,

All Departments of Mantralaya, Mumbai,

* The Registrar General, High Court,
* The Prothonotary and Senior Master, Original Side, High Court, Mumbai,
* The Registrar, High Court, Appellate Side, Mumbai,
* The Secretary, Maharashtra Public Commission, Mumbai,
* The Secretary, Maharashtra Legislature Secretariat, Mumbai/Nagpur,
* The Registrar, Office of the Lokayukta and Upa-Lokayukta, Mumbai,
* Chief Commissioner, State Information Commission,
* Chief Commissioner, Right to Service,

All Divisional Commissioners,

All Collectors,

All Chief Executive Officers of Zilla Parishads,

Head of the Department / Head of the Office under all Departments of Mantralaya,

The Accountant General, Accounts and Entitlement, Maharashtra-I, Mumbai,

The Accountant General, Accounts and Entitlement, Maharashtra-II, Nagpur,

The Accountant General, Audit, Maharashtra-I, Mumbai,

The Accountant General, Audit, Maharashtra-II, Nagpur,

IQAC In-charge
Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Pamer
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering Tal. Pathardi Dist. Ahmednagar Kanjule Harya

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Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Pamer, Dist. A'Nagar

GENERAL ADMINISTRATION DEPARTMENT

Madam Cama Road, Hutatma Rajguru Chowk, Mantralaya
Mumbai 400 032, dated the 2nd December 2021

NOTIFICATION

No. PHD. 1120/C.R. 97/Desk-29.— The Government of Maharashtra has separately declared 16 Public Holidays for the year 2022 notified the section 25 of the Negotiable Instruments Act, 1881 (XXIV of 1881) as per Notification No. PHD. 1121/C.R. 97/Desk-29, dated 2nd December 2021.

2. The State Government has also decided to declare following additional holiday for the offices of the State Government, State Public Sector undertakings, Municipal Corporation, Municipal Council, Nagar Panchayat, Zilla Parishad, Panchayat Samittee and Village Panchayat.

Sr. No.	Holiday	Date	Saka Date	Day
(1)	(2)	(3)	(4)	(5)
1	Bhaubeej	26th October, 2022	4 Kartika,1944	Wednesday

By order and in the name of the Governor of Maharashtra,

J. J. VALVI,
Deputy Secretary to Government.

IQAC In-charge

ON BEHALF OF GOVERNMENT PRINTING, STATIONERY AND PUBLICATION, PRINTED AND PUBLISHED BY DIRECTOR, RUPENDRA DINESH MORE, PRINTED AT GOVERNMENT CENTRAL PRESS, 21-A, NETAJI SUBHASH ROAD, CHARNI ROAD, MUMBAI 400 004 AND PUBLISHED AT DIRECTORATE OF GOVERNMENT PRINTING, STATIONERY AND PUBLICATIONS, 21-A, NETAJI SUBHASH ROAD, CHARNI ROAD, MUMBAI 400 004. EDITOR : DIRECTOR, RUPENDRA DINESH MORE.

* मुख्य लेखापाल, रिझर्व्ह बँक ऑफ इंडिया, मुंबई,
* व्यवस्थापक, रिझर्व्ह बँक ऑफ इंडिया, मुंबई,
* सचिव, मुंबई पोर्ट ट्रस्ट, मुंबई,

  आयुक्त, सर्व महानगरपालिका,
* सर्व राज्यांचे मुख्य सचिव,
* भारत सरकारची सर्व मंत्रालये, नवी दिल्ली,
* महाव्यवस्थापक, मध्य रेल्वे, छत्रपती शिवाजी महाराज टर्मिनस, मुंबई,
* महाव्यवस्थापक, पश्चिम रेल्वे, चर्चगेट, मुंबई,
* समाहारक, सीमा शुल्क, मुंबई,
* आयकर आयुक्त, मुंबई,
* समाहारक, केंद्रीय उत्पादन शुल्क, मुंबई,
* प्रादेशिक पारपत्र अधिकारी, वरळी, मुंबई,
* विशेष आयुक्त, महाराष्ट्र सदन, नवी दिल्ली,
* संचालक, महाराष्ट्र परिचय केंद्र, नवी दिल्ली,
* व्यवस्थापक, इंडस्ट्रियल डेव्हलपमेंट बँक ऑफ इंडिया, आय.डी.बी.आय.टॉवर, कफ परेड, कुलाबा, मुंबई ४०० ००५,
* सचिव, भारत निवडणूक आयोग, निर्वाचन सदन, अशोका रस्ता, नवी दिल्ली ११० ००१,
* सचिव, राज्य निवडणूक आयोग, नवीन प्रशासन भवन, मंत्रालयासमोर, मुंबई,
* सचिव, इंडियन बँक्स असोसिएशन, स्टेडियम हाऊस, ६ वा मजला, वीर नरीमन रोड, मुंबई ४०० ०२०,

  महासंचालक, माहिती व जनसंपर्क महासंचालनालय, मंत्रालय, मुंबई ४०० ०३२ (त्यांना विनंती करण्यात येते की, त्यांनी आवश्यक ते प्रसिद्धीपत्रक निर्गमित करावे, तसेच आकाशवाणी व दूरदर्शनद्वारे प्रसिद्धी द्यावी.)

  निवडनस्ती / सामान्य प्रशासन विभाग-२९

---

* पत्राद्वारे

सु. ज. तुमराम,
कक्ष अधिकारी, सामान्य प्रशासन विभाग.

IQAC In-charge
Rajiv Gandhi College of Engineering
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Rajiv Gandhi College of Engineering
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क्रमांक सार्वसु. ११२१/प्र.क्र. ९७/कार्या-२९
सामान्य प्रशासन विभाग
मादाम कामा मार्ग, हुतात्मा राजगुरू चौक,
मंत्रालय, मुंबई ४०० ०३२,
दिनांक २ डिसेंबर २०२१.

प्रति,

मा. राज्यपाल यांचे प्रधान सचिव,
मा. राज्यपाल यांचे परिवार प्रबंधक,
मा. सभापती/मा. अध्यक्ष, महाराष्ट्र विधानपरिषद/विधानसभा, यांचे सचिव,
मा. उप सभापती/मा. उपाध्यक्ष, महाराष्ट्र विधानपरिषद/विधानसभा, यांचे खाजगी सचिव,
मा. मुख्यमंत्री यांचे प्रधान सचिव, मंत्रालय, मुंबई,
मा. उप मुख्यमंत्री यांचे सचिव, मंत्रालय, मुंबई,
सर्व मा. मंत्री/मा. राज्यमंत्री यांचे खाजगी सचिव / स्वीय सहायक,
मा. विरोधी पक्ष नेता, महाराष्ट्र विधानपरिषद / विधानसभा, यांचे स्वीय सहायक,
मुख्य सचिव, सामान्य प्रशासन विभाग, मंत्रालय, मुंबई,
मंत्रालयीन विभागातील सर्व अपर मुख्य सचिव, प्रधान सचिव व सचिव, सर्व मंत्रालयीन विभाग, मंत्रालय, मुंबई,
सर्व मंत्रालयीन विभाग, मंत्रालय, मुंबई,
* महाप्रबंधक, उच्च न्यायालय, मुंबई,
* प्राथोनोटरी व सिनियर मास्टर, मूळ शाखा, उच्च न्यायालय, मुंबई,
* प्रबंधक, अपील शाखा, उच्च न्यायालय, मुंबई,
* सचिव, महाराष्ट्र लोकसेवा आयोग, मुंबई,
* सचिव, महाराष्ट्र विधानमंडळ सचिवालय, मुंबई / नागपूर,
* प्रबंधक, लोक आयुक्त व उप लोक आयुक्त यांचे कार्यालय, मुंबई,
मुख्य आयुक्त, राज्य माहिती आयोग, मुंबई,
मुख्य आयुक्त, सेवा हक्क कायदा, मुंबई,
सर्व विभागीय आयुक्त,
सर्व जिल्हाधिकारी,
सर्व जिल्हा परिषदांचे मुख्य कार्यकारी अधिकारी,
मंत्रालयाच्या निरनिराळ्या विभागांखालील सर्व विभाग प्रमुख /कार्यालय प्रमुख,
महालेखापाल, लेखा व अनुज्ञेयता, महाराष्ट्र-१, मुंबई,
महालेखापाल, लेखा व अनुज्ञेयता, महाराष्ट्र-२, नागपूर,
महालेखापाल, लेखापरीक्षा, महाराष्ट्र-१, मुंबई,
महालेखापाल, लेखापरीक्षा, महाराष्ट्र-२, नागपूर,
उप महालेखापाल, भविष्य निर्वाह निधी कक्ष, मुंबई,
अधिदान व लेखा अधिकारी, मुंबई,
कोषागारी व लेखा परीक्षा अधिकारी, मुंबई,

HOD In-Charge
Kanjule Harya, Tal. Pamer
Dist. Ahmednagar 414304

Rajiv Gandhi College of Engineering
Tal. Pamer, Dist. Ahmednagar
Kanjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Pamer, Dist. A'Nagar

सामान्य प्रशासन विभाग

मादाम कामा मार्ग, हुतात्मा राजगुरू चौक, मंत्रालय, मुंबई ४०० ०३२, दिनांक २ डिसेंबर २०२०१

अधिसूचना

क्रमांक सार्वसु. ११२१/प्र.क्र. ९७/कार्या-२९.— शासनाने सन २०२२ सालासाठी राज्य शासकीय कार्यालयांना एकूण १६ सार्वजनिक सुट्ट्या परक्राम्य संलेख अधिनियम, १८८१ (१८८१ चा २६) कलम २५ करिता अधिसूचना क्रमांक सार्वसु. ११२१/प्र.क्र. ९७/कार्या-२९, दिनांक २ डिसेंबर २०२१ अन्वये अधिसूचित केल्या आहेत.

२. राज्य शासनाने आता खालील अतिरिक्त सुट्टी राज्य शासकीय कार्यालये, राज्य शासनाचे उपक्रम तसेच महानगरपालिका, नगर परिषद, नगर पंचायत, जिल्हा परिषद, पंचायत समिती आणि ग्रामपंचायत यांच्यासाठी जाहीर करण्याचा निर्णय घेतला आहे :—

अ. क्र.	सुट्टीचा दिवस	इंग्रजी तारीख	भारतीय सौर दिनांक	वार
(१)	(२)	(३)	(४)	(५)
१	भाऊबीज	२६ ऑक्टोबर २०२२	४ कार्तिक, शके १९४४	बुधवार

महाराष्ट्राचे राज्यपाल यांच्या आदेशानुसार व नावाने,

ज. जि. वळवी,
शासनाचे उप सचिव.

IQAC In-charge
Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering
Tal. Parner, Dist. Ahmednagar
Kanjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Parner, Dist. A'Nagar

The Pay and Accounts Officer, Mumbai,

The Resident Audit Officer, Mumbai,

* The Chief Accountant, Reserve Bank of India, Mumbai,

* The Manager, Reserve Bank of India, Mumbai,

* The Secretary, Mumbai Port Trust,

All Municipal Commissioners,

* The Chief Secretaries of all State Governments,

* All Ministeries of the Government of India, New Delhi,

* The General Manager, Central Railway, Chhatrapati Shivaji Maharaj Terminus, Mumbai,

* The General Manager, Western Railway, Churchgate, Mumbai,

* The Collector of the Customs, Mumbai,

* The Commissioner of Income Tax, Mumbai,

* The Collector of Central Excise, Mumbai,

* The Regional Passport Officer, Worli, Mumbai,

* The Special Commissioner, Maharashtra Sadan, New Delhi,

* Director, Maharashtra Information Centre, New Delhi,

* The Manager, Industrial Development Bank of India, I.D.B.I. Tower, Cuffe Parade, Colaba, Mumbai-05,

* The Secretary, Election Commission of India, Nirvachan Sadan, Ashoka Road, New Delhi 110 001,

* The Secretary, State Election Commission, New Administrative Building, Mumbai,

* The Secretary, Indian Bank's Association, Stadium House, 6th Floor, Veer Nariman Road, Mumbai-20.

The Director General of Information and Public Relations, Mumbai 400 032,

(With a Request to give wide publicity by issuing a press note as also through TV and Radio.)

Select File, General Administration Department, Desk-XXIX.

* By letter

S. J. TUMRAM,
Desk Officer/G.A.D.

IQAC In-charge
Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Pamer
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering
Tal. Pamer,
Dist.
Ahmednagar
Kanjule Harya

PRINCIPAL
Rajiv Gandhi College of Engineering
Kanjule Harya, Tal. Pamer, Dist. A'Nagar

No. PHD-1121/C.R. 97/Desk-29,
GENERAL ADMINISTRATION DEPARTMENT
Madam Cama Road,
Hutatma Rajguru Chowk,
Mantralaya, Mumbai 400 032,
dated 2nd December 2021.

To,

The Principal Secretary to the Hon. Governor,

The Comptroller, Governor's Household, Mumbai,

The Secretary, to Hon. Chairman/Hon. Speaker, Maharashtra Legislative Council/Assembly,

The Private Secretary, to Hon. Deputy Chairman/Hon. Deputy Speaker, Maharashtra Legislative Council / Assembly,

The Principal Secretary, to the Hon. Chief Minister, Mantralaya, Mumbai,

The Secretary, to the Hon. Deputy Chief Minister, Mantralaya, Mumbai,

The Private Secretaries / Personal Assistants to all Hon. Ministers / Hon. Ministers of State,

The Private Secretaries / Personal Assistants to Hon. Leader of Opposition, Maharashtra Legislative Assembly / Council,

The Chief Secretary, General Administration Department, Mantralaya, Mumbai,

All Additional Chief Secretaries, Principal Secretaries and Secretaries to all Departments of Mantralaya, Mumbai,

All Departments of Mantralaya, Mumbai,

* The Registrar General, High Court, Mumbai,

* The Prothonotary and Senior Master, Original Side, High Court, Mumbai,

* The Registrar, High Court, Appellate Side, Mumbai,

* The Secretary, Maharashtra Public Service Commission, Mumbai,

* The Secretary, Maharashtra Legislature Secretariat, Mumbai / Nagpur,

* The Registrar, Office of the Lokayukta and Upa-Lokayukta, Mumbai,

* Chief Commissioner, State Information Commission, Mumbai,

* Chief Commissioner, Right to Service, Mumbai,

All Divisional Commissioners,

All Collectors,

All Chief Executive Officers of Zilla Parishads,

Head of the Department / Head of the Office under all Departments of Mantralaya,

The Accountant General, Accounts and Entitlement, Maharashtra-I, Mumbai,

The Accountant General, Accounts and Entitlement, Maharashtra-II, Nagpur,

The Accountant General, Audit, Maharashtra-I, Mumbai,

The Accountant General, Audit, Maharashtra-II, Nagpur,

* Deputy Accountant General, Provident Fund Branch, Mumbai.

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(C) The following Holiday's falls on Saturday and Sunday—*conted.*

(1)	(2)	(3)	(4)	(5)
4	Maharashtra Din	1st May, 2022	11 Vaishakha, 1944	Sunday
5	Bakri ID (Id-Uz-Zuha)	10th July, 2022	19 Ashadha, 1944	Sunday
6	Mahatma Gandhi Jayanti	2nd October, 2022	10 Ashvina, 1944	Sunday
7	Id-E-Milad	9th October, 2022	17 Ashvina, 1944	Sunday
8	Christmas	25th December, 2022	4 Pausha, 1944	Sunday

The holidays listed under (A) above are notified as public holidays under section 25 of the Negotiable Instruments Act, 1881 (XXVI of 1881).

By order and in the name of the Governor of Maharashtra,

J. J. VALVI,
Deputy Secretary to Government.

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GENERAL ADMINISTRATION DEPARTMENT

Mantralaya, Madam Cama Road, Hutatma Rajguru Chowk
Mumbai 400 032, dated the 2nd December 2021

PUBLIC HOLIDAYS—2022

NOTIFICATION

No. PHD. 1121/C.R. 97/Desk-29.— In exercise of the powers entrusted to it by the Government of India, Ministry of Home Affairs *vide* its Notification No.39/I/68/JUDI-3, dated the 8th May 1968, the Government of Maharashtra hereby declares the following days as Public Holidays in the State of Maharashtra during the calendar year 2022 :—

(A) Public Holidays

Sr. No.	Holiday	Date	Saka Date	Day
(1)	(2)	(3)	(4)	(5)
1	Republic Day	26th January, 2022	6 Magh, 1943	Wednesday
2	Mahashivratri	1st March, 2022	10 Phalguna, 1943	Tuesday
3	Holi (Second Day)	18th March, 2022	27 Phalguna, 1943	Friday
4	MahavirJayanti	14th April, 2022	24 Chaitra, 1944	Thursday
5	Dr.Babasaheb Ambedkar Jayanti	14th April, 2022	24 Chaitra, 1944	Thursday
6	Good Friday	15th April, 2022	25 Chaitra, 1944	Friday
7	Ramzan-Id(Id-Ul-Fitr) (Shawal-1)	3rd May, 2022	13 Vaishakha, 1944	Tuesday
8	Buddha Pournima	16th May, 2022	26 Vaishakha, 1944	Monday
9	Moharum	9thAugust, 2022	18 Shravana, 1944	Tuesday
10	Independence Day	15th August, 2022	24 Shravana, 1944	Monday
11	Parsi New Year (Shahenshahi)	16th August, 2022	25 Shravana, 1944	Tuesday
12	Ganesh Chaturthi	31st August, 2022	9 Bhadra, 1944	Wednesday
13	Dasara	5th October, 2022	13 Ashvina, 1944	Wednesday
14	Diwali Amavasya (LaxmiPujan)	24th October, 2022	2 Kartika, 1944	Monday
15	Diwali (Bali Pratipada)	26th October, 2022	4 Kartika, 1944	Wednesday
16	Guru Nanak Jayanti	8th November, 2022	17 Kartika, 1944	Tuesday

(B) For Banks

1	To enable to Banks to close their yearly accounts.	1st April 2022	11 Chaitra, 1944	Friday

Above holiday is limited for the Banks only. This holiday is not admissible to the Government Offices.

(C) The following Holiday's falls on Saturday and Sunday

(1)	(2)	(3)	(4)	(5)
1	Chhatrapati Shivaji Maharaj Jayanti	19th February, 2022	30 Magh, 1943	Saturday
2	Gudhi Padwa	2nd April, 2022	12 Chaitra, 1944	Saturday
3	Ram Navami	10th April, 2022	20 Chaitra, 1944	Sunday

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* मुख्य लेखापाल, रिझर्व्ह बँक ऑफ इंडिया, मुंबई,
* व्यवस्थापक, रिझर्व्ह बँक ऑफ इंडिया, मुंबई,
* सचिव, मुंबई पोर्ट ट्रस्ट, मुंबई,

  आयुक्त, सर्व महानगरपालिका,
* सर्व राज्यांचे मुख्य सचिव,
* भारत सरकारची सर्व मंत्रालये, नवी दिल्ली,
* महाव्यवस्थापक, मध्य रेल्वे, छत्रपती शिवाजी महाराज टर्मिनस, मुंबई,
* महाव्यवस्थापक, पश्चिम रेल्वे, चर्चगेट, मुंबई,
* समाहारक, सीमा शुल्क, मुंबई,
* आयकर आयुक्त, मुंबई,
* समाहारक, केंद्रीय उत्पादन शुल्क, मुंबई,
* प्रादेशिक पारपत्र अधिकारी, वरळी, मुंबई,
* विशेष आयुक्त, महाराष्ट्र सदन, नवी दिल्ली,
* संचालक, महाराष्ट्र परिचय केंद्र, नवी दिल्ली,
* व्यवस्थापक, इंडस्ट्रियल डेव्हलपमेंट बँक ऑफ इंडिया, आय.डी.बी.आय.टॉवर, कफ परेड, कुलाबा, मुंबई-०५,
* सचिव, भारत निवडणूक आयोग, निर्वाचन सदन, अशोका रस्ता, नवी दिल्ली ११० ००१,
* सचिव, राज्य निवडणूक आयोग, नवीन प्रशासन भवन, मंत्रालयासमोर, मुंबई,
* सचिव, इंडियन बँक्स असोसिएशन, स्टेडियम हाऊस, ६ वा मजला, वीर नरीमन रोड, मुंबई-२०,

  महासंचालक, माहिती व जनसंपर्क महासंचालनालय, मंत्रालय, मुंबई ४०० ०३२ (त्यांना विनंती करण्यात येते की, त्यांनी आवश्यक ते प्रसिद्धीपत्रक निर्गमित करावे, तसेच आकाशवाणी व दूरदर्शनद्वारे प्रसिद्धी द्यावी.)

  निवडनस्ती / सामान्य प्रशासन विभाग-२९

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* पत्राद्वारे

सु. ज. तुमराम,
कक्ष अधिकारी, सामान्य प्रशासन विभाग.

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Department of Mechanical Engineering

Vision:

Empowering rural youth through very high standards quality education, research and innovations, who in turn shall contribute to the advancement of society and humankind.

Mission:

M1: To Impart quality education to the students and enhancing their skills to make them globally competitive mechanical engineers.

M2: To maintain vital, state-of-the-art research facilities to provide its students and faculty with opportunities to create, interpret, apply and disseminate knowledge.

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Department of Computer Engineering

Vision:

To impart quality education for producing highly talented globally recognizable technocrats and entrepreneurs with sound ethics, latest knowledge, and innovative ideas in Computer Engineering to meet industrial needs and societal expectations.

Mission:

M1: To impart high standard value-based technical education in all aspects of Computer Engineering through the state of the art infrastructure and innovative approach.

M2: To produce ethical, motivated, and skilled engineers through theoretical knowledge and practical applications.

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Department of Electrical Engineering

Vision:

To achieve academic excellence in Electrical Engineering by imparting in depth knowledge to the students, facilitating research activities and cater to the ever changing industrial demands, global and social needs.

Mission:

M1: To impart quality engineering education in Electrical Engineering.

M2: To provide technical expertise along with professional ethics as per societal needs.

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Department of Electronics and Telecommunication Engineering

Vision:

To achieve academic excellence in Electronics and Telecommunication Engineering by imparting in depth knowledge to the students, facilitating research activities and cater to the ever changing industrial demands, global and social needs.

Mission:

M1: To impart quality engineering education in Electrical Engineering.

M2: To provide technical expertise along with professional ethics as per social needs.

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Savitribai Phule Pune University

UG CHOICE BASED CREDIT SYSTEM



RULES AND REGULATIONS

FOR

UNDER GRADUATE ROGRAMME IN ENGINEERING

UNDER

FACULTY OF SCIENCE AND TECHNOLOGY

WITH EFFECTIVE FROM A.Y. 2019-20

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Course Structure, Guidelines, Rules and Regulations

Preamble

Economic progress of country is strongly linked with quality of technical education. Engineering education is gaining new heights and it contributes substantial share in overall education system. Engineering graduates are to be educated and trained with a view of employability and sustainability. With the advent of technology and ever-changing expectations from the Industry and Society, revision of curriculum is need of the day, making it contemporary and relevant. In a bid to fine tune our technical education system to the global standards & practices, the Credit-Grade based performance and assessment system has been already implemented with effect from June 2015 onwards for all the Under Graduate Programme (UG) under the Faculty of Science & Technology.

To fulfill the necessities, the youngsters pursuing engineering studies need to be well equipped and acquaint with the latest technological trends and industrial requirements. This is possible only when the students undergo studies with an updated and evolving curriculum to match global scenario. The faculty of Science & Technology has shouldered the idea of incorporating latest advances and to upgrade the course contents with latest and relevant topics and know-how. Accordingly the new structure and curriculum are being introduced to be implemented from the academic year 2019-20 for First Year Engineering and the process will continue for subsequent years for second, third and fourth year engineering.

General Guidelines

1. All undergraduate programmes in Engineering under faculty of Science & Technology will be of **four years** duration and **eight semesters**.
2. The total number of credits required to earn for the **completion of the programme is 170 credits** in a minimum period of **eight semesters**.
3. All UG programme, under Faculty of Science & Technology shall be offered with **170 credit**; one credit is approximately equivalent to 15 contact hours.
4. Assessments in Choice based Credit System consists of
   A) In-semester examination
   B) End-semester examination
   C) Continuous assessment for various examination heads.
   Assessment and Evaluation is to be done as per guidelines provided by competent authority.
5. Semester 1 and semester 2 will be part of First Year of Engineering (FE),
   Semester 3 and semester 4 will be part of Second Year of Engineering (SE),
   Semester 5 and semester 6 will be part of Third Year of Engineering (TE),
   Semester 7 and semester 8 will be part of Final Year of Engineering (BE)
6. **Induction Program**

   Induction programme for first year students is introduced to familiarize them to the new environment and encourage them to learn beyond classrooms. Objective is to help new students adjust and feel comfortable in the new environment, inculcate in them the ethos and culture of the institution, help them build bonds with other students and faculty members, and expose them to a sense of larger purpose and self exploration. Induction Program should be preferably of 3 weeks **(2 weeks at beginning first semester and 1 week at the beginning of second semester)**. In order to implement the (SIP) in the College the following activities can be taken at College.

   - Physical Activity: - This would involve a daily routine of physical activity with games and sports.
   - Creative Arts: - Every students would chose one skill related to arts whether visual arts or performing arts.
   - Mentoring and Universal Human values:-Mentoring and connecting the students with faculty members and other students is the most important part of student induction. This can be effectively done by forming a group of 22-24 students with a

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faculty mentor each. This can be implemented through group discussion and real life activities rather than only lecturing.

- Familiarization with College, Department and Branch :-The incoming student should be told about the credit, grading system and scheme of the examination. They should be explained how the study in College differs from the study in school. They should be taken on College tour and shown important facilities such as library, canteen, gymkhana etc. They should be shown their own department.
- Literary Activity:-Literary Activity would compass reading book, writing a summary, debating, enacting a play etc.
- Proficiency modules: - The modules can be designed to overcome some critical lacunas that students might have like English Speaking, Computer familiarity etc.
- Lectures by Eminent People: - The lectures of Eminent people be organized to expose the students to social activity and public life.
- Visit to local Area:-A couple of visits to the landmarks of the city or a hospital are orphanage could be organized.
- Extracurricular activities in College:-The new students should be introduced to the extracurricular activities at the College.
- Feedback and Report on the program:-Students should be asked to give their mid program Feedback wherein each group of 22-24 students should be asked to prepare a single report on their experience of the program.

To summarize the above activity the sequence of activities can be planned as given below:

- Address by Principal, HOD's and other functionaries and welcome the new students along with their parents.
- The branch wise allocation of students to be done and a group of 22-24 students is to be formed along with one faculty as mentor.
- A detail time table of various activities is to be prepared and displayed for all students. The timetable should give details of location and details of faculty in charge of the activity.
- The visit to local areas can be arranged on Saturdays.
- The various activities to be carried out can be divided into three phases :-
  1. Initial phase:- Which may include Address by Principal, HOD's and other functionaries College and Dept Visit, interaction with parents Forming of students group and assigning of mentor mentee.
  2. Regular Phase:- This phase may include the activities such as creative arts / universal Human values Games & Sports in the morning session and in the afternoon session. Literary activities, Proficiency module, Lectures & workshop, Extracurricular Activities etc. can be scheduled.
  3. Closing Phase:- This phase may include taking feedback of students, preparation of Report by each group, Test of creative Arts, Human Values can be taken.

These are summarized guidelines to be given to the student inducing induction programme (SIP). Please refer SIP Manual published by AICTE for detail guidelines[2].

7. **Project based Learning:**

For better learning experience, along with traditional classroom teaching and laboratory work based learning, project based learning has been introduced with an objective to motivate students to learn by working in group (**5 to 6 students per group**) courteously to

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solve a problem. Students may undertake a problem which can be theoretical, practical, social, technical, symbolic, cultural and/or scientific and grows out of students' wondering within different disciplines and professional environments. A chosen problem has to be **exemplary**. The problem may involve an interdisciplinary approach in both the analysis and solving phases. Such practice will also increase their capacity and learning through shared cognition. [3] [5].

8. **Laboratory Course:**
   The laboratory work will be based on completion of experiments/ lab assignments confined to the related companion courses of the semester.
9. **Seminar:**
   Seminar shall be on state-of-the-art topic selected by student and approved by the authority. The student shall submit the duly certified seminar report in standard format, for satisfactory completion of the work by the concerned Guide and head of the department/institute.
10. **Project Work at Final Year:**
    Project work in the seventh semester is an integral part of the project work. The project work shall be based on the knowledge acquired by the student during the graduation and preferably it should meet and contribute towards the needs of the society. The project aims to provide an opportunity of designing and building complete system or subsystems based on area where the student likes to acquire specialized skills. The student shall prepare the duly certified final report of project work in standard format for satisfactory completion of the work by the concerned guide and head of the Department/Institute.
11. **Internship**
    Internships are educational and career development opportunities, providing practical experience in a field or discipline. Internships are far more important as employers are looking for employees who are properly skilled. They are structured, short-term, supervised placements often focused around particular tasks or projects with defined time scales. Core objective is to expose technical students to the industrial environment, which cannot be simulated/experienced in the classroom and hence creating competent professionals in the industry and to understand the social, economic and administrative considerations that influence the working environment of industrial organizations. Student may choose to undergo Internship at Industry/Govt./NGO/MSME/Rural Internship/ Innovation/ IPR/Entrepreneurship. Student may choose either to work on innovation or entrepreneurial activities resulting in start-up or undergo internship with industry/NGO's/Government organizations/Micro/Small/ Medium enterprises to make themselves ready for the industry [4]. Conduction, monitoring, assessment, and evaluation is to be done as per guidelines provided by AICTE [4].
12. **Abbreviations:**
    TW: Term Work **TH:** Theory **OR:** Oral **TUT**: Tutorial **PR**: Practical **Sem:** Semester, **PROJ**: Project Work, **ESE**: End Semester Examination **ISE**: In Semester Examination, CA: Continuous Assessment, **DW:** Drawing.

Definition of Credit [1]:**

1 Hour Lecture (L) per week	1 credit for 1 Hour
Tutorial (T) per week	1 credit for 1 Hour
Practical (P) per week 2 Hours Practical(Lab)/week	1 credit for 2 Hours

** The head of Tutorial and Practical (as a special case) may be merged for common credit with the permission of authority.

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This document includes following sections-

I. Undergraduate Engineering Programme Structure
II. Examination Scheme
III. Structure of Question Paper
IV. Assessment
V. Rules of Passing
VI. Rules of ATKT (Allowed To Keep Term)
VII. Assessment and Grade Point Average
VIII. Performance Indices
IX. Result
References

1) UG Programme Structure and Credit Distribution:

Each B.E. / B. Tech. programme is of 4 years duration. The minimum total number of credit requirement for each programme is 170. In the structure, the credits are distributed over 8 semesters. The open elective included, gives the student a wide choice of subjects from other programme. The Credit structure for Bachelor of Engineering programme is given below in Table 1.

TABLE 1: Credit Structure for UG programme in Engineering

Credits offered									
Course Work	Semester								Total
	I	II	III	IV	V	VI	VII	VIII	
Professional Theory Courses *	17	16	15	15	12	06	06	06	90
Elective Courses^	-	-	-	-	03	03	06	06	18
Laboratory Courses/ continuous assessment/TW	05	04	07	05	05	05	06	02	42
Seminar &Communication Skills	-	-	-		01	01		-	02
Project Work	-	-	-	-	-	02	02	06	10
Project Based Learning		02		02	--	--	--	--	04
Internship$	--	--	--	--		04	--	--	04
Total	22	22	22	22	21	21	20	20	170
Mandatory Non_Credit_Graded_Audit Course# per semester									
Induction Program at first year Engineering	3 week duration (2 week at the beginning of Sem-I & 1 week at the beginning of Sem -II)								

*: Professional Courses include - Engineering Science Courses including Workshop, Drawing, basics of Electrical/Electronics/Mechanical/Computer/Civil Engineering, Humanities and Social Sciences including Management/Finance Management courses, Basic Science courses and Professional core courses.

^: Professional Elective courses relevant to chosen specialization/branch and Open Electives (interdisciplinary and /or emerging technology)

#: There will be mandatory **Non_Credit Course** per Semester viz- Environmental Studies, Indian Constitution, Essence of Indian Traditional Knowledge, financial Management and courses introduced time to time by university or apex bodies.

$: Internship to be completed after semester 5 and to be assessed in semester 6. Internship will be of 4 to 6 weeks maximum.

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TABLE -2 First Engineering _Structure for Semester-I

Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks						Credits			
		Theory	Practical	Tutorial	ISE	ESE	TW	PR	OR	Total	TH	PR	TUT	Total
107001	Engineering Mathematics-I	03	--	01	30	70	25	--	--	125	03	--	01	04
107002/ 107009	Engineering Physics / Engineering Chemistry	04	02	--	30	70	--	25	--	125	04	01	--	05
102003	Systems in Mechanical Engineering	03	02	--	30	70	--	25	--	125	03	01	--	04
103004 / 104010	Basic Electrical Engineering / Basic Electronics Engineering	03	02	--	30	70	--	25	--	125	03	01	--	04
110005/ 101011	Programming and Problem Solving / Engineering Mechanics	03	02	--	30	70	--	25	--	125	03	01	--	04
111006	Workshop[@]	--	02	--	--	--	--	25	--	25	--	01	--	01
	Total	16	10	01	150	350	25	125	--	650	16	05	01	22
101007	Audit Course 1[&]	02	Environmental Studies-I											

Induction Program : 2 weeks at the beginning of semester-I and 1 week at the beginning of semester-II

TABLE -3 First Engineering_ Structure for Semester-II

Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks						Credits			
		Theory	Practical	Tutorial	ISE	ESE	TW	PR	OR	Total	TH	PR	TUT	Total
107008	Engineering Mathematics-II	04	--	01	30	70	25	--	--	125	04	--	01	05
107002/ 107009	Engineering Physics/ Engineering Chemistry	04	02	--	30	70	--	25	--	125	04	01	--	05
103004 / 104010	Basic Electrical Engineering / Basic Electronics Engineering	03	02	--	30	70	--	25	--	125	03	01	--	04
110005/ 101011	Programming and Problem Solving / Engineering Mechanics	03	02	--	30	70	--	25	--	125	03	01	--	04
102012	Engineering Graphics[Ω]	01	02	01	--	50	25		--	75	01	01		02
110013	Project Based Learning[§]	--	04	--	--	--	25	50	--	75	--	02	--	02
	Total	15	12	02	120	330	75	125	--	650	15	05	02	22
101014	Audit Course 2[&]	02	Environmental Studies-II											
107015		--	Physical Education-Exercise and Field Activities											

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Instructions:

- PR/Tutorial must be conducted in three batches per division.
- Minimum number of required Experiments/Assignments in PR/ Tutorial shall be carried out as mentioned in the syllabi of respective subjects.
- Every Student should appear for Engineering Physics, Engineering Chemistry, Engineering Mechanics, Basic Electrical Engineering, Basic Electronics Engineering, Programming and Problem solving during the year.
- College is allowed to distribute Teaching workload of subjects Engineering Physics, Engineering Chemistry, Basic Electrical Engineering, Basic Electronics Engineering, Engineering Mechanics, Programming and Problem solving in semester I and II dividing number of FE divisions into two appropriate groups.
- Assessment of tutorial work has to be carried out as term-work examination. Term-work Examination and Practical Examination at first year of engineering course **shall be internal continuous assessment only.**

Ω 1 Credit for Engineering Graphics theory has to be awarded on the basis of End semester examination of 50 marks while 1 credit of tutorial and practical **shall be awarded on internal continuous assessment only**.

@ Credit for the course of workshop practical is to be awarded on the basis of continuous assessment / submission of job work.

§ Project based learning (PBL) requires continuous mentoring by faculty throughout the semester for successful completion of the tasks selected by the students per batch. While assigning the teaching workload a load of 2 Hrs/week/batch needs to be considered for the faculty involved. The Batch needs to be divided into sub-groups of 5 to 6 students. Assignments / activities / models/ projects etc. under project based learning is carried throughout semester and Credit for PBL has to be awarded on the basis of internal continuous assessment and evaluation at the end of semester.

& Audit course for Environmental Studies and II (As per D.O.No.F.13-1/2000 (EA/ENV/COS-I) dated 14 May, 2019) is mandatory but non-credit course. Examination has to be conducted at the end of Sem I & II respectively for award of grade at college level. Grade awarded for audit course shall not be calculated for grade point &CGPA.

Audit course for Physical education is mandatory non-credit course. Examination has to be conducted at the end of Semester for award of grade at college level. Grade awarded for audit course shall not be calculated for grade point &CGPA.

TABLE -4 Structure for Semester-III

Subject Head	Duration (Hrs/week)	ISE	ESE	PR/OR Marks	TW Marks	Credits
Theory	15	150	350			15
PR/OR/Tut	14			100	100	07
Total	29	150	350	100	100	22

TABLE -5 Structure for Semester-IV

Subject Head	Duration (Hrs/week)	ISE	ESE	PR/OR Marks	TW Marks	Credits
Theory	15	150	350			15
PR/OR/Tut	10			100	50	05
Project based learning	04				50	02
Total	29	150	350	100	100	22

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TABLE -6 Structure for Semester-V

Subject Head	Duration (Hrs/week)	ISE	ESE	PR/OR Marks	TW Marks	Credits
Theory	15	150	350			15
PR/OR/Tut	10			100	50	05
Seminar	01				50	01
Total	26	150	350	100	100	21

TABLE -7 Structure for Semester-VI

Subject Head	Duration (Hrs/week)	ISE	ESE	PR/OR Marks	TW Marks	Credits
Theory	12	120	280			12
PR/OR/Tut	10			100	100	05
Internship	04				100	04
Total	26	120	280	100	200	21

TABLE -8 Structure for Semester-VII

Subject Head	Duration (Hrs/week)	ISE	ESE	PR/OR Marks	**TW Marks**	Credits
Theory	12	120	280			12
PR/OR/Tut	08			100	50	04
Moocs etc.					50	02
Project Stage-1	04			50	50	02
Total	24	120	280	150	150	20
Credits of MOOCs Courses shall be awarded based on completion of relevant course (recommended by college / University) of equivalent or more credits and submission of Certificate to college. College shall submit the same to university through online process to be followed in due course.						

TABLE -9 Structure for Semester-VIII

Subject Head	Duration (Hrs/week)	ISE	ESE	PR/OR Marks	TW Marks	Credits
Theory	12	120	280			12
PR/OR/Tut	04			100	50	02
Project Stage-2	12			50	100	06
Total	28	120	280	150	150	20

Note: Any Course offered (Semester-III to Semester-VIII) should be of minimum 2 credits.

2. Examination Scheme:

R.21

The theory examination shall be conducted in two phases for all the subjects of semester-I to semester-VIII.

R2.1.1: Phases of Examination

Phase I as In-Semester Examination of 30 marks written theory examination based on Unit-1 and Unit-2 of course syllabus scheduled by university

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Phase II as End-Semester Examination of 70 marks written theory examination based on unit number 3, 4, 5, 6 of course syllabus scheduled by university.

3. Structure of Question Paper:

R3.1 Two units (Unit1 and Unit 2) will be covered for 30 Marks for Phase 1 (ISE). Equal weightage will be given to both the units (15 Marks each)

R3.2 Four units (Unit 3, Unit 4, Unit 5 and Unit 6) shall have weightage of 70 Marks for Phase 2 (ESE). Marks weightage for the unit 3, unit 4, unit 5 and unit 6 shall be as shown in Table no.10

- Marks weightage to be given for questions per unit is as –

TABLE -10. Marks weightage per unit for examination

Unit Number	Phase I ISE Marks Weightage	Phase II ESE Marks Weightage
1	15	--
2	15	--
3		18
4	-	17
5	--	18
6	-	17

R3.3 Paper will have only one section and two questions for ISE and four questions for ESE. For each question there will be alternate Question based on same unit and of the same marks.

R3.4 Framing of questions should be according to Anderson/Blooms Taxonomy and disseminated through the question papers with a mention of course outcomes as well.

4. Assessment

A. Theory:

R4.1

ISE assessment will be done at the centralized assessment programme (CAP) Centre of the College by the Expert who is appointed as an examiner for the courses as per 48(3) panel of Maharashtra public university act 2016.

R4.2

ESE assessment will be done at the CAP Centre designated by the University by the Expert who is appointed as an examiner for the subject as per 48(3) panel.

B. Term work:

R4.3

Term Work assessment shall be conducted for the Lab Practice, Project, Tutorials and Seminar. Term work is continuous assessment based on work done, submission of work in the form of report/journal, timely completion, attendance, and understanding. It should be assessed by subject teacher of the institute for first to sixth semester and by the external examiner at seventh and eighth semester. At the end of the semester, the final grade for a Term Work shall be assigned based on the performance of the student and is to be submitted to the Savitribai Phule Pune University (SPPU). A student who fails in the Term Work on account of unsatisfactory performance shall be given F grade and on the account of inadequate attendance shall be given FX grade. Failing in a particular course Term Work shall not be the criteria for detention in the semester.

C. Practical/Oral/Presentation:

R.4.5

Practical/Oral/presentation is to be conducted and assessed jointly by internal and external examiners. The performance in the Practical/Oral/Presentation examination shall be assessed by at

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least one pair of examiners appointed as examiners by the Savitribai Phule Pune University. The examiners will prepare the mark / grade sheet in the format as specified by the Savitribai Phule Pune University and authenticate it.

D. Project Based Learning

R4.6

It is recommended that the all activities are to be record and regularly, regular assessment of work to be done and proper documents are to be maintained at college end by both students as well as mentor (you may call it PBL work book). Continuous Assessment Sheet (CAS) is to be maintained by all mentors/department and institutes.

Recommended parameters for assessment, evaluation and weightage:

- Idea Inception **(5%)**
- Outcomes of PBL/ Problem Solving Skills/ Solution provided/ Final product **(50%)** (Individual assessment and team assessment)
- Documentation (Gathering requirements, design & modeling, implementation/execution, use of technology and final report, other documents) **(25%)**
- Demonstration (Presentation, User Interface, Usability etc) **(10%)**
- Contest Participation/ publication **(5%)**
- Awareness /Consideration of -Environment/ Social /Ethics/ Safety measures/Legal aspects **(5%)**

PBL workbook will serve the purpose and facilitate the job of students, mentor and project coordinator. This workbook will reflect accountability, punctuality, technical writing ability and work flow of the work undertaken.

E. Internship

R4.7

Student may choose to undergo Internship at Industry/Govt./NGO/MSME/Rural Internship/ Innovation/ IPR/Entrepreneurship. Student may choose either to work on innovation or entrepreneurial activities resulting in start-up or undergo internship with industry/NGO's/Government organizations/Micro/Small/ Medium enterprises to make themselves ready for the industry[4].

Every student is required to prepare a maintain documentary proofs of the activities done by him. The evaluation of these activities will be done by Programme Head/Cell In-charge/ Project Head/ faculty mentor or Industry Supervisor based on- Overall compilation of internship activities, sub-activities, the level of achievement expected, evidence needed to assign the points and the duration for certain activities.

Based on internship the assessment and evaluation parameters may include as-

- Working for consultancy/ research project,
- Participation at Events (Technical / Business)
- Participation in innovation related completions for eg. Hackathon etc.),
- Contribution in Incubation/ Innovation/ Entrepreneurship Cell/ Institutional Innovation Council,
- Learning at Departmental Lab/Tinkering Lab/ Institutional workshop,
- Development of new product/ Business Plan/ registration of start-up,
- Participation in IPR workshop/Leadership Talks/ Idea/ Design/ Innovation/ Business Completion/ Technical Expos.

It is necessary to produce participation certificate, if applicable.

F. Seminar and Communication Skills

R4.8

Seminar is the first formal curricular activity at the UG level, where students are supposed to exhibit their communication skills and knowledge by undertaking the study of the chosen topics. Core objective is to explore the basic principles of communication (verbal and non-verbal) and

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active, empathetic listening, speaking and writing techniques. It exposes the student to new technologies, researches, products, and services.

Authorities/ examiner (optional) along with a guide would be assessing the seminar work based on various parameters which may include- Topic selection, Contents and Presentation, regularity, Punctuality and Timely Completion, Question and Answers, Report, Paper Presentation/Publication, Attendance and Active Participation in overall class activity.

G. Project Work at Final Year

R4.9

Progress of project work is monitored regularly on weekly project slot/project day. Regular interval presentations are to be arranged to review and assess the work. During process of monitoring and continuous assessment AND evaluation the individual and team performance is to be measured.
Project work is monitored and continuous assessment is done by guide and authorities. During university examination Internal examiner (preferably the guide) and External examiners jointly, evaluate the project work. Recommended performance measure parameters may include-Problem definition and scope of the project, Literature Survey, Appropriate Engineering approach used, Exhaustive and Rational Requirement Analysis, Comprehensive Implementation- Design, modeling, documentation, Usability, Optimization considerations(Time, Resources, Costing), Thorough Testing, Project Presentation and Demonstration(ease of use and usability), Social and environment aspects, Presentation of work in the form of Project Report(s), Understanding individual capacity, Role & involvement in the project, Team Work (Distribution of work, intra-team communication and togetherness), Participation in various contests, Publications and IPR, Manuals(Project Report, Quick reference, System, Installation guide) among other parameters.

5. Rules of Passing

R5.1

To pass the Term Work / Practical / Oral/ presentation the student has to earn Minimum of 40 percent marks in each respective examination head.

R5.2

To pass the Theory Subject head the student has to earn minimum of 40 percent marks in End-Semester examination and 40 percent total marks (In-Semester Examination and End-Semester Examination).

R5.3

The failing student can repeat the End-semester examination to pass the head in any semester and the In-Semester Examination marks will be retained as it is. OR the failing student can repeat for the End-Semester Examination as well as In-semester examination for the head of Even semester in the Even semester only and for the head of Odd semester in the Odd semester only for the theory head

R5.4

To earn credits of a course (Theory/term work/practical/oral/presentation) student must pass the course with minimum passing marks/grade.

R5.5

Student can apply only for the Revaluation/Photocopying of End-Semester theory examination.

6. Rules of ATKT (Allowed To Keep Term):

R6.1

A student can register for the third semester (SE), if he/she earns minimum 50% credits of the total of first and second semesters (FE).

R6.2

A student can register for the fifth semester (TE), if he/she earns minimum 50% credits of the total of third and forth semesters (SE) and all the credits of first and second semester (FE).

R6.3

A student can register for the seventh semester(BE), if he/she earns minimum 50% credits of the total of fifth and sixth semesters(TE) and all the credits of third and forth semester(SE).

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R6.4
A student will be awarded the bachelor's degree if he/she earns 170 credits and clears all the mandatory non credit courses in respective semesters

7. Assessment and Grade Point Average:

R7.1 Marks/Grade/Grade Point
A grade is assigned to each head based on marks obtained by a student in examination of the course. The marks obtained in In-semester and end-semester examination are considered together to calculate the grade of the course. These grades, their equivalent grade points are given in Table 11.

TABLE 11. Grade and Grade Point

Grade	Grade Point	Percentage of Marks Obtained	Remarks
O	10	90-100	Outstanding
A	9	80-89	Very Good
B	8	70-79	Good
C	7	60-69	Fair
D	6	50-59	Average
E	5	40-49	Below Average
F	0	Below 40	Fail
FX	**0**	--	Detained, Repeat the Course
IC	**0**	--	Incomplete Course-- Absent for Exam but continue for the course
AC	--	--	Audit Course Completed
ACN	--	--	Audit Course Not Completed

7. Passing Grade:

- The grades O, A, B, C, D, E are passing grades.
- A candidate acquiring any one of these grades in a course shall be declared as PASS. And student shall earn the credits for a course only if the student gets passing grade in that course.
- F Grade -The grade F shall be treated as a failure grade.
- The student with F grade will have to pass the concerned course by re-appearing for the examination.
- The student with F grade for any stage of the Project Work, will have to carry out additional work/ improvement as suggested by the examiners and re-appear for the examination.
- AC and ACN Grade -The student registered for audit course shall be awarded the grade AC after satisfactory completion of audit course and shall be included in the Semester grade report for that course, provided student has the minimum attendance as prescribed by the SPPU and satisfactory In-semester performance and secured a passing grade in that course. Student who is unable to complete audit course will be awarded as ACN grade.
- FX Grade-The grade FX in a course is awarded by the college, if a student does not maintain the minimum attendance in the Lecture / Tutorial class as prescribed by the SPPU and/or his performance during the semester is not satisfactory and/or he/she fails in the Term Work head of that course.
- The student with FX grade in a given course is not permitted to take the end of semester examination in that course. Such a student will have to re-register for the course.
- The student with F / FX in a course shall not be awarded any credits for that course.

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8. Performance Indices:

R8.1

The semester end grade sheet will contain grades for the courses along with titles and SGPA. Final grade sheet and transcript shall contain CGPA.

R8.2

SGPA -The performance of a student in a semester is indicated by a number called the Semester Grade Point Average (SGPA). The SGPA is the weighted average of the grade points obtained in all the courses, seminars and projects registered by the student during the semester.

Semester Grade Point Average (SGPA) $= \frac{\sum_{i=1}^{p} CiGi}{\sum_{i=1}^{p} Ci}$

$$\text{SGPA} = \frac{\sum GradePointsEarnedXCreditsForEachCourse}{TotalCredits}$$

For Example: suppose in a given semester a student has registered for five courses having credits C1, C2, C3, C4, C5 and his / her grade points in those courses are G1, G2, G3, G4, G5 respectively. Then students

$$\text{SGPA} = \frac{C1G1+C2G2+C3G3+C4G4+C5G5}{C1+C2+C3+C4+C5}$$

SGPA and CGPA is calculated up to two decimal places by rounding off.

R8.3

CGPA- The CGPA is the weighted average of the grade points obtained in all the courses (Theory/term work/practical/oral/presentation) of first semester to eighth semester for the students admitted in the First year and third to eighth semester for the students directly admitted at Second year.

CGPA is calculated in the same manner as the SGPA.

R8.4

In case of a student passing a failed course or in case of improvement, the earlier grade would be replaced by the new grade in calculation of the SGPA and CGPA.

9. Result:

R9.1

Based on the performance of the student in the semester examinations, the Savitribai Phule Pune University will declare the results and issue the Semester Grade sheets. The class shall be awarded to a student on the CGPA calculated. The award of the class shall be as per Table 12.

Table 12. CGPA and Class awarded

Sr. No.	CGPA	Class of the Degree Awarded
1.	7.75 or More than 7.75	First Class with Distinction
2.	6.75 or more but less than 7.75	First Class
3.	6.25 or more but less than 6.75	Higher Second Class
4.	5.5 or more but less than 6.25	Second Class

X. References

[1] https://www.aicte-india.org/sites/default/files/Vol%20I_UG.pdf

[2] https://www.aicte-india.org/sites/default/files/induction-guide-jun17-aicte%20(1).pdf

[3]https://www.aicteindia.org/sites/default/files/ FINAL%20BEST%20PRACTICES% 20 IN %20AICTE%20APPROVED%20INSTITUTUIONS.pdf

[4] https://www.aicte-india.org/sites/default/files/AICTE%20Internship%20Policy.pdf

[5] https://www.aicte-india.org/sites/default/files/ExaminationReforms.pdf

[6] https://www.aicte-india.org/education/model-syllabus

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Savitribai Phule Pune University
Faculty of Science & Technology



Curriculum

For

First Year
Bachelor of Engineering
(Choice Based Credit System)

(2019 Course)

(With Effect from Academic Year 2019-20)

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TABLE -1 First Engineering _Structure for Semester-I

Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks						Credits			
		Theory	Practical	Tutorial	ISE	ESE	TW	PR	OR	Total	TH	PR	TUT	Total
107001	Engineering Mathematics-I	03	--	01	30	70	25	--	--	125	03	--	01	04
107002/ 107009	Engineering Physics / Engineering Chemistry	04	02	--	30	70	--	25	--	125	04	01	--	05
102003	Systems in Mechanical Engineering	03	02	--	30	70	--	25	--	125	03	01	--	04
103004 / 104010	Basic Electrical Engineering / Basic Electronics Engineering	03	02	--	30	70	--	25	--	125	03	01	--	04
110005/ 101011	Programming and Problem Solving / Engineering Mechanics	03	02	--	30	70	--	25	--	125	03	01	--	04
111006	Workshop[@]	--	02	--	--	--	--	25	--	25	--	01	--	01
	Total	16	10	01	150	350	25	125	--	650	16	05	01	22
101007	Audit Course 1[&]	02	Environmental Studies-I											

Induction Program : 2 weeks at the beginning of semester-I and 1 week at the beginning of semester-II

TABLE -2 First Engineering_ Structure for Semester-II

Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks						Credits			
		Theory	Practical	Tutorial	ISE	ESE	TW	PR	OR	Total	TH	PR	TUT	Total
107008	Engineering Mathematics-II	04	--	01	30	70	25	--	--	125	04	--	01	05
107002/ 107009	Engineering Physics/ Engineering Chemistry	04	02	--	30	70	--	25	--	125	04	01	--	05
103004 / 104010	Basic Electrical Engineering / Basic Electronics Engineering	03	02	--	30	70	--	25	--	125	03	01	--	04
110005/ 101011	Programming and Problem Solving / Engineering Mechanics	03	02	--	30	70	--	25	--	125	03	01	--	04
102012	Engineering Graphics [Ω]	01	02	01	--	50	25		--	75	01	01		02
110013	Project Based Learning[§]	--	04	--	--	--	25	50	--	75	--	02	--	02
	Total	15	12	02	120	330	75	125	--	650	15	05	02	22
101014	Audit Course 2[&]	02	Environmental Studies-II											
107015		--	Physical Education-Exercise and Field Activities											

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Instructions:

- PR/Tutorial must be conducted in three batches per division.
- Minimum number of required Experiments/Assignments in PR/ Tutorial shall be carried out as mentioned in the syllabi of respective subjects.
- Every Student should appear for Engineering Physics, Engineering Chemistry, Engineering Mechanics, Basic Electrical Engineering, Basic Electronics Engineering, Programming and Problem solving during the year.
- College is allowed to distribute Teaching workload of subjects Engineering Physics, Engineering Chemistry, Basic Electrical Engineering, Basic Electronics Engineering, Engineering Mechanics, Programming and Problem solving in semester I and II dividing number of FE divisions into two appropriate groups.
- Assessment of tutorial work has to be carried out as term-work examination. Term-work Examination and Practical Examination at first year of engineering course **shall be internal continuous assessment only.**

Ω 1 Credit for Engineering Graphics theory has to be awarded on the basis of End semester examination of 50 marks while 1 credit of tutorial and practical **shall be awarded on internal continuous assessment only.**

@ Credit for the course of workshop practical is to be awarded on the basis of continuous assessment / submission of job work.

§ Project based learning (PBL) requires continuous mentoring by faculty throughout the semester for successful completion of the tasks selected by the students per batch. While assigning the teaching workload a load of 2 Hrs/week/batch needs to be considered for the faculty involved. The Batch needs to be divided into sub-groups of 5 to 6 students. Assignments / activities / models/ projects etc. under project based learning is carried throughout semester and Credit for PBL has to be awarded on the basis of internal continuous assessment and evaluation at the end of semester.

& Audit course for Environmental Studies and II (As per D.O.No.F.13-1/2000 (EA/ENV/COS-I) dated 14 May, 2019) is mandatory but non-credit course. Examination has to be conducted at the end of Sem I & II respectively for award of grade at college level. Grade awarded for audit course shall not be calculated for grade point &CGPA.

Audit course for Physical education is mandatory non-credit course. Examination has to be conducted at the end of Semester for award of grade at college level. Grade awarded for audit course shall not be calculated for grade point &CGPA.

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Savitribai Phule Pune University
Faculty of Science & Technology

Curriculum/Syllabus
for
Second Year
Bachelor of Engineering
(Choice Based Credit System)
Mechanical Engineering and Automobile Engineering
(2019 Course)

Board of Studies - Automobile and Mechanical Engineering
(With Effect from Academic Year 2020-21)

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Savitribai Phule Pune University

Board of Studies - Automobile and Mechanical Engineering

Undergraduate Program - Automobile Engineering & Mechanical Engineering (2019 pattern)

Course Code	Course Name	Teaching Scheme (Hours/ Week)			Examination Scheme and Marks						Credit			
		TH	PR	TUT	ISE	ESE	TW	PR	OR	TOTAL	TH	PR	TUT	TOTAL
Semester-III														
202041	Solid Mechanics	4	2	-	30	70	-	50	-	150	4	1	-	5
202042	Solid Modeling and Drafting	3	2	-	30	70	-	50	-	150	3	1	-	4
202043	Engineering Thermodynamics	3	2	-	30	70	-	-	25	125	3	1	-	4
202044	Engineering Materials and Metallurgy	3	2	-	30	70	25	-	-	125	3	1	-	4
203156	Electrical and Electronics Engineering	3	2	-	30	70	25	-	-	125	3	1	-	4
202045	Geometric Dimensioning and Tolerancing Lab	-	2	-	-	-	25	-	-	25	-	1	-	1
202046	Audit Course - III	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	**16**	**12**	**-**	**150**	**350**	**75**	**100**	**25**	**700**	**16**	**6**	**-**	**22**
Semester-IV														
207002	Engineering Mathematics - III	3	-	1	30	70	25	-	-	125	3	-	1	4
202047	Kinematics of Machinery	3	2	-	30	70	-	-	25	125	3	1	-	4
202048	Applied Thermodynamics	3	2	-	30	70	-	-	25	125	3	1	-	4
202049	Fluid Mechanics	3	2	-	30	70	-	-	25	125	3	1	-	4
202050	Manufacturing Processes	3	-	-	30	70	-	-	-	100	3	-	-	3
202051	Machine Shop	-	2	-	-	-	50	-	-	50	-	1	-	1
202052	Project Based Learning - II	-	4	-	-	-	50	-	-	50	-	2		2
202053	Audit Course - IV	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	**15**	**12**	**1**	**150**	**350**	**125**	**-**	**75**	**700**	**15**	**6**	**1**	**22**

Abbreviations: TH: Theory, **PR**: Practical, **TUT**: Tutorial, **ISE**: In-Semester Exam, **ESE**: End-Semester Exam,**TW**: Term Work, OR: Oral

Note: Interested students of SE (Automobile Engineering and Mechanical Engineering) can opt for any one of the audit course from the list of audit courses prescribed by BoS (Automobile and Mechanical Engineering)

Instructions

- Practical/Tutorial must be conducted in three batches per division only.
- Minimum number of required Experiments/Assignments in PR/ Tutorial shall be carried out as mentioned in the syllabi of respective subjects.
- Assessment of tutorial work has to be carried out as a term-work examination. Term-work Examination at second year of engineering course shall be internal continuous assessment only.
- Project based learning (PBL) requires continuous mentoring by faculty throughout the semester for successful completion of the tasks selected by the students per batch. While assigning the teaching workload of 2 Hrs/week/batch needs to be considered for the faculty involved. The Batch needs to be divided into sub-groups of 5 to 6 students. Assignments / activities / models/ projects etc. under project based learning is carried throughout semester and Credit for PBL has to be awarded on the basis of internal continuous assessment and evaluation at the end of semester.
- Audit course is mandatory but non-credit course. Examination has to be conducted at the end of Semesters for award of grade at institute level. Grade awarded for audit course shall not be calculated for grade point & CGPA.

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Faculty of Science and Technology

Board of Studies

Electrical Engineering

Syllabus

Second Year Electrical Engineering

(2019 Course)

(w.e.f. AY: 2020-21)

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Savitribai Phule Pune University

Syllabus: Second Year (SE) Electrical Engineering (2019 Course) w.e.f. AY:2020-2021

SEMESTER-I

Course Code	Courses Name	Teaching Scheme			Examination Scheme and Marks						Credits			
		TH	PR	TUT	ISE	ESE	TW	PR	OR	Total	TH	PR	TUT	Total
207006	Engineering Mathematics-III	03	--	--	30	70	--	--	--	**100**	03	--	--	**03**
203141	Power Generation Technologies	03	--	--	30	70	--	--	--	**100**	03	--	--	**03**
203142	Material Science	03	04#	--	30	70	25	--	25	**150**	03	02	--	**05**
203143	Analog and Digital Electronics	03	02	--	30	70	--	50	--	**150**	03	01	--	**04**
203144	Electrical Measurement & Instrumentation	03	04#	--	30	70	25	25	--	**150**	03	02	--	**05**
203150	Applications of Mathematics in Electrical Engineering	--	02*	--	--	--	25	--	--	**25**	--	01	--	**01**
203151	Soft Skill	--	02	--	--	--	25	--	--	**25**	--	01	--	**01**
203152	Audit Course-III	--	--	--	--	--	--	--	--	--	**Grade: PP/NP**			
Total		**15**	**14**	**--**	**150**	**350**	**100**	**75**	**25**	**700**	**15**	**07**	**--**	**22**

SEMESTER-II

Course Code	Courses Name	Teaching Scheme			Examination Scheme and Marks						Credits			
		TH	PR	TUT	ISE	ESE	TW	PR	OR	Total	TH	PR	TUT	Total
203145	Power System-I	03	--	--	30	70	--	--	--	**100**	03	--	--	**03**
203146	Electrical Machines-I	03	02	--	30	70	--	50	--	**150**	03	01	--	**04**
203147	Network Analysis	03	02	--	30	70	25	--	--	**125**	03	01	--	**04**
203148	Numerical Methods & Computer Programming	03	02	--	30	70	--	25	--	**125**	03	01	--	**04**
203149	Fundamental of Microcontroller and Applications	03	04$	--	30	70	25	--	25	**150**	03	02	--	**05**
203152	Project Based Learning	--	04	--	--	--	50	--	--	--	--	02	--	--
203153	Audit Course-IV	--	--	--	--	--	--	--	--	--	**Grade: PP/NP**			
Total		**15**	**14**	**--**	**150**	**350**	**100**	**75**	**25**	**700**	**15**	**07**	**--**	**22**

* - Lab sessions on application of Mathematics in Electrical Engineering using professional software.

- Practical section will comprises of two Part : a) PART A : 2 hours per week : Regular curriculum listed practical total 12 numbers out of which conduction of 8 numbers will be mandatory b) PART B : 2 Hours a week :Practical/case studies/assignments to enable active learning based on advances related to subject to bridge gap between curriculum and enhance practical knowledge required in field .

$ - Practical section will comprises of two Part : a) PART A : 2 hours per week : Regular curriculum listed practical total 12 numbers out of which conduction of 8 numbers will be mandatory b) PART B : 2 Hours a week : IOT application in Electrical Engineering using microcontroller and GSM module to bridge gap between curriculum and enhance application knowledge.

Abbreviation: TH: Theory, PR: Practical, TUT:Tutorial, ISE: Insem Exam, ESE: End Sem Exam, TW: Term Work, OR: Oral

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Curriculum
for
Second Year of Computer Engineering
(2019 Course)
(With effect from 2020-21)

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Second Year of Computer Engineering (2019 Course)

(With effect from Academic Year 2020-21)

Semester-III

Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks						Credit Scheme			
		Lecture	Practical	Tutorial	Mid-Sem	End-Sem	Term work	Practical	Oral	Total	Lecture	Practical	Tutorial	Total
210241	Discrete Mathematics	03	-	-	30	70	-	-	-	100	03	--	-	03
210242	Fundamentals of Data Structures	03	-	-	30	70	-	-	-	100	03	-	-	03
210243	Object Oriented Programming (OOP)	03	-	-	30	70	-	-	-	100	03	-	-	03
210244	Computer Graphics	03	-	-	30	70	-	-	-	100	03	-	-	03
210245	Digital Electronics and Logic Design	03	-	-	30	70	-	-	-	100	03	-	-	03
210246	Data Structures Laboratory	-	04	-	-	-	25	50	-	75	-	02	-	02
210247	OOP and Computer Graphics Laboratory	-	04	-	-	-	25	25	-	50	-	02	-	02
210248	Digital Electronics Laboratory	-	02	-	-	-	25	-	-	25	-	01	-	01
210249	Business Communication Skills	-	02	-	-	-	25	-	-	25	-	01	-	01
210250	Humanity and Social Science	-	-	01	-	-	25	-	-	25	-	-	01	01
210251	Audit Course 3													
										Total Credit	15	06	01	22
	Total	**15**	**12**	**01**	**150**	**350**	**125**	**75**	**-**	**700**	-	-	-	-

Semester-IV

Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks						Credit Scheme			
		Lecture	Practical	Tutorial	Mid-Sem	End-Sem	Term work	Practical	Oral	Total	Lecture	Practical	Tutorial	Total
207003	Engineering Mathematics III	03	-	01	30	70	25	-	-	125	03	--	01	04
210252	Data Structures and Algorithms	03	-	-	30	70	-	-	-	100	03	-	-	03
210253	Software Engineering	03	-	-	30	70	-	-	-	100	03	-	-	03
210254	Microprocessor	03	-	-	30	70	-	-	-	100	03	-	-	03
210255	Principles of Programming Languages	03	-	-	30	70	-	-	-	100	03	-	-	03
210256	Data Structures and Algorithms Laboratory	-	04	-	-	-	25	25	-	50	-	02	-	02
210257	Microprocessor Laboratory	-	02	-	-	-	25	-	25	50	-	01	-	01
210258	Project Based Learning II	-	04	-	-	-	50	-	-	50	-	02	-	02
210259	Code of Conduct	-	-	01	-	-	25	-	-	25	-	-	01	01
210260	Audit Course 4													
										Total Credit	15	05	02	22
	Total	**15**	**10**	**02**	**150**	**350**	**150**	**25**	**25**	**700**	-	-	-	-

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Faculty of Science and Technology



Syllabus for

S.E (Electronics / Electronics & Telecommunication Engineering)

(Course 2019)

(w.e.f. June 2020)

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S.E. (Electronics / E&TC Engineering) 2019 Course
(With effect from Academic Year 2020-21)

Semester-III

Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks						Credit			
		Theory	Practical	Tutorial	In-Sem	End-Sem	TW	PR	OR	Total	TH	PR	TUT	Total
207005	Engineering Mathematics III	04	-	01	30	70	25	-	-	125	04	-	01	05
204181	Electronic Circuits	03	-	-	30	70	-	-	-	100	03	-	-	03
204182	Digital Circuits	03	-	-	30	70	-	-	-	100	03	-	-	03
204183	Electrical Circuits	03	-	-	30	70	-	-	-	100	03	-	-	03
204184	Data structures	03	-	-	30	70	-	-	-	100	03	-	-	03
204185	Electronic Circuit Lab	-	02	-	-	-	-	50	-	50	-	01	-	01
204186	Digital circuits Lab		02					50		50		01		01
204187	Electrical Circuit Lab	-	02	-	-	-	25	-	-	25	-	01	-	01
204188	Data Structures Lab	-	02	-	-	-	-	-	25	25	-	01	-	01
204189	Electronic Skill Development	-	02	-	-	-	25	-	-	25	-	01	-	01
204190	Mandatory Audit Course 3 &	-	-	-					-	-	-	-	-	-
Total		**16**	**10**	**01**	**150**	**350**	**75**	**100**	**25**	**700**	**16**	**05**	**01**	**22**

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Savitribai Phule Pune University, Pune
S.E. (Electronics / E&TC Engineering) 2019 Course
(With effect from Academic Year 2020-21)

Semester-IV

Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks						Credit			
		Theory	Practical	Tutorial	In-Sem	End-Sem	TW	PR	OR	Total	TH	PR	TUT	Total
204191	Signals & Systems	03	-	01	30	70	25	-	-	125	03	-	01	04
204192	Control Systems	03	-		30	70		-	-	100	03	-	-	03
204193	Principles of Communication Systems	03	-	-	30	70	-	-	-	100	03	-	-	03
204194	Object Oriented Programming	03	-	-	30	70	-	-	-	100	03	-	-	03
204195	Signals & Control System Lab		02				50			50		01		01
204196	Principle of Communication Systems Lab	-	02	-	-	-	-	50	-	50	-	01	-	01
204197	Object Oriented Programming Lab	-	02	-	-	-	-	-	50	50	-	01	-	01
204198	Data Analytics Lab		02				-		25	25		01		01
204199	Employability Skill Development	02	02	-	-	-	50	-	-	50	02	01	-	03
204200	Project Based Learning ¶	-	04				50		-	50		02		02
204201	Mandatory Audit Course 4&	-	-	-	-	-	-	-	-	-	-	-	-	-
Total		**14**	**14**	**01**	**120**	**280**	**175**	**50**	**75**	**700**	**14**	**07**	**01**	**22**

Abbreviations:
In-Sem: In semester — End-sem: End semester — TH : Theory — TW : Term Work
PR : Practical — OR : Oral — TUT : Tutorial

Note: Interested students of S.E. (Electronics/E&TC) can opt any one of the audit course from the list of audit courses prescribed by BoS (Electronics & Telecommunications Engineering)

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General Instructions

- PR/Tutorial/PBL must be conducted in three batches per division.
- Minimum number of required Experiments/Assignments in PR/ Tutorial shall be carried out as mentioned in the syllabi of respective subjects.
- Assessment of tutorial work has to be carried out as term-work examination. Term-work Examination at second year of engineering course **shall be internal continuous assessment only.**
- **η:** Project based learning (PBL) requires continuous mentoring by faculty throughout the semester for successful completion of the tasks selected by the students per batch. While assigning the teaching workload of 2 Hrs. / week / batch needs to be considered for the faculty involved. The Batch needs to be divided into sub-groups of 5 to 6 students. Assignments / activities / models/ projects etc. under project-based learning is carried throughout semester and Credit for PBL has to be awarded on the basis of internal continuous assessment and evaluation at the end of semester.
- **&:** Audit course is mandatory but non-credit course. Assessment has to be conducted at the end of Sem III & IV respectively for award of grade at college level. Grade awarded for audit course shall not be calculated for grade point & CGPA.
- **Examination Scheme:** The theory examination shall be conducted in two phases for all the subjects.
  - Phase I as **In-Semester Examination** of 30 marks written theory examination based on Unit-1 and Unit-2 of course syllabus scheduled by university.
  - Phase II as **End-Semester Examination** of 70 marks written theory examination based on unit number 3, 4, 5, 6 of course syllabus scheduled by university.

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Savitribai Phule Pune University
Faculty of Science & Technology

Curriculum/Syllabus
For
Third Year
Bachelor of Engineering
(Choice Based Credit System)
Mechanical Engineering
(2019 Course)
Board of Studies – Mechanical and Automobile Engineering
(With Effect from Academic Year 2021-22)

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Savitribai Phule Pune University

Board of Studies - Automobile and Mechanical Engineering

Undergraduate Program - Mechanical Engineering (2019 pattern)

Course Code	Course Name	Teaching Scheme (Hrs./week)			Examination Scheme and Marks						Credit			
		TH	PR	TUT	ISE	ESE	TW	PR	OR	Total	TH	PR	TUT	Total
Semester-V														
302041	Numerical & Statistical Methods	3	-	1	30	70	25	-	-	125	3	-	1	4
302042	Heat & Mass Transfer	3	2	-	30	70	-	50	-	150	3	1	-	4
302043	Design of Machine Elements	3	2	-	30	70	-	-	25	125	3	1	-	4
302044	Mechatronics	3	2	-	30	70	-	-	25	125	3	1	-	4
302045	Elective I	3	-	-	30	70	-	-	-	100	3	-	-	3
302046	Digital Manufacturing Laboratory	-	2	-	-	-	50	-	-	50	-	1	-	1
302047	Skill Development	-	2	-	-	-	25	-	-	25	-	1	-	1
302048	Audit course - V[$]	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	**15**	**10**	**1**	**150**	**350**	**100**	**50**	**50**	**700**	**15**	**5**	**1**	**21**
Semester-VI														
302049	Artificial Intelligence &Machine Learning	3	2	-	30	70	-	-	25	125	3	1	-	4
302050	Computer Aided Engineering	3	2	-	30	70	-	50	-	150	3	1	-	4
302051	Design of Transmission Systems	3	2	-	30	70	-	-	25	125	3	1	-	4
302052	Elective II	3	-	-	30	70	-	-	-	100	3	-	-	3
302053	Measurement Laboratory	-	2	-	-	-	50	-	-	50	-	1	-	1
302054	Fluid Power &Control Laboratory	-	2	-	-	-	50	-	-	50	-	1	-	1
302055	Internship/Mini project *	-	4	-	-	-	100	-	-	100	-	4	-	4
302056	Audit course - VI[$]	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	**12**	**14**	**-**	**120**	**280**	**200**	**50**	**50**	**700**	**12**	**9**	**-**	**21**

Elective-I		**Elective-II**	
302045-A	Advanced Forming & Joining Processes	302052-A	Composite Materials
302045-B	Machining Science & Technology	302052-B	Surface Engineering

Abbreviations: **TH**: Theory, **PR**: Practical, **TUT**: Tutorial, **ISE**: In-Semester Exam, **ESE**: End-Semester Exam, **TW**: Term Work, **OR**: Oral

Note: Interested students of TE (Automobile Engineering and Mechanical Engineering) can opt for any one of the audit course from the list of audit courses prescribed by BOS (Automobile and Mechanical Engineering)

Instructions:

- Practical/Tutorial must be conducted in FOUR batches per division only.
- Minimum number of Experiments/Assignments in PR/Tutorial shall be carried out **as mentioned in the syllabi** of respective courses.
- Assessment of tutorial work has to be carried out similar to term-work. The Grade cum marks for Tutorial and Term-work shall be awarded on the basis of **continuous evaluation.**
- [$]Audit course is mandatory but non-credit course. Examination has to be conducted at the end of Semesters for award of grade at institute level. Grade awarded for audit course shall not be calculated for grade point & CGPA.

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Faculty of Science and Technology

Board of Studies

Electrical Engineering

Syllabus

Third Year Electrical Engineering (2019 course)

(w.e.f. 2021-22)

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Savitribai Phule Pune University, Pune
Syllabus: Third Year (TE) Electrical Engineering (2019 course)
(w.e.f 2021-22)

SEMESTER-I

Course code	Course Name	Teaching Scheme				Examination Scheme						Credit				
		Th	Pr	Tu	SEM /PW /IN	ISE	ESE	TW	PR	OR	Total	Th	Pr	Tu	SEM /PW /IN	Total
303141	Industrial and Technology Management	3	0	0	0	30	70	0	0	0	100	3	0	0	0	3
303142	Power Electronics	3	4#	0	0	30	70	0	50	0	150	3	2	0	0	5
303143	Electrical Machines-II	3	2	0	0	30	70	25	25	0	150	3	1	0	0	4
303144	Electrical Installation Design and Condition Based Maintenance	3	4#	0	0	30	70	25	0	25	150	3	2	0	0	5
303145	Elective-I	3	0	0	0	30	70	0	0	0	100	3	0	0	0	3
303146	Seminar	0	0	0	1	0	0	50	0	0	50	0	0	0	1	1
303147	Audit course-V	2*	0	0	0	0	0	0	0	0	0	GRADE: PP/NP				0
Total		**15**	**10**	**0**	**1**	**150**	**350**	**100**	**75**	**25**	**700**	**15**	**5**	**0**	**1**	**21**

303145: Elective-I	303147 : Audit Course-V
303145A : Advanced Microcontroller and Embedded System	303147A : Energy storage systems
303145B : Digital Signal Processing	303147B : Start-up & Disruptive innovation
303145C : Open Elective	

SEMESTER-II

Course code	Course Name	Teaching Scheme				Examination Scheme						Credit				
		Th	Pr	Tu	SEM /PW /IN	ISE	ESE	TW	PR	OR	Total	Th	Pr	Tu	SEM /PW /IN	Total
303148	Power System-II	3	2	1	0	30	70	25	50	0	175	3	1	1	0	5
303149	Computer Aided Design of Electrical Machines	3	4#	0	0	30	70	50	0	25	175	3	2	0	0	5
303150	Control System Engineering	3	2$	1$	0	30	70	25	0	25	150	3	1	0	0	4
303151	Elective-II	3	0	0	0	30	70	0	0	0	100	3	0	0	0	3
303152	Internship	0	0	0	4	0	0	100	0	0	100	0	0	0	4	4
303153	Audit Course VI	2*	0	0	0	0	0	0	0	0	0	GRADE: PP/NP				0
Total		12	8	2	4	120	280	200	50	50	700	12	4	1	4	21

303151: Elective-II	303153 : Audit Course-VI
303151A : IoT and its Applications in Electrical Engineering	303153A: Ethical Practices for Engineers
303151B : Electrical Mobility	303153B :Project Management
303 151C: Cybernetic Engineering	
303151D: Energy Management	

#Practical consists of Part A & part B. PART A; Regular experiments & part B; to bridge the gap between theory & actual industrial practices. For subject 303144; there will be auto cad drawing on Electrical installation, Electrical wiring, cabling etc. For 303149, Part A, Regular drawing by hand & part B same drawing by AutoCAD.
$ tutorial credit merged with Practical.
* Conduct over and above these lectures.

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Curriculum
for

Third Year of Computer Engineering
(2019 Course)

(With effect from 2021-22)

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Faculty of Science and Technology

Savitribai Phule Pune University
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Savitribai Phule Pune University

Third Year of Computer Engineering (2019 Course)

(With effect from Academic Year 2021-22)

Home

Semester V

Course Code	Course Name	Teaching Scheme (Hours/week)			Examination Scheme and Marks						Credit Scheme			
		Lecture	Practical	Tutorial	Mid-Sem	End-Sem	Term work	Practical	Oral	Total	Lecture	Practical	Tutorial	Total
310241	Database Management Systems	03	-	-	30	70	-	-	-	100	03	-	-	03
310242	Theory of Computation	03	-	-	30	70	-	-	-	100	03	-	-	03
310243	Systems Programming and Operating System	03	-	-	30	70	-	-	-	100	03	-	-	03
310244	Computer Networks and Security	03	-	-	30	70	-	-	-	100	03	-	-	03
310245	Elective I	03	-	-	30	70	-	-	-	100	03	-	-	03
310246	Database Management Systems Laboratory	-	04	-	-	-	25	25	-	50	-	02	-	02
310247	Computer Networks and Security Laboratory	-	02	-	-	-	25	-	25	50	-	01	-	01
310248	Laboratory Practice I	-	04	-	-	-	25	25	-	50	-	02	-	02
310249	Seminar and Technical Communication	-	-	01	-	-	50	-	-	50	-	-	01	01
	Total	**15**	**10**	**01**	**150**	**350**	**125**	**50**	**25**	**700**	**15**	**05**	**01**	**21**
310250	Audit Course 5												**Grade**	
										Total Credit	**15**	**05**	**01**	**21**

310245 Elective I Options:

310245(A) Internet of Things and Embedded Systems
310245(B) Human Computer Interface
310245(C) Distributed Systems
310245(D) Software Project Management

310250 Audit Course 5 Options:

310250 (A) Cyber Security
310250 (B) Professional Ethics and Etiquettes
310250 (C) Learn New Skills
310250 (D) Engineering Economics
310250 (E) Foreign Language

Laboratory Practice I

Assignments from **Systems Programming and Operating System** and **Elective I**

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Third Year of Computer Engineering (2019 Course)

(With effect from Academic Year 2021-22)

Home

Semester VI

Course Code	Course Name	Teaching Scheme (Hours/week) $$			Examination Scheme and Marks						Credit Scheme			
		$$ Lecture	Practical	Tutorial	Mid-Sem	End-Sem	Term work	Practical	Oral	Total	Lecture	Practical	Tutorial	Total
310251	Data Science and Big Data Analytics	04	-	-	30	70	-	-	-	100	03	-	-	03
310252	Web Technology	04	-	-	30	70	-	-	-	100	03	-	-	03
310253	Artificial Intelligence	04	-	-	30	70	-	-	-	100	03	-	-	03
310254	Elective II	04	-	-	30	70	-	-	-	100	03	-	-	03
310255	Internship**	-	-	-	-	-	100 **	-	-	100	-	-	-	04 **
310256	Data Science and Big Data Analytics Laboratory	-	04	-	-	-	50	25	-	75	-	02	-	02
310257	Web Technology Laboratory	-	02	-	-	-	25	-	25	50	-	01	-	01
310258	Laboratory Practice II	-	04	-	-	-	50	25	-	75	-	02	-	02
	Total	**12**	**10**	**-**	**120**	**280**	**225**	**50**	**25**	**700**	**12**	**09**	**-**	**21**
310259	Audit Course 6												**Grade**	
										Total	**12**	**09**	**-**	**21**

310254 Elective II Options:

310254(A) Information Security
310254(B) Augmented and Virtual Reality
310254(C) Cloud Computing
310254(D) Software Modeling and Architectures

310259 Audit Course 6 Options:

310259(A) Digital and Social Media Marketing
310259(B) Sustainable Energy Systems
310259(C) Leadership and Personality Development
310259(D) Foreign Language
310259(E) Learn New Skills

Laboratory Practice II:

Assignments from **Artificial Intelligence** and **Elective II**.

**** Internship:**

Internship guidelines are provided in course curriculum sheet.

$$ Hours/Week for Theory Course in Third Year of Engineering, Semester VI:

As per the apex bodies' recommendations and guidelines, it is need of the day to train the pre-final year students for the industrial readiness through internship. As per the guidelines of AICTE, the duration of internship is 4-6 weeks after completion of semester V and before commencement of semester VI, so it is apparent that the contact hours of the TE students need to be managed meticulously. It becomes mandatory as per the structure that 4 credits for internship must earned by the students. **Per semester, 15 weeks duration that is suggested ideally by the affiliated university will eventually reduce to fruitful 12 weeks after the implementation of the revised curriculum (2019 Course). With the evaluatory introduction of internship in the structure, we are left with the choice of 4 theory courses in the sixth semester with 12 weeks instead of traditional 15 weeks.** To balance the credits and to achieve the minimum required contact hours, it is the reasonable choice to allot 4 hours / week for each theory course of the sixth semester of Third year of Engineering. The additional one lecture/ week will definitely be instrumental in achieving the largest of minimum contact hours. As such there is no correspondence of weekly load and credits earned, the credit allotted per course remain intact despite of the change. **So it is almost imperative that the commencement of VI Semester need to be approx. 3 weeks beyond the schedule.**

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Syllabus for

T.E (Electronics & Telecommunication Engineering)

(Course 2019)

(w.e.f. June 2021)

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(With effect from Academic Year 2021-22)

Semester-V

Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks						Credit			
		Theory	Practical	Tutorial	In-Sem	End-Sem	TW	PR	OR	Total	TH	PR	TUT	Total
304181	Digital Communication	03	-	-	30	70	-	-	-	100	03	-	-	03
304182	Electromagnetic Field Theory	03	-	01	30	70	25	-	-	125	03	-	01	04
304183	Database Management	03	-	-	30	70	-	-	-	100	03	-	-	03
304184	Microcontrollers	03	-	-	30	70	-	-	-	100	03	-	-	03
304185	Elective - I	03	-	-	30	70	-	-	-	100	03	-	-	03
304186	Digital Communication Lab	-	02	-	-	-	-	50	-	50	-	01	-	01
304187	Database Management Lab	-	02	-	-	-	-	-	25	25	-	01	-	01
304188	Microcontroller Lab	-	02	-	-	-	-	50	-	50	-	01	-	01
304189	Elective I Lab	-	02	-	-	-	-	25	-	25	-	01	-	01
304190	Skill Development	-	02	-	-	-	25	-	-	25	-	01	-	01
304191A	Mandatory Audit Course 5 &	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	**15**	**10**	**01**	**150**	**350**	**50**	**125**	**25**	**700**	**-**		**-**	**-**
	Total Credit										**15**	**05**	**01**	**21**

Elective -I

1) Digital Signal Processing
2) Electronic Measurements
3) Fundamentals of JAVA Programming
4) Computer Networks

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(With effect from Academic Year 2021-22)

Semester-VI

Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks						Credit			
		Theory	Practical	Tutorial	In-Sem	End-Sem	TW	PR	OR	Total	TH	PR	TUT	Total
304192	Cellular Networks	03	-	-	30	70	-	-	-	100	03	-	-	03
304193	Project Management	03	-	-	30	70	-	-	-	100	03	-	-	03
304194	Power Devices & Circuits	03	-	-	30	70	-	-	-	100	03	-	-	03
304195	Elective-II	03	-	-	30	70	-	-	-	100	03	-	-	03
304196	Cellular Networks Lab	-	02	-	-	-	-	-	50	50	-	01	-	01
304197	Power Devices & Circuits Lab	-	02	-	-	-	-	50	-	50		01		01
304198	Elective-II Lab	-	02	-	-	-	-	25	-	25	-	01	-	01
304199	Internship**	-	-	-	-	-	100	-	-	100	-	-	04	04
304200	Mini Project	-	04	-	-	-	25	-	50	75	-	02	-	02
304191 B	Mandatory Audit Course 6 &	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	**12**	**10**	**00**	**120**	**280**	**125**	**75**	**100**	**700**				
										Total Credit	**12**	**05**	**04**	**21**

Abbreviations:
In-Sem: In semester — End-Sem: End semester — TH: Theory — TW : Term Work
PR: Practical — OR: Oral — TUT: Tutorial

Note: Students of T.E. (Electronics & Telecommunications) have to opt any one of the audit course from the list of audit courses prescribed by BoS (Electronics & Telecommunications Engineering)

Elective -II

1) Digital Image Processing
2) Sensors in Automation
3) Advanced JAVA Programming
4) Embedded Processors
5) Network Security

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Curriculum/Syllabus
For
Fourth Year
Bachelor of Engineering
(Choice Based Credit System)
Mechanical Engineering
(2019 Course)
Board of Studies – Mechanical and Automobile Engineering
(With Effect from Academic Year 2022-23)

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Board of Studies - Mechanical and Automobile Engineering

Undergraduate Program – Final Year Mechanical Engineering (2019 pattern)

Course Code	Course Name	Teaching Scheme (Hrs./week)			Examination Scheme and Marks						Credit			
		TH	PR	TUT	ISE	ESE	TW	PR	OR	TOTAL	TH	PR	TUT	TOTAL
Semester-VII														
402041	Heating Ventilation Air-Conditioning and Refrigeration	3	2	-	30	70	-	-	25	125	3	1	-	4
402042	Dynamics of Machinery	3	2	-	30	70	-	-	25	125	3	1	-	4
402043	Turbomachinery*	2	2	-	-	50	25	-	25	100	2	1	-	3
402044	Elective – III	3	-	-	30	70	-	-	-	100	3	-	-	3
402045	Elective - IV	3	-	-	30	70	-	-	-	100	3	-	-	3
402046	Data Analytics Laboratory	-	2	-	-	-	50	-	-	50	-	1	-	1
402047	Project (Stage - I)	-	4	-	-	-	50	-	50	100	-	2	-	2
402054	Audit Course VII$	-	-	-	-	-	-	-	-	-	-	NC		
	Total	**14**	**12**	**-**	**120**	**330**	**125**	**-**	**125**	**700**	**14**	**6**	**-**	**20**
Semester-VIII														
402048	Computer Integrated Manufacturing	3	2	-	30	70	25	-	25	150	3	1	-	4
402049	Energy Engineering	3	2	-	30	70	25	-	25	150	3	1	-	4
402050	Elective - V	3	-	-	30	70	-	-	-	100	3	-	-	3
402051	Elective - VI	3	-	-	30	70	-	-	-	100	3	-	-	3
402052	Mechanical Systems Analysis Laboratory	-	2	-	-	-	25	-	25	50	-	1	-	1
402053	Project (Stage - II)	-	10	-	-	-	100	-	50	150	-	5	-	5
402055	Audit Course VIII$	-	-	-	-	-	-	-	-	-	-	NC		
		12	**16**	**-**	**120**	**280**	**175**	**-**	**125**	**700**	**12**	**8**	**-**	**20**

Elective-III		Elective-V	
402044A	Automobile Design	402050A	Quality and Reliability Engineering
402044B	Design of Heat Transfer Equipments	402050B	Energy Audit and Management
402044C	Modern Machining Processes	402050C	Manufacturing Systems and Simulation
402044D	Industrial Engineering	402050D	Engineering Economics and Financial Management
402044E	Internet of Things	402050E	Organizational Informatics
402044F	Computational Fluid Dynamics	402050F	Computational Multi Body Dynamics
Elective-IV		**Elective-VI**	
402045A	Product Design and Development	402051A	Process Equipment Design
402045B	Experimental Methods in Thermal Engineering	402051B	Renewable Energy Technologies
402045C	Additive Manufacturing	402051C	Automation and Robotics
402045D	Operations Research	402051D	Industrial Psychology and Organizational Behavior
402045E	Augmented Reality and Virtual Reality	402051E	Electrical and Hybrid Vehicle

Audit Courses			
402054A	Yoga Practices	402054B	Stress Management
402055A	Managing Innovation	402055B	Operations Management

Abbreviations: TH: Theory, **PR**: Practical, **TUT**: Tutorial, **ISE**: In-Semester Exam, **ESE**: End-Semester Exam, **TW**: Term Work, **OR**: Oral

- Student can select any elective subjects from the list given as per his/her choice. However, it is advised to select the subjects from within a group identified for specialization.

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Board of Studies

Electrical Engineering

Syllabus

Final Year Electrical Engineering (2019 Course) (w.e.f. 2022-2023)

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BE Electrical (2019 Course)

SEM-I

Course Code	Course Name	Teaching Scheme				Examination Scheme						Credit				
		Th	Pr	Tu	PW	ISE	ESE	TW	PR	OR	Total	Th	Pr	Tu	PW	Total
403141	Power System Operation & Control	3	2	–	–	30	70	25	–	25	150	3	1	–	–	4
403142	Advanced Control System	3	2	–	–	30	70	–	–	50	150	3	1	–	–	4
403143	Elective-I	3	2	–	–	30	70	–	–	25	125	3	1	–	–	4
403144	Elective-II	3	–	2*	–	30	70	25	–	–	125	3	–	1	–	4
403145	Project Stage-I	–	–	–	4	–	–	50	–	50	100	–	–	–	2	2
403146	MOOCs	–	–	–	–	–	–	50	–	–	50	–	–	–	2	2
403147	Audit Course-VII	2#	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total		**12**	**6**	**2**	**4**	**120**	**280**	**150**	**–**	**150**	**700**	**12**	**3**	**1**	**4**	**20**

403143: Elective-I	403144: Elective-II	403147: Audit Course-VII
403143A: PLC and SCADA 403143B: Power Quality Management 403143C: High Voltage Engineering 403143D: Robotics and Automation	403144A : Alternate Energy System 403144B : Electrical & Hybrid Vehicle 403144C : Special-purpose Machines 403144D: HVDC & FACTS	403147 A: German Language I 403147B: Engineering Economics I 403147C: Sustainability(IGBC)

SEM-II

Course Code	Course Name	Teaching Scheme				Examination Scheme						Credit				
		Th	Pr	Tu	PW	ISE	ESE	TW	PR	OR	Total	Th	Pr	Tu	PW	Total
403148	Switchgear and Protection	3	2	–	–	30	70	25	–	50	175	3	1	–	–	4
403149	Advanced Electrical Drives & Control	3	2	–	–	30	70	25	50	–	175	3	1	–	–	4
403150	Elective-III	3	–	–	–	30	70	–	–	–	100	3	–	–	–	3
403151	Elective-IV	3	–	–	–	30	70	–	–	–	100	3	–	–	–	3
403152	Project stage II	–	–	–	12	–	–	100	–	50	150	–	–	–	6	6
403153	Audit course VIII	2#	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total		12	4	–	12	120	280	150	50	100	700	12	2	–	6	20

403150: Elective-III	403151: Elective-IV	403153: Audit Course-VIII
403150 A : Digital Control System 403150 B : Restructuring and Deregulation 403 150 C: Smart Grid 403150 D: SensorTechnology (Open Elective)	403151A: EHV AC Transmission 403151B : Illumination Engineering 403151C: Electromagnetic Fields 403151D: AI and ML (Open Elective)	403153A: German Language II 403153B: Engineering Economics II 403153C: Green Building

*** For the tutorial, one credit is given. # Audit Course: Conduct over and above these lectures.**

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Maharashtra, India



Curriculum
for
Fourth Year of Computer Engineering
(2019 Course)
(With effect from 2022-23)

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BE Computer Engineering 2019 Course tentative Curriculum structure:

Savitribai Phule Pune University
Fourth Year of Computer Engineering (2019 Course)
(With effect from Academic Year 2022-23)

Semester VII

Course Code	Course Name	Teaching Scheme (Hours/week)			Examination Scheme and Marks						Credit Scheme			
		Lecture	Practical	Tutorial	Mid-Sem	End-Sem	Term work	Practical	Oral\Pre	Total	Lecture	Practical	Tutorial	Total
410241	Design and Analysis of Algorithms	03	-	-	30	70	-	-	-	100	3	-	-	3
410242	Machine Learning	03	-	-	30	70	-	-	-	100	3	-	-	3
410243	Blockchain Technology	03	-	-	30	70	-	-	-	100	3	-	-	3
410244	Elective III	03	-	-	30	70	-	-	-	100	3	-	-	3
410245	Elective IV	03	-	-	30	70	-	-	-	100	3	-	-	3
410246	Laboratory Practice III	-	04	-	-	-	50	50	-	100	-	2	-	2
410247	Laboratory Practice IV	-	02	-	-	-	50	-	-	50	-	1	-	1
410248	Project Stage I	-	02	-	-	-	50	-	-	50	-	2	-	2
										Total Credit	**15**	**05**	**-**	**20**
	Total	**15**	**08**	**-**	**150**	**350**	**150**	**50**	**-**	**700**	**15**	**05**	**-**	**20**
410249	Audit Course 7										**Grade**			

Elective III	**Elective IV**
410244(A) Pervasive Computing 410244(B) Multimedia Techniques 410244(C) Cyber Security and Digital Forensics 410244(D) Object Oriented Modeling and Design 410244(E) Digital Signal Processing	410245(A) Information Retrieval 410245(B) GPU Programming and Architecture 410245(C) Mobile Computing 410245(D)Software Testing and Quality Assurance 410245(E) Compilers
Laboratory Practice III: Laboratory assignments Courses- 410241, 410242, 410243	**Laboratory Practice IV:** Laboratory assignments Courses- 410244, 410245

Audit Course 7(AC7) Options:
AC7- I MOOC- Learn New Skills
AC7- II Entrepreneurship Development
AC7- III Botnet of Things
AC7- IV 3D Printing
AC7- V Industrial Safety and Environment Consciousness

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Savitribai Phule Pune University
Final Year of Computer Engineering (2019 Course)
(With effect from Academic Year 2022-23)
Semester VIII

Course Code	Course Name	Teaching Scheme (Hours/week)			Examination Scheme and Marks						Credit Scheme			
		Lecture	Practical	Tutorial	Mid-Sem	End-Sem	Term work	Practical	Oral/Pre	Total	Lecture	Practical	Tutorial	Total
410250	High Performance Computing	03	-	-	30	70	-	-	-	100	03			03
410251	Deep Learning	03	-	-	30	70	-	-	-	100	03			03
410252	Elective V	03	-	-	30	70	-	-	-	100	03			03
410253	Elective VI	03	-	-	30	70	-	-	-	100	03			03
410254	Laboratory Practice V	-	02	-	-	-	50	50	-	100		01		01
410255	Laboratory Practice VI	-	02	-	-	-	50	-	-	50		01		01
410256	Project Stage II	-	06	-	-	-	100	-	50	150		06		06
										Total Credit	**12**	**08**	**-**	**20**
	Total	**12**	**10**	**-**	**120**	**280**	**200**	**50**	**50**	**700**	**12**	**08**	**-**	**20**
410257	Audit Course 8										**Grade**			

Elective V	**Elective VI**
410252(A) Natural Language Processing 410252(B) Image Processing 410252(C) Software Defined Networks 410252(D) Advanced Digital Signal Processing 410252(E) Open Elective I	410253(A) Pattern Recognition 410253(B) Soft Computing 410253(C) Business Intelligence 410253(D) Quantum Computing 410253(E) Open Elective II
Lab Practice V: Laboratory assignments Courses- 410250, 410251	**Lab Practice VI:** Laboratory assignments Courses- 410252, 410253

Audit Course 8(AC8) Options:

AC8- I Usability Engineering
AC8- II Conversational Interfaces
AC8- III Social Media and Analytics
AC8- IV MOOC- Learn New Skills
AC8- V Emotional Intelligence

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Syllabus for

B.E (Electronics & Telecommunication Engineering)

(Course 2019)

(w.e.f. June 2022)

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Savitribai Phule Pune University, Pune
B.E. (Electronics & Telecommunication) 2019 Course
(With effect from Academic Year 2022-23)

Semester-VII

Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks						Credit			
		Theory	Practical	Tutorial	In-Sem	End-Sem	TW	PR	OR	Total	TH	PR	TUT	Total
404181	Radiation & Microwave Theory	03	-	-	30	70	-	-	-	100	03	-	-	03
404182	VLSI Design and Technology	03	-	-	30	70	-	-	-	100	03	-	-	03
404183	Cloud Computing	03	-	-	30	70	-	-	-	100	03	-	-	03
404184	Elective - 3	03	-	-	30	70	-	-	-	100	03	-	-	03
404185	Elective - 4	03	-	-	30	70	-	-	-	100	03	-	-	03
404186	Lab Practice - 1 (RMT & Cloud Computing)	-	04	-	-	-	25	-	50	75	-	02	-	02
404187	Lab Practice - 2 (VLSI Design & Elective -3)	-	04	-	-	-	25	50	-	75	-	02	-	02
404188	Project Stage - I	-	02	-	-	-	50	-	-	50	-	01	-	01
404189	Mandatory Audit Course 7	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	**15**	**10**	**-**	**150**	**350**	**100**	**50**	**50**	**700**	-	-	-	-
	Total Credits										**15**	**05**	**-**	**20**

Elective - 3	Elective - 4
1. Speech Processing	1. Data Mining
2. PLC SCADA & Automation	2. Electronic Product Development
3. JAVA Script	3. Deep Learning
4. Embedded & RTOS	4. Low Power CMOS
5. Modernized IoT	5. Smart Antennas

Mandatory Audit Course - 7
1. Management Information System
2. Patent Search & Analysis
3. Knowledge Management
4. Energy Economics & Policy
5. Educational Leadership
6. Human Resource Development

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(With effect from Academic Year 2022-23)

Semester-VIII

Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks						Credit			
		Theory	Practical	Tutorial	In-Sem	End-Sem	TW	PR	OR	Total	TH	PR	TUT	Total
404190	Fiber Optic Communication	03	-	-	30	70	-	-	-	100	03	-	-	03
404191	Elective - 5	03	-	-	30	70	-	-	-	100	03	-	-	03
404192	Elective - 6	03	-	-	30	70	-	-	-	100	03	-	-	03
404193	Innovation & Entrepreneurship	-	-	02	-	-	50	-	-	50	-	-	02	02
404194	Digital Business Management	-	-	02	-	-	50	-	-	50	-	-	02	02
404195	Fiber Optic Lab	-	02	-	-	-	25	-	50	75	-	01	-	01
404196	Lab Practice - 3 (Elective - 5)	-	02	-	-	-	25	50	-	75	-	01	-	01
404197	Project Stage - II	-	10	-	-	-	100	-	50	150	-	05	-	05
	Total	**09**	**14**	**04**	**90**	**210**	**250**	**50**	**100**	**700**	-	-	-	-
										Total Credits	**09**	**07**	**04**	**20**

Elective - 5	Elective - 6
1. Biomedical Signal Processing	1. System on Chip
2. Industrial Drives & Automation	2. Nano Electronics
3. Android Development	3. Remote Sensing
4. Embedded System Design	4. Digital Marketing
5. Mobile Computing	5. Open Elective

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Semester-VII

Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks						Credit			
		Theory	Practical	Tutorial	In-Sem	End-Sem	TW	PR	OR	Total	TH	PR	TUT	Total
404181	Radiation & Microwave Theory	03	-	-	30	70	-	-	-	100	03	-	-	03
404182	VLSI Design and Technology	03	-	-	30	70	-	-	-	100	03	-	-	03
404183	Cloud Computing	03	-	-	30	70	-	-	-	100	03	-	-	03
404184	Elective - 3	03	-	-	30	70	-	-	-	100	03	-	-	03
404185	Elective - 4	03	-	-	30	70	-	-	-	100	03	-	-	03
404186	Lab Practice - 1 (RMT & Cloud Computing)	-	04	-	-	-	25	-	50	75	-	02	-	02
404187	Lab Practice - 2 (VLSI Design & Elective -3)	-	04	-	-	-	25	50	-	75	-	02	-	02
404188	Project Stage - I	-	02	-	-	-	50	-	-	50	-	01	-	01
404189	Mandatory Audit Course 7	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	**15**	**10**	**-**	**150**	**350**	**100**	**50**	**50**	**700**	-	-	-	-
										Total Credits	**15**	**05**	**-**	**20**

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Mandatory Audit Course - 7
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2. Patent Search & Analysis
3. Knowledge Management
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Semester-VIII

Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks						Credit			
		Theory	Practical	Tutorial	In-Sem	End-Sem	TW	PR	OR	Total	TH	PR	TUT	Total
404190	Fiber Optic Communication	03	-	-	30	70	-	-	-	100	03	-	-	03
404191	Elective - 5	03	-	-	30	70	-	-	-	100	03	-	-	03
404192	Elective - 6	03	-	-	30	70	-	-	-	100	03	-	-	03
404193	Innovation & Entrepreneurship	-	-	02	-	-	50	-	-	50	-	-	02	02
404194	Digital Business Management	-	-	02	-	-	50	-	-	50	-	-	02	02
404195	Fiber Optic Lab	-	02	-	-	-	25	-	50	75	-	01	-	01
404196	Lab Practice - 3 (Elective - 5)	-	02	-	-	-	25	50	-	75	-	01	-	01
404197	Project Stage - II	-	10	-	-	-	100	-	50	150	-	05	-	05
	Total	**09**	**14**	**04**	**90**	**210**	**250**	**50**	**100**	**700**	-	-	-	-
	Total Credits										**09**	**07**	**04**	**20**

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PROGRAM OUTCOMES (POs):

(Engineering Course)

Engineering Graduates will be able to

PO01 Engineering Knowledge: Apply the knowledge of basic sciences and engineering fundamentals and engineering fundamentals to the solve the complex engineering problems

PO02 Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO03 Design/ development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO04 Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions for complex problems:

- that cannot be solved by straight forward application of knowledge, theories and techniques applicable to the engineering discipline as against problems given at the end of chapters in a typical text book that can be solved using simple engineering theories and techniques;
- that may not have a unique but possible multiple solutions, also require consideration of appropriate constraints / requirements not explicitly given in the problem statement such as cost, power requirement, durability, product life, etc.; and
- which need to be defined (modeled) within appropriate mathematical framework.

PO05 Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations

PO06 Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO07 Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development

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PO08 Ethics: Understand their professional and ethical responsibility and enhance their commitment towards best engineering practices.

PO09 Individual and team work: Function effectively as a member or a leader in diverse teams, and be competent to carry out multidisciplinary tasks.

PO10 Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11 Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12 Life-long learning: Recognize the need of self-education, ability to engage in independent and life-long learning process in order to keep abreast with the ongoing technological changes & developments in the field of engineering.

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❖ B.E [Mechanical Engineering]

PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

The graduates of Mechanical Engineering should be able to:

PEO01: Apply the overall knowledge of Mechanical Engineering along with concepts of Mathematics, Science, Communication and Computing skills to understand specific problem areas and finding the optimal solutions for the same.

PEO 2: Implement ideas of Mechanical Engineering for the challenging tasks in the interdisciplinary areas like Electrical, Electronics, Computer Science, Civil, Bio-Technology and allied branches.

PEO 3: Widely talented in the fields of manufacturing, service and design industries, which will not only improve their employability but also aid in establishing the above said industries.

PEO 4: Develop lifelong learning attitudes, ethics and values that will help their career employability and growth in engineering, academia, defence, state and central government sectors.

PROGRAM SPECIFIC OUTCOMES (PSOs):

The students of Mechanical engineering will be able to:

PSO1: Specify, fabricate, test and operate various machines along with essential documentations.

PSO2: Analyse, design, develop and implement the concepts of mechanical systems and processes towards product development.

PSO3: Design components for automotive applications.

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❖ B.E [Electrical Engineering]

PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

The graduates of Electrical Engineering should be able to:

PEO01: develop seamless knowledge for providing solution to any industrial problem.

PEO02: equip the theoretical, practical knowledge of designing of core areas of EE in order to develop & maintain modern electrical equipment's and to actively take part in application based research and development.

PEO03: test and verify the characteristics of common electrical equipment / machines / control system and to develop the skill to analyze, appreciate and interpret the data for engineering applications

PEO04: inculcate professional and ethical attitude, communication and team work skills and the ability to relate engineering issues from broader social perspective for truly contributing to the needs of the nation.

PROGRAM SPECIFIC OUTCOMES (PSOs)

The students of Electrical engineering will be able to:

PSO01: Develop models, analyse and assess the performance of different types of generation, transmission, distribution and protection mechanisms in power systems.

PSO02: Design, develop, analyse and test electrical and electronic systems; deploy control strategies for power electronics related applications.

PSO03: Measure, analyse, model and control the behavior of electrical quantities associated with constituents of energy or allied systems.

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❖ B.E [Computer Engineering]

PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

The graduates of Computer Engineering should be able to:

PEO1: Pursue successful professional career in IT and IT-enabled industries/public sector/research organizations or work as an entrepreneur.

PEO2: Pursue lifelong learning in generating innovative engineering solutions using research and complex problem-solving skills.

PEO3: provide solutions to challenging problems in their profession by applying computer engineering theory and practices.

PEO4: Demonstrate professionalism, ethics, inter-personal skills and continuous learning to develop leadership qualities to work effectively in multidisciplinary environment.

PROGRAM SPECIFIC OUTCOMES (PSOs)

The students of Computer engineering students will be able to:

PSO01: Design and develop the web applications using various technologies such as HTML, JSP, PHP, ASP and ASP.NET to cater the needs of the society.

PSO02: Offer solutions which impact geo-socio-economic and Environmental scenario by using Machine Learning, Artificial Intelligence and IoT.

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❖ B.E. E&TC Engineering

PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

The graduates of E&TC Engineering should be able to:

PEO01: Solve real-life engineering problems, design and development of innovative and cost-effective products exhibiting a solid foundation in Electronics and Communication Engineering fundamentals to cater needs of society.

PEO02: Excel in Industry/technical profession, higher studies, and entrepreneurship exhibiting global competitiveness.

PEO03: Exhibit professional ethics and values, effective communication, teamwork, multidisciplinary approach, and ability to relate engineering issues to broader social context.

PROGRAM SPECIFIC OUTCOMES (PSOS):

PSO 1: Development of Hardware/Software Co-designs: An ability to apply electronic design principles in the development of hardware/software prototypes and systems with progressive depth of complexity.

PSO 2: Development of Electronics Communication Systems: An ability to deploy conventional & next-gen. techniques/tools for analysis & design of Information and Communication systems.

PSO 3: Development of Signal Processing Applications: An ability to apply algorithmic knowledge of signal processing towards analysis, Recognition, and synthesis of multi-dimensional data.

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RAJIV GANDHI COLLEGE OF ENGINEERING, KARJULE HARYA
DEPARTMENT OF FIRST YEAR ENGINEERING
COURSE OUTCOMES

Year	Course Name	Course Outcome NO.	Course Outcome
	107001 – Engineering Mathematics – I	CO1	Mean value theorems and its generalizations leading to Taylors and Maclaurin's series useful in the analysis of engineering problems.
		CO2	the Fourier series representation and harmonic analysis for design and analysis of periodic continuous and discrete systems.
		CO3	to deal withderivative of functions of several variables that are essential in various branches of Engineering.
		CO4	to apply the concept of Jacobian to find partial derivative of implicit function and functional dependence. Use of partial derivatives in estimating error and approximation and finding extreme values of the function.
		CO5	the essential tool of matrices and linear algebra in a comprehensive manner for analysis of system of linear equations, finding linear and orthogonal transformations, Eigen values and Eigen vectors applicable to engineering problems
	107002: Engineering Physics	CO1	Develop understanding of interference, diffraction and polarization; connect it to few engineering applications.
		CO2	Learn basics of lasers and optical fibers and their use in some applications.
		CO3	Understand concepts and principles in quantum mechanics. Relate them to some applications.
		CO4	Understand theory of semiconductors and their applications in some semiconductor devices.
		CO5	Summarize basics of magnetism and superconductivity. Explore few of their technological applications.
		CO6	Comprehend use of concepts of physics for Non Destructive Testing. Learn some properties of nanomaterials and their application.
	102003 - Systems in Mechanical Engineering	CO1	Describe and compare the conversion of energy from renewable and non-renewable energy sources
		CO2	Explain basic laws of thermodynamics, heat transfer and their applications
		CO3	List down the types of road vehicles and their specifications
		CO4	Illustrate various basic parts and transmission system of a road vehicle
		CO5	Discuss several manufacturing processes and identify the suitable process
		CO6	Explain various types of mechanism and its application

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First Year Engineering	104010:Basic Electronics Engineering	CO1	Explain the working of P-N junction diode and its circuits.
		CO2	Identify types of diodes and plot their characteristics and also can compare BJT with MOSFET.
		CO3	Build and test analog circuits using OPAMP and digital circuits using universal/basic gates and flip flops.
		CO4	Use different electronics measuring instruments to measure various electrical parameters.
		CO5	Select sensors for specific applications.
		CO6	Describe basic principles of communication systems.
	110005: Programming and Problem Solving	CO1	Inculcate and apply various skills in problem solving.
		CO2	Choose most appropriate programming constructs and features to solve the problems in diversified domains.
		CO3	Exhibit the programming skills for the problems those require the writing of well-documented programs including use of the logical constructs of language, Python.
		CO4	Demonstrate significant experience with the Python program development environment.
	111006 -Workshop Practice	CO1	Familiar with safety norms to prevent any mishap in workshop.
		CO2	Able to handle appropriate hand tool, cutting tool and machine tools to manufacture a job.
		CO3	Able to understand the construction, working and functions of machine tools and their parts.
		CO4	Able to know simple operations (Turning and Facing) on a centre lathe.
	101007: Environmental Studies-I	CO1	Demonstrate an integrative approach to environmental issues with a focus on sustainability.
		CO2	Explain and identify the role of the organism in energy transfers in different ecosystems.
		CO3	Distinguish between and provide examples of renewable and nonrenewable resources & analyze personal consumption of resources.
		CO4	Identify key threats to biodiversity and develop appropriate policy options for conserving biodiversity in different settings.
		CO1	the effective mathematical tools for solutions of first order differential equations that model physical processes such as Newton's law of cooling, electrical circuit, rectilinear motion, mass spring systems, heat transfer etc.
		CO2	advanced integration techniques such as Reduction formulae, Beta functions, Gamma functions, Differentiation under integral sign and Error functions needed in evaluating multiple integrals and their applications.

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107008 – Engineering Mathematics – II	CO3	to trace the curve for a given equation and measure arc length of various curves.
	CO4	the concepts of solid geometry using equations of sphere, cone and cylinder in a comprehensive manner.
	CO5	evaluation of multiple integrals and its application to find area bounded by curves, volume bounded by surfaces, Centre of gravity and Moment of inertia.
107009: Engineering Chemistry	CO1	Apply the different methodologies for analysis of water and techniques involved in softening of water as commodity.
	CO2	Select appropriate electro-technique and method of material analysis.
	CO3	Demonstrate the knowledge of advanced engineering materials for various engineering applications.
	CO4	Analyze fuel and suggest use of alternative fuels.
	CO5	Identify chemical compounds based on their structure.
		Explain causes of corrosion and methods for minimizing corrosion.
103004: Basic Electrical Engineering	CO1	Differentiate between electrical and magnetic circuits and derive mathematical relation for self and mutual inductance along with coupling effect.
	CO2	Calculate series, parallel and composite capacitor as well as characteristics parameters of alternating quantity and phasor arithmetic
	CO3	Derive expression for impedance, current, power in series and parallel RLC circuit with AC supply along with phasor diagram.
	CO4	Relate phase and line electrical quantities in polyphase networks, demonstrate the operation of single phase transformer and calculate efficiency and regulation at different loading conditions
	CO5	Apply and analyze the resistive circuits using star-delta conversion KVL, KCL and different network theorems under DC supply.
	CO6	Evaluate work, power, energy relations and suggest various batteries for different applications, concept of charging and discharging and depth of charge.
101011: Engineering Mechanics	CO1	Determine resultant of various force systems
	CO2	Determine centroid, moment of inertia and solve problems related to friction
	CO3	Determine reactions of beams, calculate forces in cables using principles of equilibrium
	CO4	Solve trusses, frames for finding member forces and apply principles of equilibrium to forces in space
	CO5	Calculate position, velocity and acceleration of particle using principles of kinematics

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		CO6	Calculate position, velocity and acceleration of particle using principles of kinetics and Work, Power, Energy
	102012: Engineering Graphics	CO1	Draw the fundamental engineering objects using basic rules and able to construct the simple geometries.
		CO2	Construct the various engineering curves using the drawing instruments.
		CO3	Apply the concept of orthographic projection of an object to draw several 2D views and its sectional views for visualizing the physical state of the object.
		CO4	Apply the visualization skill to draw a simple isometric projection from given orthographic views precisely using drawing equipment.
		CO5	Draw the development of lateral surfaces for cut section of geometrical solids.
		CO6	Draw fully-dimensioned 2D, 3D drawings using computer aided drafting tools.
	110013: Project Based Learning	CO1	Project based learning will increase their capacity and learning through shared cognition.
		CO2	Students able to draw on lessons from several disciplines and apply them in practical way.
		CO3	Learning by doing approach in PBL will promote long-term retention of material and replicable skill, as well as improve teachers' and students' attitudes towards learning.
	101014: Environmental Studies-II	CO1	Have an understanding of environmental pollution and the science behind those problems and potential solutions.
		CO2	Have knowledge of various acts and laws and will be able to identify the industries that are violating these rules.
		CO3	Assess the impact of ever increasing human population on the biosphere: social, economic issues and role of humans in conservation of natural resources.
		CO4	Learn skills required to research and analyze environmental issues scientifically and learn how to use those skills in applied situations such as careers that may involve environmental problems and/or issues.

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Year	Course Name	Course Outcome NO.	Course Outcome
SE			
SEM IV	202041-Solid Mechanics	CO 1	CO1.DEFINE various types of stresses and strain developed on determinate and indeterminate members.
		CO2	CO2. DRAW Shear force and bending moment diagram for various types of transverse loading and support.
		CO 3	CO3. COMPUTE the slope & deflection, bending stresses and shear stresses on a beam.
		CO 4	CO4. CALCULATE torsional shear stress in shaft and buckling on the column.
		CO 5	CO5. APPLY the concept of principal stresses and theories of failure to determine stresses on a 2-D element.
		CO 6	CO6. UTILIZE the concepts of SFD & BMD, torsion and principal stresses to solve combined loading application based problems.
	202042 - Solid Modeling and Drafting	CO 1	CO1. UNDERSTAND basic concepts of CAD system, need and scope in Product Lifecycle Management
		CO2	CO2. UTILIZE knowledge of curves and surfacing features and methods to create complex solid geometry
		CO 3	CO3. CONSTRUCT solid models, assemblies using various modeling techniques & PERFORM mass property analysis, including creating and using a coordinate system
		CO 4	CO4. APPLY geometric transformations to simple 2D geometries
		CO 5	CO5. USE CAD model data for various CAD based engineering applications viz. production drawings, 3D printing, FEA, CFD, MBD, CAE, CAM, etc.
		CO 6	CO6. USE PMI & MBD approach for communication
	202043 - Engineering Thermodynamics	CO 1	CO1. DESCRIBE the basics of thermodynamics with heat and work interactions.
		CO2	CO2. APPLY laws of thermodynamics to steady flow and non-flow processes.
		CO 3	CO3. APPLY entropy, available and non available energy for an Open and Closed System,
		CO 4	CO4. DETERMINE the properties of steam and their effect on performance of vapour power cycle.
		CO 5	CO5. ANALYSE the fuel combustion process and products of combustion.
		CO 6	CO6. SELECT various instrumentations required for safe and efficient operation of steam generator.
	202044 - Engineering Materials and Metallurgy	CO 1	CO1. COMPARE crystal structures and ASSESS different lattice parameters.
		CO2	CO2. CORRELATE crystal structures and imperfections in crystals with mechanical behaviour of materials.
		CO 3	CO3. DIFFERENTIATE and DETERMINE mechanical properties using destructive and non-destructive testing of materials.
		CO 4	CO4. IDENTIFY & ESTIMATE different parameters of the system viz., phases, variables, component, grains, grain boundary, and degree of freedom. etc.
		CO 5	CO5. ANALYSE effect of alloying element & heat treatment on properties of ferrous & nonferrous alloy.
		CO 6	CO6. SELECT appropriate materials for various applications.
	203156 - Electrical and Electronics Engineering	CO 1	CO1. APPLY programming concepts to UNDERSTAND role of Microprocessor and Microcontroller in embedded systems
		CO2	CO2. DEVELOP interfacing of different types of sensors and other hardware devices with Atmega328 based Arduino Board
		CO 3	CO3. UNDERSTAND the operation of DC motor, its speed control methods and braking
		CO 4	CO4. DISTINGUISH between types of three phase induction motor and its characteristic features
		CO 5	CO5. EXPLAIN about emerging technology of Electric Vehicle (EV) and its modular subsystems
		CO 6	CO6. CHOOSE energy storage devices and electrical drives for EVs
	202045 - Geometric Dimensioning and Tolerancing Lab	CO 1	CO1. SELECT appropriate IS and ASME standards for drawing
		CO2	CO2. READ & ANALYSE variety of industrial drawings
		CO 3	CO3. APPLY geometric and dimensional tolerance, surface finish symbols in drawing
		CO 4	CO4. EVALUATE dimensional tolerance based on type of fit, etc.
		CO 5	CO5. SELECT an appropriate manufacturing process using DFM, DFA, etc.

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SEM V	207002 - Engineering Mathematics - III	CO 1	CO1. SOLVE higher order linear differential equations and its applications to model and analyze mass spring systems.
		CO2	CO2. APPLY Integral transform techniques such as Laplace transform and Fourier transform to solve differential equations involved in vibration theory, heat transfer and related mechanical engineering applications.
		CO 3	CO3. APPLY Statistical methods like correlation, regression in analyzing and interpreting experimental data applicable to reliability engineering and probability theory in testing and quality control.
		CO 4	CO4. PERFORM Vector differentiation & integration, analyze the vector fields and APPLY to fluid flow problems.
		CO 5	CO5. SOLVE Partial differential equations such as wave equation, one and two dimensional heat flow equations.
	202047 - Kinematics of Machinery	CO 1	CO1. APPLY kinematic analysis to simple mechanisms
		CO2	CO2. ANALYZE velocity and acceleration in mechanisms by vector and graphical method
		CO 3	CO3. SYNTHESIZE a four bar mechanism with analytical and graphical methods
		CO 4	CO4. APPLY fundamentals of gear theory as a prerequisite for gear design
		CO 5	CO5. CONSTRUCT cam profile for given follower motion
	202048 - Applied Thermodynamics	CO 1	CO1. DETERMINE COP of refrigeration system and ANALYZE psychrometric processes.
		CO2	CO2. DISCUSS basics of engine terminology,air standard, fuel air and actual cycles.
		CO 3	CO3. IDENTIFY factors affecting the combustion performance of SI and CI engines.
		CO 4	CO4. DETERMINE performance parameters of IC Engines and emission control.
		CO 5	CO5. EXPLAIN working of various IC Engine systems and use of alternative fuels.
		CO 6	CO6. CALCULATE performance of single and multi stage reciprocating compressors and DISCUSS rotary positive displacement compressors
	202049 - Fluid Mechanics	CO 1	CO1. DETERMINE various properties of fluid
		CO2	CO2. APPLY the laws of fluid statics and concepts of buoyancy
		CO 3	CO3. IDENTIFY types of fluid flow and terms associated in fluid kinematics
		CO 4	CO4. APPLY principles of fluid dynamics to laminar flow
		CO 5	CO5. ESTIMATE friction and minor losses in internal flows and DETERMINE boundary layer formation over an external surface
		CO 6	CO6. CONSTRUCT mathematical correlation considering dimensionless parameters, also ABLE to predict the performance of prototype using model laws
	202050 - Manufacturing Processes	CO 1	CO1. SELECT appropriate moulding, core making and melting practice and estimate pouring time, solidification rate and DESIGN riser size and location for sand casting process
		CO2	CO2. UNDERSTAND mechanism of metal forming techniques and CALCULATE load required for flat rolling
		CO 3	CO3. DEMONSTRATE press working operations and APPLY the basic principles to DESIGN dies and tools for forming and shearing operations
		CO 4	CO4. CLASSIFY and EXPLAIN different welding processes and EVALUATE welding characteristics
		CO 5	CO5. DIFFERENTIATE thermoplastics and thermosetting and EXPLAIN polymer processing techniques
		CO 6	CO6. UNDERSTAND the principle of manufacturing of fibre-reinforce composites and metal matrix composites
	202051 - Machine Shop	CO 1	CO1. PERFORM welding using TIG/ MIG/ Resistance/Gas welding technique
		CO2	CO2. MAKE Fibre-reinforced Composites by hand lay-up process or spray lay-up techniques
		CO 3	CO3. PERFORM cylindrical/surface grinding operation and CALCULATE its machining time
		CO 4	CO4. DETERMINE number of indexing movements required and acquire skills to PRODUCE a spur gear on a horizontal milling machine
		CO 5	CO5. PREPARE industry visit report
		CO 6	CO6. UNDERSTAND procedure of plastic processing
	202052 - Project Based Learning - II	CO 1	CO1. IDENTIFY the real-world problem (possibly of interdisciplinary nature) through a rigorous literature survey and formulate / set relevant aims and objectives.
		CO2	CO2. ANALYZE the results and arrive at valid conclusions.
		CO 3	CO3. PROPOSE a suitable solution based on the fundamentals of mechanical engineering by possibly integration of previously acquired knowledge.
		CO 4	CO4. CONTRIBUTE to society through proposed solutions by strictly following professional ethics and safety measures.
		CO 5	CO5. USE of technology in proposed work and demonstrate learning in oral and written form.
		CO 6	CO6. DEVELOP ability to work as an individual and as a team member.

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Year	Course Name	Course Outcome NO.	Course Outcome
TE			
SEM V	302041: Numerical and Statistical Methods	CO 1	SOLVE system of equations using direct and iterative numerical methods
		CO2	ESTIMATE solutions for differential equations using numerical techniques
		CO 3	DEVELOP solution for engineering applications with numerical integration.
		CO 4	DESIGN and CREATE a model using a curve fitting and regression analysis.
		CO 5	APPLY statistical Technique for quantitative data analysis.
		CO 6	DEMONSTRATE the data, using the concepts of probability and linear algebra.
	302042: Heat and Mass Transfer	CO 1	CO1. ANALYZE & APPLY the modes of heat transfer equations for one dimensional thermal system.
		CO2	CO2. DESIGN a thermal system considering fins, thermal insulation and & Transient heat conduction.
		CO 3	CO3. EVALUATE the heat transfer rate in natural and forced convection & validate with experimentation results.
		CO 4	CO4. INTERPRET heat transfer by radiation between objects with simple geometries, for black and grey surfaces.
		CO 5	CO5. ABILITY to analyze the rate of mass transfer using Fick's Law of Diffusion and understands mass diffusion in different coordinate systems.
		CO 6	CO6. DESIGN & ANALYSIS of heat transfer equipments and investigation of its performance
	302043: Design of Machine Elements	CO 1	CO1. DESIGN AND ANALYZE the cotter and knuckle Joints, levers and components subjected to eccentric loading.
		CO2	CO2. DESIGN shafts, keys and couplings under static loading conditions.
		CO 3	CO3. ANALYZE different stresses in power screws and APPLY those in the procedure to design screw jack.
		CO 4	CO4. EVALUATE dimensions of machine components under fluctuating loads.
		CO 5	CO5. EVALUATE & INTERPRET the stress developed on the different type of welded and threaded joints.
		CO 6	CO6. APPLY the design and development procedure for different types of springs.
	302044: Mechatronics	CO 1	CO1. DEFINE key elements of mechatronics, principle of sensor and its characteristics.
		CO2	CO2. UTILIZE concept of signal processing and MAKE use of interfacing systems such as ADC, DAC, Digital I/O.
		CO 3	CO3. DETERMINE the transfer function by using block diagram reduction technique.
		CO 4	CO4. EVALUATE Poles and Zero, frequency domain parameter for mathematical modeling for mechanical system. CO5. APPLY the concept of different controller modes to an industrial application. CO6. DEVELOP the ladder programming for industrial application.
		CO 5	CO5. APPLY the concept of different controller modes to an industrial application.
		CO 6	CO6. DEVELOP the ladder programming for industrial application.
	302045-A: Advanced Forming & Joining Processes	CO 1	CO1. ANALYSE the effect of friction in metal forming deep drawing and IDENTIFICATION of surface defects and their remedies in deep drawing operations
		CO2	CO2. ASSESS the parameters for special forming operation and SELECT appropriate special forming operation for particular applications
		CO 3	CO3. ANALYSE the effect of HAZ on microstructure and mechanical properties of materials
		CO 4	CO4. CLASSIFY various solid state welding process and SELECT suitable welding processes for particular applications
		CO 5	CO5. CLASSIFY various advanced welding process and SELECT suitable welding processes for particular applications.
		CO 6	CO6. INTERPRET the principles of sustainable manufacturing and its role in manufacturing industry.
	302045-B:Machining Science &Technology	CO 1	CO1. DEFINE metal cutting principles and mechanics of metal cutting and tool life.
		CO2	CO2. DESCRIBE features of gear and thread manufacturing processes.
		CO 3	CO3. SELECT appropriate grinding wheel and demonstrate the various surface finishing processes.
		CO 4	CO4. SELECT appropriate jigs/fixtures and to draw the process plan for a given component.
		CO 5	CO5. SELECT & EVALUATE various parameters of process planning. CO6. GENERATE CNC program for Turning / Milling processes and generate tool path using CAM software.
		CO 6	CO6. GENERATE CNC program for Turning / Milling processes and generate tool path using CAM software.

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SEM VI	302046: Digital Manufacturing Laboratory	CO 1	CO1. DEVELOP a component using conventional machines, CNC machines and Additive Manufacturing Techniques.
		CO2	CO2. ANALYZE cutting tool parameters for machining given job.
		CO 3	CO3. DEMONSTRATE simulation of manufacturing process using Digital Manufacturing Tools.
		CO 4	CO4. SELECT and DESIGN jigs and Fixtures for a given component. CO5. DEMONESTRATE different parameters for CNC retrofitting and reconditioning.
		CO 5	CO5. DEMONESTRATE different parameters for CNC retrofitting and reconditioning.
	302047: Skill Development	CO 1	CO1. APPLY& DEMONSTRATE procedure of assembly & disassembly of various machines.
		CO2	CO2. DESIGN & DEVELOP a working/model of machine parts or any new product.
		CO 3	CO3. EVALUATE fault with diagnosis on the machines, machine tools and home appliances. CO4. IDENTIFY & DEMONSTRATE the various activities performed in an industry such as maintenance, design of components, material selection.
		CO 4	CO4. IDENTIFY & DEMONSTRATE the various activities performed in an industry such as maintenance, design of components, material selection.
	302049: Artificial Intelligence & Machine Learning	CO 1	CO1. DEMONSTRATE fundamentals of artificial intelligence and machine learning.
		CO2	CO2. APPLY feature extraction and selection techniques.
		CO 3	CO3. APPLY machine learning algorithms for classification and regression problems.
		CO 4	CO4. DEVISE AND DEVELOP a machine learning model using various steps.
		CO 5	CO5. EXPLAIN concepts of reinforced and deep learning.
		CO 6	CO6. SIMULATE machine learning model in mechanical engineering problems.
	302050: Computer Aided Engineering	CO 1	CO1: DEFINE the use of CAE tools and DESCRIBE the significance of shape functions in finite element formulations.
		CO2	CO2: APPLY the various meshing techniques for better evaluation of approximate results.
		CO 3	CO3: APPLY material properties and boundary condition to SOLVE 1-D and 2-D element stiffness matrices to obtain nodal or elemental solution.
		CO 4	CO4: ANALYZE and APPLY various numerical methods for different types of analysis.
		CO 5	CO5: EVALUATE and SOLVE non-linear and dynamic analysis problems by analyzing the results obtained from analytical and computational method.
		CO 6	CO6: GENERATE the results in the form of contour plot by the USE of CAE tools.
	302051: Design of Transmission Systems	CO 1	CO1. APPLY the principle of Spur & Helical gear design for industrial application and PREPARE a manufacturing drawing with the concepts of GD&T.
		CO2	CO2. EXPLAIN and DESIGN Bevel & Worm gear considering design parameters as per design standards.
		CO 3	CO3. SELECT&DESIGN Rolling and Sliding Contact Bearings from manufacturer's catalogue for a typical application considering suitable design parameters.
		CO 4	CO4. DEFINE and DESIGN various types of Clutches, Brakes, used in automobile.
		CO 5	CO5. APPLY various concept to DESIGN Machine Tool Gear box, for different applications
		CO 6	CO6. ELABORATE various modes of operation, degree of hybridization and allied terms associated with hybrid electric vehicles.
	302052-B: Surface Engineering	CO 1	CO1. DEFINE the basic's principle & mechanism of surface degradation
		CO2	CO2. ANALYSE & SELECT correct corrosion prevention techniques for a different service condition.
		CO 3	.CO3. DEMONSTRATE the role of surface engineering of materials to modify/improve the surface properties.
		CO 4	CO4. SELECT the suitable surface heat treatments to improve the surface properties.
		CO 5	CO5. APPLY the surface modification technique to modify surface properties.
		CO 6	CO6. ANALYSE & EVALUTE various surface coating defects using various testing/characterization method.
	302053: Measurement	CO 1	CO1. EVALUATE causes of errors in Vernier calipers, micrometers by performing experiments in standard metrological conditions, noting deviations at actual and by plotting cause and effect diagram, to reduce uncertainty in measurement.
		CO2	CO2. ANALYZE strain measurement parameters by taking modulus of elasticity in consideration to acknowledge its usage in failure detection and force variations.
		CO 3	CO3. EXAMINE surface Textures, surface finish using equipment's like Talysurf and analyze surface finish requirements of metrological equipment's like gauges, jaws of vernier calipers, micrometers, magnifying glasses of height gauge and more, to optimize surface finish accuracy requirements and cost of measurement.

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	Laboratory	CO 4	CO4. MEASURE the dimensional accuracy using Comparator and limit gauges and appraise their usage in actual measurement or comparison with standards set to reduce measurement lead time. CO5. PERFORM Testing of Flow rate, speed and temperature measurements and their effect on performance in machines and mechanisms like hydraulic or pneumatic trainers, lathe machine etc. to increase repeatability and reproducibility. CO6. COMPILE the information of opportunities of entrepreneurships/business in various sectors of metrology like calibrations, testing, coordinate and laser metrology etc in an industry visit report.

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Year	Course Name	Course Outcome NO.	Course Outcome
BE			
SEM VII	402041: Heating, Ventilation, Air Conditioning and Refrigeration	CO 1	CO1.ANALYSE different air-craft refrigeration systems and EXPLAIN the properties, applications and environmental issues of different refrigerants.
		CO2	CO2.ANALYSE multi pressure refrigeration system used for refrigeration applications.
		CO 3	CO3.DISCUSS types of compressors, condensers, evaporators and expansion valves along with regulatory and safety controls and DESCRIBE Transcritical and ejector refrigeration systems.
		CO 4	CO4.ESTIMATE cooling load for air conditioning systems used with concern of design conditions and indoor quality of air.
		CO 5	CO5.DESIGN air distribution system along with consideration of ventilation and infiltration.
		CO 6	CO6.EXPLAIN the working of types of desiccants, evaporative, thermal storage, radiant cooling, clean room and heat pump systems.
	402042: Dynamics of Machinery	CO 1	CO1. APPLY balancing technique for static and dynamic balancing of multi cylinder inline and radial engines.
		CO2	CO2. ANALYZE the gyroscopic couple or effect for stabilization of Ship, Airplane and Four wheeler vehicles.
		CO 3	CO3. ESTIMATE natural frequency for single DOF un-damped & damped free vibratory systems.
		CO 4	CO4. DETERMINE response to forced vibrations due to harmonic excitation, base excitation and excitation due to unbalance forces.
		CO 5	CO5. ESTIMATE natural frequencies, mode shapes for 2 DOF un-damped free longitudinal and torsional vibratory systems.
		CO 6	CO6. DESCRIBE noise and vibration measuring instruments for industrial / real life applications along with suitable method for noise and vibration control.
	402043: Turbomachinery	CO 1	CO1: VALIDATE impulse moment principle using flat, inclined and curved surfaces and INVESTIGATE performance characteristics of hydraulic turbines.
		CO2	CO2: DETERMINE performance parameters of impulse and reaction steam turbine along with discussion of nozzles, governing mechanism & losses.
		CO 3	CO3: MEASURE performance parameters of single & multistage centrifugal pumps along with discussion of cavitation and selection.
		CO 4	CO4: EXPLAIN performance parameters of centrifugal compressor along with discussion of theoretical aspects of axial compressor.
	402044D: Industrial Engineering	CO 1	CO1. EVALUATE the productivity and IMPLEMENT various productivity improvement techniques.
		CO2	CO2. APPLY work study techniques and UNDERSTANDS its importance for better productivity.
		CO 3	CO3. DEMONSTRATE the ability to SELECT plant location, appropriate layout and material handling equipment.
		CO 4	CO4. USE of Production planning and control tools for effective planning, scheduling and managing the shop floor control.
		CO 5	CO5. PLAN inventory requirements and EXERCISE effective control on manufacturing requirements.
		CO 6	CO6. APPLY Ergonomics and legislations for human comfort at work place and UNDERSTANDS the role of value engineering in improving productivity.
	402045C: Additive Manufacturing	CO 1	CO1. USE and CLASSIFY the fundamentals of Additive Manufacturing Technologies for engineering applications.
		CO2	CO2. IDENTIFY and CATEGORIZE the methodology to manufacture the products using light-based photo-curing, LASER based technologies and STUDY their applications, benefits.
		CO 3	CO3. IDENTIFY and CATEGORIZE the methodology to manufacture the products using extrusion-based deposition, inkjet-based technologies and STUDY their applications, benefits.
		CO 4	CO4. SYNTHESIZE, RECOMMEND and DESIGN the suitable material and process for fabrication and build behavior of verities of product.
		CO 5	CO5. DESIGN and CONSTRUCT the AM equipment's for appropriate applications and the input CAD model.
		CO 6	CO6. DEVELOP the knowledge of additive manufacturing for various real-life applications.

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	402046: Data Analytics Laboratory	CO 1	CO1: UNDERSTAND the basics of data analytics using concepts of statistics and probability.
		CO2	CO2: APPLY various inferential statistical analysis techniques to describe data sets and withdraw useful conclusions from acquired data set.
		CO 3	CO3: EXPLORE the data analytics techniques using various tools
		CO 4	CO4: APPLY data science concept and methods to solve problems in real world context
		CO 5	CO5: SELECT advanced techniques to conduct thorough and insightful analysis and interpret the results
SEM VIII	402047: Project (Stage I)	CO 1	CO1. IMPLEMENT systems approach
		CO2	CO2. CONCEPTUALIZE a novel idea / technique into a product.
		CO 3	CO3. THINK in terms of a multi-disciplinary environment.
		CO 4	CO4. TAKE ON the challenges of teamwork, and DOCUMENT all aspects of design work.
		CO 5	CO5. UNDERSTAND the management techniques of implementing a project.
		CO 6	CO6. DEMONSTRATE the final product for Functionality, Designability, and Manufacturability.
	402048: Computer Integrated Manufacturing	CO 1	CO1. EXPLAIN CIM and factory automation.
		CO2	CO2. UNDERSTAND the integration of hardware and software elements for CIM
		CO 3	CO3. APPLY CNC program for appropriate manufacturing techniques.
		CO 4	CO4. ANALYZE processes planning, quality and MRP integrated with computers.
		CO 5	CO5. INTERPRET flexible, cellular manufacturing and group technology.
		CO 6	CO6. ANALYZE the effect of IOT, Industry-4.0 and cloud base manufacturing.
	402049: Energy Engineering	CO 1	CO1: EXPLAIN the power generation scenario, the layout components of thermal power plant and ANALYZE the improved Rankine cycle.
		CO2	CO2: ANALYZE the performance of steam condensers, cooling tower system; RECOGNIZE an environmental impact of energy systems and methods to control the same.
		CO 3	CO3: EXPLAIN the layout, component details of diesel engine plant, hydel and nuclear energy systems.
		CO 4	CO4: ANALYZE gas and improved power cycles.
		CO 5	CO5: EXPLAIN the fundamentals of renewable energy systems.
		CO 6	CO6: EXPLAIN basic principles of energy management, storage and economics of power generation.
	402050B: Energy Audit and Management	CO 1	CO1. EXPLAIN the energy need and role of energy management
		CO2	CO2. CARRY OUT an energy audit of the Institute/Industry/Organization
		CO 3	CO3. ASSESS the ENCON opportunities using energy economics
		CO 4	CO4. ANALYSE the energy conservation performance of Thermal Utilities
		CO 5	CO5. ANALYSE the energy conservation performance of Electrical Utilities
		CO 6	CO6. EXPLAIN the energy performance improvement by Cogeneration and WHR method
	402051B: Renewable Energy Technologies	CO 1	1. DESCRIBE fundaments, needs and scopes of renewable energy systems.
		CO2	2. EXPLAIN performance aspects of flat and concentric solar collectors along with applications.
		CO 3	3. DESIGN solar photovoltaic system for residential applications.
		CO 4	4. DESIGN AND ANALYSIS of wind energy conversion system.
		CO 5	5. APPLY Installation practices of Wind and Solar Photovoltaic Systems for grid connection.

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		CO 6	6. DETERMINE performance parameters of bio-energy conversion systems.
	402052: Mechanical Systems Analysis Laboratory	CO 1	CO1. DEVELOP an understanding of the Systems Engineering Process and the range of factors that influence the product need, problem-specific information collection, Problem Definition, Task Specification, Solution Concept inception, Concept Development, System's Mathematical Modelling, Synthesis, Analysis, final solution Selection, Simulation, Detailed Design, Construction, Prototyping, Testing, fault-finding, Diagnosis, Performance Analysis, and Evaluation, Maintenance, Modification, Validation, Planning, Production, Evaluation and use of a system using manual calculation, computational tools to automate product development process, redesign from customer feedback and control of technological systems.
		CO2	CO2. ILLUSTRATE the concepts and USE the developed skill-set of use of computational tools (FEA, CFD, MBD, FSI, CAE) to automate the complete product development process.
		CO 3	CO3. EVALUATE the knowledge of new developments and innovations in technological systems to carry forward to next stage of employment after passing your Undergraduate Degree Examination.
		CO 4	CO4. APPRAISE how technologies have transformed people's lives and can be used to SOLVE challenges associated with climate change, efficient energy use, security, health, education and transport, which will be coming your ways in the coming future.
		CO 5	CO5. PRIORITIZE the concept of quality and standards, including systems reliability, safety and fitness for the intended purpose.
		CO 6	CO6. INVENT yourself to face the challenges of future technologies and their associated Problems.

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DEPARTMENT OF ELECTRICAL ENGINEERING

Year	Course Name	Course Outcome NO.	Course Outcome
SE			
SEM III	Engineering Mathematics-III (207006)	CO 1	Solve higher order linear differential equation using appropriate techniques to model and analyze electrical circuits.
		CO2	Apply Integral transforms such as Laplace transform, Fourier transform and Z-Transform to solve problems related to signal processing and control systems.
		CO 3	Apply Statistical methods like correlation, regression and Probability theory as applicable to analyze and interpret experimental data related to energy management, wer systems, testing and quality control.
		CO 4	Perform Vector differentiation and integration, analyze the vector fields and apply to wave theory and electro-magnetic fields.
		CO 5	Analyze Complex functions, conformal mappings, and perform contour integration in the study of electrostatics, signal and image processing.
	Power Generation Technologies (203141)	CO 1	Identify components and elaborate working principle of conventional power plants.
		CO2	Recognize the importance and opportunities of renewable energies.
		CO 3	Calculate and control power output of wind solar, and hydro power plant.
		CO 4	Describe process of grid interconnection of distributed generation and requirements.
		CO 5	Interpret the environmental and social impact of various generation technologies
	Material Science (203142)	CO 1	Discuss classification,properties and characteristics of different electrical engineering materials.
		CO2	State various applicationsmeasuring methods for parameters of different classes of electrical engineering materials.
		CO 3	Solve simple problems based on dielectric, magnetic and conducting materials.
		CO 4	Apply knowledge of Nano-technology to electrical engineering.
		CO 5	Execute tests ondielectric, insulating, magnetic, conducting, resistive materials as per IS to decide the quality of thematerials.
		CO 6	Create learning resource material ethically to demonstrate self learning leading to lifelong learning skills and usage of ICT/ online technology through collaborative/active learning activities.
	Analog And Digital Electronics (203143)	CO 1	Design logical, sequential and combinational digital circuit using K-Map.
		CO2	Demonstrate different digital memories and programmable logic families
		CO 3	Apply and analyze applications of OPAMP in open and closed loop condition.
		CO 4	Design uncontrolled rectifier with given specifications.
	Electrical Measurements and Instrumentation (203144)	CO 1	Define various characteristic and classify measuring instruments along with rangeextension techniques.
		CO2	Apply measurement techniques for measurement of resistance, inductance and capacitance.
		CO 3	Demonstrate construction, working principle of electrodynamo type and induction type instruments for measurement of power and energy.
		CO 4	Make use of CRO for measurement of voltage, current and frequency.
		CO 5	Classify transducer and apply it for measurement of physical parameters in real time.

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	Applications of Mathematics in Electrical Engineering (203150)	CO 1	Apply fundamentals of mathematics in solving electrical engineering problem
		CO2	Analyze complex electrical engineering problem using mathematical techniques.
		CO 3	Implement program and simulation for problems in electrical engineering.
		CO 4	Demonstrate self lifelong learning skills with applications of mathematics in electrical engineering through software.
	Soft Skill (203151)	CO 1	DoSWOC analysis.
		CO2	Develop presentation and take part in group discussion.
		CO 3	Understand and implement etiquette in workplace and in society at large.
		CO 4	Work in team with team spirit.
		CO 5	Utilize the techniques for time management and stress management
	Audit Course-III(A) : Solar Thermal System (203152 A)	CO 1	Differentiate between types of solar Concentrators
		CO2	Apply software tool for solar concentrators
		CO 3	Design different types of Solar collectors and balance of plant
	Power System-I (203145)	CO 1	Recognize different patterns of load curve and calculate associated different factors with it and tariff.
		CO2	Draft specifications of electrical equipment in power station.
		CO 3	Design electrical and mechanical aspects in overhead transmission and underground cables.
		CO 4	Evaluate the inductance and capacitance of different transmission line configurations.
		CO 5	Analyse the performance of short and medium transmission lines
	Electrical Machines-I (203146)	CO 1	Evaluate performance parameters of transformer with experimentation and demonstrate construction along with specifications as per standards.
		CO2	Distinguish between various types of transformer connections as per vector groups with application and to perform parallel operation of single/three phase ransformers.
		CO 3	Select and draft specifications of DC machines and Induction motors for variousapplications along with speed control methods.
		CO 4	Justify the need of starters in electrical machines with merits and demerits.
		CO 5	Test and evaluate performance of DC machines and Induction motors as per IS standard.
	Network AnalysisI (203147)	CO 1	Calculate current/voltage in electrical circuits using simplification techniques, Mesh, Nodal analysis and network theorems.
		CO2	Analyze the response of RLC circuit with electrical supply in transient and stead state.
		CO 3	Apply Laplace transform to analyze behaviour of an electrical circuit.
		CO 4	Derive formula and solve numerical of two port network and Design of filters
		CO 5	Applyknowledge of network theory to find transfer function, poles and zeroes location to perform stability analysis and parallel resonance
SEM IV	**Numerical Methods**	CO 1	Demonstrate types of errors in computation and their causes of occurrence.
		CO2	Calculate root of algebraic and transcendental equations using various methods.

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	and Computer Programming (203148)	CO 3	Apply numerical methods for various mathematical problems such as interpolation, numerical differentiation, integration and ordinary differential equation.
		CO 4	Solve linear simultaneous equation using direct and indirect method.
		CO 5	Develop algorithms and write computer programs for various numerical methods.
	Fundamental of Microcontroller and Applications (203149)	CO 1	Describe the architecture and features of various types of the microcontroller.
		CO2	Illustrate addressing modes and execute programs in assembly language for the microcontroller.
		CO 3	Write programs in C language for microcontroller 8051.
		CO 4	Elaborate interrupt structure of 8051 and program to handle interrupt and ADC809
		CO 5	Define the protocol for serial communication and understand the microcontroller development systems.
		CO 6	Interface input output devices and measure electricalparameters with 8051 in real time.
	Project Based Learning (203152)	CO 1	Identify, formulate, and analyze the simple project problem.
		CO2	Apply knowledge of mathematics, basic sciences, and electrical engineering fundamentals to develop solutions for the project.
		CO 3	Learn to work in teams, and to plan and carry out different tasks that are required during a project.
		CO 4	Understand their own and their team-mate's strengths andskills.
		CO 5	Draw information from a variety of sources and be able to filter and summarize the relevant points.
		CO 6	Communicate to different audiences in oral, visual, and written forms
	Audit Course-IV(A): Solar Photovoltaic	CO 1	design of Solar PV system for small and large installations
		CO2	handle software tools for Solar PV systems

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DEPARTMENT OF ELECTRICAL ENGINEERING

Year	Course Name	Course Outcome NO.	Course Outcome
TE			
SEM V	Industrial and Technology Management (303141)	CO 1	Differentiate between different types of business organizations and discuss the fundamentals of economics and management.
		CO2	Explain the importance of technology management and quality management.
		CO 3	Explain the importance of IPR and role of Human Resource Management.
		CO 4	Understand the importance of Quality and its significance.
		CO5	Describe the characteristics of marketing & its types and overview of financial Management.
		CO 6	Discuss the qualities of a good leader and road map to Entrepreneurship
	Power Electronics (303142)	CO 1	Develop characteristics of different power electronic switching devices.
		CO2	Reproduce working principle of power electronic converters for different types of loads.
		CO 3	Choose the appropriate converter for different applications.
	Electrical Machines-II (303143)	CO 1	Learn construction, working principle of three phase Synchronous Machines, Induction Motors, A.C. Series Motor and Special Purpose Motors.C
		CO2	Understand characteristics of three phase Synchronous Machines, Induction Motors, A.C. Series Motor and Special Purpose Motors.
		CO 3	Select the above machines in Power System, industrial, household & Military Engineering applications.
		CO 4	Testing of machines to evaluate the performance through experimentation.
	Electrical Installation, Design and Condition Based Maintenance (303144)	CO 1	Classify different types of distribution supply system and determine economics of distribution system. compare and classify various substations, bus-bars and Earthing systems.
		CO2	Demonstrate the importance and necessity of maintenance.
		CO 3	Analyse and test different condition monitoring methods.
		CO4	Carry out estimation and costing of internal wiring for residential and commercial installations.
		CO 5	Apply electrical safety procedures.
	Elective-I: Advanced Microcontroller and Embedded System (303145 A)	CO 1	Explain architecture of PIC 18F458 microcontroller, its instructions and the addressing modes.
		CO2	Use Ports and timers for peripheral interfacing and delay generation.
		CO 3	Interface special and generate events using CCP module.
		CO 4	Effectively use interrupt structure in internal and External interrupt mode.
		CO 5	Effectively use ADC for parameter measurement and also understand LCD interfacing.
		CO 6	Use Serial Communication and various serial communication protocols.
	Seminar (303146)	CO 1	Relate with the current technologies and innovations in Electrical engineering.
		CO2	Improve presentation and documentation skill
		CO 3	Apply theoretical knowledge to actual industrial applications and research activity.
		CO 4	Communicate effectively.
	Audit Course V: Energy Storage System	CO 1	Explain and differentiate various types of energy storage for suitable applications
		CO2	Understand battery recycling techniques

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SEM VI	**Power System-II (303148)**	CO 1	Solve problems involving modelling, design and performance evaluation of HVDC and EHVAC power transmission lines.
		CO2	Calculate per unit values and develop Y bus for solution power flow equations in power transmission networks
		CO 3	Calculate currents and voltages in a faulted power system under both symmetrical and asymmetrical faults, and relate fault currents to circuit breaker ratings.
	Computer Aided Design of Electrical Machines (303149)	CO 1	Summarize temperature rise, methods of cooling of transformer and consider IS 2026 in transformer design.
		CO2	Design the overall dimensions of the transformer.
		CO 3	Analyze the performance parameters of transformer.
		CO 4	Design overall dimensions of three phase Induction motor
		CO 5	Analyze the performance parameters of three phase Induction motor.
		CO 6	Implement and develop computer aided design of transformer and induction motor
	Control System Engineering (303150)	CO 1	Construct mathematical model of Electrical and Mechanical system using differential equations and transfer function and develop analogy between Electrical and Mechanical systems.
		CO2	Determine time response of systems for a given input and perform analysis of first and second order systems using time domain specifications.
		CO 3	Investigate closed loop stability of system in s-plane using Routh Hurwitz stability criteria and root locus.
		CO 4	Analyze the systems in frequency domain and investigate stability using Nyquist plot and Bode plot
		CO 5	Design PID controller for a given plant to meet desired time domain specifications
	Elective-II Energy Management (303151 D)	CO 1	Describe BEE Energy policies, Energy ACT.
		CO2	List and apply demand side management measures for managing utility systems.
		CO 3	Explore and use simple data analytic tools.
		CO 4	Use various energy measurement and audit instruments.
		CO 5	Evaluate economic feasibility of energy conservation projects.
		CO 6	Identify appropriate energy conservations methods for electric and thermal utilities.
	Internship (303152)	CO 1	Understand the working culture and environment of the Industry and get familiar with various departments and practices in the industry.towards society and the environment.
		CO2	Operate various meters, measuring instruments, tools used in industry efficiently and develop technical competence.
		CO 3	Apply internship learning in other course completions and final year project management, i.e.topic finalization, project planning, hardware development, result interpretations, report writing, etc.
		CO 4	Create a professional network and learn about ethical, safety measures, and legal practices.
		CO 5	Appreciate the responsibility of a professional
		CO 6	Identify career goals and personal aspirations.
	Audit Course VI: Project Management	CO 1	Elaborate importance of project management and its process.
		CO2	Learn about the role of high performance teams and leadership in project management.

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DEPARTMENT OF ELECTRICAL ENGINEERING

Year	Course Name	Course Outcome NO.	Course Outcome
BE			
SEM VII	Power System Operation and Control (403141)	CO 1	Summarize angle, voltage and frequency stability in the power system control (UN).
		CO 2	Illustrate various ways of interchange of power between interconnected utilities (AP).
		CO 3	Analyze stability and optimal load dispatch using different techniques (AN).
		CO 4	Select appropriate FACTS devices for stable operation of the system (EV).
		CO5	Evaluate the stability of the system and suggest the methods to improve it (EV).
	Advanced Control System (403142)	CO 1	Explain compensation networks, common nonlinearities, the concept of state, sampling and reconstruction, and concepts of advanced controls (Understanding)
		CO 2	Determine transfer function from state model (Applying)
		CO 3	Test controllability and observability properties of the system (Evaluating)
		CO 4	Design compensators, state feedback controls, and observers for the system (Creating)
	Elective-I High Voltage Engineering (403143C)	CO 1	Identify, describe and analyze the breakdown theories of gaseous, solid and liquid materials.
		CO 2	Analyze the occurrence of over voltage and to provide remedial solutions
		CO 3	Describe and use of various methods of generation of high AC, DC, impulse voltage and current.
		CO 4	Demonstrate the methods of measurement of high AC, DC, impulse voltage and current, tests on high voltage equipment and devices
		CO 5	Study design of high voltage laboratory with all safety measures.
	Elective-II HVDC and FACTs (403144D)	CO 1	Choose a proper FACTS controller for the specific application based on system requirements.
		CO 2	Analyze shunt, series, and combined controllers to explore different benefits.
		CO 3	Compare EHVAC and HVDC systems and to describe various types of DC links.
		CO 4	Describe various methods for the control of HVDC systems and to perform power flow analysis in AC/DC systems
	Project Stage I (403145)	CO 1	Define the project problem statement and identify the scope of the project.
		CO 2	Search the appropriate research papers, standards and e-resources and write a literature survey.
		CO 3	Identify tools, techniques, methods, concepts, measuring devices, and instruments required for the project to define the methodology of the project.
		CO 4	Justify the selection of electrical, electronic and mechanical components for the project prototyping
		CO 5	Simulate or develop a system for software or hardware verification.
		CO 6	Write a project report with proper interpretation of results
	MOOCs (403146)	CO 1	Enables the students to directly engage and learn from the best faculty in the country in order to strengthen the fundamentals.
		CO 2	Explore new areas of interest in a relevant field.
		CO 3	Enable self learning initiative in learners..
		CO 4	Develop critical thinking to solve complex problems in engineering, science and humanities.
		CO 5	Improve communication skills by interacting with peers and course teachers.

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	Audit Course-VII German Language-I (403147A)	CO 1	Will have the ability of basic communication.
		CO 2	Will have the knowledge of German script.
		CO 3	Will get introduced to reading ,writing and listening skills
		CO 4	Will develop interest to pursue profession in Indo-German Industry.
SEM VIII	Switchgear and Protection (403148)	CO 1	Understand the fundamentals of protective relaying.
		CO 2	Demonstrate the arc interruption and analyze the RRRV in circuit breakers
		CO 3	Demonstrate the construction and working principle of air brake circuit breakers, SF6 circuit breakers, and a vacuum circuit breaker.
		CO 4	Explain the characteristics of static and digital relays and their applications in power systems.
		CO 5	Apply the differential protection scheme to large transformers, alternators, and induction motors.
		CO 6	Apply distance protection, three stepped protection for transmission line
	Advanced Electrical Drives and Control (403149)	CO 1	Explain motor load dynamics and multi quadrant operation of drives.
		CO2	Analyze operation of converter fed and chopper fed DC drives.
		CO 3	Apply different braking methods of D.C. and induction motor drive.
		CO 4	Elaborate vector control for induction motor and BLDC drives.
		CO 5	Elaborate synchronous motor, reluctance motor drive.
		CO 6	Differentiate between classes and duty cycles of motors and select suitable drives in various industrial applications.
	Elective-III Restructuring and Deregulation (403150B)	CO 1	Identify the various institutions in the Indian power sector and explain their role in the Indian power sector .
		CO 2	Explain the various fundamentals of power sector economics
		CO 3	Describe the regulatory process in India and list the steps involved in tariff determination and explain the phases of tariff determination
		CO 4	Describe and explain different power sector restructuring models and explain the concept of energy trading
		CO 5	Explain the types of electricity markets and compare the types of electricity markets .
		CO 6	State different transmission pricing methods and describe and compare various congestion management methods.
	Elective-IV Illumination Engineering (403151B)	CO 1	Define and reproduce various terms in illumination.
		CO 2	Identify various parameters for illumination system design.
		CO 3	Design indoor and outdoor lighting systems.
		CO 4	Enlist state of the art illumination systems.
	Project Stage II (403152)	CO 1	Identify tools, techniques, methods, concepts, measuring devices, and instruments required for the project to define the methodology of the project
		CO 2	Justify the selection of electrical, electronic and mechanical components for the project prototyping
		CO 3	Select the appropriate testing method for system performance evaluation
		CO 4	Interpret results obtained by simulation, and hardware implementation and decide on further action or write a conclusion
		CO 5	Write a project report and research paper on the project work
	Audit Course-VIII German Language-II	CO 1	Will have the ability of advanced communication.
		CO 2	Will develop reading, writing and listening skills.

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	German Language-II (403153A)	CO 3	Will understand tenses in German Language.
		CO 4	Will develop interest to pursue a German language course.

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Year	Course Name	Course Outcome NO.	Course Outcome
SE			
SEM III	207005: Engineering Mathematics - III	CO 1	CO1: Solve higher order linear differential equation using appropriate techniques for modelling, analyzing of electrical circuits and control systems.
		CO2	CO2: Apply concept of Fourier transform & Z-transform and its applications to continuous & discrete systems, signal & image processing and communication systems.
		CO 3	CO3: Obtain Interpolating polynomials, numerically differentiate and integrate functions, numerical solutions of differential equations using single step and multi-step iterative methods used in modern scientific computing.
		CO 4	CO4: Perform vector differentiation & integration, analyze the vector fields and apply to electro- magnetic fields & wave theory.
		CO 5	CO5: Analyze Complex functions, Conformal mappings, Contour integration applicable to electrostatics, digital filters, signal and image processing.
SEM III	204181: Electronic Circuits	CO 1	CO1: Assimilate the physics, characteristics and parameters of MOSFET towards its application as amplifier
		CO2	CO2: Design MOSFET amplifiers, with and without feedback, & MOSFET oscillators, for given specifications
		CO 3	CO3: Analyze and assess the performance of linear and switching regulators, with their variants, towards applications in regulated power supplies.
		CO 4	CO4: Explain internal schematic of Op-Amp and define its performance parameters.
		CO 5	CO5: Design, Build and test Op-amp based analog signal processing and conditioning circuits towards various real time applications
		CO 6	CO6: Understand and compare the principles of various data conversion techniques and PLL with their applications.
SEM III	204182: Digital Circuits	CO 1	CO1: Identify and prevent various hazards and timing problems in a digital design.
		CO2	CO2: Use the basic logic gates and various reduction techniques of digital logic circuit.
		CO 3	CO3: Analyze, design and implement combinational logic circuits.
		CO 4	CO4: Analyze, design and implement sequential circuits.
		CO 5	CO5: Differentiate between Mealy and Moore machines.
		CO 6	CO6: Analyze digital system design using PLD
SEM III	204183: Electrical Circuits	CO 1	CO1: Analyze the simple DC and AC circuit with circuit simplification techniques.
		CO2	CO2: Formulate and analyze driven and source free RL and RC circuits.
		CO 3	CO3: Formulate & determine network parameters for given network and analyze the given network using Laplace Transform to find the network transfer function.
		CO 4	CO4: Explain construction, working and applications of DC Machines / Single Phase & Three Phase AC Motors.
		CO 5	CO5: Explain construction, working and applications of special purpose motors & understand motors used in electrical vehicles.
		CO 6	CO6: Analyze and select a suitable motor for different applications.
SEM III	204184: Data Structure	CO 1	CO1: Solve mathematical problems using C programming language.
		CO2	CO2: Implement sorting and searching algorithms and calculate their complexity.
		CO 3	CO3: Develop applications of stack and queue using array.
		CO 4	CO4: Demonstrate applicability of Linked List.
		CO 5	CO5: Demonstrate applicability of nonlinear data structures - Binary Tree with respect to its time complexity
		CO 6	CO6: Apply the knowledge of graph for solving the problems of spanning tree and shortest path algorithm.

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SEM IV	204191: Signals & Systems	CO 1	CO1: Identify, classify basic signals and perform operations on signals.
		CO2	CO2: Identify, Classify the systems based on their properties in terms of input output relation and in terms of impulse response and will be able to determine the convolution between to signals.
		CO 3	CO3: Analyze and resolve the signals in frequency domain using Fourier series and Fourier Transform
		CO 4	CO4: Resolve the signals in complex frequency domain using Laplace Transform, and will be able to apply and analyze the LTI systems using Laplace Transforms
		CO 5	CO5: Define and Describe the probability, random variables and random signals. Compute the probability of a given event, model, compute the CDF and PDF.
		CO 6	CO6: Compute the mean, mean square, variance and standard deviation for given random variables using PDF.
SEM IV	204192: Control Systems	CO 1	CO1: Determine and use models of physical systems in forms suitable for use in the analysis and design of control systems.
		CO2	CO2: Determine the (absolute) stability of a closed-loop control system.
		CO 3	CO3: Perform time domain analysis of control systems required for stability analysis.
		CO 4	CO4: Perform frequency domain analysis of control systems required for stability analysis.
		CO 5	CO5: Apply root-locus, Frequency Plots technique to analyze control systems.
		CO 6	CO6: Express and solve system equations in state variable form.
		CO 7	CO7: Differentiate between various digital controllers and understand the role of the controllers in Industrial automation.
SEM IV	204193: Principles of Communication Systems	CO 1	CO1: To compute & compare the bandwidth and transmission power requirements by analyzing time and frequency domain spectra of signal required for modulation schemes under study.
		CO2	CO2: Describe and analyze the techniques of generation, transmission and reception of Amplitude Modulation Systems.
		CO 3	CO3: Explain generation and detection of FM systems and compare with AM systems.
		CO 4	CO4: Exhibit the importance of Sampling Theorem and correlate with Pulse Modulation technique (PAM, PWM, and PPM).
		CO 5	CO5: Characterize the quantization process and elaborate digital representation techniques (PCM, DPCM, DM and ADM).
		CO 6	CO6: Illustrate waveform coding, multiplexing and synchronization techniques and articulate their importance in baseband digital transmission.
SEM IV	204194: Object Oriented Programming	CO 1	CO1: Describe the principles of object oriented programming.
		CO2	CO2: Apply the concepts of data encapsulation, inheritance in C++.
		CO 3	CO3: Understand Operator overloading and friend functions in C++.
		CO 4	CO4: Apply the concepts of classes, methods inheritance and polymorphism to write programs C++.
		CO 5	CO5: Apply Templates, Namespaces and Exception Handling concepts to write programs in C++.
		CO 6	CO6: Describe and use of File handling in C++.
SEM IV	204200: Project Based Learning	CO 1	CO1: Identify the real-world problem (possibly of interdisciplinary nature) through a rigorous literature survey and formulate / set relevant aim and objectives.
		CO2	CO2: Contribute to society through proposed solution by strictly following professional ethics and safety measures.
		CO 3	CO3: Propose a suitable solution based on the fundamentals of electronics and communication engineering by possibly the integration of previously acquired knowledge
		CO 4	CO4: Analyze the results and arrive at valid conclusion
		CO 5	CO5: Use of technology in proposed work and demonstrate learning in oral and written form.
		CO 6	CO6: Develop ability to work as an individual and as a team member.

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Year	Course Name	Course Outcome NO.	Course Outcome
TE			
SEM V	304181: Digital Communication	CO 1	CO1: Apply the statistical theory for describing various signals in a communication system.
		CO 2	CO2: Understand and explain various digital modulation techniques used in digital communication systems and analyze their performance in presence of AWGN noise.
		CO 3	CO3: Describe and analyze the digital communication system with spread spectrum modulation.
		CO 4	CO4: Analyze a communication system using information theoretic approach.
		CO 5	CO5: Use error control coding techniques to improve performance of a digital communication system.
SEM V	304182: Electromagnetic Field Theory	CO 1	CO1: Apply the basic electromagnetic principles and determine the fields (E & H) due to the given source.
		CO2	CO2: Apply boundary conditions to the boundaries between various media to interpret behavior of the fields on either sides.
		CO 3	CO3: State, Identify and Apply Maxwell's equations (integral and differential forms) in both the forms (Static, time-varying or Time-harmonic field) for various sources, Calculate the time average power density using Poynting Theorem, Retarded magnetic vector potential.
		CO 4	CO4: Formulate, Interpret and solve simple uniform plane wave (Helmholtz Equations) equations, and analyze the incident/reflected/transmitted waves at normal incidence.
		CO 5	CO5: Interpret and Apply the transmission line equation to transmission line problems with load impedance todetermine input and output voltage/current at any point on the Transmission line, Find input/load impedance, input/load admittance, reflection coefficient, SWR, Vmax/Vmin, length of transmission l ine using Smith Chart.
		CO 6	CO6: Carry out a detailed study, interpret the relevance and applications of Electromagnetics.
SEM V	304183: Database Management	CO 1	CO1: Ability to implement the underlying concepts of a database system.
		CO2	CO2: Design and implement a database schema for a given problem-domain using data model.
		CO 3	CO3: Formulate, using SQL/DML/DDL commands, solutions to a wide range of query and update problems.
		CO 4	CO4: Implement transactions, concurrency control, and be able to do Database recovery.
		CO 5	CO5: Able to understand various Parallel Database Architectures and its applications.
		CO 6	CO6: Able to understand various Distributed Databases and its applications.
SEM V	304184: Microcontroller	CO 1	CO1: Understand the fundamentals of microcontroller and programming.
		CO 2	CO2: Interface various electronic components with microcontrollers.
		CO 3	CO3: Analyze the features of PIC 18F XXXX.
		CO 4	CO4: Describe the programming details in peripheral support.
		CO 5	CO5: Develop interfacing models according to applications.
		CO 6	CO6: Evaluate the serial communication details and interfaces.
SEM V	304185 (D): Computer Networks (Elective - I)	CO 1	CO1: Design LAN using appropriate networking architecture, topologies, transmission media, and networking devices.
		CO 2	CO2: Understand the working of controlling techniques for flawless data communication using data link layer protocols.
		CO 3	CO3: Learn the functions of network layer, various switching techniques and internet protocol addressing.
		CO 4	CO4: Explore various interior and exterior, unicasting and multicasting protocols.
		CO 5	CO5: Analyze data flow using TCP/UDP Protocols, congestion control techniques for QoS.
		CO 6	CO6: Illustrate the use of protocols at application layer.
SEM V	304190: Skill Development	CO 1	CO1: Student should recognize the need to engage in independent and life-long learning in required skill sets
		CO 2	CO2: Student needs to experience the impact of industries on society by visiting different industries and understand the importance of industrial products for analog and digital circuits and systems.
		CO 3	CO3: Student has to make use of the modern electronic and IT Engineering Tools and Technologies for solving electronic engineering problems.
		CO 4	CO4: Student would be able to communicate effectively at different technical and administrative levels.
		CO 5	CO5: Student will exhibit leadership skills both as an individual and as a member in a team in multidisciplinary environment.

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SEM VI	304192: Cellular Networks	CO 1	CO1: Understand fundamentals of wireless communications.
		CO2	CO2: Discuss and study OFDM and MIMO concepts. CO3: Elaborate fundamentals mobile communication.
		CO 3	CO4: Describes aspects of wireless system planning.
		CO 4	CO5: Understand of modern and futuristic wireless networks architecture.
		CO 5	CO6: Summarize different issues in performance analysis.
SEM VI	304193: Project Management	CO 1	CO1: Apply the fundamental knowledge of project management for effectively handling the projects.
		CO2	CO2: Identify and select the appropriate project based on feasibility study and undertake its effective planning.
		CO 3	CO3: Assimilate effectively within the organizational structure of project and handle project management related issues in an efficient manner.
		CO 4	CO4: Apply the project scheduling techniques to create a Project Schedule Plan and accordingly utilize the resources to meet the project deadline.
		CO 5	CO5: Identify and assess the project risks and manage finances in line with Project Financial Management Process.
		CO 6	CO6: Develop new products assessing their commercial viability and develop skillsets for becoming successful entrepreneurs while being fully aware of the legal issues related to Product development and Entrepreneurship.
SEM VI	304194: Power Devices & Circuits	CO 1	CO1: To differentiate based on the characteristic parameters among SCR, GTO, MOSFET & IGBT and identify suitability of the power device for certain applications and understand the significance of device ratings.
		CO2	CO2: To design triggering / driver circuits for various power devices.
		CO 3	CO3: To evaluate and analyze various performance parameters of the different converters and its topologies.
		CO 4	CO4: To understand significance and design of various protections circuits for power devices.
		CO 5	CO5: To evaluate the performance of uninterruptible power supplies, switch mode power supplies and battery.
		CO 6	CO6: To understand case studies of power electronics in applications like electric vehicles, solar systems etc.
SEM VI	304195 (E): Network Security (Elective-II)	CO 1	CO1: Analyze attacks on computers and computer security.
		CO2	CO2: Demonstrate knowledge of cryptography techniques.
		CO 3	CO3: Illustrate various Symmetric and Asymmetric keys for Ciphers
		CO 4	CO4: Evaluate different Message Authentication Algorithms and Hash Functions
		CO 5	CO5: Get acquainted with various aspects of E-Mail Security
		CO 6	CO6: Assimilate various aspects of Web Security
SEM VI	304196: Cellular Networks Lab	CO 1	CO1: To develop professional competence through internship.
		CO2	304195 (E): Network Security (Elective-II)
		CO 3	CO3: To build the professional network and expose students to future employees.
		CO 4	CO4: Apply professional and societal ethics in their day to day life.
		CO 5	CO5: To become a responsible professional having social, economic and administrative considerations.
		CO 6	CO6: To make own career goals and personal aspirations.
SEM VI	304199: Internship	CO 1	CO1: To develop professional competence through internship.
		CO2	CO2: To apply academic knowledge in a personal and professional environment.
		CO 3	CO3: To build the professional network and expose students to future employees.
		CO 4	CO4: Apply professional and societal ethics in their day to day life.
		CO 5	CO5: To become a responsible professional having social, economic and administrative considerations.
		CO 6	CO6: To make own career goals and personal aspirations.
SEM VI	304200: Mini Project	CO 1	CO1: Understand, plan and execute a Mini Project with team.
		CO2	CO2: Implement electronic hardware by learning PCB artwork design, soldering techniques, testing and troubleshooting etc.
		CO 3	CO3: Prepare a technical report based on the Mini project.
		CO 4	CO 4: Deliver technical seminar based on the Mini Project work carried out.

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RGCOE: DEPARTMENT OF E&TC ENGINEERING

Year	Course Name	Course Outcome NO.	Course Outcome
BE			
SEM VII	**404181: Radiation and Microwave Theory**	CO 1	CO1: Apply the fundamentals of electromagnetic to derive free space propagation equation and distinguish various performance parameters of antenna.
		CO2:	CO2: Identify various modes in the waveguide. Compare: coaxial line, rectangular waveguides & striplines and identify applications of the same.
		CO3:	CO3: Explore construction and working of principles passive microwave devices/components.
		CO4:	CO4: Explore construction and working of principles active microwave devices/components.
		CO5:	CO5: Analyze the structure, characteristics, operation, equivalent circuits and applications of various microwave solid state active devices.
		CO6:	CO6: Know the various microwave systems, device set ups of microwave measurement devices and Identify the effect of radiations on environmental sustainability.
SEM VII	**404182: VLSI Design and Technology**	CO 1	CO1: Develop effective HDL codes for digital design.
		CO2:	CO2: Apply knowledge of real time issues in digital design.
		CO3:	CO3: Model digital circuit with HDL, simulate, synthesis and prototype in PLDs.
		CO4:	CO4: Design CMOS circuits for specified applications.
		CO5:	CO5: Analyze various issues and constraints in design of an ASIC.
		CO6:	CO6: Apply knowledge of testability in design and Build In Self Test (BIST) circuit.
SEM VII	**404183: Cloud Computing**	CO 1	CO1: Understand the basic concepts of Cloud Computing.
		CO2:	CO2: Describe the underlying principles of different Cloud Service Models.
		CO3:	CO3: Classify the types of Virtualization.
		CO4:	CO4: Examine the Cloud Architecture and understand the importance of Cloud Security.
		CO5:	CO5: Develop applications on Cloud Platforms.
		CO6:	CO6: Evaluate distributed computing and the Internet of Things.
SEM VII	**404184 (D): Embedded System & RTOS (Elective - III)**	CO 1	CO1: Apply design metrics of Embedded systems to design real time applications to match recent trends in technology.
		CO2:	CO2: Apply Real time systems concepts.
		CO3:	CO3: Evaluate µCOS operating system and its services.
		CO4:	CO4: Apply Embedded Linux Development Environment and testing tools.
		CO5:	CO5: Analyze Linux operating system and device drivers.
		CO6:	CO6: Analyze the hardware – software co design issues for testing of real time Embedded system.
SEM VII	**404185 (B): Electronics**	CO 1	CO1: Understand and explain design flow of design of electronics product.
		CO2:	CO2: Associate with various circuit design issues and testing.
		CO3:	CO3: Inferring different software designing aspects and the Importance of product test & test specifications.

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SEM VII	Product Design (Elective - IV)	CO4:	CO4: Summarizing printed circuit boards and different parameters.
		CO5:	CO5: Estimating assorted product design aspects.
		CO6:	CO6: Exemplifying special design considerations and importance of documentation.
SEM VII	404188: Project Phase – I	CO 1	CO1: Demonstrate a sound technical knowledge in field of E&TC in the form of project.
		CO2:	CO2: Undertake real life problem identification, formulation and solution.
		CO3:	CO3: Design engineering solutions to complex problems utilizing a systematic approach.
		CO4:	CO4: Demonstrate the knowledge, effective communication skills and attitudes as professional engineer

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SEM VIII	**404190: Fiber Optic Communication**	CO 1	CO1: Explain the working of components and measurement equipments in optical fiber networks.
		CO2:	CO2: Calculate the important parameters associated with optical components used in fiber optic telecommunication systems.
		CO3:	CO3: Compare and contrast the performance of major components in optical links.
		CO4:	CO4: Evaluate the performance viability of optical links using the power and rise time budget analysis.
		CO5:	CO5: Design digital optical link by proper selection of components and check its viability using simulation tools.
		CO6:	CO6: Compile technical information related to state of art components, standards, simulation tools and current technological trends by accessing the online resources to update their domain knowledge

SEM VIII	**404191 (E): Mobile Computing (Elective - V)**	CO 1	CO1: Understand concepts of Mobile Communication.
		CO2:	CO2: Analyse next generation Mobile Communication System.
		CO3:	CO3: Understand network layers of Mobile Communication.
		CO4:	CO4: Understand IP and Transport layers of Mobile Communication.
		CO5:	CO5: Study of different mathematical models.
		CO6:	CO6: Understand different mobile applications

SEM VIII	**404192 (D): Digital Marketing (Elective - VI)**	CO 1	CO1: Design websites using free tools like Wordpress and explore it for digital marketing.
		CO2:	CO2: Apply various keywords for a website & to perform SEO.
		CO3:	CO3: Understand the various SEM Tools and implement the Digital Marketing Tools.
		CO4:	CO4: Illustrate the use of Facebook, Instagram and Youtube for Digital Marketing in real life.
		CO5:	CO5: Use Linked in platform for various campaigning.
		CO6:	CO6: Understand the importance of recent trends in digital marketing.

SEM VIII	**404193: Innovation and Entrepreneurship**	CO 1	CO1: Understand Innovation, Entrepreneurship and characteristics of an entrepreneur.
		CO2:	CO2: Develop a strong understanding of the Design Process and its application in variety of business settings.
		CO3:	CO3: Generate sustainable ideas.
		CO4:	CO4: Explore various processes required to be an entrepreneur.
		CO5:	CO5: Understand patents and its process of filing.
		CO6:	CO6: Choose and use appropriate social media for marketing

SEM VIII	**404194: Digital Business Management**	CO 1	CO1: Identify drivers of digital business.
		CO2:	CO2: Illustrate various approaches and techniques for E-business and management.
		CO5:	CO3: Prepare E-business plan.

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RGCOE DEPARTMENT OF COMPUTER ENGINEERING

Year	Course Name	Course Outcome NO.	Course Outcome
SE			
SEM III	210241: Discrete Mathematics	CO 1	CO1: Design and analyze real world engineering problems by applying set theory, propositional logic and mathematical induction
		CO2	CO2: Develop skill in expressing mathematical properties of relation and function
		CO 3	CO3: Identify number of logical possibilities of events to design professional engineering Solutions
		CO 4	CO4: Model and solve computing problem using tree and graph Analyze the properties of binary operations and evaluate the algebraic structure
		CO 5	CO5: Apply abstract algebra in combinatorics, coding theory and questions regarding geometric constructio
	210242: Fundamentals of Data Structures	CO 1	CO1: To demonstrate a detailed understanding of behaviour of data structures like array, linked list, stack, and queue by developing programs.
		CO2	CO2: To use appropriate algorithmic strategy for better efficiency
		CO 3	CO3: To summarize data searching and sorting techniques.
		CO 4	CO4: To discriminate the usage of various structures in approaching the problem solution.
		CO 5	CO5: To analyze and use effective and efficient data structures in solving various Computer Engineering domain problems.
		CO 6	CO6: To design the algorithms to solve the programming problems.
	210243: Object Oriented Programming	CO 1	CO1: Analyze the strengths of object oriented programming
		CO2	CO2: Design and apply OOP principles for effective programming
		CO 3	CO3: Develop the application using object oriented programming language(C++)
		CO 4	CO4: Apply object-oriented concepts for advanced programming.
	210244: Computer Graphics	CO 1	CO1: Define basic terminologies of Computer Graphics, interpret the mathematical foundation of the concepts of computer graphics and apply mathematics to develop Computer programs for elementary graphic operations.
		CO2	CO2: Define the concept of windowing and clipping and apply various algorithms to fill and clip polygons.
		CO 3	CO3: Explain the core concepts of computer graphics, including transformation in two and three dimensions, viewing and projection.
		CO 4	CO4: Explain the concepts of color models, lighting, shading models and hidden surface elimination.
		CO 5	CO5: Describe the fundamentals of curves, fractals, animation and gaming.
	210245: Digital Electronics and Logic Design	CO 1	CO1: Simplify Boolean Expressions using K Map.
		CO2	CO2: Design and implement combinational circuits.
		CO 3	CO3: Design and implement sequential circuits.
		CO 4	CO4: Develop simple real-world application using ASM and PLD.
		CO 5	CO5: Choose appropriate logic families IC packages as per the given design specifications.
		CO 6	CO6: Explain organization and architecture of computer system
	210246: Humanity & Social Science	CO 1	CO1: Aware of the various issues concerning humans and society.
		CO2	CO2: Aware about their responsibilities towards society.
		CO 3	CO3: Sensitized about broader issues regarding the social, cultural, economic and human aspects, involved in social changes.
		CO 4	CO4: Able to understand the nature of the individual and the relationship between self and the community.
		CO 5	CO5: Able to understand major ideas, values, beliefs, and experiences that have shaped human history and cultures.

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SEM IV	210253: Data Structures & Algorithms	CO 1	CO1: To identify & articulate the complexity goals and benefits of a good hashing scheme for real-world applications.
		CO2	CO2: To apply non-linear data structures for solving problems of various domain.
		CO 3	CO3: To design and specify the operations of a nonlinear-based abstract data type and implement them in a high-level programming language.
		CO 4	CO4: To analyze the algorithmic solutions for resource requirements and optimization
		CO 5	CO5: To use efficient indexing methods and multiway search techniques to store and maintain data.
		CO 6	CO6: To use appropriate modern tools to understand and analyze the functionalities confined to the secondary storage.
	210254: Software Engineering	CO 1	CO1: Apply software engineering principles to develop software.
		CO2	CO2: Analyze software requirements and formulate design solution for a software.
		CO 3	CO3: Explain concepts of project estimation, planning and scheduling.
		CO 4	CO4: Explain risk management and software configuration management.
		CO 5	CO5: Explain various types of software testing.
	210255: Microprocessor	CO 1	CO1: To apply the assembly language programming to develop small real life embedded application.
		CO2	CO2: To understand the architecture of the advanced processor thoroughly to use the resources for programming
		CO 3	CO3: To understand the higher processor architectures descended from 80386 architecture
	210256: Principles of Programming Languages	CO 1	CO1: Make use of basic principles of programming languages
		CO2	CO2: Able to develop a program with Data representation and Computations
		CO 3	CO3: Able to develop programs using Object Oriented Programming language : Java
		CO 4	CO4: Develop application using inheritance, encapsulation, and polymorphism
		CO 5	CO5: Able to demonstrate Applet and Multithreading for robust application development
		CO 6	CO6: Able to develop a simple program using basic concepts of Functional and Logical programming paradigm
	210259: Code of Conduct	CO 1	CO1: Understand the basic perception of profession, professional ethics, various moral & social issues, industrial standards, code of ethics and role of professional ethics in engineering field.
		CO2	CO2: Aware of professional rights and responsibilities of an engineer, responsibilities of an engineer for safety and risk benefit analysis.
		CO 3	CO3: Understand the impact of the professional Engineering solutions in societal and Environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
		CO 4	CO4: Acquire knowledge about various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their professional lives.
	210260: Project Based Learning	CO 1	CO1: Ability to solve real life problems by applying knowledge.
		CO2	CO2: Ability to analyze alternative approaches, apply and use most appropriate one for feasible solution.
		CO 3	CO3: Ability to understand basics of IT Project management
		CO 4	CO4: Students should be able to accept and meet challenges in the real world, mirroring what professionals do every day.
		CO 5	CO5: Able to Classify software applications and identify unique features of various domains
		CO 6	CO6: Learning by doing approach in PBL will promote long-term retention of material and replicable skill, as well as improve teachers' and students' attitudes towards learning.

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Year	Course Name	Course Outcome NO.	Course Outcome
TE			
SEM V	310241: Database Management Systems	CO 1	CO1: Analyze and design Database Management System using ER model
		CO 2	CO2: Implement database queries using database languages
		CO 3	CO3: Normalize the database design using normal forms
		CO 4	CO4: Apply Transaction Management concepts in real-time situations
		CO 5	CO5: Use NoSQL databases for processing unstructured data
		CO 6	CO6: Differentiate between Complex Data Types and analyze the use of appropriate data types
	310242: Theory of Computation	CO 1	CO1: Understand formal language, translation logic, essentials of translation, alphabets, language representation and apply it to design Finite Automata and its variants
		CO2	CO2: Construct regular expression to present regular language and understand pumping lemma forRE
		CO 3	CO3: Design Context Free Grammars and learn to simplify the grammar
		CO 4	CO4: Construct Pushdown Automaton model for the Context Free Language
		CO 5	CO5: Design Turing Machine for the different requirements outlined by theoretical computerscience
		CO 6	CO6: Understand different classes of problems, classify and analyze them and study concepts ofNP completeness
	310243: Systems Programming and Operating System	CO 1	CO1: Analyze and synthesize basic System Software and its functionality.
		CO 2	CO2: Identify suitable data structures and Design & Implement various System Software
		CO 3	CO3: Compare different loading schemes and analyze the performance of linker and loader
		CO 4	CO4: Implement and Analyze the performance of process scheduling algorithms
		CO 5	CO5: Identify the mechanism to deal with deadlock and concurrency issues
		CO 6	CO6: Demonstrate memory organization and memory management policies
	310244: Computer Networks and Security	CO 1	CO1: Summarize fundamental concepts of Computer Networks, architectures, protocols and technologies
		CO 2	CO2: Illustrate the working and functions of data link layer
		CO 3	CO3: Analyze the working of different routing protocols and mechanisms
		CO 4	CO4: Implement client-server applications using sockets
		CO 5	CO5: Illustrate role of application layer with its protocols, client-server architectures
		CO 6	CO6: Comprehend the basics of Network Security
	Elective I 310245(A): Internet of Things and Embedded Systems	CO 1	CO1: Understand the fundamentals and need of Embedded Systems for the Internet of Things
		CO 2	CO2: Apply IoT enabling technologies for developing IoT systems
		CO 3	CO3: Apply design methodology for designing and implementing IoT applications
		CO 4	CO4: Analyze IoT protocols for making IoT devices communication
		CO 5	CO5: Design cloud based IoT systems
		CO 6	CO6: Design and Develop secured IoT applications
	310249: Seminar and Technical Communication	CO 1	CO1: Analyze a latest topic of professional interest
		CO 2	CO2: Enhance technical writing skills
		CO 3	CO3: Identify an engineering problem, analyze it and propose a work plan to solve it
		CO 4	CO4: Communicate with professional technical presentation skills
		CO 5	

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SEM VI	310251: Data Science and Big Data Analytics	CO 1	CO1: Analyze needs and challenges for Data Science Big Data Analytics
		CO 2	CO2: Apply statistics for Big Data Analytics
		CO 3	CO3: Apply the lifecycle of Big Data analytics to real world problems
		CO 4	CO4: Implement Big Data Analytics using Python programming
		CO 5	CO5: Implement data visualization using visualization tools in Python programming
		CO 6	CO6: Design and implement Big Databases using the Hadoop ecosystem
	310252: Web Technology	CO 1	CO1: Implement and analyze behavior of web pages using HTML and CSS
		CO 2	CO2: Apply the client side technologies for web development
		CO 3	CO3: Analyze the concepts of Servlet and JSP
		CO 4	CO4: Analyze the Web services and frameworks
		CO 5	CO5: Apply the server side technologies for web development
		CO 6	CO6: Create the effective web applications for business functionalities using latest web development platforms
	310253: Artificial Intelligence	CO 1	CO1: Identify and apply suitable Intelligent agents for various AI applications
		CO 2	CO2: Build smart system using different informed search / uninformed search or heuristic approaches
		CO 3	CO3: Identify knowledge associated and represent it by ontological engineering to plan a strategy to solve given problem
		CO 4	CO4: Apply the suitable algorithms to solve AI problems
		CO 5	CO5: Implement ideas underlying modern logical inference systems
		CO 6	CO6: Represent complex problems with expressive yet carefully constrained language of representation
	Elective II 310254(A): Information Security	CO 1	CO1: Model the cyber security threats and apply formal procedures to defend the attacks
		CO 2	CO2: Apply appropriate cryptographic techniques by learning symmetric and asymmetric key cryptography
		CO 3	CO3: Design and analyze web security solutions by deploying various cryptographic techniques along with data integrity algorithms
		CO 4	CO4: Identify and Evaluate Information Security threats and vulnerabilities in Information systems and apply security measures to real time scenarios
		CO 5	CO5: Demonstrate the use of standards and cyber laws to enhance Information Security in the development process and infrastructure protection
	310255: Internship**	CO 1	CO1: To demonstrate professional competence through industry internship.
		CO 2	CO2: To apply knowledge gained through internships to complete academic activities in a professional manner.
		CO 3	CO3: To choose appropriate technology and tools to solve given problem.
		CO 4	CO4: To demonstrate abilities of a responsible professional and use ethical practices in day to day life.
		CO 5	CO5: Creating network and social circle, and developing relationships with industry people.
		CO 6	CO6: To analyze various career opportunities and decide carrier goals.

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RGCOE DEPARTMENT OF COMPUTER ENGINEERING

Year	Course Name	Course Outcome NO.	Course Outcome
BE			
SEM VII	410241: Design and Analysis of Algorithms	CO 1	CO1: Formulate the problem
		CO 2	CO2: Analyze the asymptotic performance of algorithms
		CO 3	CO3: Decide and apply algorithmic strategies to solve given problem
		CO 4	CO4: Find optimal solution by applying various methods
		CO 5	CO5: Analyze and Apply Scheduling and Sorting Algorithms.
		CO 6	CO6: Solve problems for multi-core or distributed or concurrent environments
	410242: Machine Learning	CO 1	CO1: Identify the needs and challenges of machine learning for real time applications.
		CO 2	CO2: Apply various data pre-processing techniques to simplify and speed up machine learning algorithms.
		CO 3	CO3: Select and apply appropriately supervised machine learning algorithms for real time applications.
		CO 4	CO4: Implement variants of multi-class classifier and measure its performance.
		CO 5	CO5 :Compare and contrast different clustering algorithms.
		CO 6	CO6: Design a neural network for solving engineering problems.
	410243: Blockchain Technology	CO 1	CO1: Interpret the fundamentals and basic concepts in Blockchain
		CO 2	CO2: Compare the working of different blockchain platforms
		CO 3	CO3: Use Crypto wallet for cryptocurrency based transactions
		CO 4	CO4: Analyze the importance of blockchain in finding the solution to the real-world problems.
		CO 5	CO5: Illustrate the Ethereum public block chain platform
		CO 6	CO6: Identify relative application where block chain technology can be effectively used and implemented.
	Elective III 410244(D): Object oriented Modeling and Design	CO 1	CO1: Describe the concepts of object-oriented and basic class modelling.
		CO 2	CO2: Draw class diagrams, sequence diagrams and interaction diagrams to solve problems.
		CO 3	CO3: Choose and apply a befitting design pattern for the given problem
		CO 4	CO4: To Analyze applications, architectural Styles & software control strategies
		CO 5	CO5: To develop Class design Models & choose Legacy Systems.
		CO 6	CO6:To Understand Design Patterns
	Elective IV 410245 (D): Software Testing and Quality Assurance	CO 1	CO1: Describe fundamental concepts in software testing such as manual testing, automation testing and software quality assurance.
		CO 2	CO2: Design and Develop project test plan, design test cases, test data, and conduct test operations.
		CO 3	CO3: Apply recent automation tool for various software testing for testing software.
		CO 4	CO4: Apply different approaches of quality management, assurance, and quality standard to software system.
		CO 5	CO5: Apply and analyze effectiveness Software Quality Tools.
		CO 6	CO6: Apply tools necessary for efficient testing framework.
	410248: Project Work Stage I	CO 1	CO1: Solve real life problems by applying knowledge.
		CO 2	CO2: Analyze alternative approaches, apply and use most appropriate one for feasible solution.
		CO 3	CO3: Write precise reports and technical documents in a nutshell.
		CO 4	CO4: Participate effectively in multi-disciplinary and heterogeneous teams exhibiting team work
		CO 5	CO5: Inter-personal relationships, conflict management and leadership quality

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SEM VIII	410250: High Performance Computing	CO 1	CO1: Understand various Parallel Paradigm
		CO 2	CO2: Design and Develop an efficient parallel algorithm to solve given problem
		CO 3	CO3: Illustrate data communication operations on various parallel architecture
		CO 4	CO4: Analyze and measure performance of modern parallel computing systems
		CO 5	CO5: Apply CUDA architecture for parallel programming
		CO 6	CO6: Analyze the performance of HPC applications
	410251: Deep Learning	CO 1	CO1: Understand the basics of Deep Learning and apply the tools to implement deep learning applications
		CO 2	CO2: Evaluate the performance of deep learning models (e.g., with respect to the bias-variance trade- off, overfitting and underfitting, estimation of test error).
		CO 3	CO3: To apply the technique of Convolution (CNN) and Recurrent Neural Network (RNN) for implementing Deep Learning models
		CO 4	CO4: To implement and apply deep generative models.
		CO 5	CO5: Construct and apply on-policy reinforcement learning algorithms
		CO 6	CO6:To Understand Reinforcement Learning Process
	Elective V 410252(C): Software Defined Networks	CO 1	CO1: Interpret the need of Software Defined networking solutions.
		CO 2	CO2: Analyze different methodologies for sustainable Software Defined Networking solutions.
		CO 3	CO3: Select best practices for design, deploy and troubleshoot of next generation networks.
		CO 4	CO4: Develop programmability of network elements.
		CO 5	CO5: Demonstrate virtualization and SDN Controllers using Open Flow protocol
		CO 6	CO6: Design and develop various applications of SDN
	Elective VI 410253(B): Soft Computing	CO 1	CO1: Understand requirement of soft computing and be aware of various soft computing techniques.
		CO 2	CO2: Understand Artificial Neural Network and its characteristics and implement ANN algorithms.
		CO 3	CO3: Understand and Implement Evolutionary Computing Techniques.
		CO 4	CO4: Understand the Fuzzy logic and Implement fuzzy algorithms for solving real life problems.
		CO 5	CO5: Apply knowledge of Genetic algorithms for problem solving.
		CO 6	CO6: Develop hybrid systems for problem solving.
	410256: Project Work Stage II	CO 1	CO1: Show evidence of independent investigation
		CO 2	CO2: Critically analyze the results and their interpretation.
		CO 3	CO3: Report and present the original results in an orderly way and placing the open questions in the right perspective.
		CO 4	CO4: Link techniques and results from literature as well as actual research and future research lines with the research.
		CO 5	CO5: Appreciate practical implications and constraints of the specialist subject

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Phone : 8975578687, 8975178687, 7447275353 Visit us at : www.rgcoe.org / email : rajivgandhi.iot@gmail.com

Venue	Meeting room
Date & time	14/012/2019 time 11:00am

HOD Meeting Attendance

Sr. No	Name of Faculty	Designation	Sinature
1	Dr. Tidke P.A.	Principal	
2	Mr.Kudal G.B.	HOD MECH	
3	Mr. Gath S.P.	HOD Electrical	
4	Mr. Chaudhari N.J.	HOD Computer	
5	Mrs. Kulkarni G.N.	HOD E&TC	
6	Mr. Gunjal S.B.	HOD FE	

Minutes of Meeting

1. Everyone is asked to arrive ready for the following.
2. Your personal input and work what I am able and willing to do...
3. Contentment of Students.
4. Increasing My Subjects' Results.
5. Digital Promotion and Institute Branding.
6. Placement and Enhancement of Employability.
7. Admissions to FE and DSE.
8. Prompt attendance is much valued.

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Phone : 8975578687, 8975178687, 7447275353 Visit us at : www.rgcoe.org / email : rajivgandhi.iqt@gmail.com

Venue Date & time	Meeting room 25/05/2020 time 10:00am

HOD Meeting Attendance

Sr. No	Name of Faculty	Designation	Sinature
1	Dr. Tidke P.A.	Principal	
2	Mr.Kudal G.B.	HOD MECH	
3	Mr. Gath S.P.	HOD Electrical	
4	Mr. Chaudhari N.J.	HOD Computer	
5	Mrs. Kulkarni G.N.	HOD E&TC	
6	Mr. Gunjal S.B.	HOD FE	

Minutes of Meeting

1. Opening remarks about promotional groups and their activities

2. Each Group will discuss (in brief) their plan and support required from others in following sequence

- PG Admission Group
- Reviews Groups
- DSE Group
- Videos Creation Group
- CET Exam Group

3. Principals appeal and closing remarks

4. All faculty to join 5 minutes before time

5. Meeting may last for more than an hour. All faculty to make appropriate arrangements for being online with sharing documents, laptops and mobile fully charged, being at place with good network coverage, away from noise and adjusting other engagements

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Phone [illegible] Visit us at [illegible] email [illegible]

Date & time	02/08/2020 time 10:30am
Venue	Meeting room

HOD Meeting Attendance

Sr. No	Name of Faculty	Designation	Sinature
1	Dr. Tidke P.A.	Principal	
2	Mr. Kudal G.B.	HOD MECH	
3	Mr. Gath S.P.	HOD Electrical	
4	Mr. Chaudhari N.J.	HOD Computer	
5	Mrs. Kulkarni G.N.	HOD E&TC	
6	Mr. Gunjal S.B.	HOD FE	

Minutes of Meeting

1. Here is the duty chart for Week II of August 2020.

2. Other faculty members may arrive, finish their assigned work, and go for the day, in addition to the following faculty members who are held on the specified date.

3. Before you leave, please update the daily journal to reflect the work and activities you completed.

[Please locate the format.] Please share the revised sheet with the principal and the head of department every day.

4. Daily reports from HOD (or his/her representation) are expected.

5. Faculty members or their families who test positive for Corona should notify the principal's office of their absence.

6. Faculty who take leaves on their assigned day of leave must present their medical certificate when they report for duty on the following day. Why don't they apply for Causal

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Venue	Meeting room
Date & time	20/10/2020 time 10:00am

HOD Meeting Attendance

Sr. No	Name of Faculty	Designation	Sinature
1	Dr. Tidke P.A.	Principal	
2	Mr.Kudal G.B.	HOD MECH	
3	Mr. Gath S.P.	HOD Electrical	
4	Mr. Chaudhari N.J.	HOD Computer	
5	Mrs. Kulkarni G.N.	HOD E&TC	
6	Mr. Gunjal S.B.	HOD FE	

Minutes of Meeting

1. Practical/Oral/TW/Seminar/Mini Project/Project Reports Submission -5,7,8,9 Nαv 2022
2. TE/BE Prelim Exam is to be scheduled from 09 to 14 Nov 2022 for 70 Marks on 3,4,5 th and portioned covered till 8th Nov 2022
3. TE/BE SPPU Practical/Oral/TW Examination (Backlog)-11-14 Nov 2022
4. TE/BE SPPU Practical/Oral/TW Examination (Regular)-16-23 Nov 2022
5. TE/BE Mini Project/Project Stage 1/Seminar Examination-24-25 Nov 2022
6. Students can collect stationary and files from department office immediately

IQAC Incharge
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Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Principal
R G COE, Karjule Harya.

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RAJIV GANDHI COLLEGE OF ENGINEERING
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Venue	Meeting room
Date & time	21/10/2020 time 10:00 am

HOD Meeting Attendance

Sr. No	Name of Faculty	Designation	Sinature
1	Dr. Tidke P.A.	Principal	
2	Mr.Kudal G.B.	HOD MECH	
3	Mr. Gath S.P.	HOD Electrical	
4	Mr. Chaudhari N.J.	HOD Computer	
5	Mrs. Kulkarni G.N.	HOD E&TC	
6	Mr. Gunjal S.B.	HOD FE	

Minutes of Meeting

1. Few important dates were finalized in today's HOD's Meeting.
2. End of Teaching (Actual TH/PR)-03rd April 19
3. Respective practical's submission will be conducted during the unit test. (i.e. final submissions from 4 to 10 April)
4. Project/Seminar Report Submission on/before 12th April 2019.
5. Oral/Practical Schedule to be submitted to Principal office
6. Provisional Detention list to be submitted to Principal office.

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Venue	Meeting room
Date & time	25/10/2020 time 10:30am

HOD Meeting Attendance

Sr. No	Name of Faculty	Designation	Sinature
1	Dr. Tidke P.A.	Principal	
2	Mr.Kudal G.B.	HOD MECH	
3	Mr. Gath S.P.	HOD Electrical	
4	Mr. Chaudhari N.J.	HOD Computer	
5	Mrs. Kulkarni G.N.	HOD E&TC	
6	Mr. Gunjal S.B.	HOD FE	

Minutes of Meeting

1. Interaction between industry and technical institutions is need of an hour. Our students need to be employable by the time they reach final year. We have discussed about "One-Faculty-One-Company" earlier in many meetings. Now it's time to act with full strength,

2. We are going to have Industry Institute Interaction Meet-2019 in this semester. All faculty need to collaborate with at least one Industry/Research Organization/University for any/more tasks of the followings:-

3. MOU for free of cost training to students and faculty

4. Expert Lectures by Industry Personnel as part of CSR

5. Donation of old equipment for demo in the department & Industry Equipment sponsorship

6. Identify industry problems

7. Industry internship for students

8. R & D projects with industry

9. Entrepreneurship initiatives

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Venue	Meeting room
Date & time	18/02/2021 time 10:00am

HOD Meeting Attendance

Sr. No	Name of Faculty	Designation	Sinature
1	Dr. Tidke P.A.	Principal	
2	Mr.Kudal G.B.	HOD MECH	
3	Mr. Gath S.P.	HOD Electrical	
4	Mr. Chaudhari N.J.	HOD Computer	
5	Mrs. Kulkarni G.N.	HOD E&TC	
6	Mr. Gunjal S.B.	HOD FE	

Minutes of Meeting

1. The Shiv Jayanti festivities.
2. Admissions in 2020–21 Debriefing and AY 2021–22 Plan.
3. The availability of a book bank and teacher and student book donations.
4. Calendar, Assignments, and Exams.
5. Examine and Prepare.
6. Offline assessment by the Public Health Department (PSU) on February 28, 2021.

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Karjule Harya

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Mateshri Shikshanik Pratishthan's

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Date & time	23/03/2021 time 11:00am
Venue	Meeting room

HOD Meeting Attendance

Sr. No	Name of Faculty	Designation	Sinature
1	Dr. Tidke P.A.	Principal	
2	Mr.Jagdale A.A.	HOD MECH	
3	Mr. Gath S.P.	HOD Electrical	
4	Mr.Chaudhri N.J.	HOD Computer	
5	Mrs.Kulkarni G.N.	HOD E&TC	
6	Mr. Gunjal S.B.	HOD FE	

Minutes of Meeting

1. In Semester Examination.
2. Guidelines for Paper Setters, Supervisors.
3. Term Work Submissions.
4. Remedial Classes.
5. Mission Admission 2021-22 Review.
6. Any other.

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Principal
R G COE, Karjule Harya.

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Date & time	26/03/2021 time 11:00am
Venue	Meeting room

HOD Meeting Attendance

Sr. No	Name of Faculty	Designation	Sinature
1	Dr. Tidke P.A.	Principal	
2	Mr.Jagdale A.A.	HOD MECH	
3	Mr. Gath S.P.	HOD Electrical	
4	Mr.Chaudhri N.J.	HOD Computer	
5	Mrs.Kulkarni G.N.	HOD E&TC	
6	Mr. Gunjal S.B.	HOD FE	

Minutes of Meeting

1. CEO, Exam Coordinators, Class Teachers and All Examiners are requested to join a Meeting to review the following activities.
2. How many paper settings done till today (Dept. Exam Coordinator to give feedback)
3. Exam Teams made and students added (Class Teachers to give feedback)
4. Name list and Hall Ticket shared to faculty (HOD)
5. Date for mock IN SEM (Form Created by H.O.D, execution to be done by class teachers)
6. TW schedule (TW in-charge to prepare the schedule and submit)
7. Reporting, if required.
8. Any other

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Venue	Meeting room
Date & time	03/06/2021 time 10:00am

HOD Meeting Attendance

Sr. No	Name of Faculty	Designation	Sinature
1	Dr. Tidke P.A.	Principal	
2	Mr.Jagdale A.A.	HOD MECH	
3	Mr. Gath S.P.	HOD Electrical	
4	Mr.Chaudhri N.J.	HOD Computer	
5	Mrs.Kulkarni G.N.	HOD E&TC	
6	Mr. Gunjal S.B.	HOD FE	

Minutes of Meeting

1. Regarding improvemnet of Result of FE Students
2. Genral Meeting of staff including Teaching & non Taeaching is to be arranged in next week.
3. In-sern ester Senior Supervisor and CAP of In-semester .
4. Mid term Submission report Should Done and submit as early as posssioble in next week.
5. Appriciation of staff involved in extra activity.

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Venue	Meeting room
Date & time	11/06/2021 time 10:00 am

HOD Meeting Attendance

Sr. No	Name of Faculty	Designation	Sinature
1	Dr. Tidke P.A.	Principal	
2	Mr.Jagdale A.A.	HOD MECH	
3	Mr. Gath S.P.	HOD Electrical	
4	Mr.Chaudhri N.J.	HOD Computer	
5	Mrs.Kulkarni G.N.	HOD E&TC	
6	Mr. Gunjal S.B.	HOD FE	

Minutes of Meeting

1. FE/DSE Admission-Immediate activities, Activities planned, Data collections, visits to classes/schools.
2. IN-SEM Exam Status-Issues, Absentees, marks entry.
3. Oral-Practical Exam-Schedule, Making Teams, Recording, Examiners.
4. BE Project-Schedule, Black Book, Soft Copy, Publications, External Examiners, and Recording.
5. Placement Enhancements.

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Venue	Meeting room
Date & time	28/06/2021 time 10:00am

HOD Meeting Attendance

Sr. No	Name of Faculty	Designation	Sinature
1	Dr. Tidke P.A.	Principal	
2	Mr.Jagdale A.A.	HOD MECH	
3	Mr. Gath S.P.	HOD Electrical	
4	Mr.Chaudhri N.J.	HOD Computer	
5	Mrs.Kulkarni G.N.	HOD E&TC	
6	Mr. Gunjal S.B.	HOD FE	

Minutes of Meeting

1 Fe Students Attendance Improment Discussion & actions.
2. Informed to students regarding Result & instrct to Make Efforts in Study.
3 Lab Maintainace & Consumable material Availibility.

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Ahmednagar-414304

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Phone: [illegible] Visit us at: www.rgcoe.org email: rajivgandhi.iot@gmail.com

Venue	Meeting room
Date & time	01/09/2021 time 10:00 am

HOD Meeting Attendance

Sr. No	Name of Faculty	Designation	Sinature
1	Dr. Tidke P.A.	Principal	
2	Mr. Jagdale A.A.	HOD MECH	
3	Mr. Gath S.P.	HOD Electrical	
4	Mr. Chaudhri N.J.	HOD Computer	
5	Mrs. Kulkarni G.N.	HOD E&TC	
6	Mr. Gunjal S.B.	HOD FE	

Minutes of Meeting

1. FE/DSE Admission-Immediate activities, Activities planned, Data collections, visits to classes/schools.
2. IN-SEM Exam Status-Issues, Absentees, marks entry.
3. Oral-Practical Exam-Schedule, Making Teams, Recording, Examiners.
4. BE Project-Schedule, Black Book, Soft Copy, Publications, External Examiners, and Recording.
5. Placement Enhancements.

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Ahmednagar 414304

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Venue	Meeting room
Date & time	01/09/2021 time 10:00 am

HOD Meeting Attendance

Sr. No	Name of Faculty	Designation	Sinature
1	Dr. Tidke P.A.	Principal	
2	Mr.Jagdale A.A.	HOD MECH	
3	Mr. Gath S.P.	HOD Electrical	
4	Mr.Chaudhri N.J.	HOD Computer	
5	Mrs.Kulkarni G.N.	HOD E&TC	
6	Mr. Gunjal S.B.	HOD FE	

Minutes of Meeting

1. Placement & Training Efforts
2. Re-Opening College for offline Classes (Measures and Readiness)
3. In-Semester Examination from 22-27 Oct (Registrations, Preparation and Marks Entry)
4. Fees and Dues (Benefits, Scholarship forms, TG Meetings, Parents Meeting, Marksheet Issue etc)
5. Sealing of Labs/Office
7. Admission Counselling and Diwali Days Work

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Venue	Meeting room
Date & time	31/01/2022 time 10:00am

HOD Meeting Attendance

Sr. No	Name of Faculty	Designation	Sinature
1	Dr. Tidke P.A.	Principal	
2	Mr.Jagdale A.A.	HOD MECH	
3	Mr. Gath S.P.	HOD Electrical	
4	Mr.Chaudhri N.J.	HOD Computer	
5	Mrs. Patil V.V.	HOD E&TC	
6	Mr. Gunjal S.B.	HOD FE	

Minutes of Meeting

1. Academic Review for DSE/FE will be arranged on 1 Feb 2022 at 3:30 pm in conference room. Kindly make your respective documents.
2. TE/BE (SEM-II) classes to begin from 01.02.22 in online mode. Kindly prepare Timetable and float into Students.
3. SE/FE classes will resume as it is after U.T. and In-Sem in online mode.
4. Report of TE internship to be prepare (Students Completed, ongoing, no started their internship) and need to be submit to principal sir.
5. DSE classes should be start from 21 Dec 2021. For the same timetable should be ready and sanctioned from authority. If you want to take extra hours of teaching need to take official permission from principal sir.
6. Displaying of Unit Test Result (DSE/FE)
7. All new SE-TE BE-FE- for (Sem-II) student's registration need to make on ERP for attendance.

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Venue	Meeting room
Date & time	04/04/2022 time 11:00am

HOD Meeting Attendance

Sr. No	Name of Faculty	Designation	Sinature
1	Dr. Tidke P.A.	Principal	
2	Mr.Jagdale A.A.	HOD MECH	
3	Mr. Gath S.P.	HOD Electrical	
4	Mr.Chaudhri N.J.	HOD Computer	
5	Mrs. Patil V.V.	HOD E&TC	
6	Mr. Gunjal S.B.	HOD FE	

Minutes of Meeting

1. A planned meeting between college staff and students

2. Kindly bring pupils to the auditorium today (4.4.2022) at 11:30 for the meeting. Following lunch, the classes will resume.

3. The meeting in Seminar Hall at 3:55 p.m. requires the presence of the entire teaching staff. Class teacher and department head will monitor attendance.

4. OS and other administrative staff to arrange appropriate measures.

5. Please notify all members of the admission committee that they will be attending a meeting on Friday, November 3, 2022, at 2:30 p.m. Please be aware that everyone attends the same time and should

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Venue	Meeting room
Date & time	17/06/2022 time 10:30am

HOD Meeting Attendance

Sr. No	Name of Faculty	Designation	Sinature
1	Dr. Tidke P.A.	Principal	
2	Mr.Jagdale A.A.	HOD MECH	
3	Mr. Gath S.P.	HOD Electrical	
4	Mr.Wakekar A.L.	HOD Computer	
5	Mrs. Patil V.V.	HOD E&TC	
6	Mr. Gunjal S.B.	HOD FE	

Minutes of Meeting

1. Load distribution for admission work must be submitted without specifying the faculty responsible for each load.
2. To minimize absenteeism during theory examinations, maintain daily communication with pass-outs and maintain records.
3. HOD/Committee should gather feedback on admission processes and compile a report accordingly.
4. Prepare a document outlining the distribution of workload for admission across FE/SE/BE or alternatively, prepare a document detailing load distribution.
5. On the day of project exams, passing-out students should provide Google reviews. Supervisors must ensure their students submit reviews.
6. The HOD is required to submit a list of faculty members recommended for promotion to higher grades.
7. All faculty members should indicate their preferences for various committees for the academic year 2021-22.

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Date & time	06/08/2022 time 10:00am
Venue	Meeting room

HOD Meeting Attendance

Sr. No	Name of Faculty	Designation	Sinature
1	Dr. Tidke P.A.	Principal	
2	Mr.Jagdale A.A.	HOD MECH	
3	Mr. Gath S.P.	HOD Electrical	
4	Miss. Unde S.P.	HOD Computer	
5	Mrs. Patil V.V.	HOD E&TC	
6	Mr. Gunjal S.B.	HOD FE	

Minutes of Meeting

1. We understand that until the middle of this month, there will be no offline classes; nevertheless, we can still participate in their online lectures from home.

2. As per the discussion at the meeting, you have the option to report to college for any significant work, excluding online courses, for a period of twelve to fourteen days, or six to seven days each month, until we receive authorization to begin in-person instruction.

3. All departmental in-semester coordinators as well as all TE and BE class teachers are notified to attend the meeting in the conference room at 4:00 p.m.

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Date & time	24 08 2022 time 09:30 am
Venu	Meeting Hall

HOD Meeting Attendance

Sr. No	Name of Faculty	Designation	Sinature
1	Dr. Tidke P.A.	Principal	
2	Mr.Jagdale A.A.	HOD MECH	
3	Mr. Gath S.P.	HOD Electrical	
4	Mr.Wakekar A.L.	HOD Computer	
5	Mrs. Patil V.V.	HOD E&TC	
6	Mr. Gunjal S.B.	HOD FE	

Minutes of Meeting

1. Registrations Process of Admission
2. Academics and Tests, Calendar
3. Committee Plan of action (Earlier year committee Reports)
4. Individual Targets and Actions for AY 2021-22
5. Admission Related work- No Policies, Counseling and targets, Internships (Research Coordinators), College Brochure
6. Reporting issues, timings, diary writing and leaves
7. Any other

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Vitthalnagar, Kokate Vasti, Karjule Harya, (Takali Dhokeshwar) Nagar Kalyan Highway, Tal Parner, Dist Ahmednagar, Pin-414304.
Phone : 8975578687, 8975178687, 7447275353 Visit us at : www.rgcoe.org / email : rajivgandhi.iot@gmail.com

Date & time	25/08/2022 time 10:30am
Venue	Meeting room

HOD Meeting Attendance

Sr. No	Name of Faculty	Designation	Sinature
1	Dr. Tidke P.A.	Principal	
2	Mr.Jagdale A.A.	HOD MECH	
3	Mr. Gath S.P.	HOD Electrical	
4	Mr.Wakekar A.L.	HOD Computer	
5	Mrs. Patil V.V.	HOD E&TC	
6	Mr. Gunjal S.B.	HOD FE	

Minutes of Meeting

1. Today, August 25, 2022, at 4:00 p.m., let's have a 30-minute.
2. Teams to tour different districts in 2022 for admissions.
3. Organizing Communal Events.
4. FDP Schedule.
5. Conference Record.

IQAC Co-ordinator
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering
Tal. Parner, Dist. Ahmednagar
Karjule Harya

Principal
R G COE, Karjule Harya.

MATOSHRI SHAIKSHANIK PRATISHTHAN'S, ANE

RAJIV GANDHI COLLEGE OF ENGINEERING

Department of Computer Engineering

SE (2015 Pattern)Computer Student Details

Academic Year:- 2018-19 (OCT)

SUB:-Data StructuresLab

Term Work Evaluation Sheet

			Exp.1		Exp.2		Exp.3		Exp.4		Exp.5		Exp.6		Exp.7		Exp.8		Exp.9		Exp.10				
Roll No.	PRN NO.	Name of Student	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	TOTAL	Term Marks Out Of 100	Term Marks Out Of 25
1	71940860B	AHER SHRENIK ANKUSH	4	4	4	3	3	3	3	4	3	4	4	4	4	5	4	4	4	4	4	4	76	76	19
2	71940861L	BHAGANAGARE VAISHNAVI VITTHAL	4	5	5	5	2	3	3	4	3	5	4	3	4	5	2	3	2	5	4	5	76	76	19
3	71940862J	DERLE SAURABH BALASAHEB	5	3	2	4	5	5	4	2	5	4	3	3	3	4	5	3	3	4	3	2	72	72	18
4	71940866G	JIVANVAL BHUSHAN DILIP	4	5	5	4	3	3	3	3	3	3	3	3	3	3	3	5	4	5	4	5	76	76	19
5	71940864E	MAHADIK HARSHAL DADASAHEB	5	4	5	4	3	3	3	2	2	5	5	4	5	4	5	5	4	4	4	4	80	80	20
6	71940865C	MORE SHARDA RATNAKAR	5	3	2	4	3	5	4	4	5	4	3	3	3	4	5	3	3	4	3	2	72	72	18
7	71727684J	PANDEY KUNAL KEWAL	4	5	5	4	4	4	5	4	5	5	4	3	3	4	3	3	2	3	4	2	76	76	19
8	71806705D	PINGALE KAJAL SANJAY	5	5	5	5	5	4	5	4	5	5	5	5	5	4	5	5	4	4	4	4	92	92	23
9	71940866M	SHINDE PRABHAT MALLU	4	5	5	4	4	4	5	4	5	5	4	3	3	4	3	3	2	3	4	2	76	76	19
10	71727691M	THORAT PRATIKSHA SUBHASH	5	4	5	4	5	4	5	4	5	4	5	3	5	4	5	5	4	4	4	4	88	88	22
11	71727692K	UNDE SUVARNA POPAT	5	4	5	4	5	4	5	4	5	4	5	3	5	4	5	5	4	4	4	4	88	88	22
12	71632516M	YADAV KIRAN TUKARAM	5	3	2	4	3	5	4	2	5	4	3	3	4	5	5	3	3	4	3	2	72	72	18

IQAC In-charge
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Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering * Karjule Harya * Tal. Parner, Dist. Ahmednagar

Principal
R G COE, Karjule Harya.

MATOSHRI SHAIKSHANIK PRATISHTHAN'S, ANE

RAJIV GANDHI COLLEGE OF ENGINEERING

Department of Computer Engineering

BE (2015 Pattern)Computer Student Details

Academic Year:- 2019-20 (OCT)

SUB:-410246 LABORATORY PRACTICE I

Term Work Evaluation Sheet

			Exp.1		Exp.2		Exp.3		Exp.4		Exp.5		Exp.6		Exp.7		Exp.8		Exp.9		Exp.10				
Roll No.	PRN NO.	Name of Student	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	TOTAL	Term Marks Out Of 100	Term Marks Out Of 50
1	71656737H	DAUND ANKUSH SUKHDEO	2	3	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	40	40	20
2	71656738F	DAUND SUMEET MOHAN	2	2	2	3	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	40	40	20
3	71753060E	JADHAV DEEPALI DEELIP	5	5	4	5	3	5	3	3	3	5	5	4	5	5	4	5	5	4	3	5	86	86	43
4	71656743B	KOLHE RUSHIKESH ROHIDAS	2	2	2	2	2	3	2	1	2	2	2	2	2	2	2	2	2	2	2	2	40	40	20
5	71656746G	NAIK LAXMAN SANJAY	2	2	2	2	2	2	2	1	2	2	2	2	3	2	2	2	2	2	2	2	40	40	20
6	71753065F	PUND PRATIK ASHOK	5	5	5	3	4	5	5	5	4	5	4	4	4	4	4	3	4	4	3	4	84	84	42
7	71753066D	SALVE VAIBHAV MAHENDRA	5	5	5	3	2	5	5	5	4	5	4	4	4	4	4	3	4	4	3	4	82	82	41

IQAC In-charge
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Karjule Harya

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R G COE, Karjule Harya.

MATOSHRI SHAIKSHANIK PRATISHTHAN'S, ANE

RAJIV GANDHI COLLEGE OF ENGINEERING

Department of Computer Engineering

BE (2015 Pattern)Computer Student Details

Academic Year:- 2020-21 (OCT)

SUB:-410247 LABORATORY PRACTICE II

Term Work Evaluation Sheet

			Exp.1		Exp.2		Exp.3		Exp.4		Exp.5		Exp.6		Exp.7		Exp.8		Exp.9		Exp.10				
Roll No.	PRN NO.	Name of Student	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	TOTAL	Term Marks Out Of 100	Term Marks Out Of 50
1	71940861L	BHAGANAGARE VAISHNAVI VITTHAL	5	5	5	5	4	5	4	3	4	5	3	4	3	5	5	5	4	5	2	5	86	86	43
2	71806663E	BHANAGE RAMDAS SANJAY	5	5	5	5	4	5	4	3	4	5	3	4	3	5	5	5	4	5	2	5	86	86	43
3	71753058C	DAUND BABURAO NAVNATH	5	5	5	5	4	5	4	3	4	5	3	4	3	5	3	5	4	5	2	5	84	84	42
4	71940862J	DERLE SAURABH BALASAHEB	5	5	5	5	4	5	4	3	4	5	3	4	3	5	5	5	4	5	2	5	86	86	43
5	71940863G	JIVANVAL BHUSHAN DILIP	5	5	5	5	4	5	4	3	4	5	3	4	3	2	5	4	4	5	2	5	82	82	41
6	71656744L	KOPNAR BALIKA KANTILAL	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	40	40	20
7	71753062M	MAGAR MAHESH SHRIRAM	5	5	5	5	4	5	4	5	4	5	3	4	3	5	5	5	4	5	2	5	84	88	42
8	71940864E	MAHADIK HARSHAL DADASAHEB	5	5	5	5	4	5	4	4	4	5	4	4	3	5	5	5	4	5	2	5	88	88	44
9	71727684J	PANDEY KUNAL KEWAL	5	5	5	5	4	5	4	3	4	5	5	4	5	5	5	5	4	5	2	5	90	90	45
10	71806703H	PETE AJAY RAOSAHEB	5	5	5	5	4	5	4	3	4	5	3	4	5	5	5	5	4	5	2	5	88	88	44
11	71806705D	PINGALE KAJAL SANJAY	5	5	5	5	4	5	4	4	4	5	4	4	4	5	5	5	4	5	3	5	90	90	45
12	71727691M	THORAT PRATIKSHA SUBHASH	5	5	5	5	4	5	4	3	4	5	3	4	3	5	5	5	4	5	4	5	88	88	44
13	71727692K	UNDE SUVARNA POPAT	5	5	5	5	4	5	4	3	4	5	3	4	5	5	5	5	4	5	2	5	88	88	44

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MATOSHRI SHAIKSHANIK PRATISHTHAN'S, ANE

RAJIV GANDHI COLLEGE OF ENGINEERING

Department of Computer Engineering

SE (2019 Pattern)Computer Student Details

Academic Year:- 2021-22 (OCT)

SUB:-OOP & COMP. GRAPHICS LAB

Term Work Evaluation Sheet

			Exp.1		Exp.2		Exp.3		Exp.4		Exp.5		Exp.6		Exp.7		Exp.8		Exp.9		Exp.10				
Roll No.	PRN NO.	Name of Student	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	TOTAL	Term Marks Out Of 100	Term Marks Out Of 25
1	72221117B	ADE JAYRAM SANJAY	4	2	3	2	3	4	3	4	4	3	4	4	3	4	3	5	4	3	2	4	68	68	17
2	72221118L	ADMANE SHRADDHA RAJENDRA	3	2	3	2	3	4	3	4	4	3	4	4	3	3	3	3	4	3	2	4	64	64	16
3	72221119J	AHER KUNDAN VITTHAL	4	2	3	2	3	4	3	4	4	3	4	4	3	4	4	5	4	4	4	4	72	72	18
4	72221120B	ANANTWAR PIYUSH VILAS	4	4	4	4	4	4	4	5	5	5	4	4	4	4	4	5	4	4	4	4	84	84	21
5	72221121L	BACHKAR SANTOSH NANA	4	2	3	2	3	4	3	4	4	3	4	4	3	4	3	5	4	3	2	4	68	68	17
6	72221122J	BANGAR SHIVAM SUNIL	4	5	3	2	2	2	5	5	5	3	4	4	3	4	3	5	4	3	2	4	72	72	18
7	72221123G	BHOSALE MOHINI BHARAT	4	2	3	2	3	4	3	4	4	3	4	4	3	4	3	5	4	3	2	4	68	68	17
8	72221124E	CHABUKSWAR RUTWIK DILEEP	4	2	3	2	3	4	5	4	4	5	4	4	3	4	3	5	4	3	2	4	72	72	18
9	72221125C	DALVI KUMAR SUBHASH	4	2	4	2	2	4	5	4	4	5	4	4	5	4	5	5	4	3	2	4	76	76	19
10	72221126M	DHAS PAYAL SHIVAJI	4	2	3	2	3	4	5	4	4	5	4	4	3	4	3	5	4	3	2	4	72	72	18
11	72221127K	GADEKAR ISHWARI NANDKUMAR	4	2	3	2	3	4	5	4	4	5	4	4	3	4	3	5	4	3	2	4	72	72	18
12	72221128H	GADEKAR NIDHI RAMESH	4	2	3	2	5	4	5	4	4	5	4	4	5	5	5	5	4	5	5	4	84	84	21
13	72221129F	GAGARE KAJAL VINAYAK	4	2	3	2	3	4	3	4	4	3	4	4	3	5	5	5	4	5	5	4	76	76	19
14	72221130K	GHUGARKAR MAHESH SHRIDHAR	4	2	3	2	3	4	5	4	4	5	4	4	3	4	3	5	4	3	2	4	72	72	18
15	72221131H	GURAV NITIN UDDHAV	4	2	3	2	3	4	3	4	4	3	4	4	3	4	3	5	4	3	2	4	68	68	17
16	72221144H	JAGNAR VIJAY MACHHINDRA	4	2	3	4	5	4	5	4	4	5	4	4	5	4	5	5	4	3	2	4	80	80	20
17	72221132F	JARARE VIRAJ VIJAY	4	2	3	2	3	4	3	4	4	3	4	4	3	5	5	5	4	5	5	4	76	76	19
18	72221145F	JUNNARKAR SHUBHAM GANESH	4	2	3	2	3	4	3	4	4	3	4	4	3	4	3	5	4	3	2	4	72	72	18
19	72221133D	KABADI AADESH MACHINDRA	4	2	3	2	3	4	3	4	4	3	4	4	3	4	3	5	4	3	2	4	80	80	20
20	72221134B	KADAM PURVA DILIP	4	2	4	2	2	4	5	4	4	5	4	4	5	4	5	5	4	3	2	4	76	76	19
21	72159848L	LAMKHADE ANIL RAJARAM	4	2	4	2	2	4	5	4	4	5	4	4	5	4	5	5	4	3	2	4	76	76	19
22	72221135L	LONKAR PRATHMESH	4	2	3	2	3	4	3	4	4	3	4	3	3	4	4	4	4	5	5	4	72	72	18
23	72159849J	MALGUNDE MAHESH MAHANTA	4	2	3	2	3	4	3	4	4	3	4	4	3	4	3	5	4	3	2	4	68	68	17
24	72221136J	MANCHARE VAISHNAVI SHIVAJI	4	5	5	5	3	5	5	5	4	3	4	4	3	4	3	5	4	3	2	4	80	80	20
25	72221137G	MORADE SAMRUDDHI KALYAN	4	2	3	2	3	4	5	4	4	5	4	4	3	4	3	5	4	3	2	4	72	72	18
26	72221138E	NACHAN RUSHIKESH MAHADEV	4	2	4	2	2	4	5	4	4	5	4	4	5	4	5	5	4	3	2	4	76	76	19
27	72159852J	PANDULE TUSHAR DATTATRAY	4	2	4	2	2	4	5	4	4	5	4	4	5	4	5	5	4	3	2	4	76	76	19
28	72221139C	RATHOD ADITYA MOTIRAM	4	2	3	2	3	4	5	4	4	5	4	4	3	4	3	5	4	3	2	4	72	72	18
29	72221140G	RATHOD SAKSHI GANESH	4	2	3	2	3	4	5	4	4	5	4	4	3	4	3	5	4	3	2	4	72	72	18
30	72221141E	RAUT CHETAN SANJAY	4	2	3	2	3	4	3	4	4	3	4	4	3	4	3	5	4	3	2	4	68	68	17
31	72221142C	SANAP VAIBHAV DNYANESHWAR	4	5	5	5	3	5	5	5	4	3	4	4	3	4	3	5	4	3	2	4	80	80	20
32	72221143M	SAPRE ATHARV SUJIT	4	2	4	2	2	4	5	4	4	5	4	4	5	4	5	5	4	3	2	4	76	76	19
33	72221144K	SHAIKH MUSTAKIM RAHIM	4	2	3	2	3	4	5	4	4	5	4	4	3	4	3	5	4	3	2	4	72	72	18

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Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering * Karjule Harya * Tal. Parner Dist. Ahmednagar

Principal
R G COE, Karjule Harya.

34	72221145H	SHINDE SHRIKANT CHANDRAKANT	4	2	4	2	2	4	5	4	4	5	4	4	5	4	5	5	4	3	2	4	76	76	19
35	72221146F	THATAR POOJA KACHARU	4	2	4	2	2	4	5	4	4	5	4	4	5	4	5	5	4	3	2	4	76	76	19
36	72221147D	THUBE SAYALI GANPAT	4	2	3	2	3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	88	88	22
37	72221148B	WAGH NILESH DEEPAK	4	2	4	2	2	4	5	4	4	5	4	4	5	4	5	5	4	3	2	4	76	76	19
38	72221149L	ZANJE PRAJKTA DNYANDEO	4	2	4	2	2	4	5	4	4	5	4	4	5	4	5	5	4	3	2	4	76	76	19

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R G COE, Karjule Harya.

MATOSHRI SHAIKSHANIK PRATISHTHAN'S, ANE

RAJIV GANDHI COLLEGE OF ENGINEERING

Department of Computer Engineering

TE (2019 Pattern)Computer Student Details

Academic Year:- 2022-23 (MAY)

SUB:-WEB TECHNOLOGY

Term Work Evaluation Sheet

			Exp.1		Exp.2		Exp.3		Exp.4		Exp.5		Exp.6		Exp.7		Exp.8		Exp.9		Exp.10				
Roll No.	PRN NO.	Name of Student	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	report(5M)	performance(5M)	TOTAL	Term Marks Out Of 100	Term Marks Out Of 25
1	72221117B	ADE JAYRAM SANJAY	2	3	5	3	3	2	3	2	5	3	1	3	4	4	3	3	4	3	4	4	64	64	16
2	72221118L	ADMANE SHRADDHA RAJENDRA	4	4	5	4	3	4	3	4	5	3	1	3	4	4	3	3	4	3	4	4	72	72	18
3	72221119J	AHER KUNDAN VITTHAL	2	3	5	3	3	2	3	2	5	3	1	3	4	4	3	3	4	3	4	4	64	64	16
4	72221120B	ANANTWAR PIYUSH VILAS	4	4	2	4	4	2	2	2	2	3	2	2	2	2	3	3	2	3	2	2	52	52	13
5	72221121L	BACHKAR SANTOSH NANA	2	2	2	2	2	4	2	4	2	3	2	2	2	4	3	3	4	3	4	4	56	56	14
6	72221122J	BANGAR SHIVAM SUNIL	4	4	5	4	3	4	3	4	5	3	1	3	4	4	3	3	4	3	4	4	76	76	19
7	72221123G	BHOSALE MOHINI BHARAT	4	4	2	4	4	4	4	4	4	3	2	2	2	4	3	3	4	3	4	4	68	68	17
8	72221124E	CHABUKSWAR RUTWIK DILEEP	4	5	5	4	5	4	5	5	4	4	4	4	4	4	4	4	4	3	4	4	84	84	21
9	72221125C	DALVI KUMAR SUBHASH	4	5	5	4	5	4	5	5	4	4	4	4	4	4	4	4	4	3	4	4	84	84	21
10	72221126M	DHAS PAYAL SHIVAJI	4	2	2	4	2	4	2	4	2	3	2	2	2	4	3	3	4	3	4	4	60	60	15
11	72221127K	GADEKAR ISHWARI NANDKUMAR	4	5	5	4	5	4	5	5	5	5	5	5	4	4	4	4	4	3	4	4	88	88	22
12	72221128H	GADEKAR NIDHI RAMESH	4	5	5	4	5	4	5	5	4	4	4	4	4	4	4	4	4	3	4	4	84	84	21
13	72221129F	GAGARE KAJAL VINAYAK	4	5	5	4	5	4	5	5	4	4	4	4	4	4	4	4	4	3	4	4	84	84	21
14	72221130K	GHUGARKAR MAHESH SHRIDHAR	2	3	5	3	3	2	3	2	5	3	1	3	4	4	3	3	4	3	4	4	64	64	16
15	72221131H	GURAV NITIN UDDHAV	4	2	2	4	2	4	2	4	2	3	2	2	2	4	3	3	4	3	4	4	60	60	15
16	72221132F	JARARE VIRAJ VIJAY	4	4	2	4	4	4	2	4	2	3	2	2	2	4	3	3	4	3	4	4	64	64	16
17	72221145F	JUNNARKAR SHUBHAM GANESH	3	2	2	3	2	2	3	2	3	2	2	3	4	3	4	4	3	3	3	3	56	56	14
18	72221133D	KABADI AADESH MACHINDRA	4	4	5	4	3	4	3	4	5	3	1	3	4	4	3	3	4	3	4	4	72	72	18
19	72221134B	KADAM PURVA DILIP	4	5	5	4	5	4	5	5	4	4	4	4	4	4	4	4	4	3	4	4	84	84	21
20	72159848L	LAMKHADE ANIL RAJARAM	4	2	2	4	2	4	2	4	2	3	2	2	2	4	3	3	4	3	4	4	60	60	15
21	72221135L	LONKAR PRATHMESH	2	3	5	3	3	2	3	2	5	3	1	3	4	4	3	3	4	3	4	4	64	64	16
22	72159849J	MALGUNDE MAHESH MAHANTA	4	2	2	4	2	4	2	4	2	3	2	2	2	4	3	3	4	3	4	4	60	60	15
23	72221136J	MANCHARE VAISHNAVI SHIVAJI	4	5	5	4	5	4	5	5	5	5	5	5	4	4	4	4	4	3	4	4	88	88	22
24	72221137G	MORADE SAMRUDDHI KALYAN	4	5	5	4	5	4	5	5	4	4	4	4	4	4	4	4	4	3	4	4	84	84	21
25	72221138E	NACHAN RUSHIKESH MAHADEV	4	2	2	4	2	2	2	2	3	5	5	4	4	4	4	4	4	3	4	4	68	68	17
26	72159852J	PANDULE TUSHAR DATTATRAY	4	4	2	4	4	4	2	4	2	3	2	2	2	4	3	3	4	3	4	4	64	64	16
27	72221139C	RATHOD ADITYA MOTIRAM	4	5	5	4	5	4	5	5	4	4	4	4	4	4	4	4	4	3	4	4	84	84	21
28	72221140G	RATHOD SAKSHI GANESH	4	5	5	4	5	4	5	5	4	4	4	4	4	4	4	4	4	3	4	4	84	84	21
29	72221141E	RAUT CHETAN SANJAY	4	4	5	4	4	4	4	4	5	4	4	3	4	4	4	4	4	3	4	4	80	80	20
30	72221142C	SANAP VAIBHAV DNYANESHWAR	4	4	5	4	4	4	4	4	5	3	3	3	4	4	3	3	4	3	4	4	76	76	19
31	72221143M	SAPRE ATHARV SUJIT	4	5	5	4	5	4	5	5	4	4	4	4	4	4	4	4	4	3	4	4	84	84	21
32	72221144K	SHAIKH MUSTAKIM RAHIM	4	5	5	4	5	4	5	5	5	5	5	5	4	4	4	4	4	3	4	4	88	88	22
33	72221145H	SHINDE SHRIKANT CHANDRAKANT	4	5	5	4	5	4	5	5	5	5	5	5	4	4	4	4	4	3	4	4	88	88	22
34	72221146F	THATAR POOJA KACHARU	4	4	5	4	4	4	4	4	5	4	4	3	4	4	4	4	4	3	4	4	80	80	20
35	72221147D	THUBE SAYALI GANPAT	4	4	5	4	4	4	4	4	5	4	4	3	4	4	4	4	4	3	4	4	80	80	20
36	72221148B	WAGH NILESH DEEPAK	4	2	2	4	2	4	2	4	2	3	2	2	2	4	3	3	4	3	4	4	60	60	15
37	72221149L	ZANJE PRAJKTA DNYANDEO	5	4	2	3	4	2	1	2	3	4	3	4	2	1	4	3	4	3	4	3	72	72	18

IQAC In-charge
Rajiv Gandhi College of Engg
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering Tal. Parner, Dist. Ahmednagar Karjule Harya

Principal
R G COE, Karjule Harya.

MATOSHRI SHAIKSHANIK PRATISHTHAN'S, ANE

RAJIV GANDHI COLLEGE OF ENGINEERING, KARJULE HARYA

DEPARTMENT OF MECHANICAL ENGINEERING-2021-22 (SEM-VII)

Class: BE | **Class Incharge:** Prof. Chavhan P.P.

CLASS TIME TABLE

Date of Start: 02/08/2021 | **Class Room No.:** BE01

Time ⇒ Day	09.15 am to 10.15 am	10.15 am to 11.15 am	11.15 am to 12.15 pm	12.15 pm to 01.00 pm (Short Reccess)	01.00 pm to 02.00 pm	2.00 pm to 3.00 pm	03.00 pm to 03.15 pm (Short Reccess)	03.15 pm to 04.15 pm
MON	DOM	PRO-I1,H&P3,CAD-CAM2			EL-II	CAD CAM		H&P
TUE	DOM	PRO-I2,H&P1,CAD-CAM3			EL-II	EL-I		CAD CAM
WED	H&P	PRO-I3,DOM1,H&P2			EL-I	LIB		DOM
THU	EL-II	PRO-I1,DOM2,EL-I3			PRO-I3,EL-I2,CAD-CAM1			LIB
FRI	H&P	PRO-I2,DOM3,EL-I1			CAD CAM	EL-I		LIB

Subject Abbr.	Subject	Subject Code	Name of Staff	Practical Batches
H&P	Hydraulics & Pneumatics	402041	Prof. Chavhan P.P.	B1= 1 to 25 ,B2= 26 to 50 ,B3= 51 to 75
DOM	Dynamics of machinary	402043	Prof. Gunjal S.B.	
EL-I	Finite Element Analysis	402044	Dr. Pawar K.P.	
EL-II	Energy Audit and Management	402045	Prof.Jagdale A.A.	
CAD CAM	CAD CAM Automation	402042	Prof. Kurpawar B.P. / Mr. Pawar A A	
PRO-I	Project-I	402046	Prof. Patil A.R.	

TIME TABLE INCHAGE

HOD

IQAC In-charge
Rajiv Gandhi College of Engin.
Karjule Harya, Tal. Parner,
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering, Tal. Parner, Dist. Ahmednagar

Principal
R G COE, Karjule Harya,

MATOSHRI SHAIKSHANIK PRATISHTHAN'S, ANE

RAJIV GANDHI COLLEGE OF ENGINEERING, KARJULE HARYA

DEPARTMENT OF MECHANICAL ENGINEERING-2023-24 (SEM-VIII)

Class: BE

Class Incharge: BE Class Teacher

CLASS TIME TABLE

Date of Start: 11/12/2023

Class Room No.: BE01

Time ➡ Day	09.15 am to 10.15 am	10.15 am to 11.15 am	11.15 am to 12.15 pm	12.05 pm to 012.50 pm (Short Reccess)	01.00 pm to 02.00 pm	2.00 pm to 3.00 pm	02.50 pm to 03.00 pm (Short Reccess)	03.15 pm to 04.15 pm
MON	EAM	PROJ 1,2,3			EE	RET		RET
TUE	EE	EE1,MSAL2,CIM3			PROJ 1,2,3			CIM
WED	EAM	PROJ 1,2,3			EE2,MSAL3,CIM1			LIB
THU	CIM	PROJ 1,2,3			EE3,MSAL1,CIM2			LIB
FRI	EAM	PROJ 1,2,3			RET	CIM		EE

Subject Abbr.	Subject	Subject Code	Name of Staff	Practical Batches
CIM	Computer Integrated Manufacturing	402048	Dr.Pawar K.P.	B1= 1-25, B2= 26-50, B3 =51 to onwords
EE	Energy Engineering	402049	Mr. Pawar N.V.	
EAM	Elective - V	402050	Mr. Jagdale A.A.	
RET	Elective - VI	402051	Miss. Paimode S.S.	
MSAL	Mechanical Systems Analysis Laboratory	402052	Mr. Kurpatwar B.P.	
PRJ	Project (Stage - II)	402053	Mr. Aher V.B.	
AC- VIII	Audit Course VIII[$]	402055	Miss. Unde A.R.	

Time Table Incharge

HOD

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414501

Rajiv Gandhi College of Engineering * Karjule Harya * Tal. Parner, Dist. Ahmednagar

Principal
R G COE, Karjule Harya.

MATOSHRI SHAIKSHANIK PRATISHTHAN'S, ANE

RAJIV GANDHI COLLEGE OF ENGINEERING, KARJULE HARYA

LOD DISTRUBUTION 2021-2022

DEPARTMENT OF MECHANICAL ENGINEERING-2021-22 (Term II)

FACULTY	SUBJECT		TH	PR	TUT	TOTAL	TOTAL	Responsibility
Dr. Pawar Krupal Prabhakar	CAE	TE	3	2		9	12	Incharge Principal
	MP	SE	3			3		
Prof.Jagdale aniruda avinash							15	HOD
						0		
	Proj-II	BE		2		6		
	EL-III	BE	3	2		9		
Prof.Gunjal Satish Bapu	KOM	SE	3	2		9	18	FE HOD
	DTS	TE	3			3		
	MSD			2		6		
Prof. Chavhan Pramod Prabhu	PBL-II	SE		4		12	15	BE CLASS TEACHER
	EE	BE	3			3		
						0		
Prof. Kurpatwar B.P.	MS	SE		2		6	15	TE CLASS TEACHER
	EL-II	TE	3			3		
	FPCL	TE		2		6		
Prof.Korade Eshwar Sakharam	ATD	SE	3	2		9	18	SE CLASS TEACHER
	AIML	TE	3	2		9		
						0		
Prof. Kachare Savita Sakharam	FM	SE	3	2		9	15	
	ML	TE		2		6		
						0		
						0		
Prof. Patil Ashvin Ramchandra	EE	BE		2		6	12	
	DTS	TE		2		6		
						0		
						0		
Prof. Pawar Abhishek Anil						0	16	
	MSD	BE	4			4		
	Proj-II	BE		4		12		
Prof.Patne Balaji Vishwanath	AMP-EL-IV	BE	3			3	15	
	ITSP	TE		4		12		
Prof.Aher Vijay Balaji	AC-IV	TE	0	0		0	18	
	AC-VI	BE	0	0		0		
	Proj-II	BE		6		18		
Shende Priyanka Bhausahel	MIII	SE	3		1	4	4	
Total Lod							173	

Time Table Incharge

HOD

Principal

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering * Karjule Harya * Tal. Parner, Dist. Ahmednagar

Principal
R G COE, Karjule Harya.

MATOSHRI SHAIKSHANIK PRATISHTHAN'S, ANE

RAJIV GANDHI COLLEGE OF ENGINEERING, KARJULE HARYA

LOD DISTRUBUTION 2021-2022

DEPARTMENT OF MECHANICAL ENGINEERING-2021-22 (Term I)

FACULTY	SUBJECT	Class	TH	PR	TUT	TOTAL	TOTAL LOD	Responsibility
Dr. Pawar Krupal Prabhakar	NSM	TE	3		1	4	13	Incharge Principal
	EL-I	BE	3	2		9		
Prof.Jagdale aniruda avinash	SM		4			4	10	HOD
	DME-I	TE	3			3		
	EL-II	BE	3			3		
Prof.Gunjal Satish Bapu	EMM	SE	3			3	16	FE HOD
	ETD	SE	3			3		
	DOM	BE	4	2		10		
Prof. Chavhan Pramod Prabhu	GD&T	SE		2		6	15	CIASS TECHAR BE
	H&P	BE	3	2		9		
Prof. Kurpatwar B.P.	CAD CAM	BE	3			3	15	CIASS TECHAR TE
	EL-I	TE	3			3		
	MECTX	TE	3	2		9		
Prof .Korade Eshwar Sakharam	SMD	SE	3			3	12	CIASS TECHAR SE
	EEE	SE	3			3		
	EMM	SE		2		6		
Prof. Kachare Savita Sakharam	AC-III	SE	0	0			12	
	AC V	TE	0	0				
	ETD	SE		2		6		
	SD	TE		2		6		
Prof. Patil Ashvin Ramchandra	PROJ-I	BE		4		12	18	
	DML	TE		2		6		
				0				
Prof. Pawar Abhishek Anil	HMT	TE	3	2		9	9	
Patne Balaji Vishwanath	SMD	SE		2		6	12	
	EEE	SE		2		6		
Prof. Aher Vijay Balaji	CAD CAM	BE		2		6	18	
	DME-I	TE		2		6		
	SM	SE		2		6		
Total Lod							150	

Time Table Incharge | HOD | Principal

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering * Karjule Harya * Tal. Parner, Dist. Ahmednagar

Principal
R G COE, Karjule Harya.

MATOSHRI SHAIKSHANIK PRATISHTHAN'S, ANE

RAJIV GANDHI COLLEGE OF ENGINEERING, KARJULE HARYA

DEPARTMENT OF MECHANICAL ENGINEERING-2021-22 (SEM-V)

Class: TE

Class Incharge: Prof. Kurpawar B.P.

CLASS TIME TABLE

Date of Start: 02/08/2021

Class Room No.: TE01

Time ⇒ Day	09.15 am to 10.15 am	10.15 am to 11.15 am	11.15 am to 12.15 pm	12.15 pm to 01.00 pm (Short Reccess)	01.00 pm to 02.00 pm	2.00 pm to 3.00 pm	03.00 pm to 03.15 pm (Short Reccess)	03.15 pm to 04.15 pm
MON	NSM	MECTX	LIB		EL-I	DME		NSM
TUE	DME	NSM	EL-I		MECTX2,DML3,HMT1			HMT
WED	DME	HMT	EL-I		DML2,MECTX1,HMT3			LIB
THU	NSM	MECTX	HMT		DME1,SD2,MECTX3			LIB
FRI	MECTX	DME3,SD1,HMT2			DME2,SD3,DML1			LIB

Subject Abbr.	Subject	Subject Code	Name of Staff	Practical Batches
NSM	Numerical & Statistical Methods	302041	Dr. Pawar K.P.	T1= 1 to 25 ,T2=26 to 50 ,T3=50 to 73
HMT	Heat & Mass Transfer	302042	Mr. Pawar A A	
DME	Design of Machine Elements	302043	Mr Jagdale A A / Mr. Aher V B	
MECTX	Mechatronics	302044	Prof. Kurpawar B.P.	
EL-I	Elective I	302045	Prof. Kurpawar B.P.	
DML	Digital Manufacturing Laboratory	302046	Prof. Patil A.R.	
SD	Skill Development	302047	Miss Kachare S S	
AC-V	Audit course - V$	302048	Miss Kachare S S	

TIMETABLE INCHAGE

HOD

IQAC In-charge
Rajiv Gandhi College of Engg
Karjule Harya, Tal. Par
Dist. Ahmednagar-414

Rajiv Gandhi College of Engineering ★ Karjule Harya ★ Tal. Parner, Dist. Ahmednagar

Principal
R G COE, Karjule Harya.

MATOSHRI SHAIKSHANIK PRATISHTHAN'S, ANE

RAJIV GANDHI COLLEGE OF ENGINEERING, KARJULE HARYA

DEPARTMENT OF MECHANICAL ENGINEERING-2023-24 (SEM-VI)

Class: TE | **Class Incharge:** Prof Darade P.P.

CLASS TIME TABLE

Date of Start: 11/12/2023 | **Class Room No.:** TE01

Time ⇨ Day	09.15 am to 10.15 am	10.15 am to 11.15 am	11.15 am to 12.15 pm	12.05 pm to 012.50 pm (Short Reccess)	01.00 pm to 02.00 pm	2.00 pm to 3.00 pm	02.50 pm to 03.00 pm (Short Reccess)	03.15 pm to 04.15 pm
MON	AIML1,INTPS2,CAE3		CAE		LIB			AIML
TUE	FPCL2,CAE1,DTS3		CAE		INTPS1,ML2,FPCL3			AIML
WED	AIML3,INTPS1,CAE2		LIB		DTS	DTS		AIML
THU	AIML2,INTPS3,FPCL1		CAE		DTS			SE
FRI	INTPS3,DTS2,ML1		SE		ML3,INTPS2,DTS1			SE

Subject Abbr.	Subject	Subject Code	Name of Staff	Practical Batches
AIML	Artificial Intelligence &Machine Learning	302049	Mr. Jagtap B.M.	T1= 1-25, T2= 26-50, T3 =51 to onwords
CAE	Computer Aided Engineering	302050	Mr. Darade P.P.	
DTS	Design of Transmission Systems	302051	Mr. Gunjal S.B.	
SE	Elective II	302052	Mr. Kurpatwar B.P.	
ML	Measurement Laboratory	302053	Mr. Darade P.P.	
FPCL	Fluid Power &Control Laboratory	302054	Miss. Paimode S.S.	
INTSP	Internship/Mini project *	302055	Mr. Pawar N.V.	
AC-VI	Audit course - VI[S]	302056	Miss. Unde A.R.	

TIME TABLE INCHAGE

HOD

IQAC In-charge
Rajiv Gandhi College of Engg
Karjule Harya, Tal. Parn
Dist. Ahmednagar-414304

Rajiv Gandhi College of ... Tal. Parner, Dist. Ahmednagar ... Karjule Harya

Principal
R G COE, Karjule Harya.

MATOSHRI SHAIKSHANIK PRATISHTHAN'S, ANE

RAJIV GANDHI COLLEGE OF ENGINEERING, KARJULE HARYA

DEPARTMENT OF MECHANICAL ENGINEERING-2021-22 (SEM-III)

Class: SE

Class Incharge: Prof. Korde E S

CLASS TIME TABLE

Date of Start: 20/08/2021

Class Room No.: SE01

Time / Day	09.15 am to 10.15 am	10.15 am to 11.15 am	11.15 am to 12.15 pm	12.15 pm to 01.00 pm (Short Recess)	01.00 pm to 02.00 pm	2.00 pm to 3.00 pm	03.00 pm to 03.15 pm (Short Recess)	03.15 pm to 04.15 pm
MON	SM	SMD	ETD		SMD1,ETD2,SM3			EEE
TUE	SMD	SM	EMM		SMD2 ,ETD3,SM1			ETD
WED	ETD	EEE	SM		SMD3,ETD1,SM2			SMD
THU	EMM	SM	EEE		EEE1,EMM2,GD&T3			LIB
FRI	EMM	EEE3,EMM1,GD&T2			EEE2,EMM3,GD&T1			LIB

Subject Abbr.	Subject	Subject Code	Name of Staff		Practical Batches
SM	Solid Mechanics	202041	M.r Jagdale A A	Mr. Aher V B	S1=1 to 25 ,S2=26 to 50 ,S3=51 to 69
SMD	Solid Modeling and Drafting	202042	Mr. Korde E S	Mr. Patne B V	
ETD	Engineering Thermodynamics	202043	Mr. Gunjal S B	Miss Kachare S S	
EMM	Engineering Materials and Metallurgy	202044	Mr. Gunjal S B	Mr. Korde E S	
EEE	Electrical and Electronics Engineering	203156	Mr. Korde E S	Mr. Patne B V	
GD&T	Geometric Dimensioning and Tolerancing Lab	202045		Mr. Chavhan P P	
AC-III	Audit Course - III	202046		Miss Kachare S S	

TIME TABLE INCHAGE

HOD

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner

Rajiv Gandhi College of Engineering
Tal. Parner, Dist. Ahmednagar
Karjule Harya

Principal
RGCOE, Karjule Harya.

MATOSHRI SHAIKSHANIK PRATISHTHAN'S, ANE

RAJIV GANDHI COLLEGE OF ENGINEERING, KARJULE HARYA

DEPARTMENT OF MECHANICAL ENGINEERING-2023-24 (SEM-IV)

Class: SE | **Class Incharge:** Prof. Jagtap B.M.

CLASS TIME TABLE

Date of Start: 01/01/2024 | **Class Room No.:** SE01

Day/Time	09.15 am to 10.15 am	10.15 am to 11.15 am	11.15 am to 12.15 pm	12.15 pm to 01.00 pm (Short Reccess)	01.00 pm to 02.00 pm	2.00 pm to 3.00 pm	03.00 pm to 03.15 pm (Short Reccess)	03.15 pm to 04.15 pm
MON	MP	ATD	FM		PBL1,KOM2,MS3			KOM
TUE	FM	PBL1,FM2,ATD3			EM-III	ATD		KOM
WED	EM-III	PBL2,KOM3,MS1			EM-III	MP		MP
THU	FM	PBL3,KOM1,MS2			EM-III (TUT)	KOM		
FRI	ATD	PBL3,FM1,ATD2			PBL2,FM3,ATD1			

Subject Abbr.	Subject	Subject Code	Name of Staff		Practical Batches
EM-III	Engineering Mathematics - III	207002	Miss. Shende P.B		S1- 1-25, S2- 26-50, S3-51 to Onwords
KOM	Kinematics of Machinery	202047	Mr. Gunjal S.B.		
ATD	Applied Thermodynamics	202048	Miss. Unde A.R.		
FM	Fluid Mechanics	202049	Mr. Jagdale A.A.		
MP	Manufacturing Processes	202050	Mr. Pawar N.V.		
MS	Machine Shop	202051	Mr. Kurpatwar B.P.		
PBL-II	Project Based Learning - II	202052	Mr. Jagtap B.M.		
AC-IV	Audit Course - IV	202053			

TIME TABLE INCHAGE

HOD

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414005

Rajiv Gandhi College of Engineering Affiliated to Tal. Parner, Dist. Ahmednagar Karjule Harya

Principal
R G COE, Karjule Harya.

MATOSHRI SHAIKSHANIK PRATISHTHAN'S, ANE

RAJIV GANDHI COLLEGE OF ENGINEERING, KARJULE HARYA

LOD DISTRUBUTION 2021-2022

DEPARTMENT OF MECHANICAL ENGINEERING-2021-22 (Term II)

FACULTY	SUBJECT		TH	PR	TUT	TOTAL	TOTAL	Responsibility
Dr. Pawar Krupal Prabhakar	CAE	TE	3	2		9	12	Incharge Principal
	MP	SE	3			3		
Prof.Jagdale aniruda avinash							15	HOD
						0		
	Proj-II	BE		2		6		
	EL-III	BE	3	2		9		
Prof.Gunjal Satish Bapu	KOM	SE	3	2		9	18	FE HOD
	DTS	TE	3			3		
	MSD			2		6		
Prof. Chavhan Pramod Prabhu	PBL-II	SE		4		12	15	BE CLASS TEACHER
	EE	BE	3			3		
						0		
Prof. Kurpatwar B.P.	MS	SE		2		6	15	TE CLASS TEACHER
	EL-II	TE	3			3		
	FPCL	TE		2		6		
Prof.Korade Eshwar Sakharam	ATD	SE	3	2		9	18	SE CLASS TEACHER
	AIML	TE	3	2		9		
						0		
Prof. Kachare Savita Sakharam	FM	SE	3	2		9	15	
	ML	TE		2		6		
						0		
						0		
Prof. Patil Ashvin Ramchandra	EE	BE		2		6	12	
	DTS	TE		2		6		
						0		
						0		
Prof. Pawar Abhishek Anil						0	16	
	MSD	BE	4			4		
	Proj-II	BE		4		12		
Prof.Patne Balaji Vishwanath	AMP-EL-IV	BE	3			3	15	
	ITSP	TE		4		12		
Prof.Aher Vijay Balaji	AC-IV	TE	0	0		0	18	
	AC-VI	BE	0	0		0		
	Proj-II	BE		6		18		
Shende Priyanka Bhausahel	MIII	SE	3		1	4	4	
Total Lod							173	

Time Table Incharge	HOD	Principal

IQAC In-charge
Rajiv Gandhi College of Engine
Karjule Harya, Tal. Parne
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering * Tal. Parner, Dist. Ahmednagar * Karjule Harya

Principal
R G COE, Karjule Harya

Matoshri Shaikshanik Pratishthan's Ane

Rajiv Gandhi College of Engineering

Karjule Harya, Tal-Parner, Dist-Ahmednagar: 414304

Department of Mechanical Engineering

Index of Course File

Class: BE Semester: VII Academic Year- 2022-23

Subject: Dynamics of Machinery Subject Code: 402042

Name of the Subject Teacher: Prof. Gunjal S.B.

Sr. No.	Particulars	Yes / No	Remark
1.	Academic Calendar	✓	
2.	Class Time Table	✓	
3.	Individual Time Table	✓	
4.	University Syllabus	✓	
5.	Teaching Plan	✓	
6.	Practical Plan	✓	
7.	Unit wise Notes	✓	
8.	Unit wise Assignment list	✓	
9.	Savitribai Phule Pune University, Pune Question Papers (Previous Exams.)	✓	
10.	Model Question papers as per University format	✓	
11.	Attendance Book / record (Theory and Practical)	✓	
12.	Other if any		

Signature of Subject Teacher **Signature of HOD** **Signature of Principal**

HOD
Mechanical Engineering Department
R.G.C.O.E., Karjule Harya

Principal
R.G.COE, Karjule Harya.

Savitribai Phule Pune University
(formerly University of Pune)

Circular No. 07 of 2023
Important Notification

Revised Dates of Commencement and Conclusion of terms of U.G. / P.G. Courses for the Academic Year 2022-23 for Affiliated Colleges / Recognised Institutes.

In view of changes in the dates of commencement and conclusion of First Term and commencement of Second Term in the academic calendar for the academic year 2022-23, it is observed that some dates are not suitable. Therefore, considering the issue, the earlier circular issued by the University bearing no. 484 dated 29.12.2022 revised as per below:

Sr.No.	Name of the Courses, Faculties & Year	2022 - 2023			
		First Term		Second Term	
		Commencement	Conclusion	Commencement	Conclusion
1	**Science & Technology**				
	B.Engineering : I	04/11/2022	06/03/2023	01/04/2023	22/07/2023
	B.Engineering : II	17/08/2022	10/12/2022	06/02/2023	31/05/2023
	B.Engineering : III & IV	18/07/2022	30/11/2022	23/01/2023	20/05/2023
	B. Arch. : I	22/11/2022	25/03/2023	10/04/2023	29/07/2023
	M. Arch. : I	22/10/2022	25/02/2023	13/03/2023	01/07/2023

Deputy Registrar
(P.G.Admission)

Ganeshkhind, Pune-07
Ref. No. PGS/ 390
Date: 18/01/2023

Copy to: for Information and necessary action

The Members of the Management Council.
The Deans of Faculties.
The Registrar, Savitribai Phule Pune University, Pune.
The Director, Examinations & Evaluation, Savitribai Phule Pune University, Pune.
The Heads of all University Departments.
The Principals of all Affiliated Colleges.
The Directors of all Recognized Institutes.
The Heads of all the Administrative Sections of the University Office.
Asstt. Registrar, office of the Hon. Vice-Chancellor, Savitribai Phule Pune University
Asstt. Registrar, office of the Hon. Pro-Vice-Chancellor, Savitribai Phule Pune University

MATOSHRI SHAIKSHANIK PRATISHTHAN'S, ANE

RAJIV GANDHI COLLEGE OF ENGINEERING, KARJULE HARYA

DEPARTMENT OF FIRST YEAR ENGINEERING-2022-23 (SEM-IV)

Class: BE

Class Incharge:

CLASS TIME TABLE

Date of Start: 18 /07/2022

Class Room No.: SE01

Time / Day	09.15 am to 10.15 am	10.15 am to 11.15 am	11.15 am to 12.15 pm	12.15 pm to 01.00 pm (Short Reccess)	01.00 pm to 02.00 pm	2.00 pm to 3.00 pm	03.00 pm to 03.15 pm (Short Reccess)	03.15 pm to 04.15 pm
MON	DOM •	TMC1,HVAC3,PRO-I2			EL-III	EL-IV		LIB
TUE	DOM •	TMC2,HVAC1,PRO-I3			EL-III	HVAC		EL-IV
WED	TMC	TMC3,HVAC2,PRO-I1			HVAC	LIB		DOM •
THU	EL-III	DAL1,DOM2,PRO-I3			DAL2,DOM3,PRO-I1			LIB
FRI	TMC	DAL3,DOM1,PRO-I2			EL-IV	HVAC		LIB

Subject Abbr.	Subject	Subject Code	Name of Staff		Practical Batches
HVAC	Heating Ventilation Air-Conditioning and Refrigeration	402041	Dr. Pawar K.P.		B1= 1-25 ,B2=26-50 ,B3=51 to onwords
DOM	Dynamics of Machinery	402042	Prof. Gunjal S.B.		
TMC	Turbomachinery	402043	Prof. Pawar N.V.	Prof. Paimode S S	
EL-III	Elective – III	402044	Prof.Jagdale A.A.		
EL-IV	Elective - IV	402045	Prof. Kurpawar B.P.		
DAL	Data Analytics Laboratory	402046	Prof. Chavhan P.P.		
PRO-I	Project (Stage - I)	402047	Prof. Patil A.R.		
AC-VII	Audit course - VII	402054	Prof. Patil A.R.		

Proj Time table incharge.

HOD

Mechanical Engineering Department
R.G.C.O.E., Karjule Harya

Matoshri Shaikshanik Pratishthan's

Rajiv Gandhi College of Engineering

Karjule Harya, Tal-Parner, Dist-Ahmednagar: 414304

Department of Mechanical Engineering

Personal Time Table

ACADEMIC YEAR 2022-23

Time / Day	9.15AM to 10:15AM	10.15AM to 11:15AM	11.15AM to 12:15PM	12.15PM to 01:00PM	01:00PM to 02:00PM	02:00PM to 03:00PM	03:00PM to 3:15PM	3.15PM to 4.15PM
Mon	DOM			BREAK			RECCESS	
Tues	DOM							
Wed								DOM
Thurs		DOM-2			DOM-3			
Fri		DOM-1						
Sat								

Mr. Gunjal S.B.

Savitribai Phule Pune University
Faculty of Science & Technology



Curriculum/Syllabus
For
Fourth Year
Bachelor of Engineering
(Choice Based Credit System)
Mechanical Engineering
(2019 Course)
Board of Studies – Mechanical and Automobile Engineering
(With Effect from Academic Year 2022-23)

Savitribai Phule Pune University

Board of Studies - Mechanical and Automobile Engineering

Undergraduate Program – Final Year Mechanical Engineering (2019 pattern)

Course Code	Course Name	Teaching Scheme (Hrs./week)			Examination Scheme and Marks						Credit			
		TH	PR	TUT	ISE	ESE	TW	PR	OR	TOTAL	TH	PR	TUT	TOTAL
Semester-VII														
402041	Heating Ventilation Air-Conditioning and Refrigeration	3	2	-	30	70	-	-	25	125	3	1		4
402042	Dynamics of Machinery	3	2	-	30	70	-	-	25	125	3	1		4
402043	Turbomachinery	2	2	-	-	50	25	-	25	100	2	1	-	3
402044	Elective – III	3	-	-	30	70	-	-	-	100	3	-	-	3
402045	Elective - IV	3	-	-	30	70	-	-	-	100	3	-	-	3
402046	Data Analytics Laboratory	-	2	-	-	-	50	-	-	50	-	1	-	1
402047	Project (Stage - I)	-	4	-	-	-	50	-	50	100	-	2	-	2
	Total	**14**	**12**		**120**	**330**	**125**	**-**	**125**	**700**	**14**	**6**	**-**	**20**
Semester-VIII														
402048	Computer Integrated Manufacturing	3	2	-	30	70	25	-	25	150	3	1	-	4
402049	Energy Engineering	3	-	-	30	70	-	-	-	100	3	-	-	3
402050	Elective - V	3	-	-	30	70	-	-	-	100	3	-	-	3
402051	Elective - VI	3	-	-	30	70	-	-	-	100	3	-	-	3
402052	Mechanical Systems Analysis Laboratory	-	2	-	-	-	50	-	50	100	-	1	-	1
402053	Project (Stage - II)	-	12	-	-	-	100	-	50	150	-	6	-	6
		12	**16**	**-**	**120**	**280**	**175**	**-**	**125**	**700**	**12**	**8**	**-**	**20**

Elective-III	
402044A	Automobile Design
402044B	Design of Heat Transfer Equipments
402044C	Modern Machining Processes
402044D	Industrial Engineering
402044E	Internet of Things

Elective-IV	
402045A	Product Design and Development
402045B	Experimental Methods in Thermal Engineering
402045C	Additive Manufacturing
402045D	Operations Research
402045E	Augmented Reality and Virtual Reality

Elective-V	
402050A	Quality and Reliability Engineering
402050B	Energy Audit and Management
402050C	Manufacturing Systems and Simulation
402050D	Engineering Economics and Financial Management
402050E	Organizational Informatics

Elective-VI	
402051A	Process Equipment Design
402051B	Renewable Energy Technologies
402051C	Automation and Robotics
402051D	Industrial Psychology and Organizational Behavior
402051E	Electrical and Hybrid Vehicle

Abbreviations: TH: Theory, **PR**: Practical, **TUT**: Tutorial, **ISE**: In-Semester Exam, **ESE**: End-Semester Exam, **TW**: Term Work, **OR**: Oral

- Student can select any elective subjects from the list given as per his/her choice. However, it is advised to select the subjects from within a group identified for specialization.
- To launch an Elective, minimum one batch is required.

Instructions:

- Practical/Tutorial must be conducted in FOUR batches per division only.
- Minimum number of Experiments/Assignments in PR/Tutorial shall be carried out **as mentioned in the syllabi** of respective courses.
- Assessment of tutorial work has to be carried out similar to term-work. The Grade cum marks for Tutorial and Term-work shall be awarded on the basis of **continuous evaluation.**

Program Outcomes (POs)

POs are statements that describe what students are expected to know and be able to do upon graduating from the program. These relate to the skills, knowledge, analytical ability attitude and behaviour that students acquire through the program.

The POs essentially indicate what the students can do from subject-wise knowledge acquired by them during the program. As such, POs define the professional profile of an engineering graduate.

1. **Engineering Knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem Analysis**: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
3. **Design/Development of Solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct Investigations of Complex Problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions for complex problems:
    i. that cannot be solved by straightforward application of knowledge, theories and techniques applicable to the engineering discipline as against problems given at the end of chapters in a typical text book that can be solved using simple engineering theories and techniques;
    ii. that may not have a unique solution. For example, a design problem can be solved in many ways and lead to multiple possible solutions;
    iii. that require consideration of appropriate constraints / requirements not explicitly given in the problem statement such as cost, power requirement, durability, product life, etc.;
    iv. which need to be defined (modelled) within appropriate mathematical framework; and
    v. that often require use of modern computational concepts and tools, for example, in the design of an antenna or a DSP filter.
5. **Modern Tool Usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
6. **The Engineer and Society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and Sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and Team Work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project Management and Finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long Learning**: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

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Savitribai Phule Pune University

Board of Studies - Mechanical and Automobile Engineering

Undergraduate Program – Final Year Mechanical Engineering (2019 pattern)

402042: Dynamics of Machinery								
Teaching Scheme:			**Credits**			**Examination Scheme:**		
Theory	**: 03 Hrs Per Week**	**TH**	**: 03**	**Theory**	**In-Sem**	**: 30**	**PR**	**: --**
Practical	**: 02 hrs per week**	**TW**	**: 01**		**End-Sem**	**: 70**	**OR**	**: 25**
							TW	**: 25**

Pre-requisites:	Strength of Materials, Engineering Mechanics, Kinematics of Machinery, Engineering Mathematics and Numerical Methods

Course Objectives:

- To conversant with balancing problems of machines.
- To understand mechanisms for system control – Gyroscope.
- To understand fundamentals of free and forced vibrations.
- To develop competency in understanding of vibration in Industry.
- To develop analytical competency in solving vibration problems.
- To understand the various techniques of measurement and control of vibration and noise.

Course Outcomes:

On completion of the course, students will be able to -

- Apply balancing technique for static and dynamic balancing of multi cylinder inline and radial engines.
- Analyze the gyroscopic couple or effect for stabilization of Ship, Aeroplane and Four wheeler vehicles.
- Estimate natural frequency for single DOF undamped & damped free vibratory systems.
- Determine response to forced vibrations due to harmonic excitation, base excitation and excitation due to unbalance forces.
- Estimate natural frequencies, mode shapes for 2 DOF undamped free longitudinal and torsional vibratory systems.
- Describe noise and vibration measuring instruments for industrial / real life applications along with suitable method for noise and vibration control.

Unit I: Balancing

Static and dynamic balancing, balancing of rotating masses in single and several planes, primary and secondary balancing of reciprocating masses, balancing in single cylinder engines, balancing in multi-cylinder in-line engines, direct and reverse cranks method -radial and V engines. Introduction to Balancing machines – Types, Classification and Methods

Unit II: Gyroscope

Introduction, Precessional angular motion, Gyroscopic couple, Effect of gyroscopic couple on an airplane,

Effect of gyroscopic couple on a naval ship during steering, pitching and rolling, Stability of a Four Wheel drive moving in a curved path, Stability of a two wheel vehicle taking a turn, Effect of gyroscopic couple on a disc fixed rigidly at a certain angle to a rotating shaft.
Unit III: Single Degree of Freedom Systems – Free Vibration Fundamentals of Vibration : Elements of a vibratory system, vector representation of S.H.M., degrees of freedom, Introduction to Physical and Mathematical modeling of vibratory systems : Bicycle, Motor bike and Quarter Car. types of vibration, equivalent stiffness and damping, formulation of differential equation of motion (Newton, D'Alembert and energy method) Undamped free vibrations: Natural frequency for longitudinal, transverse and torsional vibratory systems. Damped free vibrations: Different types of damping, Viscous damping – over damped, critically damped and under damped systems, initial conditions, logarithmic decrement, Dry friction or coulomb damping - frequency and rate of decay of oscillations.
Unit IV: Single Degree of Freedom Systems - Forced Vibrations Forced vibrations of longitudinal and torsional systems, Frequency Response to harmonic excitation, excitation due to rotating and reciprocating unbalance, base excitation, magnification factor, Force and Motion transmissibility, Quality Factor. Half power bandwidth method, Critical speed of shaft having single rotor of undamped systems.
Unit V: Two Degree of Freedom Systems – Undamped Vibrations Free vibration of spring coupled systems – longitudinal and torsional, torsionally equivalent shafts, natural frequency and mode shapes, Eigen value and Eigen vector by Matrix method, Combined rectilinear and angular motion, Vibrations of Geared systems.
Unit VI: Measurement and Control of Vibrations, Introduction to Noise : ***A) Measurement:*** Vibration Measuring Instruments, Accelerometers, Impact hammer, Vibration shakers, Vibration Analyzer, Vibration based condition monitoring, Analysis of Vibration Spectrum, Standards related to measurement of vibration. ***B) Control:*** Vibration control methods - passive, semi active and active vibration control, control of excitation at the source, control of natural frequency, Vibration isolators, Tuned Dynamic Vibration Absorbers. ***C) Noise:*** Fundamentals of noise, Sound concepts, Decibel Level, Logarithmic addition, subtraction and averaging, sound intensity, noise measurement, Noise control at the Source, along the path and at the receiver, Reverberation chamber, Anechoic Chamber, Noise standards. (Unit VI – Only theoretical treatment)
Books
Text : 1. S. S. Rao, Mechanical Vibrations, Pearson Education Inc. New Delhi. 2. G. K. Grover, Mechanical Vibrations, New Chand and Bros.,Roorkee 3. Wiiliam J Palm III, Mechanical Vibration, Wiley India Pvt. Ltd, New Delhi 4. Uicker J. John, Jr, Pennock Gordon R, Shigley Joseph E., Theory of Machines and Mechanisms,

International Version, OXFORD University Press, New Delhi.

5. M L Munjal, Noise and Vibration Control, Cambridge University Press India

6. S. S. Rattan, Theory of Machines, Third Edition, McGraw Hill Education (India) Pvt. Ltd. New Delhi.

References :

1. Weaver, Vibration Problems in Engineering, 5th Edition Wiley India Pvt. Ltd, New Delhi.
2. Bell, L. H. and Bell, D. H., Industrial Noise Control – Fundamentals and Applications‖, Marcel Dekker Inc.
3. Alok Sinha, Vibration of Mechanical System, Cambridge university Press , India
4. Debabrata Nag, Mechanical Vibrations, Wiley India Pvt. Ltd, New Delhi.
5. Kelly S. G., Mechanical Vibrations, Schaums outlines, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
6. Meirovitch, L., Elements of Mechanical Vibrations‖, McGraw Hill.
7. Ver, Noise and Vibration Control Engineering, Wiley India Pvt. Ltd, New Delhi.
8. Bies, D. and Hansen, C., Engineering Noise Control - Theory and Practice, Taylor and Francis.
9. Shrikant Bhave, Mechanical Vibrations Theory and Practice, Pearson, New Delhi

Term Work:

A] Compulsory Experiments (Sr. No. 1 to 6)

1. Balancing of wheel / rotor on computerized balancing machine OR Experimental verification of dynamic balancing of rotating masses.
2. To determine the natural frequency of damped vibration of single degree freedom system and to find it's damping coefficient.
3. To obtain frequency response curves of single degree freedom system of vibration for different amount of damping.
4. To verify natural frequency of torsional vibration of two rotor system and position of node.
5. To measure vibration of healthy and faulty beam using FFT analyser in time and/ or frequency domain and further classify the condition.
6. To measure noise of any healthy and faulty machine element and represent it into time and/or frequency domain and further predict the condition in future.

B] Any Two Experiments from the following:

1. To determine critical speed of shaft with single rotor.
2. Experimental verification of principle of dynamic vibration absorber.
3. Experiment on shock absorbers and to plot its characteristic curve.
4. To determine the effect of active gyroscopic couple on a spinning disc and verify the gyroscopic effect.
5. Industrial visit based on Conditioning Monitoring and Fault Diagnosis.

C] List of Compulsory Assignment:

1. Simulation (using suitable software) of free response of SDOF damped system to demonstrate different damping conditions by solving differential equation numerically.

OR

2. Simulation (using suitable software) of total response of SDOF damped system to harmonic excitation by solving differential equation numerically.

OR

3. A case study based on conditioning monitoring and fault diagnosis using machine learning.

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Matoshri Shaikshanik Pratishthan's Ane

Rajiv Gandhi College of Engineering

Karjule Harya, Tal - Parner, Dist-Ahmednagar:414304

Department of Mechanical Engineering

Academic Year: 2021-22

Teaching Plan

Subject Code: 402042 **Subject: Dynamics of Machinery** **Class:** B.E.

Name of Subject Teacher : - Prof. S. B. GUNJAL **Total No. of Lectures required:** 48

Semster: VII

Unit No.	Lecture No.	Planned Date	Topics to be covered	Actual Conduction Date	Signature of Subject Teacher
I	1	18-7-22	**Unit I: Balancing (8 Hrs)** Static and dynamic balancing, balancing of rotating masses in single and several planes	18-7-22	
	2	19-7-22	Numericals	19-7-22	
	3	20-7-22	primary and secondary balancing of reciprocating masses, balancing in single cylinder engines	20-7-22	
	4	25-7-22	Numericals	25-7-22	
	5	26-7-22	balancing in multi-cylinder in-line engines	26-7-22	
	6	27-7-22	Numericals	27-7-22	
	7	1/8-22	direct and reverse cranks method -radial and V engines	1-8-22	
	8	3-8-22	Numericals	3-8--22	
II	9	8-8-22	**Unit II : Gyroscope (10Hrs)** Introduction, Precessional angular motion,	8-8-22	
	10	10-8-22	Gyroscopic couple, Effect of gyroscopic couple on an airplane	10-8-22	
	11	16-8-22	Numericals	16-8-22	
	12	17-8-22	Effect of gyroscopic couple on a naval ship during steering,	17-8-22	
	13	22-8-22	Numericals	22-8-22	
	14	23-8-22	pitching and rolling, Stability of a Four Wheel drive moving in a curved path	23-8-22	
	15	24-8-22	Stability of a two wheel vehicle taking a turn	24-8-22	
	16	29-8-22	Numericals	29-8-22	
	17	30-8-22	Effect of gyroscopic couple on a disc fixed rigidly at a certain angle to a rotating shaft.	29-8-22	
	18	5-9-22	Numerical on this unit	5-9-22	
	19	6-9-22	**Unit III :Single Degree of Freedom Systems – Free Vibration (10 Hrs)**	6-9-22	

Matoshri Shaikshanik Pratishthan's Ane

Rajiv Gandhi College of Engineering

Karjule Harya, Tal - Parner, Dist-Ahmednagar:414304

Department of Mechanical Engineering

Academic Year: 2021-22

Teaching Plan

Subject Code: 402042 **Subject: Dynamics of Machinery** **Class:** B.E.

Name of Subject Teacher : - Prof. S. B. GUNJAL **Total No. of Lectures required:** 48

Semster: VII

III		6-9-22	Elements of a vibratory system, vector representation of S.H.M., degrees of freedom	6-9-22	
	20	7-9-22	Introduction to Physical and Mathematical modeling of vibratory systems : Bicycle, Motor bike and Quarter Car.	7-9-22	
	21	12-9-22	types of vibration, equivalent stiffness and damping,	12-9-22	
	22	14-9-22	formulation of differential equation of motion (Newton, D'Alembert and energy method)	14-9-22	
	23	19-9-22	Undamped free vibrations: Natural frequency for longitudinal	19-9-22	
	24	20-9-22	transverse and torsional vibratory systems	20-9-22	
	25	21-9-22	Damped free vibrations: Different types of damping, Viscous damping – over damped, critically damped and under damped systems	21-9-22	
	26	27-9-22	initial conditions, logarithmic decrement,	27-9-22	
	27	28-9-22	Dry friction or coulomb damping - frequency and rate of decay of oscillations.	28-9-22	
	28	29-9-22	Numerical on this unit	29-9-22	
IV	29	30-9-22	**Unit IV:Single Degree of Freedom Systems - Forced Vibrations (8 Hrs)** Forced vibrations of longitudinal and torsional systems	30-9-22	
	30	1-10-22	Frequency Response to harmonic excitation, excitation due to rotating and reciprocating unbalance	1-10-22	
	31	11-10-22	Numerical on above topic	11-10-22	
	32	12-10-22	base excitation, magnification factor, Force and Motion transmissibility, Quality Factor	12-10-22	
	33	17-10-22	Numericals	17-10-22	
	34	18-10-22	Half power bandwidth method	18-10-22	
	35	19-10-22	Critical speed of shaft having single rotor of undamped systems.	19-10-22	
	36	1-11-22	Numericals on critical speed	1-11-22	
	37	2-11-22	**Unit V : Two Degree of Freedom Systems – Undamped Vibrations (8 Hrs)**	2-11-22	

Matoshri Shaikshanik Pratishthan's Ane

Rajiv Gandhi College of Engineering

Karjule Harya, Tal - Parner, Dist-Ahmednagar:414304

Department of Mechanical Engineering

Academic Year: 2021-22

Teaching Plan

Subject Code: 402042 **Subject: Dynamics of Machinery** **Class:** B.E.

Name of Subject Teacher : - Prof. S. B. GUNJAL **Total No. of Lectures required:** 48

Semster: VII

			Free vibration of spring coupled systems – longitudinal and torsional, torsionally equivalent shafts		
	38	7-11-22	natural frequency and mode shapes	7-11-22	
	39	9-11-22	Numericals	9-11-22	
V	40	14-11-22	Eigen value and Eigen vector by Matrix method	14-11-22	
	41	15-11-22	Numericals	15-11-22	
	42	16-11-22	Combined rectilinear and angular motion	16-11-22	
	43	20-11-22	Vibrations of Geared systems.	20-11-22	
	44	21-11-22	Numericals	21-11-22	
	45	22-11-22	**Unit VI: Measurement and Control of Vibrations, Introduction to Noise (6 Hrs)** A) Measurement: Vibration Measuring Instruments, Accelerometers, Impact hammer, Vibration shakers, Vibration Analyzer,	22-11-22	
	46	23-11-22	Vibration based condition monitoring, Analysis of Vibration Spectrum, Standards related to measurement of vibration	23-11-22	
VI	47	27-11-22	B) Control: Vibration control methods - passive, semi active and active vibration control, control of excitation	27-11-22	
	48	28-11-22	at the source, control of natural frequency, Vibration isolators, Tuned Dynamic Vibration Absorbers.	28-11-22	
	49	29-11-22	C) Noise: Fundamentals of noise, Sound concepts, Decibel Level, Logarithmic addition, subtraction and averaging, sound intensity, noise measurement	29-11-22	
	50	30-11-22	Noise control at the Source, along the path and at the receiver, Reverberation chamber, Anechoic Chamber, Noise standards.	30-11-22	

Name and Signature of Subject Teacher **Name and Signature of HOD** **Name and Signature of Principal**

HOD
Mechanical Engineering Department
R.G.C.O.E., Karjule Harya

Principal
R.G.COE, Karjule Harya

Matoshri Shaikshanik Pratishthan's Ane

Rajiv Gandhi College of Engineering

Karjule Harya, Tal - Parner, Dist-Ahmednagar:414304

Department of Mechanical Engineering

Practical Plan

Subject Name: Dynamics of Machinery Subject Code: 402042

Subject Teacher: Prof. S.B.Gunjal Academic Year: 2022-23 Semester: VII

Practical No.	Planned Date	Batch	Practical to be covered	Actual conduction date	Remark	Sign of Subject Teacher
1	22-7-22	B_1	Balancing of wheel / rotor on computerized balancing machine OR Experimental verification of dynamic balancing of rotating masses.	22-7-22	C	
	21-7-22	B_2		21-7-22	C	
	21-7-22	B_3		21-7-22	C	
2	5-8-22	B1	To determine the natural frequency of damped vibration of single degree freedom system	5-8-22	C	
	4-8-22	B_2		4-8-22	C	

	4-8-22	B_3	and to find it's damping coefficient.	4-8-22	C	
3	2-9-22	B_1	To obtain frequency response curves of single degree freedom system of vibration for different amount of damping.	2-9-22	C	
	1-9-22	B_2		1-9-22	C	
	1-9-22	B_3		1-9-22	C	
4	16-9-22	B_1	To verify natural frequency of torsional vibration of two rotor system and position of node.	16-9-22	C	
	15-9-22	B_2		15-9-22	C	
	15-9-22	B_3		15-9-22	C	
5	23-9-22	B_1	To measure vibration of healthy and faulty beam using FFT analyser in time and/ or frequency domain and further classify the condition.	23-9-22	C	
	22-9-22	B_2		22-9-22	C	
	22-9-22	B_3		22-9-22	C	
6	30-9-22	B_1	To measure noise of any healthy and faulty machine element and represent it into time and/or	30-9-22	C	

	29-9-22	B2	frequency domain and further predict the condition in future.	29-9-22	C	
	29-9-22	B3	Noise measurement and analysis using vibration Analyzer.	29-9-22	C	
7	14-10-22	B1	To determine critical speed of shaft with single rotor.	14-10-22	C	
	13-10-22	B2		13-10-22	C	
	13-10-22	B3		13-10-22	C	
8	11-11-22	B1	Experiment on shock absorbers and to plot its characteristic curve.	11-11-22	C	
	10-11-22	B2		10-11-22	C	
	10-11-22	B3		10-11-22	C	
9	25-11-22	B1	Simulation (using suitable software) of free response of SDOF damped system to demonstrate different damping conditions by solving differential equation numerically.	25-11-22	C	
	24-11-22	B2		24-11-22	C	
	24-11-22	B3		24-11-22	C	

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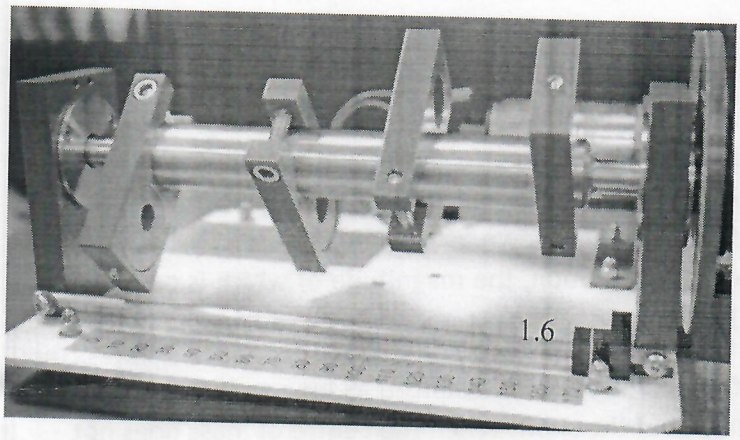
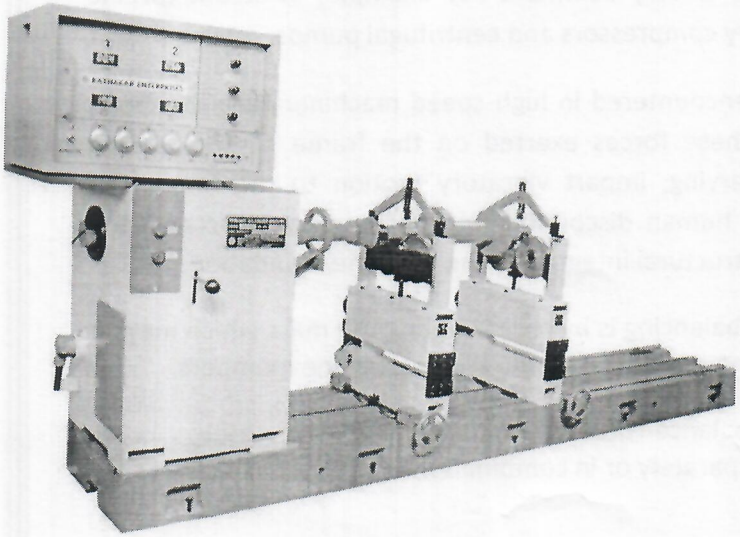
Unit:I
Balancing

1.1 BALANCING OF ROTATING MASSES





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1.1 Introduction

- Often an unbalance of forces is produced in rotary or reciprocating machinery due to the inertia forces associated with the moving masses. Balancing is the process of designing or modifying machinery so that the unbalance is reduced to an acceptable level and if possible is eliminated entirely.

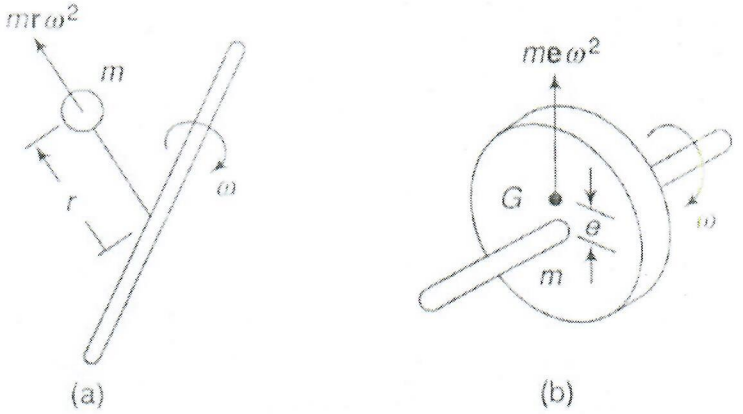


Fig. 1.1

- A particle or mass moving in a circular path experiences a centripetal acceleration and a force is required to produce it. An equal and opposite force acting radially outwards acts on the axis of rotation and is known as centrifugal force [Fig. 1.1(a)]. This is a disturbing force on the axis of rotation, the magnitude of which is constant but the direction changes with the rotation of the mass.

- In a revolving rotor, the centrifugal force remains balanced as long as the centre of the mass of the rotor lies on the axis of the shaft. When the centre of mass does not lie on the axis or there is an eccentricity, an unbalanced force is produced [Fig. 1.1(b)]. This type of unbalance is very common. For example, in steam turbine rotors, engine crankshafts, rotary compressors and centrifugal pumps.

- Most of the serious problems encountered in high-speed machinery are the direct result of unbalanced forces. These forces exerted on the frame by the moving machine members are time varying, impart vibratory motion to the frame and produce noise. Also, there are human discomfort and detrimental effects on the machine performance and the structural integrity of the machine foundation.

- The most common approach to balancing is by redistributing the mass which may be accomplished by addition or removal of mass from various machine members.

- There are two basic types of unbalance-rotating unbalance and reciprocating unbalance – which may occur separately or in combination.

1.2 Static Balancing:

- A system of rotating masses is said to be in static balance if the combined mass centre of the system lies on the axis of rotation.

1.3 Types of Balancing:

There are main two types of balancing conditions

(i) Balancing of rotating masses

(ii) Balancing of reciprocating masses

(i) Balancing of Rotating Masses

Whenever a certain mass is attached to a rotating shaft, it exerts some centrifugal force, whose effect is to bend the shaft and to produce vibrations in it. In order to prevent the effect of centrifugal force, another mass is attached to the opposite side of the shaft, at such a position so as to balance the effect of the centrifugal force of the first mass. This is done in such a way that the centrifugal forces of both the masses are made to be equal and opposite. The process of providing the second mass in order to counteract the effect of the centrifugal force of the first mass is called balancing of rotating masses.

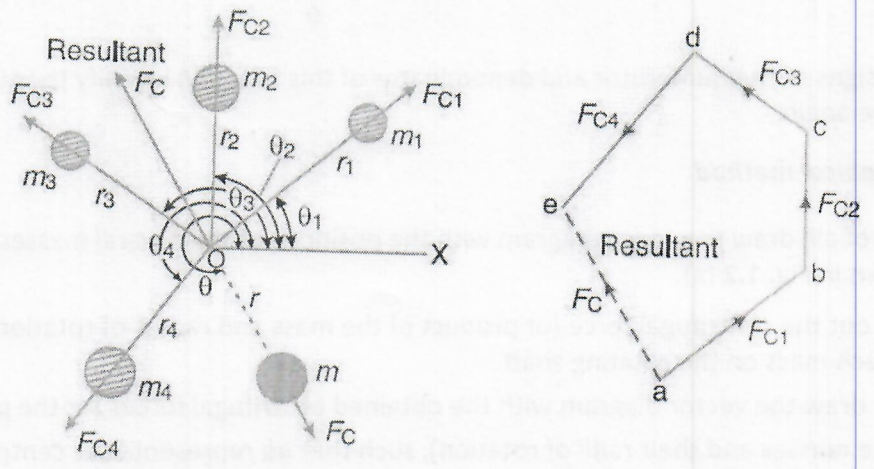
The following cases are important from the subject point of view:

1. Balancing of a single rotating mass by a single mass rotating in the same plane.
2. Balancing of different masses rotating in the same plane.
3. Balancing of different masses rotating in different planes.

1.4 Balancing of Several Masses Rotating in the Same Plane

- Consider any number of masses (say four) of magnitude m_1, m_2, m_3 and m_4 at distances of r_1, r_2, r_3 and r_4 from the axis of the rotating shaft. Let θ_1, θ_2, θ_3 and θ_4 be the angles of these masses with the horizontal line OX, as shown in Fig. 1.2 (a).

  Let these masses rotate about an axis through O and perpendicular to the plane of paper, with a constant angular velocity of ω rad/s.



(a) Space diagram. *(b) Vector diagram.*

Fig. 1.2 Balancing of several masses rotating in the same plane.

- The magnitude and position of the balancing mass may be found out analytically or graphically as discussed below:

1. *Analytical method*

- Each mass produces a centrifugal force acting radially outwards from the axis of rotation. Let F be the vector sum of these forces.

$$F = m_1 r_1 \omega^2 + m_2 r_2 \omega^2 + m_3 r_3 \omega^2 + m_4 r_4 \omega^2$$

- The rotor is said to be statically balanced if the vector sum F is zero.
- If F is not zero, i.e., the rotor is unbalanced, then produce a counterweight (balance weight) of mass m_c, at radius r_c to balance the rotor so that

$$m_1 r_1 \omega^2 + m_2 r_2 \omega^2 + m_3 r_3 \omega^2 + m_4 r_4 \omega^2 + m_c r_c \omega^2 = 0$$

$$m_1 r_1 + m_2 r_2 + m_3 r_3 + m_4 r_4 + m_c r_c = 0$$

- The magnitude of either m_c or r_c may be selected and of other can be calculated.
- In general, if Σmr is the vector sum of $m_1.r_1$, $m_2.r_2$, $m_3.r_3$, $m_4.r_4$, etc., then

$$\Sigma\, mr + m_c r_c = 0$$

- To solve these equation by mathematically, divide each force into its *x* and *z* components, $\Sigma\, mr\cos\theta + m_c r_c \cos\theta_c = 0$

  and $\Sigma\, mr\sin\theta + m_c r_c \sin\theta_c = 0$

$$m_c r_c \cos\theta_c = -\Sigma\, mr\cos\theta \qquad \text{.....(i)}$$

and

$$m_c r_c \sin\theta_c = -\Sigma\, mr\sin\theta \qquad \text{.....(ii)}$$

- Squaring and adding (i) and (ii),

$$m_c r_c = \Sigma \quad \theta^2 + \Sigma \quad \theta^2$$

- Dividing (ii) by (i),

$$\frac{-\Sigma \qquad \theta}{-\Sigma \qquad \theta}$$

- The signs of the numerator and denominator of this function identify the quadrant of the angle.

2. *Graphical method*

- First of all, draw the space diagram with the positions of the several masses, as shown in Fig. 1.2 (a).
- Find out the centrifugal force (or product of the mass and radius of rotation) exerted by each mass on the rotating shaft.
- Now draw the vector diagram with the obtained centrifugal forces (or the product of the masses and their radii of rotation), such that *ab* represents the centrifugal force exerted by the mass m_1 (or $m_1.r_1$) in magnitude and direction to some suitable scale. Similarly, draw *bc, cd* and *de* to represent centrifugal forces of other masses m_2, m_3 and m_4 (or $m_2.r_2$, $m_3.r_3$ and $m_4.r_4$).
- Now, as per polygon law of forces, the closing side *ae* represents the resultant force in magnitude and direction, as shown in Fig. 1.2 (b).

- The balancing force is, then, equal to resultant force, but in opposite direction.
- Now find out the magnitude of the balancing mass (m) at a given radius of rotation (r), such that

$m.r.\omega^2$ = Resultant centrifugal force

or

$m.r$ = Resultant of $m_1.r_1$, $m_2.r_2$, $m_3.r_3$ and $m_4.r_4$

- (In general for graphical solution, vectors $m_1.r_1$, $m_2.r_2$, $m_3.r_3$, $m_4.r_4$, etc., are added. If they close in a loop, the system is balanced. Otherwise, the closing vector will be giving $m_c.r_c$. Its direction identifies the angular position of the countermass relative to the other mass.)

Example 1.1 :A circular disc mounted on a shaft carries three attached masses of 4 kg, 3 kg and 2.5 kg at radial distances of 75 mm, 85 mm and 50 mm and at the angular positions of 45°, 135° and 240° respectively. The angular positions are measured counterclockwise from the reference line along the x-axis. Determine the amount of the countermass at a radial distance of 75 mm required for the static balance.

$m_1 = 4$ kg, $m_2 = 3$ kg, $m_3 = 2.5$ kg

$r_1 = 75$ mm, $r_2 = 85$ mm, $r_3 = 50$ mm

$\theta_1 = 45°$, $\theta_2 = 135°$, $\theta_3 = 240°$

$m_1r_1 = 4 \times 75 = 300$ kg.mm

$m_2r_2 = 3 \times 85 = 255$ kg.mm

$m_3r_3 = 2.5 \times 50 = 125$ kg.mm

Analytical Method:

$\Sigma mr + m_cr_c = 0$

$300\cos45° + 255\cos135° + 125\cos240° + m_cr_c\cos\theta_c = 0$ and

$300\sin45° + 255\sin135° + 125\sin240° + m_cr_c\sin\theta_c = 0$

Squaring, adding and then solving,

$$m_c r_c = \sqrt{(300\cos45° + 255\cos135° + 125\cos240°)^2 + (300\sin45° + 255\sin135° + 125\sin240°)^2}$$

$m_c \times 75 = \sqrt{(-30.68)^2 + (284.2)^2}$

$= 285.8$ kg.mm

$m_c = 3.81$ kg

$$\tan\theta_c = \frac{-\Sigma mr\sin\theta}{-\Sigma mr\cos\theta} = \frac{-284.2}{-(-30.68)} = -9.26$$

$\theta_c = -83°50'$

θ_c lies in the fourth quadrant (numerator is negative and denominator is positive).

$\theta_c = 360 - 83°50'$

$\theta_c = 276°9'$

Graphical Method:

- The magnitude and the position of the balancing mass may also be found graphically as discussed below :
- Now draw the vector diagram with the above values, to some suitable scale, as shown in Fig. 1.3. The closing side of the polygon *co* represents the resultant force. By measurement, we find that *co* = 285.84 kg-mm.

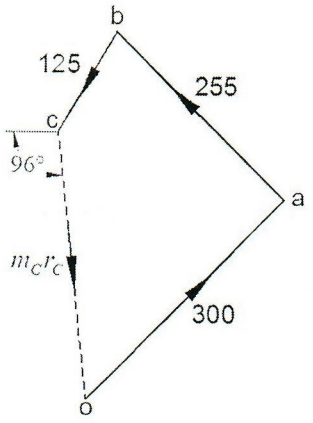


Fig. 1.3 Vector Diagram

- The balancing force is equal to the resultant force. Since the balancing force is proportional to *m.r*, therefore

$$m_C \times 75 = \text{vector } co = 285.84 \text{ kg-mm or } m_C = 285.84/75$$

$$\mathbf{m_C = 3.81 \text{ kg.}}$$

- By measurement we also find that the angle of inclination of the balancing mass (m) from the horizontal or positive X-axis,

$$\mathbf{\theta_C = 276°.}$$

Example 1.2 :Four masses m_1, m_2, m_3 and m_4 are 200 kg, 300 kg, 240 kg and 260 kg respectively. The corresponding radii of rotation are 0.2 m, 0.15 m, 0.25 m and 0.3 m respectively and the angles between successive masses are 45°, 75° and 135°. Find the position and magnitude of the balance mass required, if its radius of rotation is 0.2 m.

$m_1 = 200$ kg $\quad r_1 = 0.2$ m $\quad \theta_1 = 0°$

$m_2 = 300$ kg $\quad r_2 = 0.15$ m $\quad \theta_2 = 45°$

$m_3 = 240$ kg $\quad r_3 = 0.25$ m $\quad \theta_3 = 45° + 75° = 120°$

$m_4 = 260$ kg $\quad r_4 = 0.3$ m $\quad \theta_4 = 120° + 135° = 255°$

$m_1r_1 = 200 \times 0.2 = 40$ $\quad r_C = 0.2$ m

$m_2r_2 = 300 \times 0.15 = 45$

$m_3r_3 = 240 \times 0.25 = 60$

$m_4r_4 = 260 \times 0.3 = 78$

$\Sigma mr + m_Cr_C = 0$

$40 \cos 0° + 45\cos 45° + 60\cos 120° + 78\cos 255° + m_Cr_C\cos\theta_C = 0$ and

$40 \sin 0° + 45 \sin 45° + 60 \sin 120° + 78 \sin 255° + m_Cr_C\sin\theta_C = 0$

Squaring, adding and then solving,

$$m_c r_c = \sqrt{(40\cos 0° + 45\cos 45° + 60\cos 120° + 78\cos 255°)^2 + (40\sin 0° + 45\sin 45° + 60\sin 120° + 78\sin 255°)^2}$$

$$m_c \times 0.2 = \sqrt{(21.6)^2 + (8.5)^2}$$

$$= 23.2 \text{ kg.mm}$$

$$\mathbf{m_c = 116 \text{ kg}}$$

$$\tan\theta_c = \frac{-\sum mr\sin\theta}{-\sum mr\cos\theta} = \frac{-8.5}{-21.6} = 0.3935$$

$$\theta_c = 21°28'$$

θ_c lies in the third quadrant (numerator is negative and denominator is negative).

$$\theta_c = 180 + 21°28'$$

$$\mathbf{\theta_c = 201°28'}$$

Graphical Method:

- For graphical method draw the vector diagram with the above values, to some suitable scale, as shown in Fig. 1.4. The closing side of the polygon *ae* represents the resultant force. By measurement, we find that *ae* = 23 kg-m.

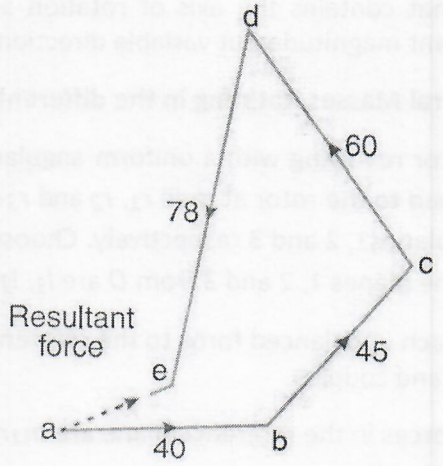


Fig. 1.4 Vector Diagram

- The balancing force is equal to the resultant force.Since the balancing force is proportional to *m.r*, therefore

$$m \times 0.2 = \text{vector } ea = 23 \text{ kg-m or } m_C = 23/0.2$$

$$\mathbf{m_C = 115 \text{ kg.}}$$

- By measurement we also find that the angle of inclination of the balancing mass (*m*) from the horizontal or positive X-axis,

$$\mathbf{\theta_C = 201°.}$$

1.5 Dynamic Balancing

- When several masses rotate in different planes, the centrifugal forces, in addition to being out of balance, also form couples. A system of rotating masses is in dynamic balance when there does not exist any resultant centrifugal force as well as resultant couple.
- In the work that follows, the products of *mr* and *mrl* (instead of $mr\omega^2$ and $mrl\omega^2$), usually, have been referred as force and couple respectively as it is more convenient to draw force and couple polygons with these quantities.

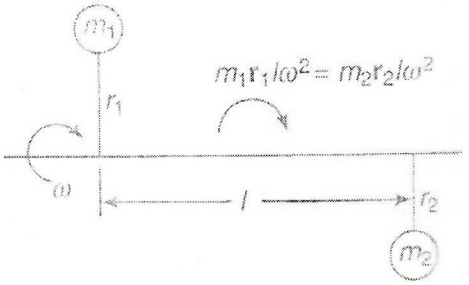


Fig. 1.5

- If m_1, and m_2 are two masses (Fig. 1.5) revolving diametrically opposite to each other in different planes such that $m_1r_1 = m_2r_2$, the centrifugal forces are balanced, but an unbalanced couple of magnitude m_1r_1l (= m_2r_2l) is introduced. The couple acts in a plane that contains the axis of rotation and the two masses. Thus, the couple is of constant magnitude but variable direction.

1.6 Balancing of Several Masses Rotating in the different Planes

- Let there be a rotor revolving with a uniform angular velocity ω. m_1, $m_2$and m_3 are the masses attached to the rotor at radii r_1, r_2 and $r_3$respectively.The masses m_1, m_2 and m_3 rotate in planes1, 2 and 3 respectively. Choose a reference plane at *O* so that the distances of the planes 1, 2 and 3 from *O* are l_1, l_2 and l_3 respectively.
- Transference of each unbalanced force to the reference plane introduces the like number of forces and couples.
- The unbalanced forces in the reference plane are $m_1r_1\omega^2$, $m_2r_2\omega^2$ and $m_3r_3\omega^2$ acting radially outwards.
- The unbalanced couples in the reference plane are $m_1r_1\omega^2l_1$, $m_2r_2\omega^2l_2$ and $m_3r_3\omega^2l_3$ which may be represented by vectors parallel to the respective force vectors, i.e., parallel to the respective radii of m_1, m_2 and m_3.
- For complete balancing of the rotor, the resultant force and resultant couple both should be zero, i.e., $m_1r_1\omega^2 + m_2r_2\omega^2 + m_3r_3\omega^2 = 0$ .....(a)
  and $m_1r_1\omega^2l_1 + m_2r_2\omega^2l_2 + m_3r_3\omega^2l_3 = 0$ .....(b)
- If the Eqs (a) and (b) are not satisfied, then there are unbalanced forces and couples. A mass placed in the reference plane may satisfy the force equation but

the couple equation is satisfied only by two equal forces in different transverse planes.

- Thus in general, two planes are needed to balance a system of rotating masses.
- Therefore, in order to satisfy Eqs (a) and (b), introduce two counter-masses m_{C1} and m_{C2} at radii r_{C1} and r_{C2} respectively. Then Eq. (a) may be written as

$$m_1r_1\omega^2 + m_2r_2\omega^2 + m_3r_3\omega^2 + m_{C1}r_{C1}\omega^2 + m_{C2}r_{C2}\omega^2 = 0$$

$$m_1r_1 + m_2r_2 + m_3r_3 + m_{C1}r_{C1} + m_{C2}r_{C2} = 0$$

$$\Sigma mr + m_{C1}r_{C1} + m_{C2}r_{C2} = 0 \quad \text{.....(c)}$$

- Let the two countermasses be placed in transverse planes at axial locations *O* and *Q*, i.e., the countermass m_{C1} be placed in the reference plane and the distance of the plane of m_{C2} be l_{C2} from the reference plane. Equation (b) modifies to (taking moments about *O*)

$$m_1r_1\omega^2 l_1 + m_2r_2\omega^2 l_2 + m_3r_3\omega^2 l_3 + m_{C2}r_{C2}\omega^2 l_{C2} = 0$$

$$m_1r_1l_1 + m_2r_2l_2 + m_3r_3l_3 + m_{C2}r_{C2}l_{C2} = 0$$

$$\Sigma mrl + m_{C2}r_{C2}l_{C2} = 0 \quad \text{.....(d)}$$

- Thus, Eqs (c) and (d) are the necessary conditions for dynamic balancing of rotor. Again the equations can be solved mathematically or graphically.

  Dividing Eq. (d) into component form

$$\Sigma\, mrl\cos\theta + m_{C2}r_{C2}l_{C2}\cos\theta_{C2} = 0$$

$$\Sigma\, mrl\sin\theta + m_{C2}r_{C2}l_{C2}\sin\theta_{C2} = 0$$

$$m_{C2}r_{C2}l_{C2}\cos\theta_{C2} = -\Sigma mrl\cos\theta \quad \text{(i)}$$

$$m_{C2}r_{C2}l_{C2}\sin\theta_{C2} = -\Sigma mrl\sin\theta \quad \text{(ii)}$$

- Squaring and adding (i) and (ii)

$$m_{C2}r_{C2}l_{C2} = \sqrt{\Sigma\ \ \theta^2 + \Sigma\ \ \theta^2}$$

- Dividing (ii) by (i),

$$\theta_2 = -\Sigma \frac{\theta}{\theta}$$

- After obtaining the values of m_{C2} and θ_{C2} from the above equations, solve Eq. (c) by taking its components,

$$\Sigma\, mr\cos\theta + m_{C1}r_{C1}\cos\theta_{C1} + m_{C2}r_{C2}\cos\theta_{C2} = 0$$

$$\Sigma\, mr\sin\theta + m_{C1}r_{C1}\sin\theta_{C1} + m_{C2}r_{C2}\sin\theta_{C2} = 0$$

$$m_{C1}r_{C1}\cos\theta_{C1} = -(\Sigma mr\cos\theta + m_{C2}r_{C2}\cos\theta_{C2})$$

$$m_{C1}r_{C1}\sin\theta_{C1} = -(\Sigma mr\sin\theta + m_{C2}r_{C2}\sin\theta_{C2})$$

$$m_{C1}r_{C1} = \frac{\sqrt{\theta + \ \ \theta_2^2 + \Sigma \qquad \theta + \ \ \theta_2^2}}{\theta - \Sigma\theta + 22\,\theta_2 1 = -\Sigma\theta + 22\,\theta_2}$$

Example 1.3 : A shaft carries four masses A, B, C and D of magnitude 200 kg, 300 kg, 400 kg and 200 kg respectively and revolving at radii 80 mm, 70 mm, 60 mm and 80 mm in planes measured from A at 300 mm, 400 mm and 700 mm. The angles between the cranks measured anticlockwise are A to B 45°, B to C 70° and C to D 120°. The balancing masses are to be placed in planes X and Y. The distance between the planes A and X is 100 mm, between X and Y is 400 mm and between Y and D is 200 mm. If the balancing masses revolve at a radius of 100 mm, find their magnitudes and angular positions.

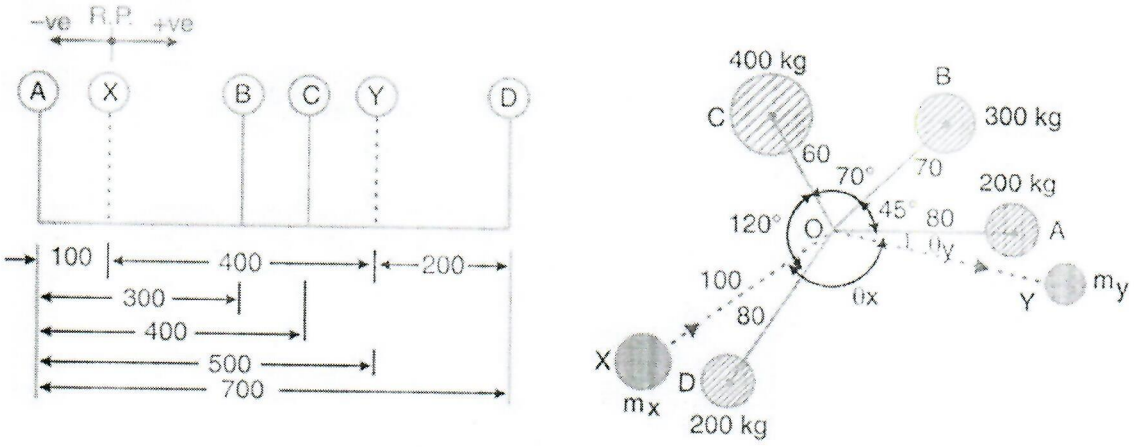
m_A = 200 kg	r_A = 80 mm	$\theta_A = 0°$	l_A = -100 mm
m_B = 300 kg	r_B= 70 mm	$\theta_B = 45°$	l_B = 200 mm
m_C = 400 kg	r_C = 60 mm	$\theta_C = 45° + 70° = 115°$	l_C = 300 mm
m_D = 200 kg	r_D = 80 mm	$\theta_D = 115° + 120° = 235°$	l_D = 600 mm
	$r_X = r_Y$ = 100 mm		l_Y = 400 mm

Let m_X = Balancing mass placed in plane *X*, and

m_Y = Balancing mass placed in plane *Y*.

The position of planes and angular position of the masses (assuming the mass A as horizontal) are shown in Fig. 1.5 (*a*) and (*b*) respectively.

Assume the plane *X* as the reference plane (*R.P.*). The distances of the planes to the right of plane *X* are taken as + ve while the distances of the planes to the left of plane *X* are taken as –ve.



(a) Position of planes. *(b) Angular position of masses.*

Fig. 1.6

$m_A r_A l_A = 200 \times 0.08 \times (-0.1) = -1.6$ kg.m^2

$m_B r_B l_B = 300 \times 0.07 \times 0.2 = 4.2$ kg.m^2

$m_C r_C l_C = 400 \times 0.06 \times 0.3 = 7.2$ kg.m^2

$m_D r_D l_D = 200 \times 0.08 \times 0.6 = 9.6$ kg.m^2

$m_A r_A = 200 \times 0.08 = 16$ kg.m

$m_B r_B = 300 \times 0.07 = 21$ kg.m

$m_C r_C = 400 \times 0.06 = 24$ kg.m

$m_D r_D = 200 \times 0.08 = 16$ kg.m

Analytical Method:

For unbalanced couple

$\Sigma mrl + m_Y r_Y l_Y = 0$

$$m_Y r_Y l_Y = \sqrt{(\Sigma mrl\cos\theta)^2 + (\Sigma mrl\sin\theta)^2}$$

$$m_{YYY} r_{YYY} l_{YYY} = \sqrt{\begin{aligned}&(-1.6\cos0° + 4.2\cos45° + 7.2\cos115° + 9.6\cos235°)^2 + \\ &(-1.6\sin0° + 4.2\sin45° + 7.2\sin115° + 9.6\sin235°)^2\end{aligned}}$$

$$m_Y r_Y l_Y = \sqrt{(-7.179)^2 + (1.63)^2}$$

$$m_Y \times 0.1 \times 0.4 = 7.36$$

m_Y = 184 kg.

$$\tan\theta_Y = \frac{-\Sigma mrl\sin\theta}{-\Sigma mrl\cos\theta} = \frac{-1.63}{-(-7.179)} = -0.227$$

$$\theta_Y = -12°47'$$

θ_Y lies in the fourth quadrant (numerator is negative and denominator is positive).

$$\theta_Y = 360 - 12°47'$$

θ_Y = 347°12'

For unbalanced centrifugal force

$\Sigma mr + m_X r_X + m_Y r_Y = 0$

$$m_X r_X = \sqrt{(\Sigma mr\cos\theta + m_Y r_Y\cos\theta_Y)^2 + (\Sigma mr\sin\theta + m_Y r_Y\sin\theta_Y)^2}$$

$$m_{XX} r_{XX} = \sqrt{\begin{aligned}&(16\cos0° + 21\cos45° + 24\cos115° + 16\cos235° + 18.4\cos347°12')^2 + \\ &(16\sin0° + 21\sin45° + 24\sin115° + 16\sin235° + 18.4\sin347°12')^2\end{aligned}}$$

$$m_X r_X = \sqrt{(29.47)^2 + (19.42)^2}$$

$$m_X \times 0.1 = 35.29$$

m_X = 353 kg.

$$\tan\theta_X = \frac{-\Sigma mr\sin\theta}{-\Sigma mr\cos\theta} = \frac{-19.42}{-29.47} = 0.6589$$

$$\theta_X = 33°22'$$

θ_X lies in the third quadrant (numerator is negative and denominator is negative).

$$\theta_X = 180 + 33°22'$$

θ_X = 213°22'

Graphical Method:

The balancing masses and their angular positions may be determined graphically as discussed below :

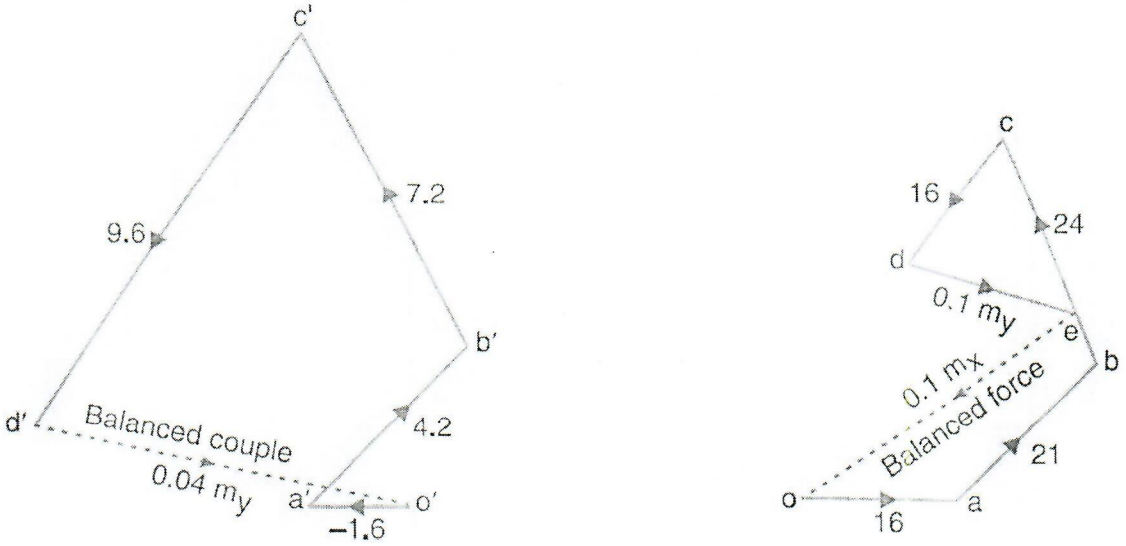
Table 1.1

Plane	Angle	Mass (m) kg	Radius (r)m	Cent.force ÷ ω^2 *(mr)* kg-m	Distance from Ref. Plane *(l)* m	Couple ÷ ω^2 *(mrl)* kg-m^2
A	0°	200	0.08	160	– 0.1	–1.6
X (R.P.)	θ_X	m_X	0.1	0.1 m_X	0	0
B	45°	300	0.07	21	0.2	4.2
C	115°	400	0.06	24	0.3	7.2
Y	θ_Y	m_Y	0.1	0.1 m_Y	0.4	0.04 m_Y
D	235°	200	0.08	16	0.6	9.6

- First of all, draw the couple polygon from the data given in Table 1.1 (column 7) as shown in Fig. 1.7 (a) to some suitable scale. The vector *d'o'* represents the balanced couple. Since the balanced couple is proportional to 0.04 m_Y, therefore by measurement, $0.04 m_Y$ = vector *d'o'* = 73 kg-m^2

  or **m_Y = 182.5 kg**

- The angular position of the mass m_Y is obtained by drawing Om_Y in Fig. 1.6 (*b*), parallel to vector *d'o'*. By measurement, the angular position of m_Y is θ_Y = 12° in the clockwise direction from mass m_A (*i.e.* 200 kg), so **θ_Y = 360°– 12° = 348°.**



(a) Couple Polygon *(b) Force Polygon Fig. 1.7*

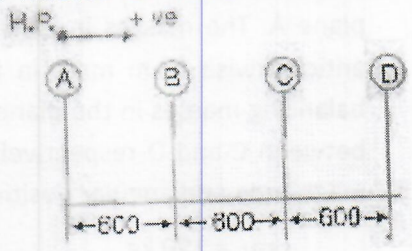
- Now draw the force polygon from the data given in Table 1.1 (column 5) as shown in Fig. 1.7 (b). The vector *eo* represents the balanced force. Since the balanced force is proportional to 0.1 m_X, therefore by measurement,

  $0.1 m_X$ = vector *eo* = 35.5 kg-m

  or **m_X = 355 kg.**

- The angular position of the mass m_X is obtained by drawing Om_X in Fig. 1.6 (*b*), parallel to vector *eo*. By measurement, the angular position of m_X is θ_X = 145° in the clockwise direction from mass m_A (*i.e.* 200 kg), so **θ_X = 360°– 145° = 215°.**

Example 1.4: Four masses A, B, C and D carried by a rotating shaft are at radii 100, 140, 210 and 160 mm respectively. The planes in which the masses revolve are spaced 600 mm apart and the masses of B, C and D are 16 kg, 10 kg and 8 kg respectively. Find the required mass A and the relative angular positions of the four masses so that shaft is in complete balance.



m_A = ? r_A = 100mm

m_B = 16 kg r_B = 140mm l_B = 600 mm

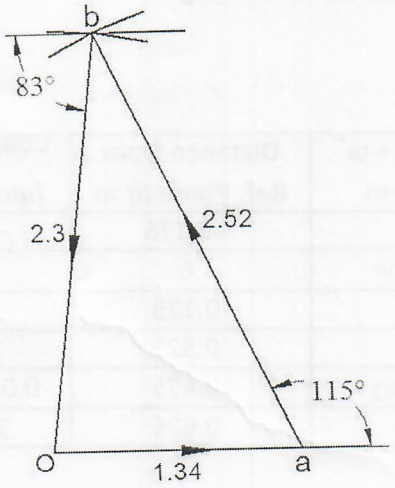
m_C = 10 kg r_C = 210mm l_C = 1200 mm

m_D = 8 kg r_D = 160 mm l_D = 1800 mm

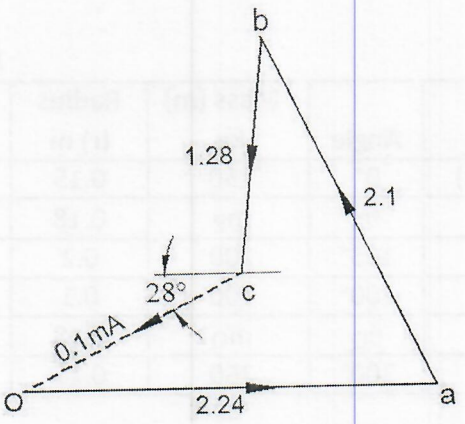
Table 1.2

Plane	Angle	Mass (m) kg	Radius (r) m	Cent.force ÷ ω^2 *(mr)* kg-m	Distance from Ref. Plane *(l)* m	Couple ÷ ω^2 *(mrl)* kg-m
A (R.P.)	θ_A	m_A	0.1	$0.1m_A$	0	0
B	0°	16	0.14	2.24	0.6	1.34
C	θ_C	10	0.21	2.1	1.2	2.52
D	θ_D	8	0.16	1.28	1.8	2.3

- First of all, draw the couple polygon from the data given in Table 1.2 (column 7) as shown in Fig. 1.8 (a) to some suitable scale. By measurement, the angular position of m_C is θ_C = **115°** in the anticlockwise direction from mass m_B and the angular position of m_D is θ_D = **263°** in the anticlockwise direction from mass m_B.



(a) Couple Polygon



(b) Force Polygon

Fig. 1.8

- Now draw the force polygon from the data given in Table 1.2 (column 5) as shown in Fig. 1.8 (b). The vector *co* represents the balanced force. Since the balanced force is proportional to 0.1 m_A, therefore by measurement,

  $0.1m_A$ = vector*co* = 1.36 kg-m

  Or m_A = **13.6 kg.**

- By measurement, the angular position of m_A is θ_A = **208°** in the anticlockwise direction from mass m_B (*i.e.* 16 kg).

Example 1.5 :Four masses 150 kg, 200 kg, 100 kg and 250 kg are attached to a shaft revolving at radii 150 mm, 200 mm, 100 mm and 250 mm; in planes A, B, C and D respectively. The planes B, C and D are at distances 350 mm, 500 mm and 800 mm from plane A. The masses in planes B, C and D are at an angle 105°, 200° and 300° measured anticlockwise from mass in plane A. It is required to balance the system by placing the balancing masses in the planes P and Q which are midway between the planes A and B, and between C and D respectively. If the balancing masses revolve at radius 180 mm, find the magnitude and angular positions of the balance masses.

$m_A = 150$ kg $\quad r_A = 150$mm $\quad \theta_A = 0°$

$m_B = 200$ kg $\quad r_B = 200$mm $\quad \theta_B = 105°$

$m_C = 100$ kg $\quad r_C = 100$mm $\quad \theta_C = 200°$

$m_D = 250$ kg $\quad r_D = 250$ mm $\quad \theta_D = 300°$

$r_X = r_Y = 180$ mm

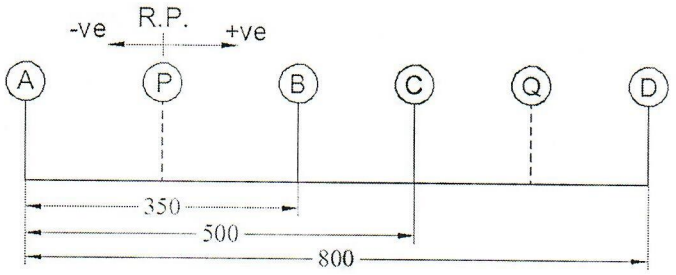


Fig. 1.9

Table 1.3

Plane	Angle	Mass (m) kg	Radius (r) m	Cent.force ÷ ω^2 *(mr)* kg-m	Distance from Ref. Plane *(l)* m	Couple ÷ ω^2 *(mrl)* kg-m
A (R.P.)	0°	150	0.15	22.5	–0.175	–3.94
P	θ_P	m_P	0.18	0.18 m_P	0	0
B	105°	200	0.2	40	0.175	7
C	200°	100	0.1	10	0.325	3.25
Q	θ_Q	m_Q	0.18	0.18 m_Q	0.475	0.0855 m_Q
D	300°	250	0.25	62.5	0.625	39.06

Analytical Method:

Table 1.4

$mrl\cos\theta$ (H_C)	$mrl\sin\theta$ (V_C)	$mr\cos\theta$ (H_F)	$mr\sin\theta$ (V_F)
–3.94	0	22.5	0
0	0	0.18 $m_P\cos\theta_P$	0.18 $m_P\sin\theta_P$
–1.81	6.76	–10.35	38.64
–3.05	–1.11	-9.4	–3.42
0.0855 $m_Q\cos\theta_Q$	0.0855 $m_Q\sin\theta_Q$	0.18 $m_Q\cos\theta_Q$	0.18 $m_Q\sin\theta_Q$
19.53	–33.83	31.25	–54.13

$\Sigma H_C = 0$

$-3.94 + 0 - 1.81 - 3.05 + 0.0855\ m_Q \cos\theta_Q + 19.53 = 0$

$0.0855\ m_Q \cos\theta_Q = -10.73$

$m_Q \cos\theta_Q = -125.497$ ..... (i)

$\Sigma V_C = 0$

$0 + 0 + 6.76 - 1.11 + 0.0855\ m_Q \sin\theta_Q - 33.83 = 0$

$0.0855\ m_Q \sin\theta_Q = 28.18$

$m_Q \sin\theta_Q = 329.59$ ..... (ii)

$m_Q = \sqrt{(-125.497)^2 + (329.59)^2}$

m_Q = 352.67 kg.

$$\frac{m_Q \sin\theta_Q}{m_Q \cos\theta_Q} = \frac{329.59}{-125.497}$$

$\tan\theta_Q = -2.626$

$\theta_Q = -69.15$

$\theta_Q = 180 - 69.15$

θ_Q = 110.84°

$\Sigma H_F = 0$

$22.5 + 0.18\ m_P \cos\theta_P - 10.35 - 9.4 + 0.18\ m_Q \cos\theta_Q + 31.25 = 0$

$22.5 + 0.18\ m_P \cos\theta_P - 10.35 - 9.4 + 0.18\ (352.67) \cos 110.84° + 31.25 = 0$

$0.18\ m_P \cos\theta_P = -11.416$

$m_P \cos\theta_P = -63.42$

$\Sigma V_F = 0$

$0 + 0.18\ m_P \sin\theta_P + 38.64 - 3.42 + 0.18\ m_Q \sin\theta_Q - 54.13 = 0$

$0 + 0.18\ m_P \sin\theta_P + 38.64 - 3.42 + 0.18\ (352.67) \sin 110.84° - 54.13 = 0$

$0.18\ m_P \sin\theta_P = -40.417$

$m_P \sin\theta_P = -224.54$

$m_P = \sqrt{(-63.42)^2 + (-224.54)^2}$

m_P = 233.32 kg.

$$\frac{m_P \sin\theta_P}{m_P \cos\theta_P} = \frac{-224.54}{-63.42}$$

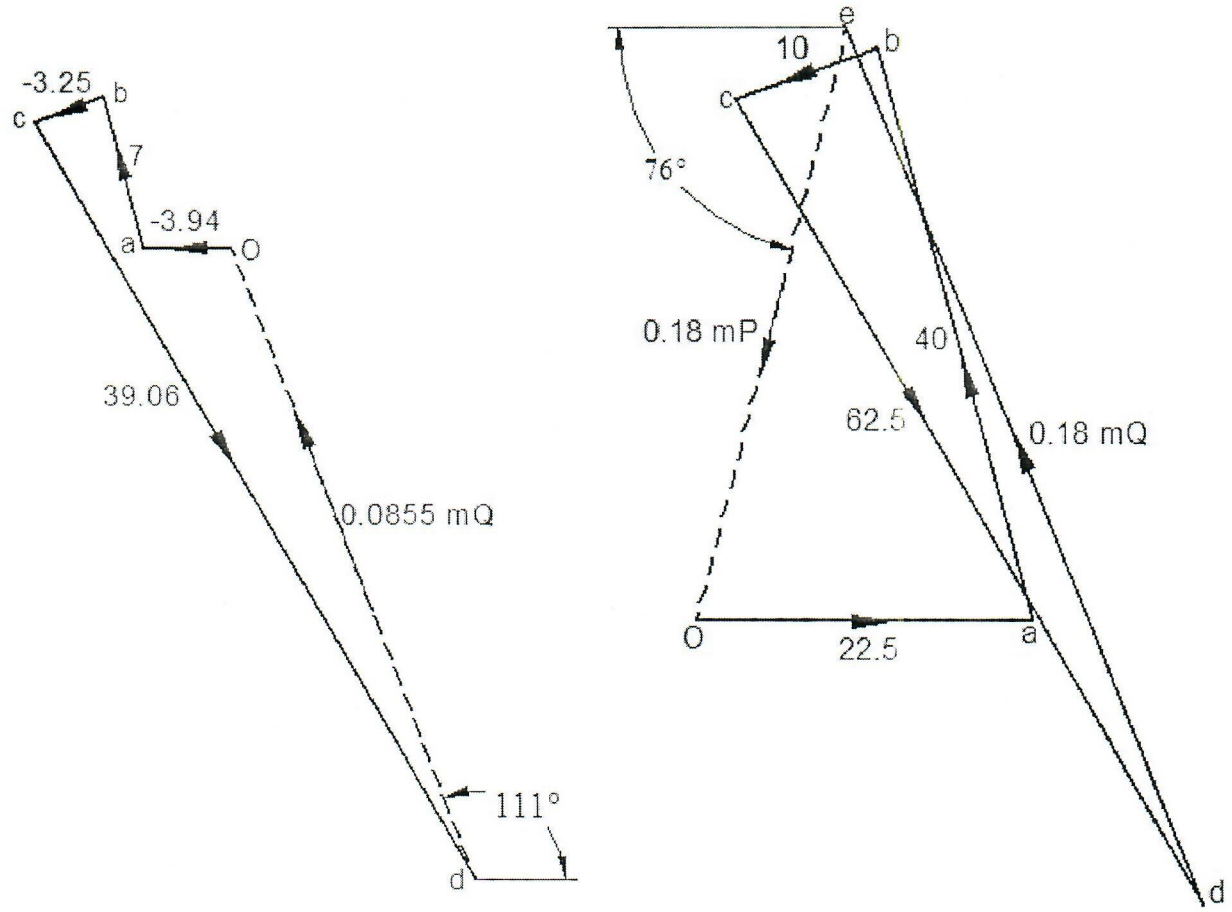
$\tan\theta_P = 3.54$

$\theta_P = 74.23$

$\theta_P = 180 + 74.23$

θ_P = 254.23°

Graphical Method :



(a) Couple Polygon *(b) Force Polygon*

Fig. 1.10

- First of all, draw the couple polygon from the data given in Table 1.4 (column 7) as shown in Fig. 1.10 (a) to some suitable scale. The vector *do* represents the balanced couple. Since the balanced couple is proportional to 0.0855 m_Q, therefore by measurement,

$$0.0855\ m_Q = \text{vector } do = 30.15\ \text{kg-m}^2$$

$$\text{or } \mathbf{m_Q = 352.63\ kg.}$$

- By measurement, the angular position of m_Q is $\mathbf{\theta_Q = 111°}$ in the anticlockwise direction from mass m_A (*i.e.* 150 kg).

- Now draw the force polygon from the data given in Table 1.4 (column 5) as shown in Fig. 1.10 (b). The vector *eo* represents the balanced force. Since the balanced force is proportional to 0.18 m_P, therefore by measurement,

$$0.18\ m_P = \text{vector } eo = 41.5\ \text{kg-m}$$

$$\text{Or} \qquad \mathbf{m_P = 230.5\ kg.}$$

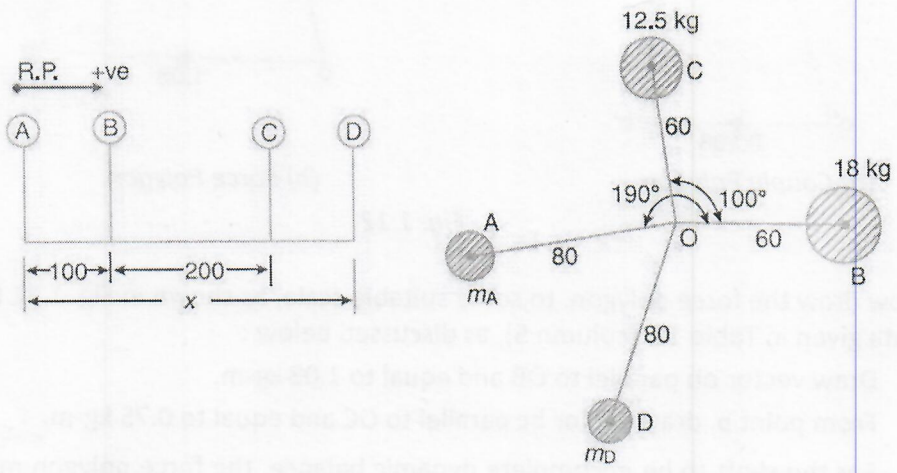
- By measurement, the angular position of m_P is $\mathbf{\theta_P = 256°}$ in the anticlockwise direction from mass m_A (*i.e.* 150kg).

Example 1.6 : A shaft carries four masses in parallel planes A, B, C and D in this order along its length. The masses at B and C are 18 kg and 12.5 kg respectively, and each has an eccentricity of 60 mm. The masses at A and D have an eccentricity of 80 mm. The angle between the masses at B and C is 100° and that between the masses at B and A is 190°, both being measured in the same direction. The axial distance between the planes A and B is 100 mm and that between B and C is 200 mm. If the shaft is in complete dynamic balance, determine: 1. The magnitude of the masses at A and D;

2. The distance between planes A and D; and
3. The angular position of the mass at D.

m_A = ?	r_A = 80 mm	θ_A = 190°
m_B = 18 kg	r_B= 60 mm	θ_B = 0°
m_C = 12.5 kg	r_C = 60 mm	θ_C = 100°
m_D = ?	r_D = 80 mm	θ_D = ?

X= Distance between planes *A* and *D*.



(a) Position of planes. *(b) Angular position of masses.*

Fig. 1.11

– The position of the planes and angular position of the masses is shown in Fig. 1.11 (a) and (b) respectively. The position of mass B is assumed in the horizontal direction, i.e. along OB. Taking the plane of mass A as the reference plane, the data may be tabulated as below:

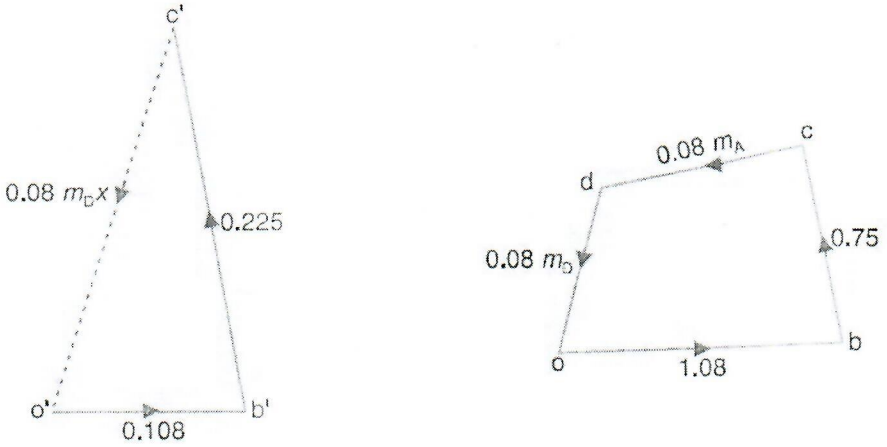
Table 1.5

Plane	Angle	Mass (m) kg	Radius (r) m	Cent.force ÷ ω^2 *(mr)* kg-m	Distance from Ref. Plane *(l)* m	Couple ÷ ω^2 *(mrl)* kg-m^2
A (R.P.)	190°	m_A	0.08	0.08m_A	0	0
B	0°	18	0.06	1.08	0.1	0.108
C	100°	12.5	0.06	0.75	0.3	0.225
D	θ_D	m_D	0.08	0.08 m_D	*X*	0.08 $m_D X$

- First of all, draw the couple polygon from the data given in Table 1.5 (column 7) as shown in Fig. 1.12 (a) to some suitable scale. The closing side of the polygon (vector c'o') is proportional to 0.08 $m_D.X$, therefore by measurement,

$$0.08\ m_D X = \text{vector } c'o' = 0.235\ \text{kg-m}^2 \quad \ldots\ldots\ldots\ldots\ldots\ldots (i)$$

- By measurement, the angular position of m_D is $\theta_D = 251°$ in the anticlockwise direction from mass m_B (*i.e.* 18 kg).



(a) Couple Polygon *(b) Force Polygon*

Fig. 1.12

- Now draw the force polygon, to some suitable scale, as shown in Fig. 1.11 (b), from the data given in Table 1.5 (column 5), as discussed below :
  - i. Draw vector ob parallel to OB and equal to 1.08 kg-m.
  - ii. From point b, draw vector bc parallel to OC and equal to 0.75 kg-m.
  - iii. For the shaft to be in complete dynamic balance, the force polygon must be a closed. Therefore from point *c*, draw vector cd parallel to *OA* and from point *o* draw vector *od* parallel to *OD*. The vectors *cd* and *od* intersect at *d*. Since the vector *cd* is proportional to 0.08 m_A, therefore by measurement 0.08

$$m_A = \text{vector } cd = 0.77\ \text{kg-m}$$

or $$\mathbf{m_A = 9.625\ kg.}$$

- and vector *do* is proportional to 0.08 m_D, therefore by measurement,

$$0.08\ m_D = \text{vector do} = 0.65\ \text{kg-m}$$

or $$\mathbf{m_D = 8.125\ kg.}$$

- Distance between planes A and D

From equation (i),

$$0.08\ m_D.X = 0.235\ \text{kg-m}^2$$

$$0.08 \times 8.125 \times X = 0.235\ \text{kg-m}^2$$

$$\mathbf{X = 0.3615\ m}$$

$$\mathbf{= 361.5\ mm}$$

Example 1.7: An inside cylinder locomotive has its cylinder centre lines 0.7 m apart and has a stroke of 0.6 m. The rotating masses per cylinder are equivalent to 150 kg at the crank pin, and

the reciprocating masses per cylinder to 180 kg. The wheel centre lines are 1.5 m apart. The cranks are at right angles.

The whole of the rotating and 2/3 of the reciprocating masses are to be balanced by masses placed at a radius of 0.6 m. Find the magnitude and direction of the balancing masses.

Find the fluctuation in rail pressure under one wheel, variation of tractive effort and the magnitude of swaying couple at a crank speed of 300 r.p.m.

$l_B = l_C = 0.6$ m or $r_B = r_C = 0.3$ m;

$m_1 = 150$ kg $r_A = r_D = 0.6$ m;

$m_2 = 180$ kg; $c = 2/3$

$N = 300$ r.p.m.

$$\omega = \frac{2\pi N}{6060} = \frac{2\pi \times 300}{6060}$$

$$= 31.42 \; rad/s$$

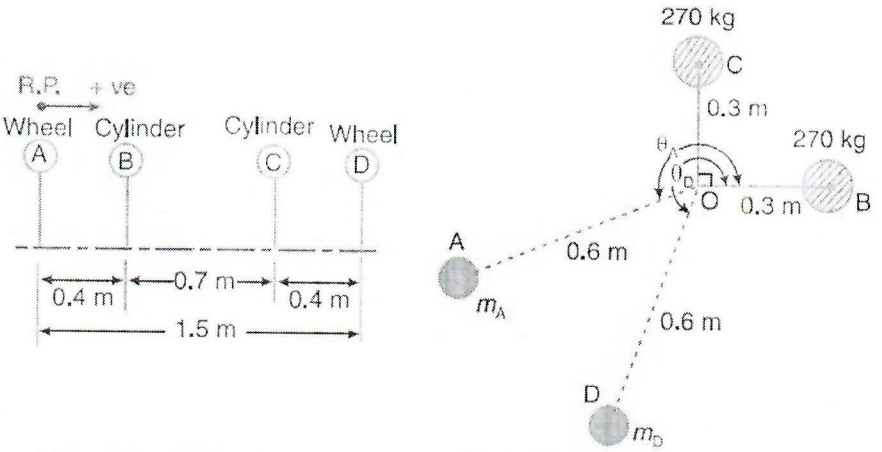
Equivalent mass of the rotating parts to be balanced per cylinder at the crank pin,

$$m = m_B = \frac{m_C}{2} = m_1 + c.m_2$$

$$= 150 + \frac{}{3} \times 180 = 270 \text{ kg}$$

The magnitude and direction of balancing masses may be determined graphically as below:

- First of all, draw the space diagram to show the positions of the planes of the wheels and the cylinders, as shown in Fig. 2.7 (*a*). Since the cranks of the cylinders are at right angles, therefore assuming the position of crank of the cylinder *B* in the horizontal direction, draw *OC* and *OB* at right angles to each other as shown in Fig. 2.7 (b).



(*a*) Position of planes. (*b*) Angular position of masses.

Fig. 2.7

- Tabulate the data as given in the following table. Assume the plane of wheel *A* as the reference plane.

Table 2.1

Plane	Angle	Mass (m) kg	Radius (r) m	Cent.force ÷ ω^2 *(mr)* kg-m	Distance from Ref. Plane *(l)* m	Couple ÷ ω^2 *(mrl)* kg-m^2
A (R.P.)	θ_A	m_A	0.6	0.6 m_A	0	0
B	0°	270	0.3	81	0.4	32.4
C	90°	270	0.3	81	1.1	89.1
D	θ_D	m_D	0.6	0.6 m_D	1.5	0.9 m_D

- Now, draw the couple polygon from the data given in Table 2.1 (column 7), to some suitable scale, as shown in Fig 2.8 (a). The closing side *c'o'* represents the balancing couple and it is proportional to 0.9 m_D. Therefore, by measurement,

0.9 m_D = vector c'o' = 94.5 kg-

m m_D = 105 kg

Example 2.11: The cranks and connecting rods of a 4-cylinder in-line engine running at 1800 r.p.m. are 60 mm and 240 mm each respectively and the cylinders are spaced 150 mm apart. If the cylinders are numbered 1 to 4 in sequence from one end, the cranks appear at intervals of 90° in an end view in the order 1-4-2-3. The reciprocating mass corresponding to each cylinder is 1.5 kg.

Determine: (i) Unbalanced primary and secondary forces, if any, and (ii) Unbalanced primary and secondary couples with reference to central plane of the engine.

r = 60 mm

l = 240 mm

m = 1.5 kg

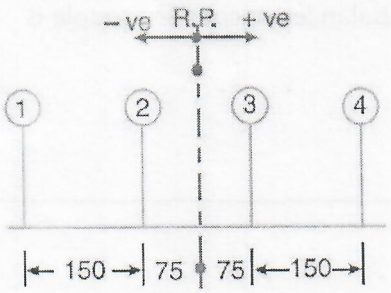
N = 1800 r.p.m

$\omega = \frac{2\pi N}{60} = \frac{2 \times \pi \times 1800}{60}$

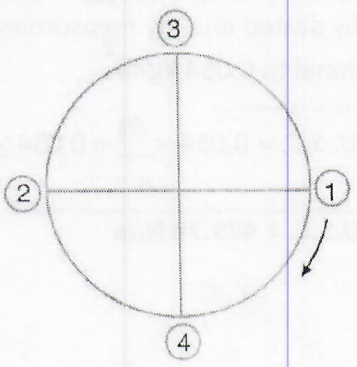
=188.5 rad/s

Table 2.8

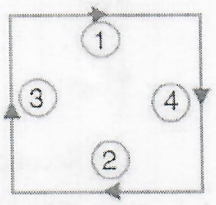
Angle 2θ	Angle θ	Plane	Mass (m) kg	Radius (r) m	Cent.force ÷ ω^2 *(mr)* kg-m	Distance from Ref. Plane *(l)* m	Couple ÷ ω^2 *(mrl)* kg-m^2
0°	0°	1	1.5	0.06	0.09	-0.225	-0.02025
360°	180°	2	1.5	0.06	0.09	-0.075	-0.00675
540°	270°	3	1.5	0.06	0.09	0.075	0.00675
180°	90°	4	1.5	0.06	0.09	0.225	0.02025



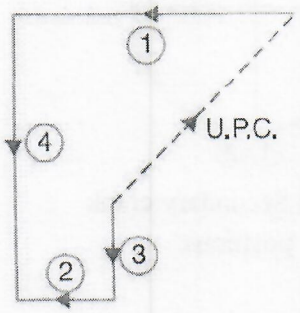
(*a*) Cylinder plane positions.



(*b*) Primary crank positions.



(*c*) Primary force polygon.



(*d*) Primary couple polygon.

Unbalanced primary forces and couples

The position of the cylinder planes and cranks is shown in Fig. 2.24 (a) and (b) respectively.

With reference to central plane of the engine, the data may be tabulated as above:

The primary force polygon from the data given in Table 2.8 (column 6) is drawn as shown in Fig. 2.24 (c). Since the primary force polygon is a closed figure, therefore there are no unbalanced primary forces,

∴ Unbalanced Primary Force, U.P.F. = 0.

The primary couple polygon from the data given in Table 2.8 (column 8) is drawn as shown in Fig. 2.24 (d). The closing side of the polygon, shown dotted in the figure, represents unbalanced primary couple. By measurement, the unbalanced primary couple is proportional to 0.0191 kg-m^2.

∴Unbalanced Primary Couple,

$$U.P.C = 0.0191 \times \omega^2 = 0.0191\,(188.52)^2$$

U.P.C = 678.81 N-m.

Unbalanced secondary forces and couples

The secondary crank positions, taking crank 3 as the reference crank, as shown in Fig. 2.24 (e). From the secondary force polygon as shown in Fig. 2.24 (f), it is a closed figure. Therefore there are no unbalanced secondary forces.

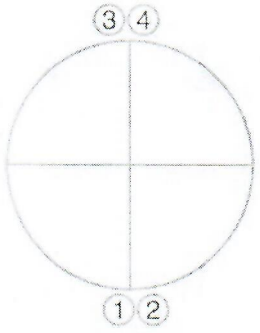
∴ Unbalanced Secondary Force, U.S.F. = 0.

The secondary couple polygon is shown in Fig. 2.24 (g). The unbalanced secondary couple is shown by dotted line. By measurement, we find that unbalanced secondary couple is proportional to 0.054 kg-m^2.

∴Unbalanced Secondary Couple,

$$U.S.C. = 0.054 \times \frac{\omega^2}{n} = 0.054 \times \frac{(188.52)^2}{0.24 / 0.06}$$

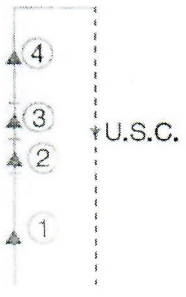
U.S.C. = 479.78 N.m ($n = l / r$)



(e) Secondary crank positions.



(f) Secondary force polygon.

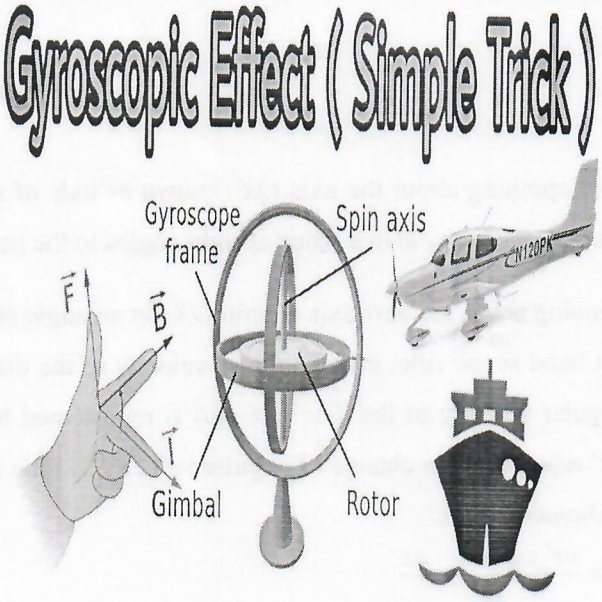


(g) Secondary couple polygon.

UNIT-II

Gyroscope





Introduction, Precessional angular motion, Gyroscopic couple, Effect of gyroscopic couple on an airplane,

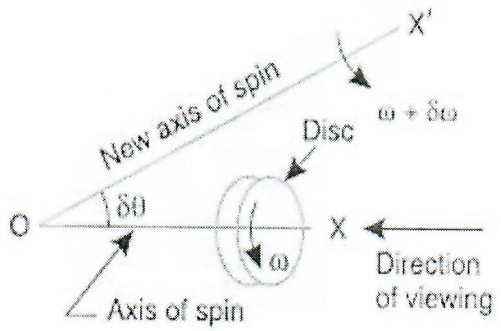
Introduction

When a body moves along a curved path with a uniform linear velocity, a force in the direction of centripetal acceleration (known as centripetal force) has to be applied externally over the body, so that it moves along the required curved path. This external force applied is known as **active force.**

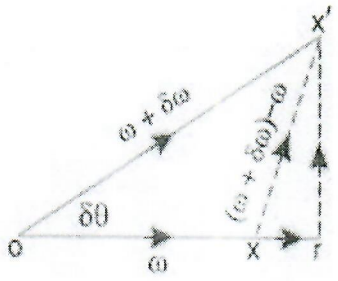
When a body, itself, is moving with uniform linear velocity along a circular path,it is subjected to the centrifugal force* radially outwards. This centrifugal force is called **reactive force.** The action of the reactive or centrifugal force is to tilt or move the body along radially outward direction.

Precessional Angular Motion

We have already discussed that the angular acceleration is the rate of change of angular velocity with respect to time. It is a vector quantity and may be represented by drawing a vector diagram with the help



(a)



(b)

of right hand screw rule.

Consider a disc, as shown in Fig (*a*), revolving or spinning about the axis *OX* (known as **axis of spin)** in anticlockwise when seen from the front, with an angular velocity ω in a plane at right angles to the paper.

After a short interval of time δt, let the disc be spinning about the new axis of spin *OX'*(at an angle $\delta\theta$) with an angular velocity ($\omega + \delta\omega$). Using the right hand screw rule, initial angular velocity of the disc (ω) is represented by vector *ox*; and the final angular velocity of the disc ($\omega + \delta\omega$) is represented by vector *ox'* asshown in Fig. 14.1 (*b*). The vector *xx'* represents the change of angular velocity in time δt

Component of angular acceleration in the direction of *ox*,

$$\alpha_t = \frac{xr}{\delta t} = \frac{or - ox}{\delta t} = \frac{ox' \cos \delta\theta - ox}{\delta t}$$

$$= \frac{(\omega + \delta\omega)\ \cos\delta\theta - \omega}{\delta t} = \frac{\omega \cos\delta\theta + \delta\omega \cos\delta\theta - \omega}{\delta t}$$

Since $\delta\theta$ is very small, therefore substituting $\cos \delta\theta = 1$, we have

$$\alpha_t = \frac{\omega + \delta\omega - \omega}{\delta t} = \frac{\delta\omega}{\delta t}$$

i.e. the angular

acceleration of the disc. This may be resolved into two components.

In the limit, when $\delta t \to 0$,

$$\alpha_t = \underset{\delta t \to 0}{\text{Lt}} \left(\frac{\delta\omega}{\delta t} \right) = \frac{d\omega}{dt}$$

Component of angular acceleration in the direction perpendicular to ox,

$$\alpha_c = \frac{rx'}{\delta t} = \frac{ox' \sin \delta\theta}{\delta t} = \frac{(\omega + \delta\omega)\sin \delta\theta}{\delta t} = \frac{\omega \sin \delta\theta + \delta\omega . \sin \delta\theta}{\delta t}$$

Since $\delta\theta$ in very small, therefore substituting $\sin \delta\theta = \delta\theta$, we have

$$\alpha_c = \frac{\omega . \delta\theta + \delta\omega . \delta\theta}{\delta t} = \frac{\omega . \delta\theta}{\delta t}$$

...(Neglecting $\delta\omega . \delta\theta$, being very small)

In the limit when $\delta t \to 0$,

$$\alpha_c = \underset{\delta t \to 0}{\text{Lt}} \frac{\omega . \delta\theta}{\delta t} = \omega \times \frac{d\theta}{dt} = \omega . \omega_p \qquad \ldots \left(\text{Substituting } \frac{d\theta}{dt} = \omega_p \right)$$

∴ Total angular acceleration of the disc

= vector xx' = vector sum of α_t and α_c

$$= \frac{d\omega}{dt} + \omega \times \frac{d\theta}{dt} = \frac{d\omega}{dt} + \omega . \omega_p$$

Where dθ/dt is the angular velocity of the axis of spin about a certain axis, which is perpendicular to the plane in which the axis of spin is going to rotate. This angular velocity of the axis of spin (i.e.dθ/dt) is known as angular velocity of precession and is denoted by ω_P. The axis, about which the axis of spin is to turn, is known as axis of precession. The angular motion of the axis of spin about the axis of precession is known as precessional angular motion.

Gyroscopic Couple

Consider a disc spinning with an angular velocity ω rad/s about the axis of

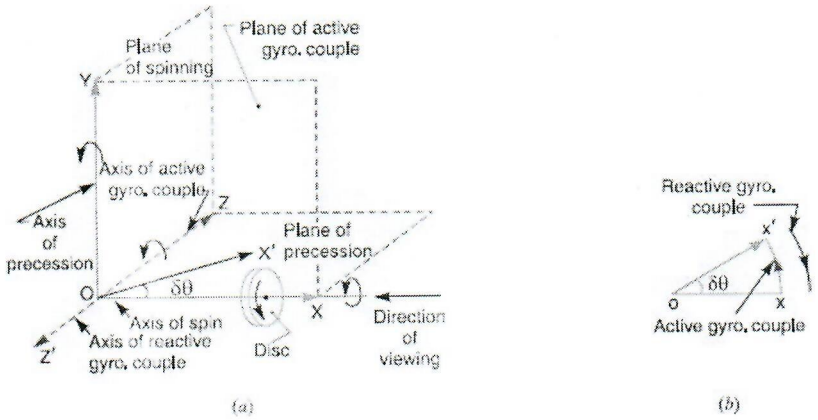
spin OX, in anticlockwise direction when seen from the front, as shown in Fig. 14.2 (a). Since the plane in which the disc is rotating is parallel to the plane YOZ, therefore it is called plane of spinning. The plane XOZ is a horizontal plane and the axis of spin rotates in a plane parallel to the horizontal plane about an axis OY. In other words, the axis of spin is said to be rotating or processing about an axis OY. In other words, the axis of spin is said to be rotating or processing about an axis OY (which is perpendicular to both the axes OX and OZ) at an angular velocity _P rap/s. This horizontal plane XOZ is called plane of precession and OY is the axis of precession.

Let I = Mass moment of inertia of the disc about OX, and ω= Angular velocity of the disc.

Angular momentum of the disc = $I. \omega$

Since the angular momentum is a vector quantity, therefore it may be represented by the vector ox', as shown in Fig. 14.2 (b). The axis of spin OX is also rotating anticlockwise when seen from the top about theaxis OY. Let the axis OX is turned in the plane XOZ through a small angle $\delta\theta$ radians to the position OX', in

time δt seconds. Assuming the angular velocity ω to be constant, the angular momentum will now be represented by vector ox'.



$= \overrightarrow{ox'} - \overrightarrow{ox} = \overrightarrow{xx'} = \overrightarrow{ox}.\delta\theta$ ...(in the direction of $\overrightarrow{xx'}$)

$= I.\ \omega.\delta\theta$

Change in angular momentum and rate of change of angular momentum

$$= I.\omega \times \frac{\delta\theta}{dt}$$

$$C = \underset{\delta t \to 0}{\text{Lt}}\ I.\omega \times \frac{\delta\theta}{\delta t} = I.\omega \times \frac{d\theta}{dt} = I.\omega.\omega_P \qquad \ldots\left(\because \frac{d\theta}{dt} = \omega_P\right)$$

Since the rate of change of angular momentum will result by the application of a couple to the disc, Therefore the couple applied to the disc causing precession,

Where $\boldsymbol{\omega_P}$ = Angular velocity of precession of the axis of spin or the speed of rotation of the axis of spin about the axis of precession *OY*.

The couple $I.\omega.\omega_P$, in the direction of the vector xx' (representing the change in angular momentum) is the active gyroscopic couple, which has to be applied over the disc when the axis of spin is made to rotate with angular velocity ω_P about the axis of precession. The vector xx' lies in the plane XOZ or the horizontal plane. In case of a very small displacement δθ, the vector xx' will be perpendicular to the vertical plane XOY. Therefore the couple causing this change in the angular momentum will lie in the plane XOY. The vector xx', as shown in Fig(b), represents an anticlockwise couple in the plane XOY. Therefore, the plane XOY is called the plane of active gyroscopic couple and the axis OZ perpendicular to the plane XOY, about which the couple acts, is called the axis of active gyroscopic couple.

When the axis of spin itself moves with angular velocity ω_P, the disc is subjected to *reactive couple* whose magnitude is same (*i.e.* $I.\omega.\omega_P$) but opposite in direction to that of active couple. This reactive couple to which the disc is subjected when the axis of spin

rotates about the axis of precession is known as *reactive gyroscopic couple*. The axis of the reactive gyroscopic couple is represented by OZ' in Fig(a).

The gyroscopic couple is usually applied through the bearings which support the shaft. The bearings will resist equal and opposite couple.

The gyroscopic principle is used in an instrument or toy known as gyroscope. The gyroscopes are installed in ships in order to minimize the rolling and pitching effects of waves. They are also used in aero planes, monorail cars, gyrocompasses etc.

Effect of the Gyroscopic Couple on an aero plane:

The top and front view of an aero plane is shown in Fig (a). Let engine or propeller rotates in the clockwise direction when seen from the rear or tail end and the aero plane takes a turn to the left.

Let ω= Angular velocity of the engine in rad/sec,

m = Mass of the engine and the propeller in kg,

k = Its radius of gyration in metre

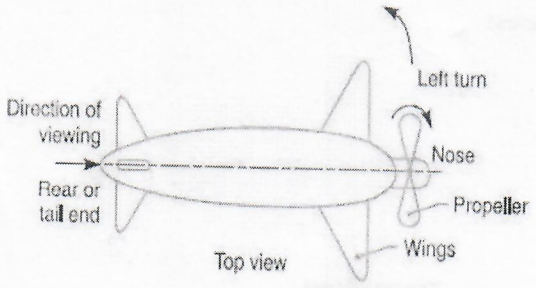
I = Mass moment of inertia of the engine and the propeller in kg-m^2

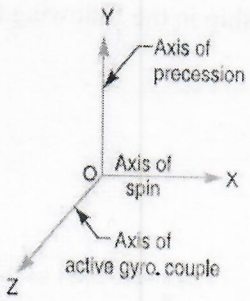
$= mk^2$

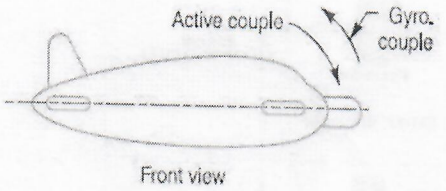
v = Linear velocity of the aero plane in m/s,

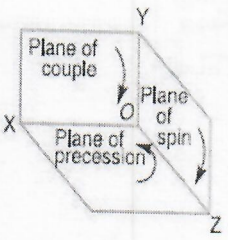
R = Radius of curvature in metres, and

ω_p = Angular velocity of precession=V/R









Before taking the left turn, the angular momentum vector is represented by ox. When it takes left turn, the active gyroscopic couple will change the direction of the angular momentum vector from ox to ox' as shown in Fig(a). The vector xx', in the limit, represents the change of angular momentum or the active gyroscopic couple and is perpendicular to ox. Thus the plane of active gyroscopic couple XOY will be perpendicular to xx', *i.e.* vertical in this case, as shown in Fig (b). By applying right hand screw rule to vector xx', we find that the direction of active gyroscopic couple is clockwise as shown in the front view ofFig (a).

In other words, for left hand turning, the active gyroscopic couple on the aero plane in the axis OZ will be clockwise as shown in Fig (b).The reactive gyroscopic couple.(equal in magnitude of active



(a) Aeroplane taking left turn. (b) Aeroplane taking right turn.

gyroscopic couple) will act in the opposite direction (*i.e.* in the anticlockwise direction) and the effect of this coupleis, therefore, to raise the nose and dip the tail of the aero plane.

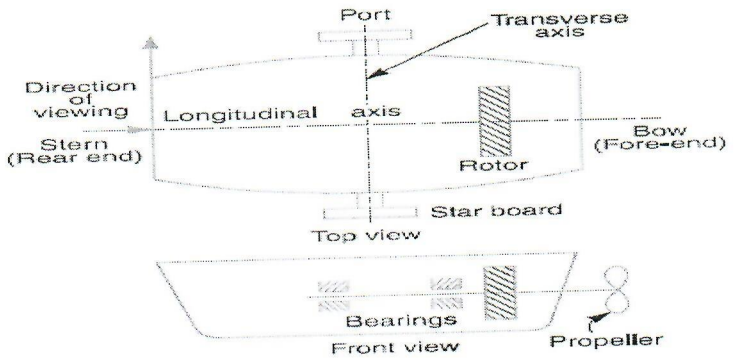
Terms Used in a Naval Ship.

The top and front views of a naval ship are shown in Fig 14.7. The fore end of the ship is called ***bow*** and the rear end is known as ***stern*** or ***aft***. The left hand and right hand sides of the ship, when viewed from the stern are called ***port*** and ***star-board*** respectively. We shall now discuss the effect of gyroscopic couple on the naval ship in the following three cases:

Steering,

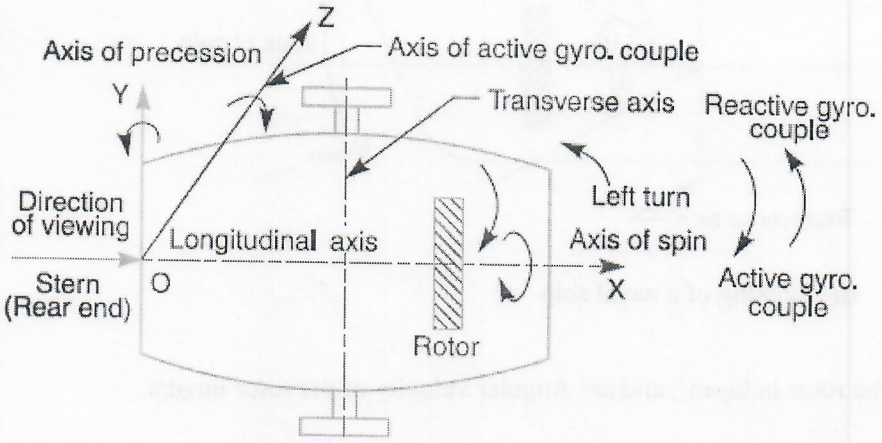
Pitching,

Rolling.

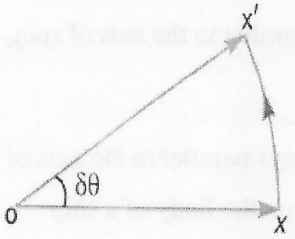


Effect of Gyroscopic Couple on a Naval Ship during Steering

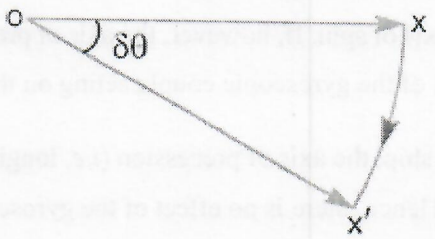
Steering is the turning of a complete ship in a curve towards left or right, while it moves forward. Considerthe ship taking a left turn, and rotor rotates in the clockwise direction when viewed from the stern, as shown in Fig. The effect of gyroscopic couple on a naval ship during steering taking left or right turn may be obtained in the similar way as for an aeroplane.



When the rotor of the ship rotates in the clockwise direction when viewed from the stern, it will have its angular momentum vector in the direction ox as shown in Fig(a). As the ship steers to the left, the active gyroscopic couple will change the angular momentum vector from ox to ox′. The vector xx′ now represents the active gyroscopic couple and is perpendicular to ox. Thus the plane of active gyroscopic couple is perpendicular to xx′ and its direction in the axis OZ for left hand turn is clockwise as shown in Fig. The reactive gyroscopic couple of the same magnitude will act in the opposite direction (i.e. in anticlockwise direction). The effect of this reactive gyroscopic couple is to raise the bow and lower the stern.



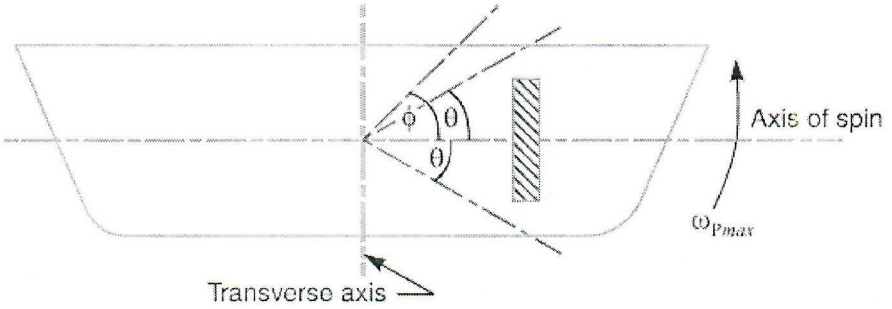
(a) Streeing to the left



(b) Streeing to the right

Effect of Gyroscopic Couple on a Naval Ship during Pitching

Pitching is the movement of a complete ship up and down in a vertical plane about transverse axis, as shown in Fig(a). In this case, the transverse axis is the axis of precession. The pitching of the ship is assumed to take place with simple harmonic motion i.e. the motion of the axis of spin about transverse



(a) Pitching of a naval ship

axis is simple harmonic.

Let I = Moment of inertia of the rotor in kg-m^2, and ω= Angular velocity of the rotor inrad/s.

Minimum gyroscopic couple,

$$C_{max} = I.\ \omega.\ \omega_{Pmax}$$

When the pitching is upward, the effect of the reactive gyroscopic couple, as shown in Fig.(b), will try to move the ship toward star-board. On the other hand, if the pitching is downward, the effect of the reactive gyroscopic couple, as shown in Fig(c), is to turn the ship towards port side.

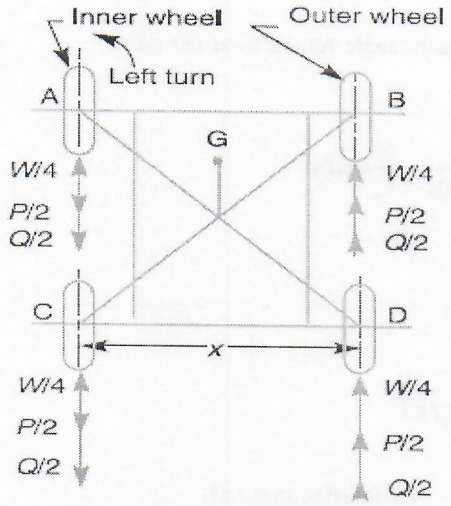
Effect of Gyroscopic Couple on a Naval Ship during Rolling

We know that, for the effect of gyroscopic couple to occur, the axis of precession should always be perpendicular to the axis of spin. If, however, the axis of precession becomes parallel to the axis of spin, there will be no effect of the gyroscopic couple acting on the body of the ship.

In case of rolling of a ship, the axis of precession (*i.e.* longitudinal axis) is always parallel to the axis of spinfor all positions. Hence, there is no effect of the gyroscopic couple acting on the body of a ship.

Stability of a Four Wheel Drive Moving in a Curved Path

Consider the four wheels *A*, *B*, *C* and *D* of an automobile locomotive taking a turn towards left as shownin Fig. The wheels *A* and *C* are inner wheels, whereas *B* and *D* are outer wheels. The centre of gravity (*C.G.*) of the vehicle lies vertically above the road surface.



Let ***m = Mass of the vehicle inkg,***

W = Weight of the vehicle in newtons = *m.g*, *r*W = Radius of the wheels in metres,

R = Radius of curvature in metres (R >rW),

h = Distance of centre of gravity, vertically above the roadsurfacein metres,

x = Width of track in metres,

*I*W = Mass moment of inertia of one of the wheels in kg-m^2,

ω_W***= Angular velocity of the wheels or velocity of spin in rad/s,***

*I*E = Mass moment of inertia of the rotating parts of the engine in kg-m2

ω_E***= Angular velocity of the rotating parts of the engine in rad/s,***

G = Gear ratio =ω_E/ω_W

v = Linear velocity of the vehicle in m/s = $\omega_W.r_W$

A little consideration will show that the weight of the vehicle (*W*) will be equally distributed over the four wheels which will act downwards. The reaction between each wheel and the road surface of the same magnitude will act upwards.

Therefore Road reaction over each wheel = $W/4 = m.g/4$ newtons

Let us now consider the effect of the gyroscopic couple and centrifugal couple on the vehicle.

∴ Angular displacement of the axis of spin from mean position after time t seconds,

$$\theta = \phi \sin \omega_1 . t$$

ϕ = Amplitude of swing *i.e.* maximum angle turned from the mean position in radians, and

ω_1 = Angular velocity of S.H.M.

$$= \frac{2\pi}{\text{Time period of S.H.M. in seconds}} = \frac{2\pi}{t_p} \text{ rad/s}$$

Angular velocity of precession,

$$\omega_p = \frac{d\theta}{dt} = \frac{d}{dt}(\phi \sin \omega_1 . t) = \phi \omega_1 \cos \omega_1 t$$

The angular velocity of precession will be maximum, if $\cos \omega_1 t = 1$.

∴ Maximum angular velocity of precession,

$$\omega_{P_{max}} = \phi . \omega_1 = \phi \times 2\pi / t_p \quad \text{...(Substituting } \cos \omega_1 t = 1)$$



(*b*) Pitching upward



(*c*) Pitching downward

Effect of the gyroscopic couple

Since the vehicle takes a turn towards left due to the precession and other rotating parts, therefore a gyroscopic couple will act.

We know that velocity of precession, $\omega_P = v/R$

Gyroscopic couple due to 4 wheels,

$C_W = 4\ I_W.\omega_W.\omega_P$

and gyroscopic couple due to the rotating parts of the engine,

$C_E = I_E.\omega_E.\omega_P = I_E.G.\omega_W.\omega_P$

Net gyroscopic couple,

$C = C_W \pm C_E = 4\ I_W.\omega_W.\omega_P \pm I_E.G.\omega_W.\omega_P$

$= \omega_W.\omega_P (4 I_W \pm G.I_E)$

The ***positive*** sign is used when the wheels and rotating parts of the engine rotate in the same direction. Ifthe rotating parts of the engine revolve in opposite direction, then ***negative*** sign is used.

Due to the gyroscopic couple, vertical reaction on the road surface will be produced. The reaction will bevertically upwards on the outer wheels and vertically downwards on the inner wheels.

Let the magnitude of this reaction at the two outer or inner wheels be P new tons. Then

$P \times x = C$ or $P = C/x$

Vertical reaction at each of the outer or inner wheels,

P /2 = C/2x

Effect of the centrifugal couple

Since the vehicle moves along a curved path, therefore centrifugal force will act outwardly at the centreof gravity of the vehicle. The effect of this centrifugal force is also to overturn the vehicle.

$$F_C = \frac{m \times v^2}{R}$$

We know that centrifugal force,

The couple tending to overturn the vehicle or overturning couple,

$$C_O = F_C \times h = \frac{m.v^2}{R} \times h$$

This overturning couple is balanced by vertical reactions, which are vertically up wards on the outerwheels and vertically downwards on the inner wheels. Let the magnitude of this reaction at the two outer

$$Q \times x = C_O \quad \text{or} \quad Q = \frac{C_O}{x} = \frac{m.v^2.h}{R.x}$$

or inner wheels be Q. Then

Vertical reaction at each of the outer or inner

wheels,Total vertical reaction at each of the outer

$$\frac{Q}{2} = \frac{m.v^2.h}{2R.x}$$

wheel,

$$P_O = \frac{W}{4} + \frac{P}{2} + \frac{Q}{2}$$

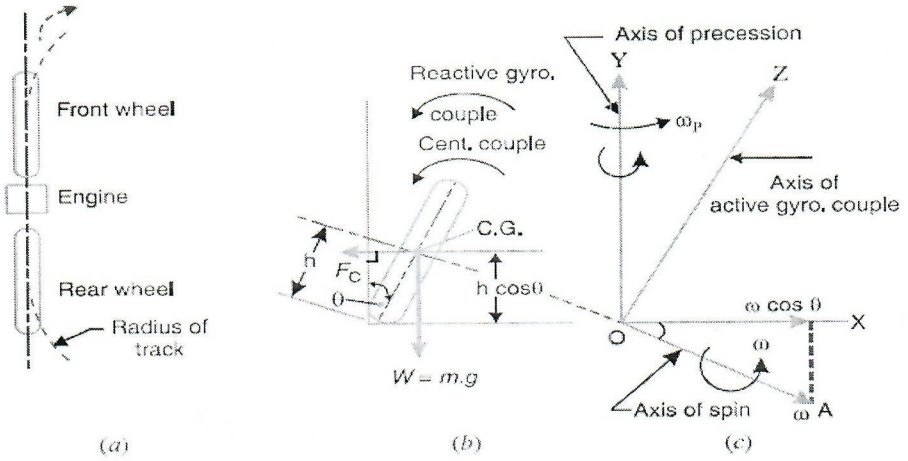
Total vertical reaction at each of the inner wheel

$$P_I = \frac{W}{4} - \frac{P}{2} - \frac{Q}{2}$$

A little consideration will show that when the vehicle is running at high speeds, P_I may bezero or even negative. This will cause the inner wheels to leave the ground thus tending to overturn the automobile. Inorder to have the contact between the inner wheels and the ground, the sum of P/2 and Q/2 must be lessthan W/4.

Stability of a Two Wheel Vehicle Taking a Turn

Consider a two wheel vehicle (say a scooter or motor cycle) taking a right turn as shown in fig.



Let

m = Mass of the vehicle and its rider in kg,

W = Weight of the vehicle and its rider in Newton's = $m.g$, h = Height of the centre of gravity of the vehicle and rider, r_W = Radius of the wheels,

R = Radius of track or curvature,

I_W = Mass moment of inertia of each wheel,

I_E = Mass moment of inertia of the rotating parts of the v engine, ω_W = Angular velocity of the wheels,

ω_E= Angular velocity of the engine,

G = Gear ratio = ω_E / ω_W,

v = Linear velocity of the vehicle = $\omega_W \times r_W$,

θ=Angle of wheel. It is inclination of the vehicle to the vertical for equilibrium.

Let us now consider the effect of the gyroscopic couple and centrifugal couple on the vehicle,Effect of gyroscopic couple

$$\omega_E = G.\omega_W = G \times \frac{v}{r_W}$$

$$\therefore \text{ Total } \quad (I \times \omega) = 2 I_W \times \omega_W \pm I_E \times \omega_E$$

$$= 2 I_W \times \frac{v}{r_W} \pm I_E \times G \times \frac{v}{r_W} = \frac{v}{r_W} (2 I_W \pm G.I_E)$$

We know that $v = \omega_W \times r_W$ or $\omega_W = v / r_W$

Velocity of precession, $\omega_P = v / R$

A little consideration will show that when the wheels move over the curved path, the vehicle is always inclined at an angle θ with the vertical plane as shown in Fig (*b*). This angle is known as ***angle of heel.*** In other words, the axis of spin is inclined to the horizontal at an angle θ, as shown in Fig (*c*). Thus the angular

Momentum vector $I\omega$ due to spin is represented by *OA* inclined to *OX* at an angle θ. But the precession

Gyroscopic couple,

$$C_1 = I.\omega \cos\theta \times \omega_P = \frac{v}{r_W} (2 I_W \pm G.I_E) \cos\theta \times \frac{v}{R}$$

$$= \frac{v^2}{R.r_W} (2 I_W \pm G.I_E) \cos\theta$$

axis is vertical. Therefore the spin vector is resolved along

OX.Effect of centrifugal couple

We know that centrifugal force,

$$F_C = \frac{m.v^2}{R}$$

This force acts horizontally through the centre of gravity (*C.G.*) along the outward direction.

$$C_2 = F_C \times h \cos\theta = \left(\frac{m.v^2}{R} \right) h \cos\theta$$

Centrifugal couple,

Since the centrifugal couple has a tendency to overturn the vehicle, therefore Total overturning couple,

$$C_O = \text{Gyroscopic couple} + \text{Centrifugal couple}$$

$$= \frac{v^2}{R.r_W}(2\,I_W + G.I_E)\cos\theta + \frac{m.v^2}{R} \times h\cos\theta$$

$$= \frac{v^2}{R}\left[\frac{2\,I_W + G.I_E}{r_W} + m.h\right]\cos\theta$$

We know that balancing couple = ***m.g.h*** **sinθ**

The balancing couple acts in clockwise direction when seen from the front of the vehicle. Therefore for stability, the overturning couple must be equal to the balancing couple,*i.e.*

$$\frac{v^2}{R}\left(\frac{2\,I_W + G.I_E}{r_W} + m.h\right)\cos\theta = m.g.h\sin\theta$$

From this expression, the value of the angle of heel (θ) may be determined, so that the vehicle does not skid.

PROBLEMS

Example 1.

A uniform disc of diameter 300 mm and of mass 5 kg is mounted on one end of an arm of length 600 mm.The other end of the arm is free to rotate in a universal bearing. If the disc rotates about the arm with a speed of 300 r.p.m. clockwise, looking from the front, with what speed will it process about the vertical axis?

Solution. Given: $d = 300$ mm or $r = 150$ mm $= 0.15$ m ; $m = 5$ kg ; $l = 600$ mm $= 0.6$ m
$N = 300$ r.p.m. or $\omega = 2\pi \times 300/60 = 31.42$ rad/s

We know that the mass moment of inertia of the disc, about an axis through its centre of gravity and perpendicular to the plane of disc,

$I = m.r^2/2 = 5(0.15)2/2 = 0.056$ kg-m^2

couple due to mass of disc,

$C = m.g.l = 5 \times 9.81 \times 0.6 = 29.43$ N-m

Let ω_P = Speed of

precession. We know that

couple (C),

$29.43 = I.\omega.\omega_P = 0.056 \times 31.42 \times \omega_P = 1.76\ \omega_P$

$\omega_P = 29.43/1.76 = 16.7$ rad/s

Example 2.

An aeroplane makes a complete half circle of 50 metres radius, towards left, when flying at 200 km per hr. The rotary engine and the propeller of the plane has a mass of 400 kg and a radius of gyration of 0.3

m. The engine rotates at 2400 r.p.m. clockwise when viewed from the rear. Find the gyroscopic couple onthe aircraft and state its effect on it.

Solution: Given :$R = 50$ m ; $v = 200$ km/hr $= 55.6$ m/s ; $m = 400$ kg ; $k = 0.3$ m ; $N =$

2400 r.p.m. or $\omega = 2\pi \times 2400/60 = 251$ rad/s

We know that mass moment of inertia of the engine and the propeller,

$I = m.k^2 = 400(0.3)2 = 36$ kg-m^2

Angular velocity of precession, $\omega_P = v/R = 55.6/50 = 1.11$

rad/sWe know that gyroscopic couple acting on the aircraft,

$C = I.\ \omega.\ \omega_P = 36 \times 251.4 \times 1.11 = 100\ 46$ N-m$=10.046$ kN-m

When the aeroplane turns towards left, the effect of the gyroscopic couple is to lift the nose upwards andtail downwards.

Example 3 :The turbine rotor of a ship has a mass of 8 tonnes and a radius of gyration0.6 m.It rotates at 1800 r.p.m. clockwise, when looking from the stern. Determine the gyroscopic couple, if the ship travelsat 100 km/hr and steer to the left in a curve of 75 m radius.

Solution. Given: $m = 8$ t $= 8000$ kg ;$k = 0.6$ m ; $N = 1800$ r.p.m. or $\omega = 2\pi \times 1800/60 = 188.5$ rad/s ; $v = 100$ km/h $= 27.8$ m/s ; $R = 75$ m

We know that mass moment of inertia of the rotor,

$I = m.k^2 = 8000\ (0.6)2 = 2880$ kg-m^2

Angular velocity of precession,

$\omega_p = v / R = 27.8 / 75 = 0.37$ rad/s We know that

gyroscopic Couple,

$C = I.\omega.\omega_P = 2880 \times 188.5 \times 0.37 = 200\ 866$ N-m

$= 200.866$ kN-m

When the rotor rotates in clockwise direction when looking from the stern and the ship steers to the left,the effect of the reactive gyroscopic couple is to raise the bow and lower the stern.

INDUSTRIAL APPLICATIONS OF GYROSCOPIC

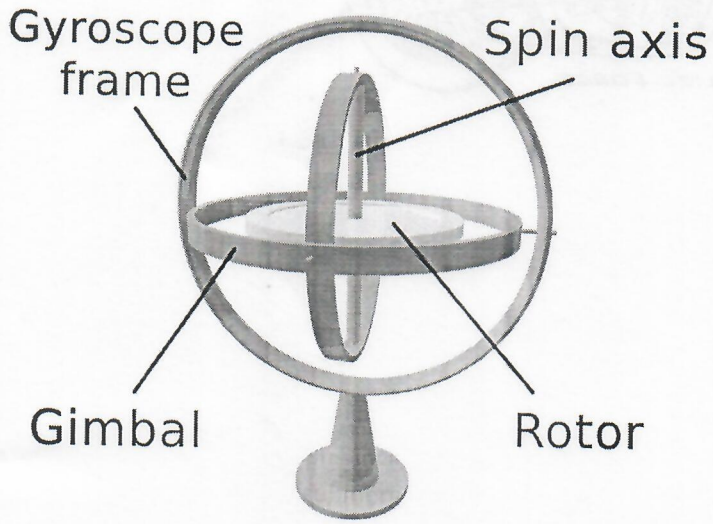
1. Motor car

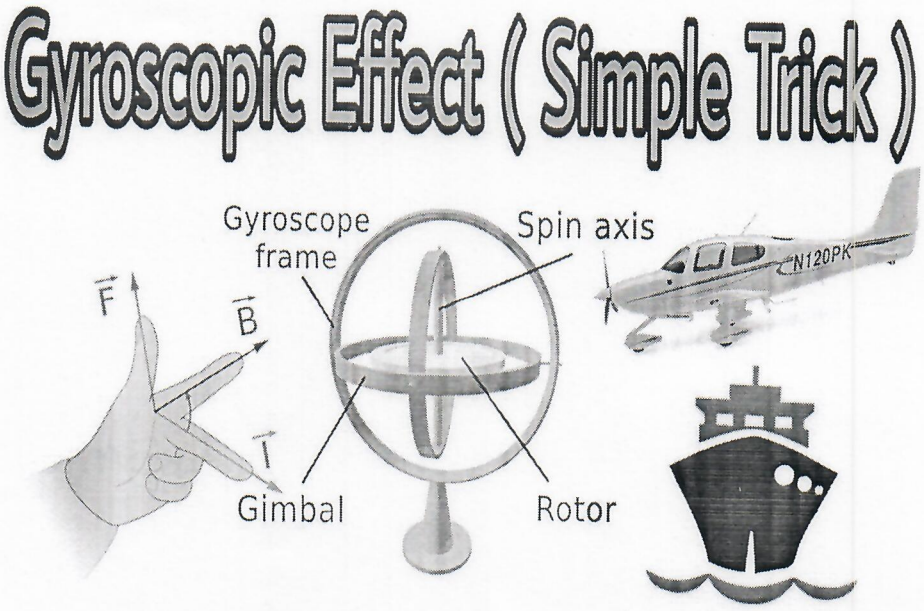
2. Motor cycle

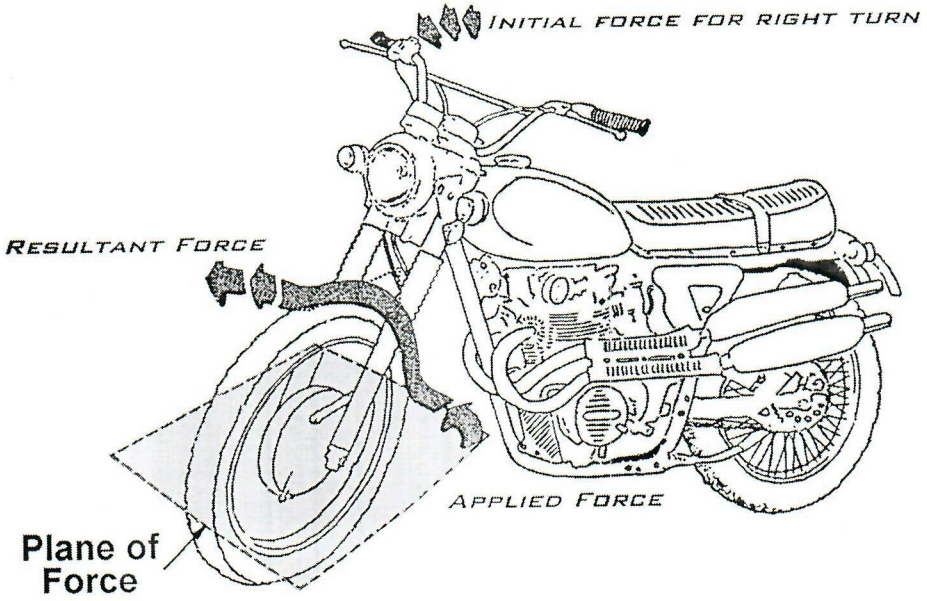
3. Aero planes

4. Ships

5. Applications of gyroscopes include inertial navigation systems, such as in the Hubble Telescope, or inside the steel hull of a submerged submarine. Due to their precision, gyroscopes are also used in gyrotheodolites to maintain direction in tunnel mining.






INITIAL FORCE FOR RIGHT TURN
RESULTANT FORCE
APPLIED FORCE
Plane of Force

TUTORIAL

1. What do you understand by gyroscopic couple? Derive a formula for its magnitude.
2. Explain the effect of the gyroscopic couple on the reaction of the four wheels of a vehicle negotiating a curve.
3. Discuss the effect of the gyroscopic couple on a two wheeled vehicle when taking a turn.
4. What will be the effect of the gyroscopic couple on a disc fixed at a certain angle to a rotating shaft?
5. A flywheel of mass 10 kg and radius of gyration 200 mm is spinning about its axis, which is horizontal and is suspended at a point distant 150 mm from the plane of rotation of the flywheel. Determine the angular velocity of precession of the flywheel. The spin speed of flywheel is 900 r.p.m.
6. Find the angle of inclination with respect to the vertical of a two wheeler negotiating a turn. Given : combined mass of the vehicle with its rider 250 kg ; moment of inertia of the engine flywheel 0.3 kg-m2 ; moment of inertia of each road wheel 1 kg-m2 ; speed of engine flywheel 5 times that of road wheels and in the same direction ; height of centre of gravity of rider with vehicle 0.6 m ; two wheeler speed 90 km/h ; wheel radius 300 mm ; radius of turn 50 m.
7. A pair of locomotive driving wheels with the axle, have a moment of inertia of 180 kg-m2. The diameter of the wheel treads is 1.8 m and the distance between wheel centres is 1.5 m. When the locomotive is travelling on a level track at 95 km/h, defective ballasting causes one wheel to fall 6 mm and to rise again in a total time of 0.1 s. If the displacement of the wheel takes place with simple harmonic motion, find: 1. The gyroscopic couple set up, and 2. The reaction between the wheel and rail due to this couple.
8. A four-wheeled trolley car of total mass 2000 kg running on rails of 1.6 m gauge, rounds a curve of 30 m radius at 54 km/h. The track is banked at 8°. The wheels have an external diameter of 0.7 m and each pair with axle has a mass of 200 kg. The radius of gyration for each pair is 0.3 m. The height of centre of gravity of the car above the wheel base is 1 m. Determine, allowing for centrifugal force and gyroscopic couple actions, the pressure on each rail.
9. A horizontal axle AB, 1 m long, is pivoted at the midpoint C. It carries a weight of 20 N at A and a wheel weighing 50 N at B. The wheel is made to spin at a speed of 600 r.p.m in a clockwise direction looking from its front. Assuming that the weight of the flywheel is uniformly distributed around the rim whose mean diameter is 0.6 m; calculate the angular velocity of precession of the system around the vertical axis through C.

TUTORIAL

2.1 Introduction to ~~Mechanical~~ TUTORIAL Vibrations

Introduction: When an elastic body such as, a spring, a beam and a shaft are displaced from the equilibrium position by the application of external forces, and then released, they execute a vibratory motion, due to the elastic or strain energy present in the body. When the body reaches the equilibrium position, the whole of the elastic or stain energy is converted into kinetic energy due to which the body continues to move in the opposite direction. The entire KE is again converted into strain energy due to which the body again returns to the equilibrium position. Hence the vibratory motion is repeated indefinitely.

Oscillatory motion is any pattern of motion where the system under observation moves back and forth across some equilibrium position, but dose not necessarily have any particular repeating pattern.

Periodic motion is a specific form of oscillatory motion where the motion pattern repeats itself with a uniform time interval. This uniform time interval is referred to as the *period* and has units of seconds per cycle. The reciprocal of the period is referred to as the *frequency* and has units of cycles per second. This unit of combination has been given a special unit symbol and is referred to as *Hertz* (Hz)

Harmonic motion is a specific form of periodic motion where the motion pattern can be describe by either a sine or cosine. This motion is also sometimes referred to as simple harmonic motion. Because the sine or cosine technically used angles in *radians*, the frequency term expressed in the units radians per seconds (*rad/sec*). This is sometimes referred to as the *circular frequency*. The relationship between the frequency in Hz (cps) and the frequency in *rad/sec* is simply the

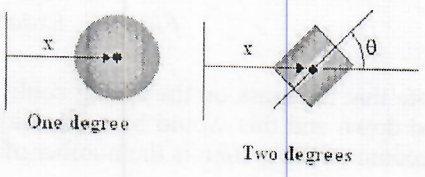
relationship. 2π *rad/sec*.

Natural frequency is the frequency at which an undamped system will tend to oscillate due to initial conditions in the absence of any external excitation. Because there is no damping, the system will oscillate indefinitely.

Damped natural frequency is frequency that a damped system will tend to oscillate due to initial conditions in the absence of any external excitation. Because there is damping in the system, the system response will eventually decay to rest.

Resonance is the condition of having an external excitation at the natural frequency of the system. In general, this is undesirable, potentially producing extremely large system response.

Degrees of freedom: The numbers of degrees of freedom that a body possesses are those necessary to completely define its position and orientation in space. This is useful in several fields of study such as robotics and vibrations. Consider a spherical object that can only be positioned somewhere on the *x* axis.



This needs only one dimension, 'x' to define the position to the centre of gravity so it has one degree of freedom. If the object was a cylinder, we also need an angle 'θ' to define the orientation so it has two degrees of freedom.

Now consider a sphere that can be positioned in Cartesian coordinates anywhere on the z plane. This needs two coordinates 'x' and 'y' to define the position of the centre of gravity so it has two degrees of freedom. A cylinder, however, needs the angle 'θ' also to define its orientation in that plane so it has three degrees of freedom.

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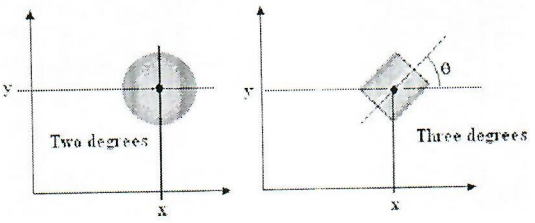
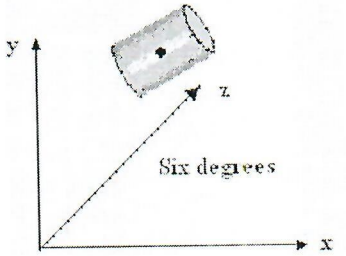


In order to completely specify the position and orientation of a cylinder in Cartesian space, we would need three coordinates x, y and z and three angles relative to each angle. This makes six degrees of freedom. A rigid body in space has $(x,y,z,\theta_x\ \theta_y\ \theta_z)$.
In the study of free vibrations, we will be constrained to one degree of freedom.



Types of Vibrations:

Free or natural vibrations: A free vibration is one that occurs naturally with no energy being added to the vibrating system. The vibration is started by some input of energy but the vibrations die away with time as the energy is dissipated. In each case, when the body is moved away from the rest position, there is a natural force that tries to return it to its rest position. Free or natural vibrations occur in an elastic system when only the internal restoring forces of the system act upon a body. Since these forces are proportional to the displacement of the body from the equilibrium position, the acceleration of the body is also proportional to the displacement and is always directed towards the equilibrium position, so that the body moves with SHM.

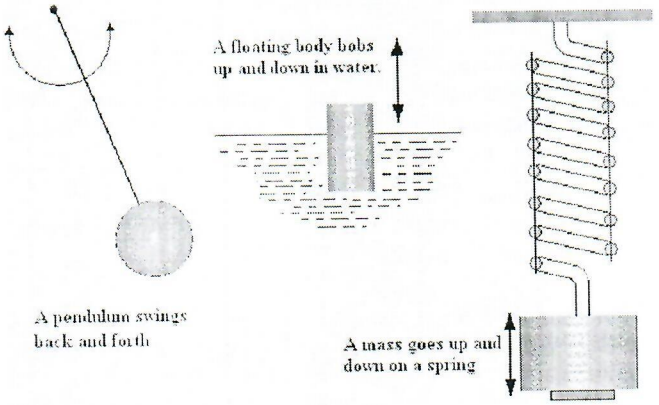


Figure 1. Examples of vibrations with single degree of freedom.

Note that the mass on the spring could be made to swing like a pendulum as well as bouncing up and down and this would be a vibration with two degrees of freedom. The number of degrees of freedom of the system is the number of different modes of vibration which the system may posses.

The motion that all these examples perform is called SIMPLE HARMONIC MOTION (S.H.M.). This motion is characterized by the fact that when the displacement is plotted against time, the resulting graph is basically sinusoidal. Displacement can be linear (e.g. the distance moved by the mass on the spring) or angular (e.g. the angle moved by the simple pendulum). Although we are studying natural vibrations, it will help us understand S.H.M. if we study a forced vibration produced by a mechanism such as the Scotch Yoke.

Simple Harmonic Motion

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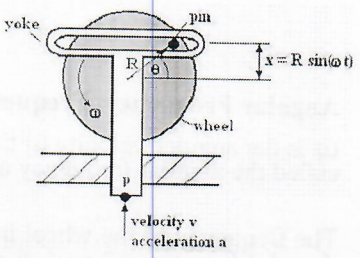
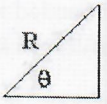


The wheel revolves at ω radians/sec and the pin forces the yoke to move up and down. The pin slides in the slot and Point *P* on the yoke oscillates up and down as it is constrained to move only in the vertical direction by the hole through which it slides. The motion of point *P* is simple harmonic motion. Point *P* moves up and down so at any moment it has a displacement *x*, velocity *v* and an acceleration *a*.

Figure 2

The pin is located at radius *R* from the centre of the wheel. The vertical displacement of the pin from the horizontal centre line at any time is *x*. This is also the displacement of point *P*. The yoke reaches a maximum displacement equal to *R* when the pin is at the top and – *R* when the pin is at the bottom.



$x = R \sin\theta = R \sin(\omega t)$

This is the amplitude of the oscillation. If the wheel rotates at ω radian/sec then after time *t* seconds the angle rotated is $\theta = \omega t$ radians. From the right angle triangle we find $x = R\,Sin(\omega t)$ and the graph of x - θ is shown on *figure 3a*.

Velocity is the rate of change of distance with time. The plot is also shown on figure 3*a*.

$$v = dx/dt = \omega R\,Cos(\omega t).$$

The maximum velocity or amplitude is ωR and this occurs as the pin passes through the horizontal position and is plus on the way up and minus on the way down. This makes sense since the tangential velocity of a point moving in a circle is $v = \omega R$ and at the horizontal point they are the same thing.

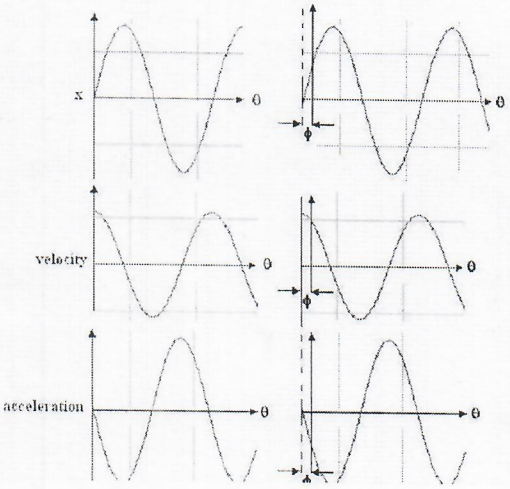
Acceleration is the rate of change of velocity with time. The plot is also shown on *figure 3a*.

$$a = dv/dt = -\omega\,R\,Sin(-\omega\,R)$$

The amplitude is $\omega^2 R$ and this is positive at the bottom and minus at the top (when the yoke is about to change direction)

Since $R\,Sin(\omega R) = x$; then substituting x we find $a = -\omega^2 x$

This is the usual definition of S.H.M. The equation tells us that any body that performs sinusoidal motion must have an acceleration that is directly proportional to the displacement and is always directed to the point of zero displacement. The constant of proportionality is ω^2. Any vibrating body that has a motion that can be described in this way must vibrate with S.H.M. and have the same equations for displacement, velocity and acceleration.



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Angular Frequency, Frequency and Periodic time

ω is the angular velocity of the wheel but in any vibration such as the mass on the spring, it is called the angular frequency as no physical wheel exists.

The frequency of the wheel in revolutions/second is equivalent to the frequency of the vibration. If the wheel rotates at 2 rev/s the time of one revolution is ½ seconds. If the wheel rotates at 5 rev/s the time of one revolution is $^1/_5$ second. If it rotates at f rev/s the time of one revolution is $^1/_f$. This formula is important and gives the periodic time.

Periodic Time T = time needed to perform one cycle.
f is the frequency or number of cycles per second.

It follows that: $T = {}^1/_f$ and $f = {}^1/_T$

Each cycle of an oscillation is equivalent to one rotation of the wheel and 1 revolution is an angle of 2π radians.

When $\theta = 2\pi$ and $t = T$.

It follows that since $\theta = \omega t$; then $2\pi = \omega T$

Rearrange and $\theta = {}^{2\pi}/_T$. Substituting $T = {}^1/_f$, then $\omega = 2\pi f$

Equations of S.H.M.

Consider the three equations derived earlier.

Displacement $x = R\,Sin(\omega t)$.

Velocity $v = dx/dt = \omega R\,Cos(\omega t)$ and Acceleration $a = dv/dt = -\omega^2 R\,Sin(\omega t)$

The plots of x, v and a against angle θ are shown on figure 3a. In the analysis so far made, we measured angle from the horizontal position and arbitrarily decided that the time was zero at this θ point.

Suppose we start the timing after the angle has reached a value of ϕ from this point. In these cases, ϕ is called the phase angle. The resulting equations for displacement, velocity and acceleration are then as follows.

Displacement $x = R\,Sin(\omega t + \phi)$.

Velocity $v = dx/dt = \omega R\,Cos(\omega t + \phi)$.

Acceleration $a = dv/dt = -\omega^2 R\,Sin((\omega t + \phi)$.

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The plots of x, v and a are the same but the vertical axis is displaced by ϕ as shown on figure 3*b*. A point to note on figure 3*a and* 3*b* is that the velocity graph is shifted ¼ cycle (90^0) to the left and the acceleration graph is shifted a further ¼ cycle making it ½ cycle out of phase with x.

Forced vibrations: When the body vibrates under the influence of external force, then the body is said to be under forced vibrations. The external force, applied to the body is a periodic disturbing force created by unbalance. The vibrations have the same frequency as the applied force.
(Note: When the frequency of external force is same as that of the natural vibrations, resonance takes place)

Damped vibrations: When there is a reduction in amplitude over every cycle of vibration, the motion is said to be damped vibration. This is due to the fact that a certain amount of energy possessed by the vibrating system is always dissipated in overcoming frictional resistance to the motion.

Types of free vibrations:

Linear / Longitudinal vibrations: When the disc is displaced vertically downwards by an external force and released as shown in the *figure 4*, all the particles of the rod and disc move parallel to the axis of shaft. The rod is elongated and shortened alternately and thus the tensile and compressive stresses are induced alternately in the rod. The vibration occurs is know as *Linear/Longitudinal vibrations*.

Transverse vibrations: When the rod is displaced in the transverse direction by an external force and released as shown in the *figure 5*, all the particles of rod and disc move approximately perpendicular to the axis of the rod. The shaft is straight and bends alternately inducing bending stresses in the rod. The vibration occurs is know as *transverse vibrations*.

Torsional vibrations: When the rod is twisted about its axis by an external force and released as shown in the *figure 6*, all the particles of the rod and disc move in a circle about the axis of the rod. The rod is subjected to twist and torsional shear stress is induced. The vibration occurs is known as *torsional vibrations*.

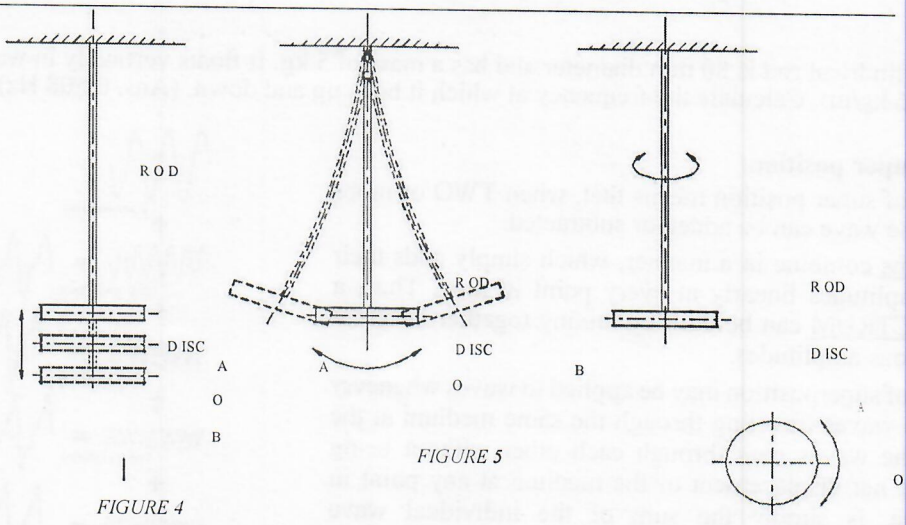


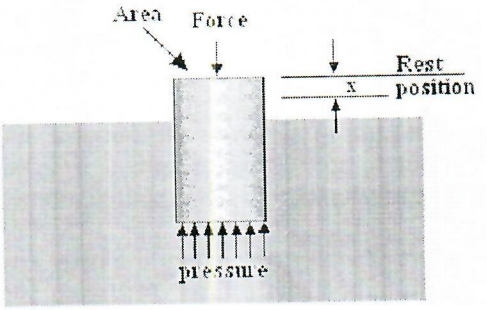
FIGURE 4

FIGURE 5

***Oscillation of a floating body*:**

You may have observed that some bodies floating in water bob up and down. This is another example of simple harmonic motion and the restoring force in this case is **buoyancy**.

Consider a floating body of mass M kg. Initially it is at rest and all the forces acting on it add up to zero. Suppose a force F is applied to the top to push it down a distance x. The applied force F must overcome this buoyancy force and also overcome the inertia of the body.



Buoyancy force:

The pressure on the bottom increases by $p = \rho g x$.

The buoyancy force pushing it up on the bottom is F_b and this increases by $p A$.

Substitute for p and $F_b = \rho g x A$

Inertia force:

The inertia force acting on the body is $F_i = M a$

Balance of forces:

The applied force must be $F = F_i + F_b$ -this must be zero if the vibration is free.

$$0 = Ma + \rho g x A$$

$$a = -\frac{\rho Ag}{M} x$$

This shows that the acceleration is directly proportional to displacement and is always directed towards the rest position so the motion must be simple harmonic and the constant of proportionality must be the angular frequency squared.

$$\omega^2 = \frac{\rho Ag}{M}$$

$$= \sqrt{\frac{\rho Ag}{M}}$$

$$f_n = \omega = \frac{1}{2\pi}\sqrt{\frac{\rho Ag}{M}}$$

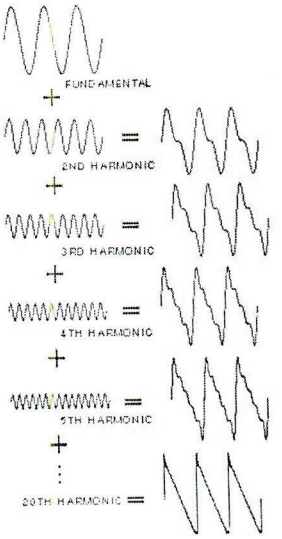
Example: A cylindrical rod is 80 mm diameter and has a mass of 5 kg. It floats vertically in water of density 1036 kg/m3. Calculate the frequency at which it bobs up and down. (Ans. 0.508 Hz)

Principal of super position:

The principal of super position means that, when TWO or more waves meet, the wave can be added or subtracted.

Two waveforms combine in a manner, which simply adds their respective Amplitudes linearly at every point in time. Thus, a complex SPECTRUM can be built by mixing together different Waves of various amplitudes.

The principle of superposition may be applied to waves whenever two (or more) waves traveling through the same medium at the same time. The waves pass through each other without being disturbed. The net displacement of the medium at any point in space or time, is simply the sum of the individual wave dispacements.



General equation of physical systems is:

$m\&x\&+ cx\& + kx = F(t)$ - This equation is for a linear system, the inertia, damping and spring force are linear function $\&x\&$, $x\&$ *and* x respectively. This is not true case of non-linear systems.

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$mx\&\& + \phi(x) + f(x) = F(t)$ - Damping and spring force are not linear functions of $x\&$ *and* x

Mathematically for linear systems, if x_1 is a solution of;

$$m\&x\&+ cx\& + kx = F_1(t)$$

and x_2 is a solution of;

$$m\&x\&+ cx\& + kx = F_2(t)$$

then $(x_1 + x_2)$ is a solution of;

$$m\&x\&+ cx\& + kx = F_1(t) + F_2(t)$$

Law of superposition does not hold good for non-linear systems.

If more than one wave is traveling through the medium: The resulting net wave is given by the *Superposition Principle given by the sum of the individual waveforms"*

2.2 (A) Undamped Free Vibrations

TUTORIAL

Undamped Free Vibrationis:

NATURAL FREQUENCY OF FREE LONGITUDINAL VIBRATION

Equilibrium Method: Consider a body of mass 'm' suspended from a spring of negligible mass as shown in the *figure 4*.

Let m = Mass of the body
W = Weight of the body = mg
K = Stiffness of the spring

δ = Static deflection of the spring due to 'W'

By applying an external force, assume the body is displaced vertically by a distance 'x', from the equilibrium position. On the release of external force, the unbalanced forces and acceleration imparted to the body are related by Newton Second Law of motion.

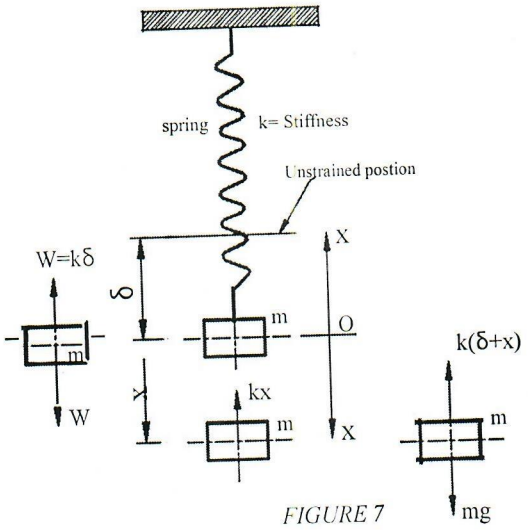

FIGURE 7

$\therefore$ The restoring force = $F = -k \cdot x$

(-ve sign indicates, the restoring force 'k.x' is opposite to the direction of the displacement 'x')

By Newton's Law; $F = m \cdot a$

$$\therefore F = -kx = m\frac{d^2x}{dt^2}$$

$\therefore$ The differential equation of motion, if a body of mass 'm' is acted upon by a restoring force 'k' per unit displacement from the equilibrium position is;

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$$\frac{d^2x}{dt^2} + \frac{k}{m}x = 0 \qquad \text{– This equation represents SHM}$$

$$\frac{d^2x}{dt^2} + \omega^2 x = 0 \qquad \omega_2 = \frac{k}{m} \quad \text{– for SHM}$$

The natural period of vibration is $T = \frac{2\pi}{\omega} = 2\pi\sqrt{\frac{m}{k}}$ *Sec*

The natural frequency of vibration is $f = \frac{1}{2\pi}\sqrt{\frac{k}{m}}$ *cycles* / sec

From the *figure 7*; when the spring is strained by an amount of 'δ' due to the weight $W = mg$

$$\delta k = mg$$

Hence $$\frac{k}{m} = \frac{g}{\delta}$$

$$\therefore f_n = \frac{1}{2\pi}\sqrt{\frac{g}{\delta}} \quad \text{Hz or cps}$$

Energy method: The equation of motion of a conservative system may be established from energy considerations. If a conservative system set in motion, the mechanical energy in the system is partially kinetic and partially potential. The *KE* is due to the velocity of mass and the *PE* is due to the stain energy of the spring by virtue of its deformation.

Since the system is conservative; and no energy is transmitted to the system and from the system in the free vibrations, the sum of *PE* and *KE* is constant. Both velocity of the mass and deformation of spring are cyclic. Thus, therefore be constant interchange of energy between the mass and the spring.

(KE is maximum, when PE is minimum and PE is maximum, when KE is minimum - so system goes through cyclic motion)

$$KE + PE = Constant$$

$$\frac{d}{dt}[KE + PE] = 0 \qquad -(1)$$

We have $KE = \frac{1}{2}mv^2 = \frac{1}{2}m\left(\frac{dx}{dt}\right)^2$ -(2)

Potential energy due to the displacement is equal to the strain energy in the spring, minus the *PE* change in the elevation of the mass.

$$\therefore PE = \int_0^x (Total\ spring\ forece)dx - mg\,dx$$

$$= \int_0^x (mg + kx - mg)dx = \frac{1}{2}kx^2 \qquad -(3)$$

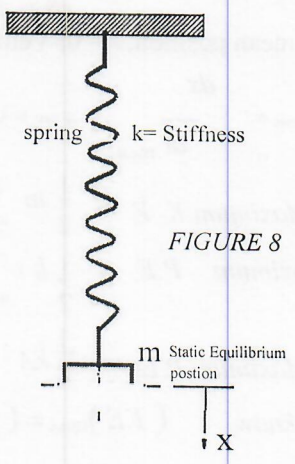

FIGURE 8

Equation (1) becomes

$$PE = \frac{0 + kx}{2}x = \frac{1}{2}kx^2$$

$$\frac{d}{dt}\left[\frac{dx}{dt}\right] + \frac{1}{2}kx^2 = 0$$

$$m\frac{d^2x}{dt^2} + kx\frac{dx}{dt} = 0$$

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Either $m\dfrac{d^2x}{dt} + kx = 0$ *OR* $\dfrac{dx}{dt} = 0$

But velocity can be zero for all values of time. dt

$\therefore m\dfrac{d^2x}{dt^2} + kx = 0$ $\quad [\because \ddot{x} + kx = 0]$

$\Rightarrow \dfrac{d^2x}{dt^2} + \dfrac{k}{m}x = 0$ $\quad$ *– Equation represents SHM*

$\therefore$ *Time period* $= T = 2\pi\sqrt{\dfrac{m}{k}}$ sec $\quad$ *and*

Natural frequency of vibration $= f_n = \dfrac{1}{2\pi}\sqrt{\dfrac{k}{m}}$ *cycles* / sec

(The natural frequency is inherent in the system. It is the function of the system parameters 'k' and 'm' and it is independent of the amplitude of oscillation or the manner in which the system is set into motion.)

Rayleigh's Method: The concept is an extension of energy method. We know, there is a constant interchange of energy between the *PE* of the spring and *KE* of the mass, when the system executes cyclic motion. At the static equilibrium position, the *KE* is maximum and *PE* is zero; similarly when the mass reached maximum displacement (amplitude of oscillation), the *PE* is maximum and *KE* is zero (velocity is zero). But due to conservation of energy total energy remains constant.

Assuming the motion executed by the vibration to be simple harmonic, then;

$$x = A\,Sin\omega t$$

x = displacement of the body from the mean position after time 't' sec
and A = Maximum displacement from the mean position

$$\dot{x} = A\,Sin\omega t$$

At mean position, $t = 0$; Velocity is maximum

$$\therefore v_{max} = \left[\frac{dx}{dt}\right]_{max} = \dot{x}_{max} = \omega A$$

$$\therefore \text{Maximum K. E} = \frac{1}{2}m\omega^2A^2$$

$$\text{Maximum P.E} = \frac{1}{2}kx^2_{max} \qquad x_{max} = A$$

$$\therefore \text{Maximum P.E} = \frac{1}{2}kA^2$$

We know $\quad (KE)_{max} = (PE)_{max}$

$$m\omega^2 = k$$

$$\omega = \sqrt{\frac{k}{m}}$$

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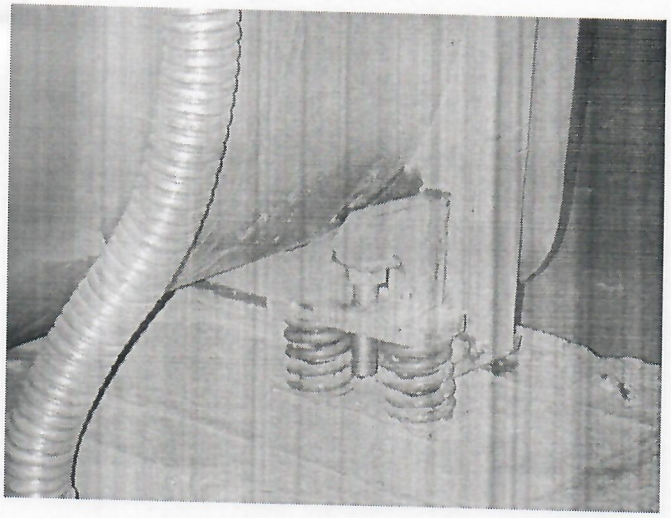
UNIT-III

Single Degree of Freedom Systems – Free Vibration





Course Contents

3.1 Introduction to Mechanical Vibrations

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3.3 Two Degrees of Freedom System

3.4 Multi degree freedom systems and analysis (Free vibrations)

3.5 Vibrations of Continuous Systems (Free Vibrations)

3.7 Rotating unbalance

3.8 Vibration Measurement

2.1 Introduction to Mechanical Vibrations

Introduction: When an elastic body such as, a spring, a beam and a shaft are displaced from the equilibrium position by the application of external forces, and then released, they execute a vibratory motion, due to the elastic or strain energy present in the body. When the body reaches the equilibrium position, the whole of the elastic or stain energy is converted into kinetic energy due to which the body continues to move in the opposite direction. The entire KE is again converted into strain energy due to which the body again returns to the equilibrium position. Hence the vibratory motion is repeated indefinitely.

Oscillatory motion is any pattern of motion where the system under observation moves back and forth across some equilibrium position, but dose not necessarily have any particular repeating pattern.

Periodic motion is a specific form of oscillatory motion where the motion pattern repeats itself with a uniform time interval. This uniform time interval is referred to as the *period* and has units of seconds per cycle. The reciprocal of the period is referred to as the *frequency* and has units of cycles per second. This unit of combination has been given a special unit symbol and is referred to as *Hertz* (Hz)

Harmonic motion is a specific form of periodic motion where the motion pattern can be describe by either a sine or cosine. This motion is also sometimes referred to as simple harmonic motion. Because the sine or cosine technically used angles in *radians*, the frequency term expressed in the units radians per seconds (*rad/sec*). This is sometimes referred to as the *circular frequency*. The relationship between the frequency in Hz (cps) and the frequency in *rad/sec* is simply the

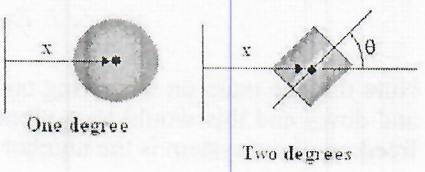
relationship. 2π *rad/sec*.

Natural frequency is the frequency at which an undamped system will tend to oscillate due to initial conditions in the absence of any external excitation. Because there is no damping, the system will oscillate indefinitely.

Damped natural frequency is frequency that a damped system will tend to oscillate due to initial conditions in the absence of any external excitation. Because there is damping in the system, the system response will eventually decay to rest.

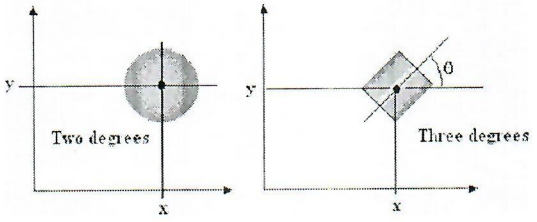
Resonance is the condition of having an external excitation at the natural frequency of the system. In general, this is undesirable, potentially producing extremely large system response.

Degrees of freedom: The numbers of degrees of freedom that a body possesses are those necessary to completely define its position and orientation in space. This is useful in several fields of study such as robotics and vibrations. Consider a spherical object that can only be positioned somewhere on the *x* axis.

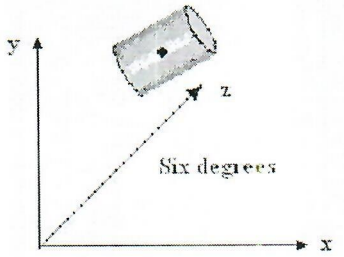


This needs only one dimension, 'x' to define the position to the centre of gravity so it has one degree of freedom. If the object was a cylinder, we also need an angle 'θ' to define the orientation so it has two degrees of freedom.

Now consider a sphere that can be positioned in Cartesian coordinates anywhere on the z plane. This needs two coordinates 'x' and 'y' to define the position of the centre of gravity so it has two degrees of freedom. A cylinder, however, needs the angle 'θ' also to define its orientation in that plane so it has three degrees of freedom.



In order to completely specify the position and orientation of a cylinder in Cartesian space, we would need three coordinates x, y and z and three angles relative to each angle. This makes six degrees of freedom. A rigid body in space has $(x,y,z,\theta_x\ \theta_y\ \theta_z)$.
In the study of free vibrations, we will be constrained to one degree of freedom.



Types of Vibrations:

Free or natural vibrations: A free vibration is one that occurs naturally with no energy being added to the vibrating system. The vibration is started by some input of energy but the vibrations die away with time as the energy is dissipated. In each case, when the body is moved away from the rest position, there is a natural force that tries to return it to its rest position. Free or natural vibrations occur in an elastic system when only the internal restoring forces of the system act upon a body. Since these forces are proportional to the displacement of the body from the equilibrium position, the acceleration of the body is also proportional to the displacement and is always directed towards the equilibrium position, so that the body moves with SHM.

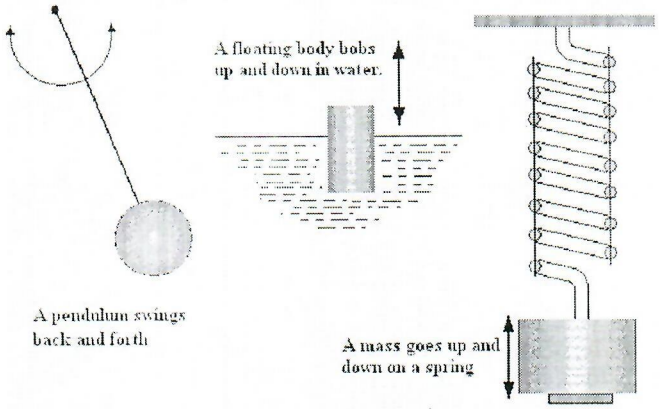
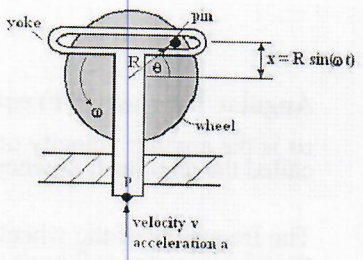


Figure 1. Examples of vibrations with single degree of freedom.

Note that the mass on the spring could be made to swing like a pendulum as well as bouncing up and down and this would be a vibration with two degrees of freedom. The number of degrees of freedom of the system is the number of different modes of vibration which the system may posses.

The motion that all these examples perform is called SIMPLE HARMONIC MOTION (S.H.M.). This motion is characterized by the fact that when the displacement is plotted against time, the resulting graph is basically sinusoidal. Displacement can be linear (e.g. the distance moved by the mass on the spring) or angular (e.g. the angle moved by the simple pendulum). Although we are studying natural vibrations, it will help us understand S.H.M. if we study a forced vibration produced by a mechanism such as the Scotch Yoke.

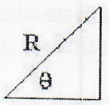
Simple Harmonic Motion



The wheel revolves at ω radians/sec and the pin forces the yoke to move up and down. The pin slides in the slot and Point *P* on the yoke oscillates up and down as it is constrained to move only in the vertical direction by the hole through which it slides. The motion of point *P* is simple harmonic motion. Point *P* moves up and down so at any moment it has a displacement *x*, velocity *v* and an acceleration *a*.

Figure 2

The pin is located at radius *R* from the centre of the wheel. The vertical displacement of the pin from the horizontal centre line at any time is *x*. This is also the displacement of point *P*. The yoke reaches a maximum displacement equal to *R* when the pin is at the top and – *R* when the pin is at the bottom.



$x = R \sin\theta = R\sin(\omega t)$

This is the amplitude of the oscillation. If the wheel rotates at ω radian/sec then after time *t* seconds the angle rotated is $\theta = \omega t$ radians. From the right angle triangle we find $x = R\,Sin(\omega t)$ and the graph of x - θ is shown on *figure 3a*.

Velocity is the rate of change of distance with time. The plot is also shown on figure 3*a*.

$$v = dx/dt = \omega R\,Cos(\omega t).$$

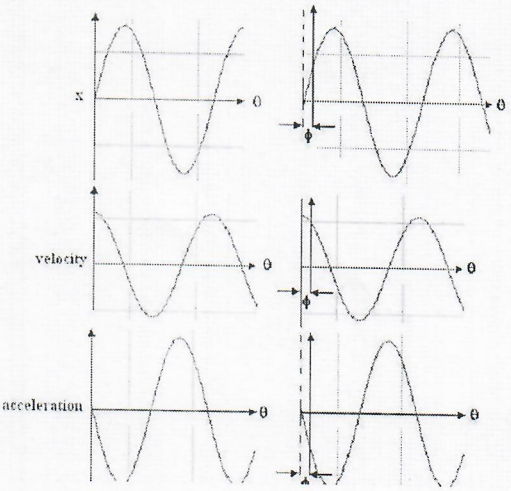
The maximum velocity or amplitude is ωR and this occurs as the pin passes through the horizontal position and is plus on the way up and minus on the way down. This makes sense since the tangential velocity of a point moving in a circle is $v = \omega R$ and at the horizontal point they are the same thing.

Acceleration is the rate of change of velocity with time. The plot is also shown on *figure 3a*. $a = dv/dt = -\omega\,R\,Sin(-\omega\,R)$

The amplitude is $\omega^2 R$ and this is positive at the bottom and minus at the top (when the yoke is about to change direction)

Since $R\,Sin(\omega R) = x$; then substituting x we find $a = -\omega^2 x$

This is the usual definition of S.H.M. The equation tells us that any body that performs sinusoidal motion must have an acceleration that is directly proportional to the displacement and is always directed to the point of zero displacement. The constant of proportionality is ω^2. Any vibrating body that has a motion that can be described in this way must vibrate with S.H.M. and have the same equations for displacement, velocity and acceleration.



Angular Frequency, Frequency and Periodic time

ω is the angular velocity of the wheel but in any vibration such as the mass on the spring, it is called the angular frequency as no physical wheel exists.

The frequency of the wheel in revolutions/second is equivalent to the frequency of the vibration. If the wheel rotates at 2 rev/s the time of one revolution is ½ seconds. If the wheel rotates at 5 rev/s the time of one revolution is $^1/_5$ second. If it rotates at f rev/s the time of one revolution is $^1/_f$. This formula is important and gives the periodic time.

Periodic Time T = time needed to perform one cycle.
f is the frequency or number of cycles per second.

It follows that: $T = {}^1/_f$ and $f = {}^1/_T$

Each cycle of an oscillation is equivalent to one rotation of the wheel and 1 revolution is an angle of 2π radians.

When $\theta = 2\pi$ and $t = T$.

It follows that since $\theta = \omega t$; then $2\pi = \omega T$

Rearrange and $\theta = {}^{2\pi}/_T$. Substituting $T = {}^1/_f$, then $\omega = 2\pi f$

Equations of S.H.M.

Consider the three equations derived earlier.

Displacement $x = R\,Sin(\omega t)$.

Velocity $v = dx/dt = \omega R\,Cos(\omega t)$ and Acceleration $a = dv/dt = -\omega^2 R\,Sin(\omega t)$

The plots of x, v and a against angle θ are shown on figure 3a. In the analysis so far made, we measured angle from the horizontal position and arbitrarily decided that the time was zero at this θ point.

Suppose we start the timing after the angle has reached a value of ϕ from this point. In these cases, ϕ is called the phase angle. The resulting equations for displacement, velocity and acceleration are then as follows.

Displacement $x = R\,Sin(\omega t + \phi)$.

Velocity $v = dx/dt = \omega R\,Cos(\omega t + \phi)$.

Acceleration $a = dv/dt = -\omega^2 R\,Sin((\omega t + \phi)$.

The plots of x, v and a are the same but the vertical axis is displaced by ϕ as shown on figure 3*b*. A point to note on figure 3*a and* 3*b* is that the velocity graph is shifted ¼ cycle (90^0) to the left and the acceleration graph is shifted a further ¼ cycle making it ½ cycle out of phase with x.

Forced vibrations: When the body vibrates under the influence of external force, then the body is said to be under forced vibrations. The external force, applied to the body is a periodic disturbing force created by unbalance. The vibrations have the same frequency as the applied force.

(Note: When the frequency of external force is same as that of the natural vibrations, resonance takes place)

Damped vibrations: When there is a reduction in amplitude over every cycle of vibration, the motion is said to be damped vibration. This is due to the fact that a certain amount of energy possessed by the vibrating system is always dissipated in overcoming frictional resistance to the motion.

Types of free vibrations:

Linear / Longitudinal vibrations: When the disc is displaced vertically downwards by an external force and released as shown in the *figure 4*, all the particles of the rod and disc move parallel to the axis of shaft. The rod is elongated and shortened alternately and thus the tensile and compressive stresses are induced alternately in the rod. The vibration occurs is know as *Linear/Longitudinal vibrations*.

Transverse vibrations: When the rod is displaced in the transverse direction by an external force and released as shown in the *figure 5*, all the particles of rod and disc move approximately perpendicular to the axis of the rod. The shaft is straight and bends alternately inducing bending stresses in the rod. The vibration occurs is know as *transverse vibrations*.

Torsional vibrations: When the rod is twisted about its axis by an external force and released as shown in the *figure 6*, all the particles of the rod and disc move in a circle about the axis of the rod. The rod is subjected to twist and torsional shear stress is induced. The vibration occurs is known as *torsional vibrations.*

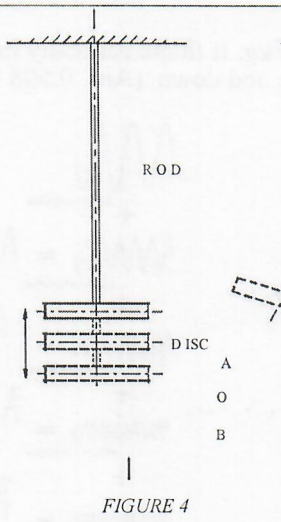
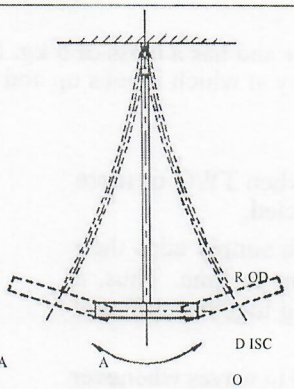


FIGURE 4



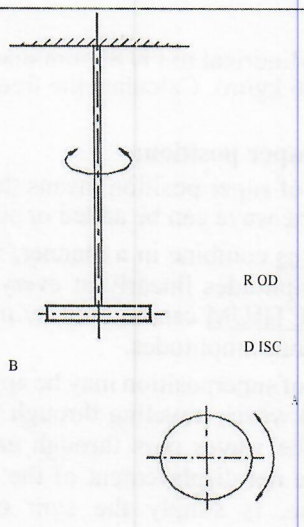
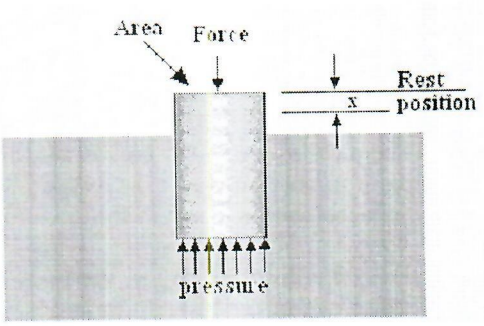


FIGURE 5

Oscillation of a floating body:

You may have observed that some bodies floating in water bob up and down. This is another example of simple harmonic motion and the restoring force in this case is **buoyancy**.

Consider a floating body of mass M kg. Initially it is at rest and all the forces acting on it add up to zero. Suppose a force F is applied to the top to push it down a distance x. The applied force F must overcome this buoyancy force and also overcome the inertia of the body.



Buoyancy force:

The pressure on the bottom increases by $p = \rho g x$.

The buoyancy force pushing it up on the bottom is F_b and this increases by $p A$.

Substitute for p and $F_b = \rho g x A$

Inertia force:

The inertia force acting on the body is $F_i = M a$

Balance of forces:

The applied force must be $F = F_i + F_b$ -this must be zero if the vibration is free.

$$0 = Ma + \rho g x A$$

$$a = -\frac{\rho Ag}{M} x$$

This shows that the acceleration is directly proportional to displacement and is always directed towards the rest position so the motion must be simple harmonic and the constant of proportionality must be the angular frequency squared.

$$\omega^2 = \frac{\rho Ag}{M}$$

$$= \sqrt{\frac{\rho Ag}{M}}$$

$$f_n = \frac{\omega}{2\pi} = \frac{1}{2\pi}\sqrt{\frac{\rho Ag}{M}}$$

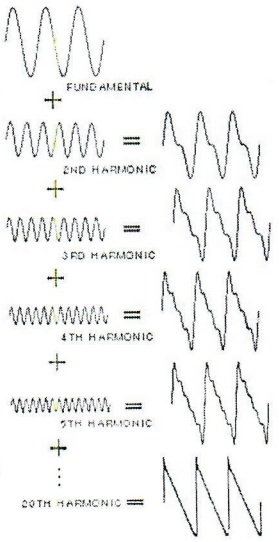
Example: A cylindrical rod is 80 mm diameter and has a mass of 5 kg. It floats vertically in water of density 1036 kg/m3. Calculate the frequency at which it bobs up and down. (Ans. 0.508 Hz)

Principal of super position:

The principal of super position means that, when TWO or more waves meet, the wave can be added or subtracted.

Two waveforms combine in a manner, which simply adds their respective Amplitudes linearly at every point in time. Thus, a complex SPECTRUM can be built by mixing together different Waves of various amplitudes.

The principle of superposition may be applied to waves whenever two (or more) waves traveling through the same medium at the same time. The waves pass through each other without being disturbed. The net displacement of the medium at any point in space or time, is simply the sum of the individual wave dispacements.



General equation of physical systems is:

$m\ddot{x} + c\dot{x} + kx = F(t)$ - This equation is for a linear system, the inertia, damping and spring force are linear function $\ddot{x}$, $\dot{x}$ *and* x respectively. This is not true case of non-linear systems.

$m\ddot{x} + \phi(\dot{x}) + f(x) = F(t)$ - Damping and spring force are not linear functions of $\dot{x}$ *and* x

Mathematically for linear systems, if x_1 is a solution of;

$$m\ddot{x} + c\dot{x} + kx = F_1(t)$$

and x_2 is a solution of;

$$m\ddot{x} + c\dot{x} + kx = F_2(t)$$

then $(x_1 + x_2)$ is a solution of;

$$m\ddot{x} + c\dot{x} + kx = F_1(t) + F_2(t)$$

Law of superposition does not hold good for non-linear systems.

If more than one wave is traveling through the medium: The resulting net wave is given by the *Superposition Principle given by the sum of the individual waveforms"*

2.2 (A) Undamped Free Vibrations

Undamped Free Vibrationis:

NATURAL FREQUENCY OF FREE LONGITUDINAL VIBRATION

Equilibrium Method: Consider a body of mass '*m*' suspended from a spring of negligible mass as shown in the *figure 4*.

Let m = Mass of the body
W = Weight of the body = mg
K = Stiffness of the spring
δ = Static deflection of the spring due to 'W'

By applying an external force, assume the body is displaced vertically by a distance 'x', from the equilibrium position. On the release of external force, the unbalanced forces and acceleration imparted to the body are related by Newton Second Law of motion.

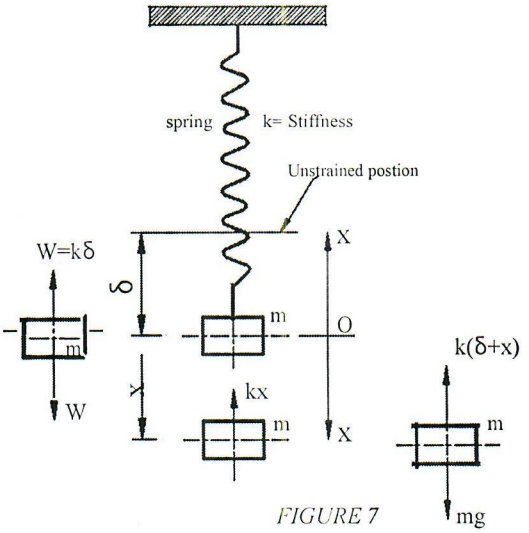


FIGURE 7

$\therefore$ The restoring force = $F = -k \cdot x$
(-ve sign indicates, the restoring force 'k.x' is opposite to the direction of the displacement 'x')

By Newton's Law; $F = m \cdot a$

$$\therefore F = -kx = m \frac{d^2}{dt^2}$$

$\therefore$ The differential equation of motion, if a body of mass 'm' is acted upon by a restoring force 'k' per unit displacement from the equilibrium position is;

$$\frac{d^2x}{dt^2} + \frac{k}{m}x = 0 \qquad \text{– This equation represents SHM}$$

$$\frac{d^2x}{dt^2} + \omega^2 x = 0 \qquad \omega_2 = \frac{k}{m} \quad \text{– for SHM}$$

The natural period of vibration is $T = \frac{2\pi}{\omega} = 2\pi\sqrt{\frac{m}{k}}$ *Sec*

The natural frequency of vibration is $f_n = \frac{1}{2\pi}\sqrt{\frac{k}{m}}$ *cycles / sec*

From the *figure 7*; when the spring is strained by an amount of 'δ' due to the weight $W = mg$

$$\delta k = mg$$

Hence $$\frac{k}{m} = \frac{g}{\delta}$$

$$\therefore f_n = \frac{1}{2\pi}\sqrt{\frac{g}{\delta}} \quad \text{Hz or cps}$$

Energy method: The equation of motion of a conservative system may be established from energy considerations. If a conservative system set in motion, the mechanical energy in the system is partially kinetic and partially potential. The *KE* is due to the velocity of mass and the *PE* is due to the stain energy of the spring by virtue of its deformation.

Since the system is conservative; and no energy is transmitted to the system and from the system in the free vibrations, the sum of *PE* and *KE* is constant. Both velocity of the mass and deformation of spring are cyclic. Thus, therefore be constant interchange of energy between the mass and the spring.

(KE is maximum, when PE is minimum and PE is maximum, when KE is minimum - so system goes through cyclic motion)

$$KE + PE = Constant$$

$$\frac{d}{dt}[KE + PE] = 0 \qquad -(1)$$

We have $KE = \frac{1}{2}mv^2 = \frac{1}{2}m\left(\frac{dx}{dt}\right)^2$ -(2)

Potential energy due to the displacement is equal to the strain energy in the spring, minus the *PE* change in the elevation of the mass.

$$\therefore PE = \int_0^x (Total\ spring\ forece)dx - mg\,dx$$

$$= \int_0^x (mg + kx - mg)dx = \frac{1}{2}kx^2 \qquad -(3)$$

Equation (1) becomes

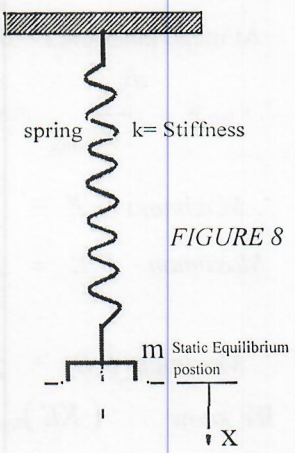


FIGURE 8

$$PE = \frac{0 + kx}{2}x = \frac{1}{2}kx^2$$

$$\frac{d}{dt}\left(\frac{dx}{dt}\right) + \frac{1}{2}kx^2 = 0$$

$$m\frac{d^2x}{dt^2} + kx\frac{dx}{dt} = 0$$

Either $m\dfrac{d^2x}{dt^2} + kx = 0$ OR $\dfrac{dx}{dt} = 0$

But velocity can be zero for all values of time.

$\therefore m\dfrac{d^2x}{dt^2} + kx = 0$ [max && $+ kx = 0$]

$\Rightarrow \dfrac{d^2x}{dt^2} + \dfrac{k}{m}x = 0$ – *Equation represents SHM*

$\therefore$ *Time period* $= T = 2\pi\sqrt{\dfrac{m}{k}}$ sec *and*

Natural frequency of vibration $= f_n = \dfrac{1}{2\pi}\sqrt{\dfrac{k}{.}}$ *cycles* / sec

(The natural frequency is inherent in the system. It is the function of the system parameters 'k' and 'm' and it is independent of the amplitude of oscillation or the manner in which the system is set into motion.)

Rayleigh's Method: The concept is an extension of energy method. We know, there is a constant interchange of energy between the *PE* of the spring and *KE* of the mass, when the system executes cyclic motion. At the static equilibrium position, the *KE* is maximum and *PE* is zero; similarly when the mass reached maximum displacement (amplitude of oscillation), the *PE* is maximum and *KE* is zero (velocity is zero). But due to conservation of energy total energy remains constant.

Assuming the motion executed by the vibration to be simple harmonic, then;

$$x = A\,Sin\omega t$$

x = displacement of the body from the mean position after time 't' sec
and A = Maximum displacement from the mean position

$$x\& = A\,Sin\omega t$$

At mean position, $t = 0$; Velocity is maximum

$\therefore v_{max} = \left(\dfrac{dx}{dt}\right)_{max} = x_{max} = \omega A$

$\therefore$ *Maximum K. E* $= \dfrac{1}{2}m\omega^2 A^2$

Maximum P.E $= \dfrac{1}{2}kx^2_{max}$ $x_{max} = A$

$\therefore$ *Maximum P.E* $= \dfrac{1}{2}kA^2$

We know $(KE)_{max} = (PE)_{max}$

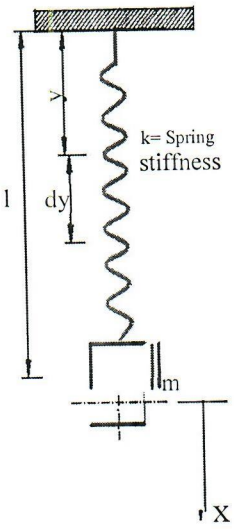
$$m\omega^2 = k$$

$$\omega = k^{1/2}$$

1 Q $\delta k = mg$

$$f_n = \frac{1}{2\pi}\sqrt{\frac{k}{m}} \quad \Rightarrow \quad \frac{k}{m} = \frac{g}{\delta}$$

1. Determine the natural frequency of the spring-mass system, taking mass of the spring into account.



Let l = Length of the spring under equilibrium condition

ρ= Mass/unit length of the spring

m_s = Mass of the spring = $\rho \cdot l$

Consider an elemental length of 'dy' of the spring at a distance 'y' from support.

∴ Mass of the element = ρ dy

At any instant, the mass 'm' is displaced by a

$\therefore PE = \frac{1}{2} k x^2$

K E of the system at this instant,

is the sum of (KE) mass and (KE) spring

$$\frac{1}{2}\dot{x}^2 \int_0^l \frac{1}{2}\left(\frac{\dot{y}}{l}\right)^2 dy$$

$$= \frac{1}{2} m \dot{x}^2 + \frac{1}{2} \rho l \left(\frac{\dot{x}}{l}\right)^2 \int_0^l y^2 dy$$

$$= \frac{1}{2} m \dot{x}^2 + \frac{1}{2} \left(\frac{\dot{x}}{l}\right)^2 \frac{l^3}{3}$$

$$= \frac{1}{2} m \dot{x}^2 + \frac{1}{2} \dot{x}^2 \frac{m_s}{3} = \frac{1}{2}\left(m + \frac{m_s}{3}\right)\dot{x}^2$$

$$\frac{1}{2} k x^2 + \frac{1}{2}\left(m + \frac{m_s}{3}\right)\dot{x}^2 = 0$$

Differenti ating with respect to 't'; $\frac{d}{dt}(PE + KE) = 0$

$$k x \dot{x} + \left(m + \frac{m_s}{3}\right)\ddot{x}\dot{x} = 0 \quad \text{– Differential equation}$$

$$\ddot{x} + \frac{k}{m + \frac{m_s}{3}} x = 0$$

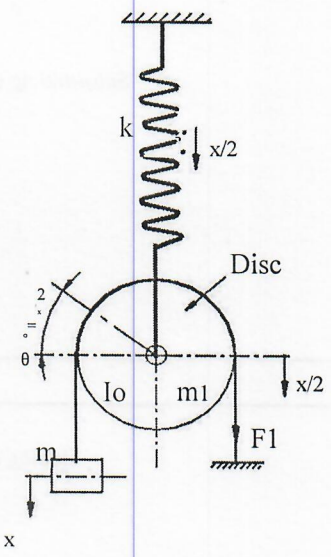
$$\therefore f_n = \frac{1}{2\pi}\sqrt{\frac{k}{m + \frac{m_s}{3}}} \; cps \qquad [\rho l = m_s]$$

OR

$$\therefore f_n = \sqrt{\frac{k}{m + \frac{m_s}{3}}} \; radians / \sec$$

We know that PE + KE = Constant

2. Determine the natural frequency of the system shown in figure by Energy and Newton's method.



When mass 'm' moves down a distance 'x' from its equilibrium position, the center of the disc if mass m_1 moves down by x and rotates though and angle θ.

$$\therefore \frac{x}{r} = 2\theta$$

$$\Rightarrow \dot{\theta} = \frac{\dot{x}}{2r}$$

$$KE = (KE)_{Tr} + (KE)_{rot}$$

$$= \frac{1}{2} m \dot{x}^2 + \frac{1}{2} m_1 \dot{x}^2 + \frac{1}{2} I_o \dot{\theta}^2$$

$$= \frac{1}{2} m \dot{x}^2 + \frac{1}{8} m_1 \dot{x}^2 + \frac{1}{4} m_1 r^2 \frac{\dot{x}^2}{4r^2}$$

$$= \frac{1}{2} m \dot{x}^2 + \frac{3}{16} m_1 \dot{x}^2$$

$$PE = \frac{1}{2} k x^2$$

$$\frac{d}{dt}(KE + PE) = 0$$

$$\Rightarrow m\dot{x}\ddot{x} + \frac{3}{8} m_1 \dot{x}\ddot{x} + \frac{1}{4} k x \dot{x} = 0$$

$$\ddot{x} + \frac{k}{\frac{8}{3}m + m_1} x = 0$$

$$\therefore f_n = \frac{1}{2\pi} \sqrt{\frac{2k}{8m + 3m_1}} \quad cps$$

$$or \quad f_n = \sqrt{\frac{2k}{8m + 3m}} \quad rad/\text{ sec}$$

Newton's Method: Use x, as co-ordinate

$$\text{or mass } m; \quad m\ddot{x} = -F \qquad -1$$

$$\text{for disc } m; \quad m_1 \frac{\ddot{x}}{2} = F + F_1 - \frac{kx}{2} \qquad -2$$

$$I_o \ddot{\theta} = Fr - F_1 r \qquad -3$$

Substituting (1) in (2) and (3) and replace θ *by* $\frac{\ddot{x}}{2r}$

$$m_1 \frac{\ddot{x}}{2} = -m\ddot{x} + F_1 - \frac{kx}{2} \qquad -4$$

$$I_o \frac{\ddot{x}}{2r} = -m\ddot{x}r - F_1 r \qquad -5$$

$$I_o \frac{\ddot{x}}{2r^2} = -m\ddot{x} - F_1 \qquad -6$$

Adding equations (4) and (6)

$$\ddot{x}_1 2 + m_1 \frac{\ddot{x}}{2r^2} = -2m\ddot{x} - \frac{kx}{2} \qquad \{I_o = \frac{m_1}{2} r^2\}$$

$$\ddot{x} + \frac{m_1}{2} + 4m + kx = 0$$

$$f_n = \sqrt{\frac{2k}{3m_1 + 8m}} \quad rad/\sec$$

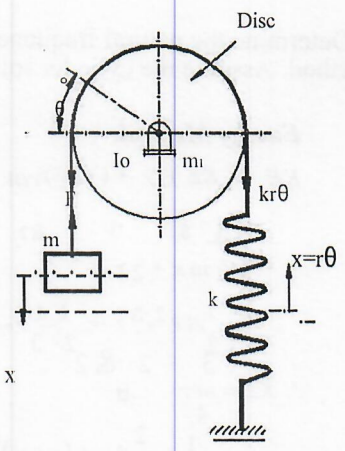
$$f_n = \frac{1}{2\pi}\sqrt{\frac{2k}{3m_1 + 8m}} \quad cps \text{ or } Hz$$

$n \quad 2\pi \quad 3m \qquad n \quad 3m$

3. Determine the natural frequency of the system shown in figure by Energy and Newton's method.

Energy Method: Use θ or x as coordinate

$KE = (KE)Tr + (KE)\,rot$



$$= \frac{1}{2} m\dot{x}^2 + \frac{1}{2} I_o \dot{\theta}^2$$

$$= \frac{1}{2} m\dot{x}^2 + \frac{1}{2}\cdot\frac{1}{2} m_1 r^2 \frac{\dot{x}^2}{r^2}$$

$$\therefore KE = \frac{1}{2} m\dot{x}^2 + \frac{1}{4} m_1 \dot{x}^2$$

$$PE = \frac{1}{2} k x^2$$

$$\frac{d}{dt}(KE + PE) = 0$$

$$\ddot{x}\left(\frac{1}{2} m + \frac{1}{4} m_1\right) + x k = 0$$

$$\left(\frac{1}{2} m + \frac{1}{2} m_1\right)\ddot{x} + x k = 0$$

$$Natural\ frequency = f_n = \sqrt{\frac{2k}{2m + m_1}}\ rad/\sec = \frac{1}{2\pi}\sqrt{\frac{2k}{2m + m_1}}\ cps\ OR\ \frac{1}{2\pi}\sqrt{\frac{kr^2}{I_o + m r^2}}\ cps\ or Hz$$

Newton's Method: Consider motion of the disc with 'θ' as coordinate.

For the mass 'm' :

For the disc : $I_o\ddot{\theta} = -F_r.r - k r\theta$ – (2)

Substitute (1) in (2):

$$I_o\ddot{\theta} = -m r\ddot{x} - k r^2\theta$$

$$I_o\ddot{\theta} = -m r^2\ddot{\theta} - k r^2\theta$$

$$\left(I_o + m r^2\right)\ddot{\theta} + k r^2\theta = 0$$

$$\therefore f_n = \sqrt{\frac{k r^2}{I_o + m r^2}}\ rad/\sec$$

$$= \frac{1}{2\pi}\sqrt{\frac{k r^2}{I_o + m r^2}}\ cps\ or\ Hz$$

$$= \frac{1}{2\pi}\sqrt{\frac{2k}{m + 2m_1}}\ cps \qquad I_o = \frac{1}{2} m_1 r^2$$

4.Determine the natural frequency of the system shown in figure 5 by Energy and Newton's method. Assume the cylinder rolls on the surface without slipping.

Energy Method:

$$KE = (KE)_{Tr} + (KE)_{rot}$$

$$= \frac{1}{2} m \dot{x}^2 + \frac{1}{2} I_o \dot{\theta}^2$$

$$= \frac{1}{2} m r^2 \dot{\theta}^2 + \frac{1}{2} \cdot \frac{1}{2} m r^2 \dot{\theta}^2$$

$$\therefore KE = \frac{3}{4} m r^2 \dot{\theta}^2$$

$$PE = \frac{1}{2} k x^2 = k (r+a)^2 \theta^2$$

$$\frac{d}{dt}(KE + PE) = 0$$

$$\Rightarrow \frac{3}{2} m r^2 \dot{\theta} \ddot{\theta} + 2k(r+a)^2 \theta \dot{\theta} = 0$$

$$3 m r^2 \ddot{\theta} + 4k(r+a)^2 \theta = 0$$

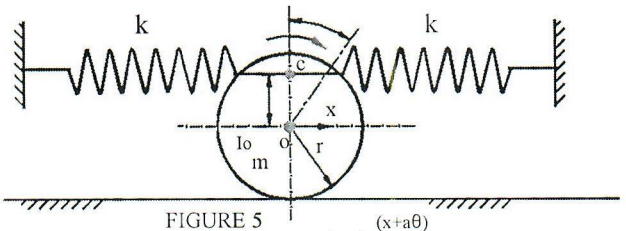


FIGURE 5

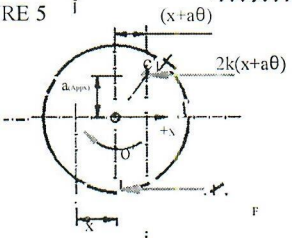


Figure 'a'

$$\text{Natural frequency} = f_n = \sqrt{\frac{4k(r+a)^2}{3mr^2}} \text{ rad/sec} = \frac{1}{2\pi}\sqrt{\frac{4k(r+a)^2}{3mr^2}} \text{ cps or Hz}$$

Newton's Method: Considering combined translation and rotational motion as shown in Figure 'a'.

Hence it must satisfy:

$$m\ddot{x} = \sum \text{Force in } x \text{ direction}$$

$$m\ddot{x} = -F - 2k(x + a\theta)$$

and $$I_o\ddot{\theta} = \sum \text{Torque about } '\theta'$$

$$mr^2\ddot{\theta} = Fr - 2k\left(x + a\theta\right)a \quad -(1)$$

and $$\frac{1}{2}mr^2\ddot{\theta} = Fr - 2k(r+a)a\theta \quad -(2)$$

Multiply equation (1) by $2r$ and (2) by 2. Then add

$$3mr^2\ddot{\theta} = -4kr(r+a)\theta - 4k(r+a)a\theta$$

$$3mr^2\ddot{\theta} + 4k[r(r+a) + (r+a)a]\theta = 0$$

$$3mr^2\ddot{\theta} + 4k(r+a) = 0$$

$$\text{Natural frequency} = f_n = \sqrt{\frac{4k(r+a)^2}{3mr^2}} \text{ rad/sec} = \frac{1}{2\pi}\sqrt{\frac{4k(r+a)^2}{3mr^2}} \text{ cps or Hz}$$

2.2 (B) Damped Free Vibrations
Single DoF

Introduction:

Damping – dissipation of energy.

For a system to vibrate, it requires energy. During vibration of the system, there will be continuous transformation of energy. Energy will be transformed from potential/strain to kinetic and vice versa.

In case of undamped vibrations, there will not be any dissipation of energy and the system vibrates at constant amplitude. Ie, once excited, the system vibrates at constant amplitude for infinite period of time. But this is a purely hypothetical case. But in an actual vibrating system, energy gets dissipated from the system in different forms and hence the amplitude of vibration gradually dies down. Fig.1 shows typical response curves of undamped and damped free vibrations.

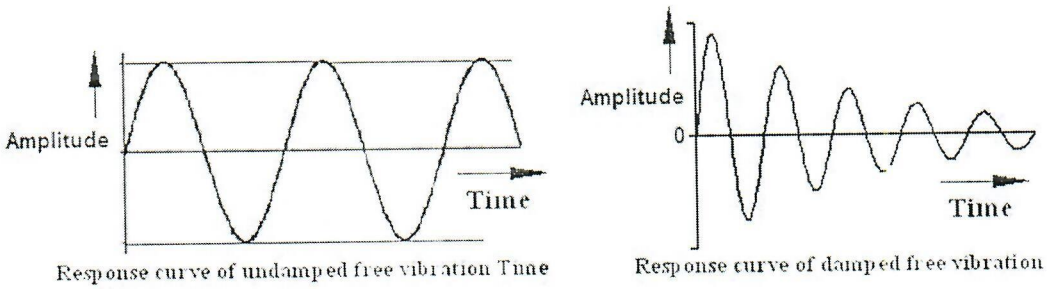


Fig 1

Types o damping:

(i) Viscous damping

In this type of damping, the damping resistance is proportional to the relative velocity between the vibrating system and the surroundings. For this type of damping, the differential equation of the system becomes linear and hence the analysis becomes easier. A schematic representation of viscous damper is shown in Fig.2.

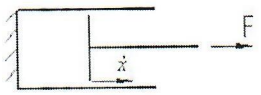


Fig 2

Here, $F \propto \dot{x}$ or $F = c\dot{x}$, where, F is damping resistance, $\dot{x}$ is relative velocity and c is the damping coefficient.

(ii) Dry friction or Coulomb damping

In this type of damping, the damping resistance is independent of rubbing velocity and is practically constant.

(iii) Structural damping

This type of damping is due to the internal friction within the structure of the material, when it is deformed.

Spring-mass-damper system:

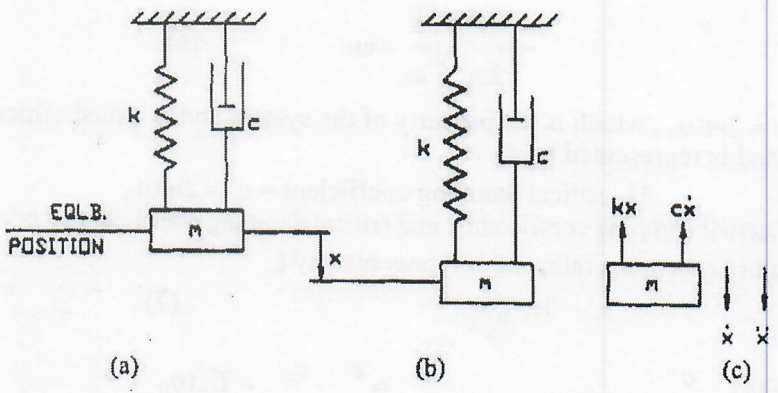


Fig 3

Fig.3 shows the schematic of a simple spring-mass-damper system, where, m is the mass of the system, k is the stiffness of the system and c is the damping coefficient.

If x is the displacement of the system, from Newton's second law of motion, it can be written

$$m\ddot{x} = -c\dot{x} - kx$$

$$\text{Ie } m\ddot{x} + c\dot{x} + kx = 0 \quad (1)$$

This is a linear differential equation of the second order and its solution can be written as

$$x = e^{st} \quad (2)$$

Differentiating (2),

$$\frac{dx}{dt} = \dot{x} = se^{st}$$

$$\frac{d^2x}{dt^2} = \ddot{x} = s^2 e^{st}$$

Substituting in (1),

$$ms^2 e^{st} + cse^{st} + ke^{st} = 0$$

$$\left(ms^2 + cs + k\right)e^{st} = 0$$

Or

$$ms^2 + cs + k = 0 \quad (3)$$

Equation (3) is called the characteristic equation of the system, which is quadratic in s. The two values of s are given by

$$s_{1,2} = -\frac{c}{2m} \pm \sqrt{\left(\frac{c}{2m}\right)^2 - \frac{k}{m}} \quad (4)$$

The general solution for (1) may be written as

$$x = C_1 e^{s_1 t} + C_2 e^{s_2 t} \qquad (5)$$

Where, C_1 and C_2 are arbitrary constants, which can be determined from the initial conditions.

In equation (4). the values of $s_1 = s_2$, when $\frac{c^2}{2m} = \frac{k}{m}$

Or, $$\frac{c}{2m} = \sqrt{\frac{k}{m}} = \omega_n \qquad (6)$$

Or $c = 2m\omega_n$, which is the property of the system and is called critical damping coefficient and is represented by c_c.

Ie, critical damping coefficient = $c_c = 2m\omega_n$

The ratio of actual damping coefficient c and critical damping coefficient c_c is called damping factor or damping ratio and is represented by ζ.

$$\text{Ie, } \zeta = \frac{c}{c_c} \qquad (7)$$

In equation (4), $\frac{c}{2m}$ can be written as $\frac{c}{2m} = \frac{c}{c_c} \cdot \frac{c_c}{2m} = \zeta . \omega_n$

Therefore, $s_{1,2} = -\zeta . \omega_n \pm \sqrt{(\zeta . \omega_n)^2 - \omega^2_n} = \left[-\zeta \pm \sqrt{\zeta^2 - 1} \right] \omega_n \qquad (8)$

The system can be analyzed for three conditions.

(i) $\zeta > 1$, ie, $c > c_c$, which is called over damped system.

(ii) $\zeta = 1$. ie, $c = c_c$, which is called critically damped system.

(iii) $\zeta < 1$, ie, $c < c_c$, which is called under damped system.

Depending upon the value of ζ, value of s in equation (8), will be real and unequal, real and equal and complex conjugate respectively.

(i) Analysis of over-damped system ($\zeta > 1$).

In this case, values of s are real and are given by

$$s_1 = \left[-\zeta + \sqrt{\zeta^2 - 1} \right] \omega_n \qquad \text{and} \qquad s_2 = \left[-\zeta - \sqrt{\zeta^2 - 1} \right] \omega_n$$

Then, the solution of the differential equation becomes

$$x = C_1 e^{-\zeta + \sqrt{\zeta^2 - 1}\ \omega_n t} + C_2 e^{-\zeta - \sqrt{\zeta^2 - 1}\ \omega_n t} \qquad (9)$$

This is the final solution for an over damped system and the constants C_1 and C_2 are obtained by applying initial conditions. Typical response curve of an over damped system is shown in fig.4. The amplitude decreases exponentially with time and becomes zero at t $= \infty$.

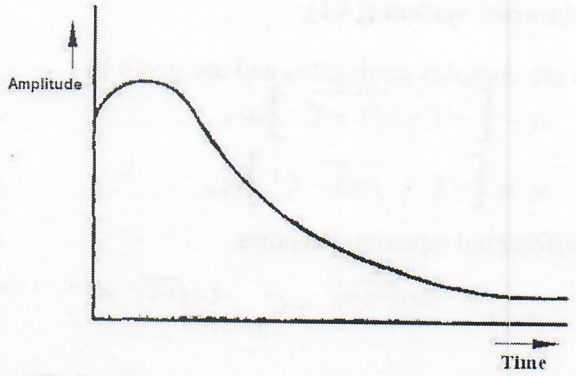


Fig 4 Typical response curve of an over damped system

(ii) Analysis of critically damped system ($\zeta=1$).

In this case, based on equation (8), $s_1 = s_2 = -\omega_n$

The solution of the differential equation becomes

$$x = C e^{s_1 t} + C t e^{s_2 t}$$

Ie, $x = C_1 e^{-\omega_n t} + C_2 t e^{-\omega_n t}$

Or, $x = (C_1 + C_2 t) e^{-\omega_n t}$ (10)

This is the final solution for the critically damped system and the constants C_1 and C_2 are obtained by applying initial conditions. Typical response curve of the critically damped system is shown in fig.5. In this case, the amplitude decreases at much faster rate compared to over damped system.

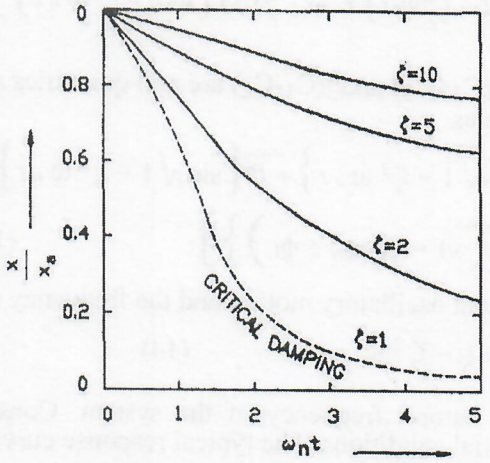


Fig 5 **Displacement-time plots of over-damped and critically damped systems with zero starting velocity**

(iii) Analysis of under damped system ($\zeta<1$).

In this case, the roots are complex conjugates and are given by

$$s_1 = \left[-\zeta + j\sqrt{1-\zeta^2}\right]\omega_n$$

$$s_2 = \left[-\zeta - j\sqrt{1-\zeta^2}\right]\omega_n$$

The solution of the differential equation becomes

$$x = C_1 e^{-\zeta+\sqrt{1-\zeta^2}\omega_n t} + C_2 e^{-\zeta-j\sqrt{1-\zeta^2}\omega_n t}$$

This equation can be rewritten as

$$x = e^{-\zeta\omega_n t}\left[C_1 e^{j\sqrt{1-\zeta^2}\omega_n t} + C_2 e^{-j\sqrt{1-\zeta^2}\omega_n t}\right] \qquad (11)$$

Using the relationships

$$e^{i\theta} = \cos\theta + i\sin\theta$$

$$e^{-i\theta} = \cos\theta - i\sin\theta$$

Equation (11) can be written as

$$x = e^{-\zeta\omega_n t}\left[C_1\left\{\cos\sqrt{1-\zeta^2}\,\omega_n t + j\sin\sqrt{1-\zeta^2}\,\omega_n t\right\} + C_2\left\{\cos\sqrt{1-\zeta^2}\,\omega_n t - j\sin\sqrt{1-\zeta^2}\,\omega_n t\right\}\right]$$

$$\text{Or } x = e^{-\zeta\omega_n t}\left[(C_1+C_2)\left\{\cos\sqrt{1-\zeta^2}\,\omega_n t\right\} + j(C_1-C_2)\left\{\sin\sqrt{1-\zeta^2}\,\omega_n t\right\}\right] \qquad (12)$$

In equation (12), constants (C_1+C_2) and $j(C_1-C_2)$ are real quantities and hence, the equation can also be written as

$$x = e^{-\zeta\omega_n t}\left[A\left\{\cos\sqrt{1-\zeta^2}\,\omega_n t\right\} + B\left\{\sin\sqrt{1-\zeta^2}\,\omega_n t\right\}\right]$$

$$\text{Or, } \quad x = A_1 e^{-\zeta\omega_n t}\left[\left\{\sin\left(\sqrt{1-\zeta^2}\,\omega_n t + \phi_1\right)\right\}\right] \qquad (13)$$

The above equations represent oscillatory motion and the frequency of this motion is represented by $\omega_d = \sqrt{1-\zeta^2}\,\omega_n$ (14)

Where, ω_d is the damped natural frequency of the system. Constants A_1 and Φ_1 are determined by applying initial conditions. The typical response curve of an under damped system is shown in Fig.6.

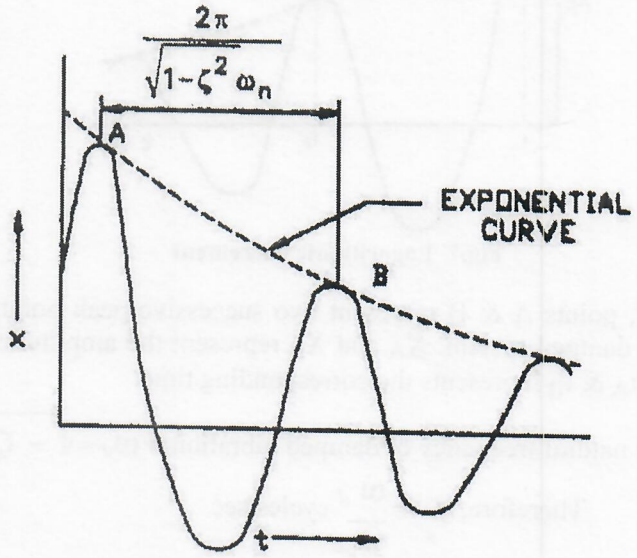


Fig 6 Typical response curve of an under damped system

Applying initial conditions,

$x = X$ at $t = 0$; and $\dot{x}$ at $t = 0$, and finding constants A_1 and Φ_1, equation (13) becomes

$$x = \frac{X_o}{\sqrt{1-\zeta^2}} e^{-\zeta\omega_n t} \sin\left(\sqrt{1-\zeta^2}\,\omega_n t + \tan^{-1}\frac{\sqrt{1-\zeta^2}}{\zeta}\right) \qquad (15)$$

The term $\frac{X_o}{\sqrt{1-\zeta^2}} e^{-\zeta\omega_n t}$ represents the amplitude of vibration, which is observed to decay exponentially with time.

LOGARITHMIC DECREMENT

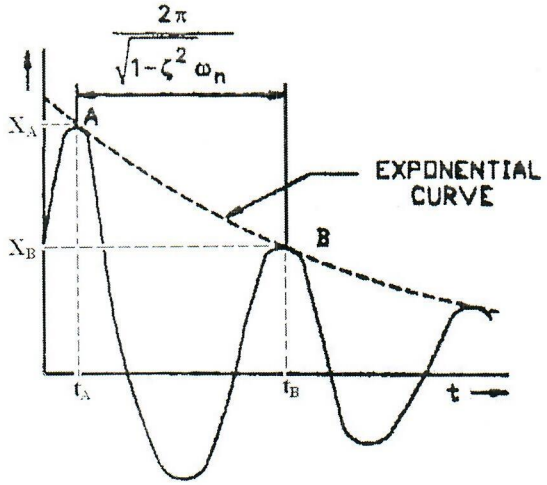


Fig.7 Logarithmic decrement

Referring to Fig.7, points A & B represent two successive peak points on the response curve of an under damped system. X_A and X_B represent the amplitude corresponding to points A & B and t_A & t_B represents the corresponding time.

We know that the natural frequency of damped vibration = $\omega_d = \sqrt{1-\zeta^2}\,\omega_n$ rad/sec.

$$\text{Therefore, } f_d = \frac{\omega_d}{2\pi} \text{ cycles/sec}$$

$$\text{Hence, time period of oscillation} = t_B - t_A = \frac{1}{f_d} = \frac{2\pi}{\omega_d} = \frac{2\pi}{\sqrt{1-\zeta^2}\,\omega_n} \text{ sec} \qquad (16)$$

From equation (15), amplitude of vibration

$$X_A = \frac{X_o}{\sqrt{1-\zeta^2}} e^{-\zeta\omega_n t_A}$$

$$X_B = \frac{X_o}{\sqrt{1-\zeta^2}} e^{-\zeta\omega_n t_B}$$

$$\text{Or, } \frac{X_A}{X_B} = e^{-\zeta\omega_n (t_A - t_B)} = e^{\zeta\omega_n (t_B - t_A)}$$

$$\text{Using eqn. (16), } \frac{X_A}{X_B} = e^{\frac{2\pi\zeta}{\sqrt{1-\zeta^2}}}$$

$$\text{Or, } \log_e \frac{X_A}{X_B} = \frac{2\pi\zeta}{\sqrt{1-\zeta^2}}$$

This is called logarithmic decrement. It is defined as the logarithmic value of the ratio of two successive amplitudes of an under damped oscillation. It is normally denoted by δ.

$$\text{Therefore, } \delta = \log_e \frac{X_A}{X_B} = \frac{2\pi\zeta}{\sqrt{1-\zeta^2}} \qquad (17)$$

This indicates that the ratio of any two successive amplitudes of an under damped system is constant and is a function of damping ratio of the system.

For small values of ζ, $\delta \approx 2\pi\zeta$

If X_0 represents the amplitude at a particular peak and X_n represents the amplitude after 'n' cycles, then, logarithmic decrement $= \delta = \log_e \frac{X_0}{X_1} = \log_e \frac{X_1}{X_2} = \ldots\ldots = \log_e \frac{X_{n-1}}{X_n}$

Adding all the terms, $n\delta = \log_e \frac{X_0}{X_1} \cdot \frac{X_1}{X_2} \ldots\ldots \frac{X_{n-1}}{X_n}$

$$\text{Or, } \delta = \frac{1}{n} \log_e \frac{X_0}{X_n} \qquad (18)$$

Solved problems

1) The mass of a spring-mass-dashpot system is given an initial velocity $5\omega_n$, where ω_n is the undamped natural frequency of the system. Find the equation of motion for the system, when (i) $\zeta = 2.0$, (ii) $\zeta = 1.0$, (i) $\zeta = 0.2$.

Solution:

Case (i) For $\zeta = 2.0$ – Over damped system

For over damped system, the response equation is given by

$$x = C_1 e^{-\zeta + \sqrt{\zeta^2 - 1}\,\omega_n t} + C_2 e^{-\zeta - \sqrt{\zeta^2 - 1}\,\omega_n t}$$

Substituting $\zeta = 2.0$, $x = C_1 e^{[-0.27]\omega_n t} + C_2 e^{[-3.73]\omega_n t}$ (a)

Differentiating, $\dot{x} = -0.27\omega_n C_1 e^{-0.27\omega_n t} - 3.73\omega_n C_2 e^{-3.73\omega_n t}$ (b)

Substituting the initial conditions

$x = 0$ at $t = 0$; and $\dot{x} = 5\omega_n$ at $t = 0$ in (a) & (b),

$0 = C_1 + C_2$ (c)

$5\omega_n = -0.27\,\omega_n C_1 - 3.73\,\omega_n C_2$ (d)

Solving (c) & (d), $C_1 = 1.44$ and $C_2 = -1.44$.

Therefore, the response equation becomes

$$x = \left(e^{[-0.27]\omega_n t} - e^{[-3.73]\omega_n t}\right)$$

Case (ii) For $\zeta = 1.0$ – Critically damped system

For critically damped system, the response equation is given by

$$x = (C_1 + C_2 t)e^{-\omega_n t} \quad \text{(f)}$$

Differentiating, $\dot{x} = -(C_1 + C_2 t)\omega_n e^{-\omega_n t} + C_2 e^{-\omega_n t}$ (g)

Substituting the initial conditions

$x = 0$ at $t = 0$; and $\dot{x} = 5\omega_n$ at $t = 0$ in (f) & (g),

$C_1 = 0$ and $C_2 = 5\omega_n$

Substituting in (f), the response equation becomes

$$x = (5\omega_n t)e^{-\omega_n t} \quad \text{(h)}$$

Case (iii) For $\zeta = 0.2$ – under damped system

For under damped system, the response equation is given by

$$x = A_1 e^{-\zeta\omega_n t}\left[\left\{\sin\sqrt{1 - \zeta^2}\,\omega_n t + \phi_1\right\}\right]$$

Substituting $\zeta = 0.2$, $x = A_1 e^{-0.2\omega_n t}\left[\{\sin(0.98\omega_n t + \phi_1)\}\right]$ (p)

Differentiating, $\dot{x} = 0.2\omega_n A_1 e^{-0.2\omega_n t}[\{\sin(0.98\omega_n t+\phi_1)\}]+0.98\omega_n A_1 e^{-0.2\omega_n t}\cos(0.98\omega_n t+\phi_1)$ (q)

Substituting the initial conditions

&

$x = 0$ at $t = 0$; and $\dot{x} = 5\omega_n$ at $t = 0$ in (p) & (q),

$A_1\sin\Phi_1 = 0$ and $A_1\cos\Phi_1 = 5.1$

Solving, $A_1 = 5.1$ and $\Phi_1 = 0$

Substituting in (p), the response equation becomes

$$x = 5.1e^{-0.2\omega_n t}[\{\sin(0.98\omega_n t)\}] \quad (r)$$

2) A mass of 20kg is supported on two isolators as shown in fig.Q.2. Determine the undamped and damped natural frequencies of the system, neglecting the mass of the isolators.

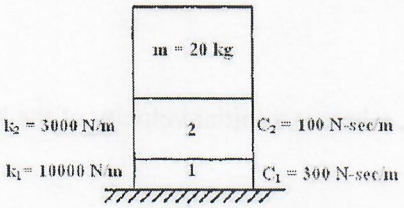
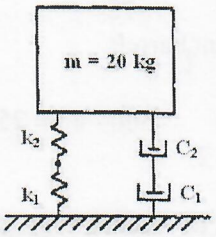
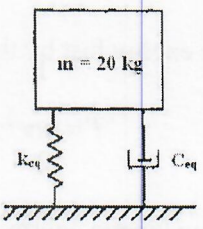


Fig Q (2)





Solution:

Equivalent stiffness and equivalent damping coefficient are calculated as

$$\frac{1}{k_{eq}} = \frac{1}{k_1} + \frac{1}{k_2} = \frac{1}{10000} + \frac{1}{3000} = \frac{13}{30000}$$

$$\frac{1}{C_{eq}} = \frac{1}{C_1} + \frac{1}{C_2} = \frac{1}{300} + \frac{1}{100} = \frac{4}{300}$$

Undamped natural frequency = $\omega_n = \sqrt{\frac{k_{eq}}{m}} = \sqrt{\frac{30000/13}{20}} = 10.74 rad/\sec$

$$f_n = \frac{10.74}{2\pi} = 1.71 cps$$

Damped natural frequency = $\omega_d = \sqrt{1-\zeta^2}\,\omega_n$

$$\zeta = \frac{C_{eq}}{2\sqrt{k_{eq} m}} = \frac{300/4}{2\cdot\sqrt{30000/13 \cdot 20}} = 0.1745$$

$$\therefore \omega_d = \sqrt{1 - 0.1745^2} \cdot 10.74 = 10.57 rad/\sec$$

Or, $$f_d = \frac{10.57}{2 \cdot \pi} = 1.68 cps$$

3) A gun barrel of mass 500kg has a recoil spring of stiffness 3,00,000 N/m. If the barrel recoils 1.2 meters on firing, determine, (a) initial velocity of the barrel

(b) critical damping coefficient of the dashpot which is engaged at the end of the recoil stroke

(c) time required for the barrel to return to a position 50mm from the initial position.

Solution:

(a) Strain energy stored in the spring at the end of recoil:

$$P = \frac{1}{2} kx^2 = \frac{1}{2} \cdot 300000 \cdot 1.2^2 = 216000 N - m$$

Kinetic energy lost by the gun barrel:

$$T = \frac{1}{2} mv^2 = \frac{1}{2} \cdot 500 \cdot v^2 = 250 v^2, \text{ where v = initial velocity of the barrel}$$

Equating kinetic energy lost to strain energy gained, ie T = P, $250 v^2 = 216000$

v = 29.39m/s

(b) Critical damping coefficient = $C_c = 2\sqrt{km} = 2\sqrt{300000 \cdot 500} = 24495 N - \sec/m$

(c) Time for recoiling of the gun (undamped motion):

$$\text{Undamped natural frequency} = \omega_n = \sqrt{\frac{k}{m}} = \sqrt{\frac{300000}{500}} = 24.49 r/s$$

$$\text{Time period} = \tau = \frac{2\pi}{\omega_n} = \frac{2\pi}{24.29} = 0.259 \text{ sec}$$

$$\text{Time of recoil} = \frac{\tau}{4} = \frac{0.259}{4} = 0.065 \text{ sec}$$

Time taken during return stroke:

Response equation for critically damped system = $x = (C_1 + C_2 t) e^{-\omega_n t}$

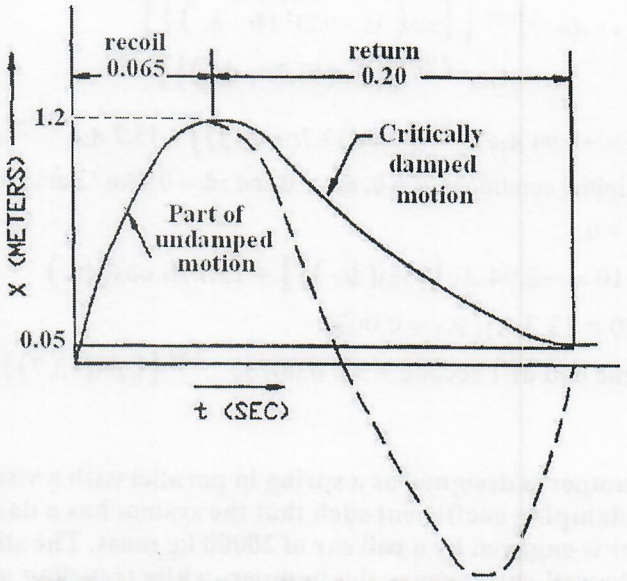
Differentiating, $\dot{x} = C_2 e^{-\omega_n t} - (C_1 + C_2 t)\omega_n e^{-\omega_n t}$

Applying initial conditions, x = 1.2, at t = 0 and $\dot{x} = 0$ at t = 0, $C_1 = 1.2$, & $C_2 = 29.39$

Therefore, the response equation = $x = (1.2 + 29.39t) e^{-24.49t}$ When x = 0.05m, by trial and error, t = 0.20 sec

Therefore, total time taken = time for recoil + time for return = 0.065 + 0.20 = 0.265 sec

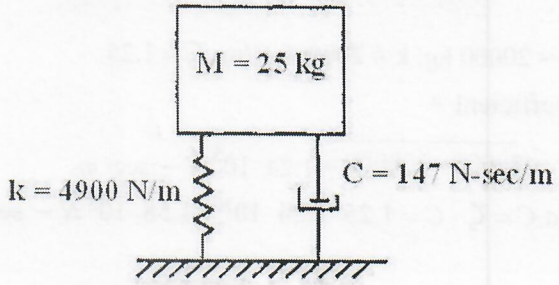
The displacement – time plot is shown in the following figure.



Displacement – time plot of recoil and return stroke

4) A 25 kg mass is resting on a spring of 4900 N/m and dashpot of 147 N-se/m in parallel. If a velocity of 0.10 m/sec is applied to the mass at the rest position, what will be its displacement from the equilibrium position at the end of first second?

Solution:



The above figure shows the arrangement of the system.

Critical damping coefficient = $c_c = 2m\omega_n$

Where $\omega_n = \sqrt{\frac{k}{m}} = \sqrt{\frac{4900}{25}} = 14r/s$

Therefore, $c_c = 2 \cdot 25 \cdot 14 = 700\ N - \text{sec}/m$

Since C< C_c, the system is under damped and $\zeta = \frac{c}{c_c} = \frac{147}{700} = 0.21$

Hence, the response equation is $x = A_1 e^{-\zeta\omega_n t}\left[\left\{\sin\left(\sqrt{1-\zeta^2}\,\omega_n t + \phi_1\right)\right\}\right]$

Substituting ζ and ω_n, $x = A_1 e^{-0.21\cdot 14t}\left[\left\{\sin\left(\sqrt{1-0.21^2}\,14t + \phi_1\right)\right\}\right]$

$$x = A_1 e^{-2.94t}\left[\left\{\sin(13.7t + \phi_1)\right\}\right]$$

Differentiating, $\dot{x} = -2.94\,A_1 e^{-2.94t}\left[\left\{\sin(13.7t + \phi_1)\right\}\right] + 13.7\,A_1 e^{-2.94t}\cos(13.7t + \phi_1)$ Applying the initial conditions, x = 0, at t = 0 and $\dot{x} = 0.10 m/s$ at t = 0

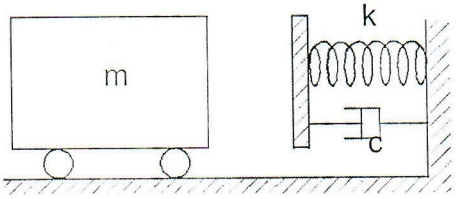
$$\Phi_1 = 0$$

$$0.10 = -2.94\,A_1\left[\left\{\sin(\phi_1)\right\}\right] + 13.7\,A_1\cos(\phi_1)$$

Since, $\Phi_1 = 0$, $0.10 = 13.7\ A_1$; $A_1 = 0.0073$

Displacement at the end of 1 second $= x = 0.0073e^{-2.94}\left[\left\{\sin(13.7)\right\}\right] = 3.5\cdot 10^{-4}\,m$

5) A rail road bumper is designed as a spring in parallel with a viscous damper. What is the bumper's damping coefficient such that the system has a damping ratio of 1.25, when the bumper is engaged by a rail car of 20000 kg mass. The stiffness of the spring is 2E5 N/m. If the rail car engages the bumper, while traveling at a speed of 20m/s, what is the maximum deflection of the bumper?



Solution: Data = m = 20000 kg; k = 200000 N/m; $\zeta = 1.25$

Critical damping coefficient =

$c_c = 2\cdot\sqrt{m\cdot k} = 2\cdot\sqrt{20000\cdot 200000} = 1.24\cdot 10^5\ N - \text{sec}/m$

Damping coefficient $C = \zeta\cdot C_c = 1.25\cdot 1.24\cdot 10^5 = 1.58\cdot 10^5\ N - \text{sec}/m$

Undamped natural frequency $= \omega_n = \sqrt{\frac{k}{m}} = \sqrt{\frac{200000}{20000}} = 3.16 r/s$

Since $\zeta = 1.25$, the system is over damped.

For over damped system, the response equation is given by

$$x = C_1 e^{-\zeta\omega_n t\left(\sqrt{\zeta^2-1}\right)\omega_n t} + C_2 e^{-\zeta\omega_n t\left(\sqrt{\zeta^2-1}\right)\omega_n t}$$

Substituting $\zeta = 1.25$, $x = C_1 e^{[-0.5]\omega_n t} + C_2 e^{[-2.0]\omega_n t}$ (a)

at t = 0 in (a) & (b),

$$20 = -0.5\,\omega_n C_1 - 2.0\,\omega_n C_2 \quad \text{(d)}$$

Solving (c) & (d), $C_1 = 4.21$ and $C_2 = -4.21$

Therefore, the response equation becomes

$$x = 4.21\left(e^{[-1.58t]} - e^{[-6.32t]}\right)m \quad \text{(e)}$$

The time at which, maximum deflection occurs is obtained by equating velocity equation to zero.

&

Ie, $x = -0.5\omega_n C_1 e^{-0.5\omega_n t} - 2.0\omega_n C_2 e^{-2.0\omega_n t} = 0$

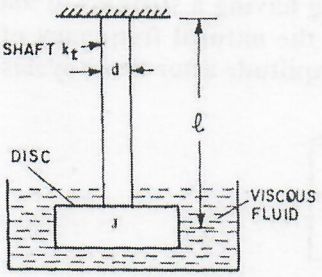
Ie, $-6.65e^{-1.58t} + 26.61e^{-6.32t} = 0$

Solving the above equation, t = 0.292 secs.

Therefore, maximum deflection at t = 0.292secs,

Substituting in (e), $x = 4.21\left(e^{[-1.58\cdot 0.292]} - e^{[-6.32\cdot 0.292]}\right)m$, = 1.99m.

6) A disc of a torsional pendulum has a moment of inertia of 6E-2 kg-m^2 and is immersed in a viscous fluid. The shaft attached to it is 0.4m long and 0.1m in diameter. When the pendulum is oscillating, the observed amplitudes on the same side of the mean position for successive cycles are 9^0, 6^0 and 4^0. Determine (i) logarithmic decrement (ii) damping torque per unit velocity and (iii) the periodic time of vibration. Assume G = 4.4E10 N/m^2, for the shaft material.



Shaft dia. = d = 0.1m

Shaft length = l = 0.4m

Moment of inertia of disc = J = 0.06 kg-m^2.

Modulus of rigidity = G = 4.4E10 N/m^2

Solution:

The above figure shows the arrangement of the system.

(i) Logarithmic decrement = $\delta = \log_e \frac{9}{6} = \log_e \frac{9}{64} = 0.405$

(ii) The damping torque per unit velocity = damping coefficient of the system 'C'.

We know that logarithmic decrement $= \delta = \frac{2\pi\zeta}{\sqrt{1-\zeta^2}}$, rearranging which, we get

$$\text{Damping factor } \zeta = \frac{\delta}{\sqrt{4\pi^2+\delta^2}} = \frac{0.405}{\sqrt{4\pi^2+0.405^2}} = 0.0645$$

$$\text{Also, } \zeta = \frac{C}{C_C}, \text{ where, critical damping coefficient} = C_C = 2\sqrt{k_t J}$$

$$\text{Torsional stiffness} = k_t = \frac{GI_p}{l} = \frac{G}{l}\cdot\frac{\pi d^4}{32} = \frac{4.4\cdot10^{10}}{0.4}\cdot\frac{\pi\cdot0.1^4}{32} = 1.08\cdot10^6\ N-m/rad$$

$$\text{Critical damping coefficient} = C_C = 2\sqrt{k_t J} = 2\sqrt{1.08\cdot10^6\cdot0.06} = 509N-m/rad$$

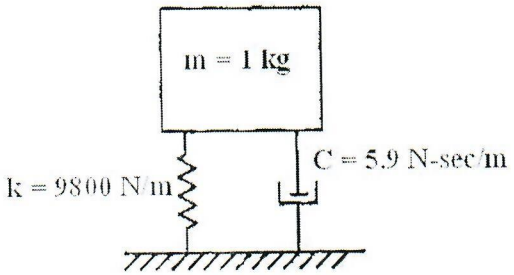
$$\text{Damping coefficient of the system} = C = C_C\cdot\zeta = 509\cdot0.0645 = 32.8N-m/rad$$

(iii) Periodic time of vibration $= \tau = \frac{1}{f_d} = \frac{2\pi}{\omega_d} = \frac{2\pi}{\omega_n\sqrt{1-\zeta^2}}$

$$\text{Where, undamped natural frequency} = \omega_n = \sqrt{\frac{k_t}{J}} = \sqrt{\frac{1.08\cdot10^6}{0.06}} = 4242.6 rad/\sec$$

$$\text{Therefore, } \tau = \frac{2\pi}{4242.6\cdot\sqrt{1-0.0645^2}} = 0.00148 \sec$$

7) A mass of 1 kg is to be supported on a spring having a stiffness of 9800 N/m. The damping coefficient is 5.9 N-sec/m. Determine the natural frequency of the system. Find also the logarithmic decrement and the amplitude after three cycles if the initial displacement is 0.003m.



Solution:

$$\text{Undamped natural frequency} = \omega_n = \sqrt{\frac{k}{m}} = \sqrt{\frac{9800}{1}} = 99r/s$$

$$\text{Damped natural frequency} = \omega_d = \sqrt{1-\zeta^2}\,\omega_n$$

$$\text{Critical damping coefficient} = c_c = 2\cdot m\cdot\omega_n = 2\cdot1\cdot99 = 198N-\sec/m$$

$$\text{Damping factor} = \zeta = \frac{c}{c_c} = \frac{5.9}{198} = 0.03$$

$$\text{Hence damped natural frequency} = \omega_d = \sqrt{1-\zeta^2}\,\omega_n = \sqrt{1-0.013^2}\cdot99 = 98.99 rad/\sec$$

Logarithmic decrement $= \delta = \frac{2\pi\zeta}{\sqrt{1-\zeta^2}} = \frac{2 \cdot \pi \cdot 0.03}{\sqrt{1-0.03^2}} = 0.188$

Also, $\delta = \frac{1}{n} \log_e \frac{X_0}{X_n}$; if $x_0 = 0.003$,

then, after 3 cycles, $\delta = \frac{1}{n} \log_e \frac{X_0}{X_n}$ *ie*, $0.188 = \frac{1}{3} \cdot \log_e \frac{0.003}{X_3}$

ie, $X_3 = \frac{0.003}{e^{3 \cdot 0.188}} = 1.71 \cdot 10^{-3} m$

8) The damped vibration record of a spring-mass-dashpot system shows the following data.
Amplitude on second cycle = 0.012m; Amplitude on third cycle = 0.0105m;
Spring constant k = 7840 N/m; Mass m = 2kg. Determine the damping constant, assuming it to be viscous.

Solution:

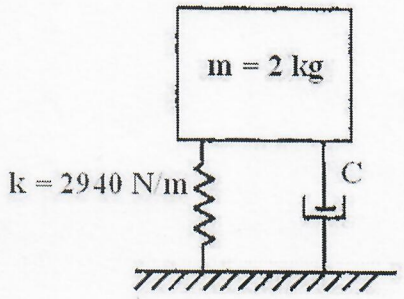
Here, $\delta = \log_e \frac{X_2}{X_3} = \log_e \frac{0.012}{0.0105} = 0.133$

Also, $\delta = \frac{2\pi\zeta}{\sqrt{1-\zeta^2}}$, rearranging, $\zeta = \frac{\delta}{\sqrt{4\pi^2 + \delta^2}} = \frac{0.133}{\sqrt{4\pi^2 + 0.133^2}} = 0.021$

Critical damping coefficient $= c_c = 2 \cdot \sqrt{m \cdot k} = 2 \cdot \sqrt{2 \cdot 7840} = 250.4 N - \text{sec}/m$

Damping coefficient $C = \zeta \cdot C_C = 0.021 \cdot 250.4 = 5.26 N - \text{sec}/m$

9) A mass of 2kg is supported on an isolator having a spring scale of 2940 N/m and viscous damping. If the amplitude of free vibration of the mass falls to one half its original value in 1.5 seconds, determine the damping coefficient of the isolator.



Solution:

Undamped natural frequency $= \omega_n = \sqrt{\frac{k}{m}} = \sqrt{\frac{2940}{2}} = 38.34 r/s$

Critical damping coefficient = $c_c = 2 \cdot m \cdot \omega_n = 2 \cdot 2 \cdot 38.34 = 153.4N - \text{sec}/m$

Response equation of under damped system = $x = A_1 e^{-\zeta \omega_n t}\left[\left\{\sin\left(\sqrt{1-\zeta^2}\,\omega_n t + \phi_1\right)\right\}\right]$

Here, amplitude of vibration = $A_1 e^{-\zeta \omega_n t}$

If amplitude = X_0 at t = 0, then, at t = 1.5 sec, amplitude = $\frac{X_0}{2}$

Ie, $A_1 e^{-\zeta \omega_n \cdot 0} = X_0$ or $A_1 = X_0$

Also, $A_1 e^{-\zeta \omega_n \cdot 1.5} = \frac{X_0}{2}$ or $X_0 \cdot e^{-\zeta \cdot 38.34 \cdot 1.5} = \frac{X_0}{2}$ or $e^{-\zeta \cdot 38.34 \cdot 1.5} = \frac{1}{2}$

Ie, $e^{\zeta \cdot 38.34 \cdot 1.5} = 2$, taking log, $\zeta \cdot 38.34 \cdot 1.5 = 0.69 \therefore \zeta = 0.012$

Damping coefficient $C = \zeta \cdot C_C = 0.012 \cdot 153.4 = 1.84N - \text{se}$

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Department of Mechanical Engineering

Sub: DOM **Class B.E** **Sem-I** **A.Y: 2022-23**

Assignment on Balancing (Unit-I)

1. A shaft carries four masses A, B, C and D of magnitude 200 kg, 300 kg, 400 kg and 200 kg respectively and revolving at radii 80 mm, 70 mm, 60 mm and 80 mm in planes measured from A at 300 mm, 400 mm and 700 mm. The angles between the cranks measured anticlockwise are A to B 45°, B to C 70° and C to D 120°. The balancing masses are to be placed in planes X and Y. The distance between the planes A and X is 100 mm, between X and Y is 400 mm and between Y and D is 200 mm. If the balancing masses revolve at a radius of 100 mm, find their magnitudes and angular positions.

2. A, B, C and D are four masses carried by a rotating shaft at radii 100 mm, 150 mm, 150 mm and 200 mm respectively. The planes in which the masses rotate are spaced at 500 mm apart and the magnitude of the masses B, C and D are 9 kg, 5 kg and 4 kgrespectively. Find the required mass A and the relative angular settings of the four massesso that the shaft shall be in complete balance

3. The cranks and connecting rods of a 4-cylinder in-line engine running at 1800 r.p.m. are 60 mm and 240 mm each respectively and the cylinders are spaced 150 mm apart. If the cylinders are numbered 1 to 4 in sequence from one end, the cranks appear at intervals of 90° in an end view in the order 1-4-2-3. The reciprocating mass corresponding to each cylinder is 1.5 kg.
   Determine: 1. Unbalanced primary and secondary forces, if any, and 2. Unbalanced primary and secondary couples with reference to central plane of the engine.

4. A four crank engine has the two outer cranks set at 120° to each other and their reciprocating masses are each 200 kg. The distance between the planes of rotation of adjacent cranks are 200 mm, 600mm and 500mm. If the engine is to be in complete primary balance, find the reciprocating mass and the relative angular position for each of the inner

cranks. If the length of each crank is 300 mm, the length of each connecting rod is 1.2 m and the speed of rotation is 240 r.p.m., what is the maximum secondaryunbalanced force?

5. A five cylinder in-line engine running at 750 r.p.m. has successive cranks 144° apart, the distance between the cylinder Centre lines being 375 mm. The piston stroke is 225 mm and the ratio of the connecting rod to the crank is 4. Examine the engine for balance of primary and secondary forces and couples. Find the maximum values of these and the position of the central crank at which these maximum values occur. The reciprocating mass for each cylinder is 15 kg.

6. The cranks and connecting rods of a 4-cylinder in-line engine running at 1800 r.p.m. are 60 mm and 240 mm each respectively and the cylinders are spaced 150 mm apart. If the cylinders are numbered 1 to 4 in sequence from one end, the cranks appear at intervals of 90° in an end view in the order 1-4-2-3. The reciprocating mass corresponding to each cylinder is 1.5 kg.
   Determine: 1. Unbalanced primary and secondary forces, if any, and
   2. Unbalanced primary and secondary couples with reference to central plane of the engine

-: BEST OF LUCK:-

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Department of Mechanical Engineering

Sub: DOM **Class B.E B** **Sem-I** **A.Y: 2022-23**

Assignment- Gyroscope (Unit-II)

1. What do you understand by gyroscopic couple? Derive a formula for its magnitude.
2. Explain the effect of the gyroscopic couple on the reaction of the four wheels of a vehicle negotiating a curve.
3. Discuss the effect of the gyroscopic couple on a two wheeled vehicle when taking a turn.
4. What will be the effect of the gyroscopic couple on a disc fixed at a certain angle to a rotating shaft?
5. A flywheel of mass 10 kg and radius of gyration 200 mm is spinning about its axis, which is horizontal and is suspended at a point distant 150 mm from the plane of rotation of the flywheel. Determine the angular velocity of precession of the flywheel. The spin speed of flywheel is 900 r.p.m.
6. Find the angle of inclination with respect to the vertical of a two wheeler negotiating a turn. Given : combined mass of the vehicle with its rider 250 kg ; moment of inertia of the engine flywheel 0.3 kg-m2 ; moment of inertia of each road wheel 1 kg-m2 ; speed of engine flywheel 5 times that of road wheels and in the same direction ; height of centre of gravity of rider with vehicle 0.6 m ; two wheeler speed 90 km/h ; wheel radius 300 mm ; radius of turn 50 m.
7. A pair of locomotive driving wheels with the axle, have a moment of inertia of 180 kg-m2. The diameter of the wheel treads is 1.8 m and the distance between wheel centres is 1.5 m. When the locomotive is travelling on a level track at 95 km/h, defective ballasting causes one wheel to fall 6 mm and to rise again in a total time of 0.1 s. If the displacement of the wheel takes place with simple harmonic motion, find: 1. The gyroscopic couple set up, and 2. The reaction between the wheel and rail due to this couple.
8. A four-wheeled trolley car of total mass 2000 kg running on rails of 1.6 m gauge, rounds a curve of 30 m radius at 54 km/h. The track is banked at 8°. The wheels have an external diameter of 0.7 m and each pair with axle has a mass of 200 kg. The radius of gyration for each pair is 0.3 m. The height of centre of gravity of the car above the wheel base is 1 m. Determine, allowing for centrifugal force and gyroscopic couple actions, the pressure on each rail.
9. A horizontal axle AB, 1 m long, is pivoted at the midpoint C. It carries a weight of 20 N at A and a wheel weighing 50 N at B. The wheel is made to spin at a speed of 600 r.p.m in a clockwise direction looking from its front. Assuming that the weight of the flywheel is uniformly distributed around the rim whose mean diameter is 0.6 m; calculate the angular velocity of precession of the system around the vertical axis through C.

-: All The Best:-

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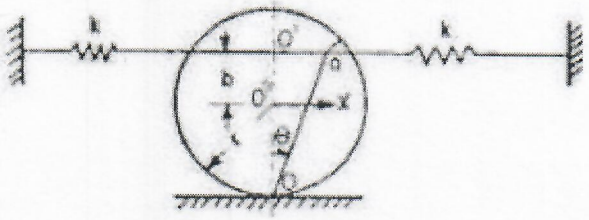
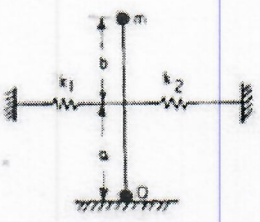
Sub: DOM **Class B.E-B** **Sem-I** **A.Y: 2022-23**

Assignment-III
Free Vibration

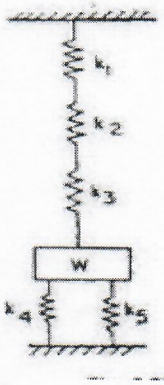
1. Define the following Terms:
   a) Amplitude b) Natural Frequency c) Resonance d) Damping coefficient e) Critical damping coefficient f) Damping ratio g) Logarithmic Decrement
2. Briefly explain Over damped, Underdamped & critical damped system with plot curve.
3. Explain Mathematical Modeling of Quarter Car, Motorbike & Bicycle

4. Determine the natural frequency of the system as shown in figure.





5. Consider a system as shown in fig. if k1=2.0kgf/cm, k2=1.5kgf/cm, k3=3.0kgf/cm, k4= k5=0.5 kgf/cm. Find the weight 'W' if the system has a natural frequency of 10Hz



6. In a single degree damped vibrating system, a suspended mass of 8 kg makes 30 oscillations in 18sec. the amplitude decreases to 0.25 of the initial value after 5 oscillations. Determine: i) The stiffness of the spring ii) The logarithmic decrement
   iii) The damping factor iv) The damping coefficient

7. A disc of a torsional pendulum has a moment of inertia of 0.06 kg-m^2 and is immersed in a viscous fluid. The shaft attached to it is 0.4m long and 0.1m in diameter. When the pendulum is oscillating, the observed amplitudes on the same side of the mean position for successive cycles are 9^0, 6^0 and 4^0. Determine (i) logarithmic decrement (ii) damping torque per unit velocity and (iii) the periodic time of vibration. Assume G = 4.4E10^7 N/m^2, for the shaft material.

8. A shock absorber is to be designed so that its overshoot is 10% of the initial displacement when released. Determine damping factor. If the damping factor is reduced to one half of this value. What will be the overshoot?

9. Find the damped natural frequency of the pendulum if mass of the rod is negligible for small oscillation as shown in fig (a)

10. Determine suitable expression of damped vibrating system as shown in fig (b). Find the critical damping coefficient when a=0.10m, b=0.13m, k=4900N/m & M=1.5 kg

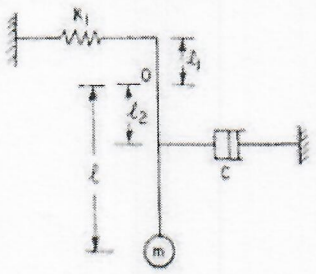


Fig. (a)

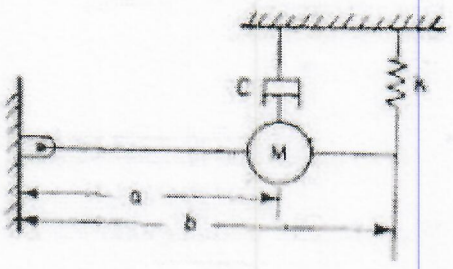


Fig. (b)

Undamped - **Q.3 (a) – 4M & Q. 4 (b) - 6M**
Damped - **Q.3 (b) – 4M & Q. 4 (a) - 6M**

-: BEST OF LUCK:-

Matoshri Shaikshanik Pratishthan's Ane
Rajiv Gandhi College of Engineering
Karjule Harya, Tal-Parner, Dist-Ahmednagar: 414304
Department of Mechanical Engineering

Sub: DOM **Class B.E B** **Sem-I** **A.Y: 2022-23**

Assignment on SDOF –Forced Vibration (Unit-IV)

1. In a forced vibrating system a body having 2kg of mass vibrates in a viscous fluid. The harmonic exciting force of 20N acting on the mass results in a resonance amplitude of 15mm with a period of 0.15sec. Determine damping coefficient of viscous fluid. If the system is excited by same harmonic force but at frequency of 5 cps. What will be the amplitudes of forced vibration with & without damper?

2. A vertical single stage air compressor having a mass of 500 kg is mounted on springs having a stiffness of 1.96×105 N/m and a damping coefficient of 0.2. The rotating parts are completely balanced and the equivalent reciprocating parts have a mass of 20 kg. The stroke is 0.2 m. Determine the dynamic amplitude of vertical motion and the phase difference between the motion and excitation force if the compressor is operated at 200 rpm.

3. The springs of an automobile trailer are compressed 0.1 m under its own weight. Find the critical speed when the trailer is travelling over a road with a profile approximated by a sine wave of amplitude 0.08 m and a wavelength of 14 m. What will be the amplitude of vibration at 60 km/hr.

4. A heavy machine of 3000 N is supported on a resilient foundation. The static deflection of the foundation due to the weight of the machine is found to be 7.5 cm. It is observed that the machine vibrates with an amplitude of 1cm when the base of the machine is subjected to harmonic oscillations at the undamped natural frequency of the system with an amplitude of 0.25 cm. Find (a) the damping constant of the foundation (b) the dynamic force amplitude on the base (c) the amplitude of the displacement of the machine relative to the base.

5. A 75 kg machine is mounted on springs of stiffness $k=11.76\times10^6$ N/m with a damping factor of 0.2. A 2 kg piston within the machine has a reciprocating motion with a stroke of 0.08 m and a speed of 3000 cpm. Assuming the motion of the piston to be harmonic, determine the amplitude of vibration of machine and the vibratory force transmitted to the foundation.

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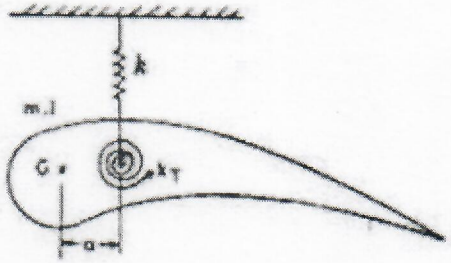
Department of Mechanical Engineering

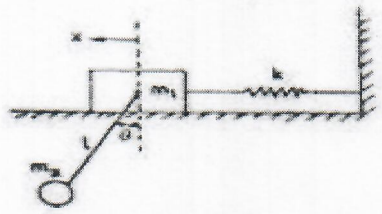
Sub: DOM **Class B.E B** **Sem-I** **A.Y: 2022-23**

Assignment- DOF system-Undamped Vibration (Unit-V)

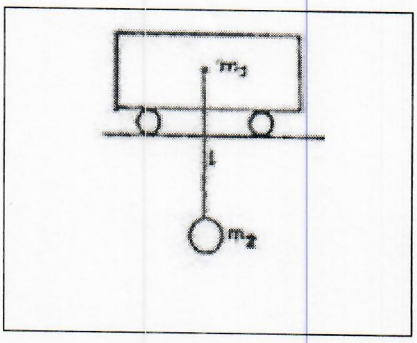
1. An aero-foil wing in its first bending & torsional modes can be represented schematically as shown in fig. connected through a translational spring stiffness 'k' & torsional spring stiffness of 'k_t'. Write the equation of motion for the system & obtain two natural frequencies. Assume the following data: m=5kg, I=0.12kg-m^2, k=5000N/m, $k_t=0.4x10^3$ Nm/rad, a=0.1m



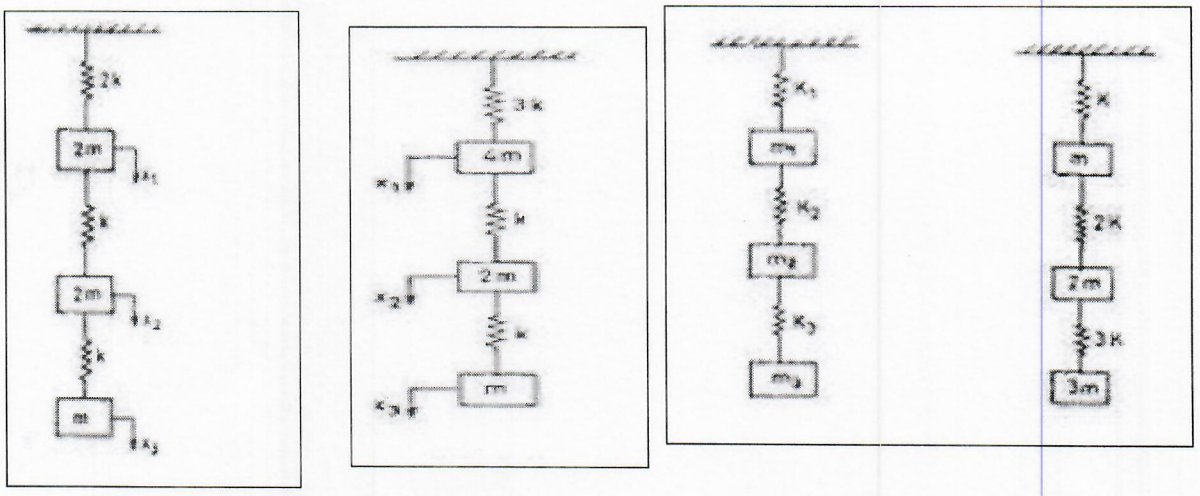
2. Find the natural frequency of the system as shown in fig.



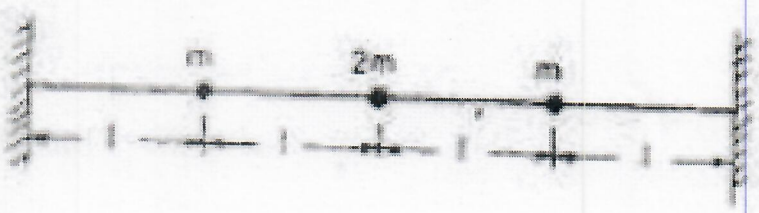
K=90N/m, l=0.25m, m_1=2kg, m_2=0.5kg



3. Find the natural frequency & mode shape of the system as shown in fig. by **Matrix method.**



4. For a taut string having tension T & three concentrated masses as shown in fig Find the natural frequency of the system



5. Write a short note on Mathematical modeling of Bicycle, Motor bike and Quarter Car.

-: All The Best:-

Matoshri Shaikshanik Pratishthan's Ane
Rajiv Gandhi College of Engineering
Karjule Harya, Tal-Parner, Dist-Ahmednagar: 414304
Department of Mechanical Engineering

Sub: DOM **Class B.E B** **Sem-I** **A.Y: 2022-23**

Measurement and Control of Vibrations, Introduction to Noise
(Unit-VI)

1) Explain following terms with respect to sound:
i) Anechoic chamber
ii) Reverberation chamber
2) State and explain various types of sound fields
3) Calculate the total noise, if there are 4 sources of noise having magnitudes 45 dB, 54 dB, 53 dB, and 52 dB. What would be effect on total noise, if 45 dB noise is switched off?
4) Explain in brief various sources of noise and how to control the same.
5) Explain acoustic material & its characteristics
6) Show that if the sound power is doubled, then the sound power level

Matoshri Shaikshanik Pratishthan's

Rajiv Gandhi College of Engineering

Karjule Harya, Tal-Parner, Dist-Ahmednagar: 414304

Department ofMechanical Engineering

Academic Year 2022-23

Sessional Test- 1

Subject & Subject Code – DOM (402042) **Time-1Hr 30 Min**

Class-BE (Mech) **Max Marks-30 Marks**

Q.1 Attempt Any ONE **10 Marks**

1. Explain with neat diagram direct and reverse cranks method -radialand V engines.
2. A shaft carries four masses in parallel planes A, B, C and D in this order along its length. The masses at B and C are 18 kg and 12.5 kg respectively, and each has an eccentricity of 60 mm. The masses at A and D have an eccentricity of 80 mm. The angle between the masses at B and C is 100° and that between the masses at B and A is 190°, both being measured in the same direction. The axial distance between the planes A and B is 100 mm and that between B and C is 200 mm. If the shaft is in complete dynamic balance, determine:
   a. The magnitude of the masses at A and D
   b. The distance between planes A and D; and
   c. The angular position of the mass at D

3. A shaft carries four masses A, B, C and D of magnitude 200 kg, 300 kg, 400 kg and 200 kg respectively and revolving at radii 80 mm, 70 mm, 60 mm and 80 mm in planes measured from A at 300 mm, 400 mm and 700 mm. The angles between the cranks measured anticlockwise are A to B 45°, B to C 70° and C to D 120°. The balancing masses are to be placed in planes X and Y. The distance between the planes A and X is 100 mm, between X and Y is 400 mm and between Y and D is 200 mm. If the balancing masses revolve at a radius of 100 mm, find their magnitudes and angular positions.

Q.2 Attempt Any TWO **20 Marks**

1. Explain condition for static and dynamic balancing and need for balancing.
2. The cranks and connecting rods of a 4-cylinder in-line engine running at 1800 r.p.m. are 60 mm and 240 mm each respectively and the cylinders are spaced 150 mm apart. If the cylinders are numbered 1 to 4 in sequence from one end, the cranks appear at intervals of 90° in an end view in the order 1-4-2-3. The reciprocating mass corresponding to each cylinder is 1.5 kg.

Determine: 1. Unbalanced primary and secondary forces, if any, and 2. Unbalanced primary and secondary couples with reference to central plane of the engine.

3. A four crank engine has the two outer cranks set at 120° to each other and their reciprocating masses are each 200 kg. The distance between the planes of rotation of adjacent cranks are 200 mm, 600mm and 500mm. If the engine is to be in complete primary balance, find the reciprocating mass and the relative angular position for each of the inner cranks. If the length of each crank is 300 mm, the length of each connecting rod is 1.2 m and the speed of rotation is 240 r.p.m., what is the maximum secondary unbalanced force?

4. A five cylinder in-line engine running at 750 r.p.m. has successive cranks 144° apart, the distance between the cylinder Centre lines being 375 mm. The piston stroke is 225 mm and the ratio of the connecting rod to the crank is 4. Examine the engine for balance of primary and secondary forces and couples. Find the maximum values of these and the position of the central crank at which these maximum values occur. The reciprocating mass for each cylinder is 15 kg.

#BEST OF LUCK#

MATOSHRI SHAIKSHANIK PRATISTHAN'S ANE

RAJIV GANDHI COLLEGE OF ENGINEERING, KARJULE HARYA

Mchanical Engineering 2022-23

UNIT TEST-I MARKS

SUB-Dynamics of Machinery

Roll No.	Student Name	Total marks (out of 30)
1	MORE VISHAL HARIBHAU	17
2	AGARKAR ASHUTOSH SUDHIR	18
3	AHER TUSHAR ANIL	16
4	AJABE SAGAR KAILAS	12
5	AKHANDE AKASH PRAKASH	15
6	ASWAR PAYAL GOVIND	13
7	AUTI GAURAV ANIL	13
8	BADGUJAR UMESH SURESH	14
9	BATULE BHARAT POPAT	15
10	BHASKAR AMAR SHRIKANT	16
11	BHOGADE OMKAR MAHADEO	17
12	BHOJANE SWAPNIL SHIVAJI	20
13	BORASE AMOL BAHGWANTRAO	20
14	DHAS PAVANKUMAR SUBHASH	14
15	DHUMAL AJINKYA PARAJI	15
16	DHUMAL SHUBHAM RAJENDRA	15
17	GAIKWAD LOKESH RAJAN	16
18	GAWADE GAYATRI GOPICHAND	17
19	GODE MAHESH NANDU	21
20	HINGMIRE ANAND BHARAT	21
21	INGLE SANKET SIDDHARTH	22
22	ISAEE RUTIK NITIN	23
23	JADHAV MAHESH BALU	12
24	JADHAV NILESH RAMESH	12

MATOSHRI SHAIKSHANIK PRATISTHAN'S ANE

RAJIV GANDHI COLLEGE OF ENGINEERING, KARJULE HARYA

Mchanical Engineering 2022-23

UNIT TEST-I MARKS

SUB-Dynamics of Machinery

25	KADAM SOMESHWAR NANASAHEB	10
26	KARANDE NITIN DADASAHEB	10
27	KATKAR VISHAL RAGHUNATH	14
28	KHADE ANIKET SUBHASH	14
29	KHEMNAR VISHAL SATISH	14
30	KHESE AJIT DNYANDEV	15
31	KHIRKADE TUSHAR MOHAN	15
32	KHOMANE AJAY SOPAN	16
33	KIRTISHAHI SUMEDH DILIP	17
34	KSHIRSAGAR HIMANSHU	18
35	LOKHANDE AKASH SANTOSH	19
36	MALVE DHIRAJ RAJENDRA	20
37	MANDLIK ANIKET BHARAT	17
38	MORE SIDHDANT SATYAVIJAY	12
39	MURKUTE YOGESH PANDURANG	12
40	NAGARKAR CHINMAY SHARAD	13
41	NAGAWADE GHRUSHNESHWAR	21
42	NETKE RAHUL BALASAHEB	22
43	NILE SIDDHARTH BHAUSAHEB	14
44	PADWAL GAURAV SUNIL	14
45	PAROJI RAMANNA SHABU	15
46	PATHARE KARAN DEEPAK	12
47	PATIL BHUSHAN DILIP	13
48	PATIL HEMANT SUNIL	14
49	PATIL VAIBHAV SHARAD	14
50	PAWAR SHARAD VASANT	25

MATOSHRI SHAIKSHANIK PRATISTHAN'S ANE

RAJIV GANDHI COLLEGE OF ENGINEERING, KARJULE HARYA

Mchanical Engineering 2022-23

UNIT TEST-I MARKS

SUB-Dynamics of Machinery

51	RAJPUT NILESH MADANSINGH	22
52	RAJPUT SURAJ PREMSINGH	14
53	RAMPHALE BHAUSAHEB KISAN	14
54	RANE SHUBHAM RAJENDRA	17
55	SANAP JAGADISH DHARMA	15
56	SARODE RAHUL DATTATRAYA	18
57	SHAIKH ARSHAD BADSHAHA	16
58	SHARMA SHIVAM HARISH	20
59	SHEKADE TEJAS AJIT	20
60	SHELKE SHUBHAM SHIVAJI	10
61	SHEVANTE VIKRAM RAJENDRA	16
62	SINGH NIMESH SUBHASH	17
63	TANTAK OMKAR VIJAY	18
64	THUBE SWAPNIL DADASAHEB	19
65	VADAK MAHESH DNYANDEV	20
66	VEDE PAVAN VIJAY	21
67	WAGHMARE BHUSHAN JAYSINGH	12

Subject Teacher

HOD

Matoshri Shaikshanik Pratishthan's

Rajiv Gandhi College of Engineering

Karjule Harya, Tal-Parner, Dist-Ahmednagar: 414304

Department ofMechanical Engineering

Academic Year 2022-23

Sessional Test- II

Subject & Subject Code –DOM (402042) **Time-1Hr 30 Min**

Class-BE (Mech) **Max Marks-30 Marks**

Instructions to the candidates:

1) Answer Q1 or Q2, Q3 or Q4.
2) Neat diagrams must be drawn whenever necessary.
3) Figures to the right indicate full marks.
4) Assume suitable data, if nessacary.

Q1 a) A vibrating system is defined by the following parameters m=3kg, K=100N/m, C=3N-sec/m. Determine (i) Damping factor (ii) Natural Frequency of damped vibration (iii) Logarithmic decrement (iv) Ratio of two consecutive amplitude and (v) Number of cycles after which the original amplitude is reduced to 20 percent. **[8]**

b) Derive the differential equation of motion for undamped free torsional vibration. **[5]**

c) What are the causes of vibration? Explain the advantages of vibration. **[4]**

Q2) a) A spring mass system has spring stiffness 'K' N/m and a mass of 'm' kg it has a natural frequency of vibration as 112Hz. An extra 2kg mass is coupled to 'm' and the natural frequency is reduced by 2Hz. Find the values of 'K' and 'm'. **[8]**

b) By using energy method find the natural frequency of undamped free longitudinal vibrations. **[5]**

c) List the different types of damping and explain in detail any one type of damping? **[4]**

Q3) **a)** Explain critical speed of shaft carrying single rotor. **[8]**

b) A machine of mass 1000kg is acted upon by an external force of 2450N in 1500rpm. To reduce the effect of vibration, isolators of rubber having a static deflection of 2mm under machine weight and an estimated damping factor of 0.2 are used. Determine. **[10]**

i) Amplitude of vibration of machine.
ii) Force transmitted to the foundation.
iii) Phase lag
iv) Phase angle between transmitted force and exciting force.
v) Speed at which the maximum amplitude of vibration would occur.

OR

Q4) **a)** Explain the significance of frequency response curves. **[8]**

b) An electric motor running at 1500 rpm is mounted on five springs and the force transmitted is one eleventh of the impressed force. The weight of the motor is 125 N while the armature weighs 35 N with its center of gravity 0.05 cm from the rotational axis. Determine: (i) Stiffness of each spring, (ii) Natural frequency of the system, (iii) Dynamic force transmitted to the base at operating speed. **[10]**

#BEST OF LUCK#

MATOSHRI SHAIKSHANIK PRATISTHAN'S ANE

RAJIV GANDHI COLLEGE OF ENGINEERING, KARJULE HARYA

Mchanical Engineering 2022-23

UNIT TEST-II MARKS

SUB-Dynamics of Machinery

Roll No.	Student Name	Total marks (out of 30)
1	MORE VISHAL HARIBHAU	16
2	AGARKAR ASHUTOSH SUDHIR	15
3	AHER TUSHAR ANIL	15
4	AJABE SAGAR KAILAS	11
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6	ASWAR PAYAL GOVIND	13
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18	GAWADE GAYATRI GOPICHAND	16
19	GODE MAHESH NANDU	18
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21	INGLE SANKET SIDDHARTH	18
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23	JADHAV MAHESH BALU	12
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MATOSHRI SHAIKSHANIK PRATISTHAN'S ANE

RAJIV GANDHI COLLEGE OF ENGINEERING, KARJULE HARYA

Mchanical Engineering 2022-23

UNIT TEST-II MARKS

SUB-Dynamics of Machinery

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50	PAWAR SHARAD VASANT	25

MATOSHRI SHAIKSHANIK PRATISTHAN'S ANE

RAJIV GANDHI COLLEGE OF ENGINEERING, KARJULE HARYA

Mchanical Engineering 2022-23

UNIT TEST-II MARKS

SUB-Dynamics of Machinery

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65	VADAK MAHESH DNYANDEV	15
66	VEDE PAVAN VIJAY	20
67	WAGHMARE BHUSHAN JAYSINGH	10

Subject Teacher

HOD

Total No. of Questions : 8]

SEAT No. :

PA-961

[Total No. of Pages : 3

[5927]-413

B.E. (Mechanical)

DYNAMICS OF MACHINERY

(2019 Pattern) (Semester - VII) (402042)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.*
2) *Neat diagrams must be drawn whenever necessary.*
3) *Figures to the right indicate full marks.*
4) *Assume suitable data, if nessacary.*

UNIT - I

Q1) a) A vibrating system is defined by the following parameters m=3kg, K=100N/m, C=3N-sec/m. Determine (i) Damping factor (ii) Natural frequency of damped vibration (iii) Logarithmic decrement (iv) Ratio of two consecutive amplitude and (v) Number of cycles after which the original amplitude is reduced to 20 percent. **[8]**

b) Derive the differential equation of motion for undamped free torsional vibration. **[5]**

c) What are the causes of vibration? Explain the advantages of vibration. **[4]**

OR

Q2) a) A spring mass system has spring stiffness 'K' N/m and a mass of 'm' kg it has a natural frequency of vibration as 112Hz. An extra 2kg mass is coupled to 'm' and the natural frequency is reduced by 2Hz. Find the values of 'K' and 'm'. **[8]**

b) By using energy method find the natural frequency of undamped free longitudinal vibrations. **[5]**

c) List the different types of damping and explain in detail any one type of damping? **[4]**

P.T.O.

UNIT - II

Q3) a) Explain critical speed of shaft carrying single rotor. **[8]**

b) A machine of mass 1000kg is acted upon by an external force of 2450N in 1500rpm. To reduce the effect of vibration, isolators of rubber having a static deflection of 2mm under machine weight and an estimated damping factor of 0.2 are used. Determine. **[10]**

i) Amplitude of vibration of machine.

ii) Force transmitted to the foundation.

iii) Phase lag

iv) Phase angle between transmitted force and exciting force.

v) Speed at which the maximum amplitude of vibration would occur.

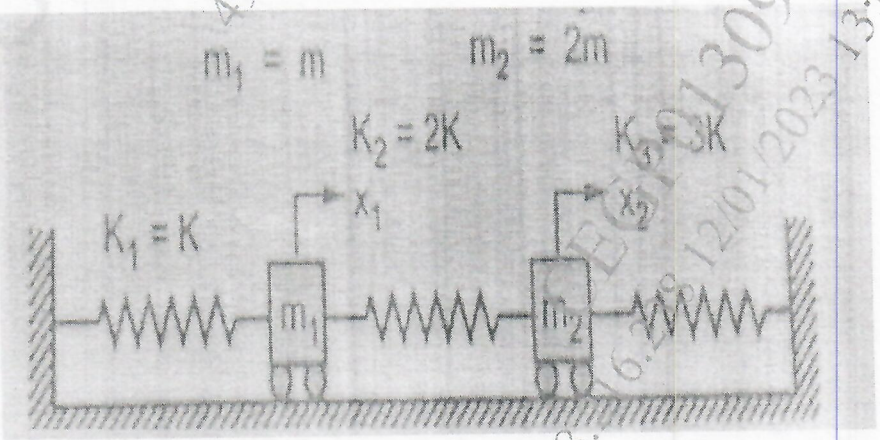
OR

Q4) a) Explain the significance of frequency response curves. **[8]**

b) An electric motor running at 1500 rpm is mounted on five springs and the force transmitted is one eleventh of the impressed force. The weight of the motor is 125 N while the armature weighs 35 N with its center of gravity 0.05 cm from the rotational axis. Determine: (i) Stiffness of each spring, (ii) Natural frequency of the system, (iii) Dynamic force transmitted to the base at operating speed. **[10]**

UNIT - III

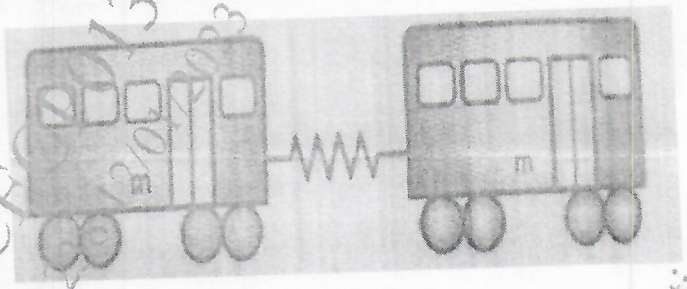
Q5) a) An electric motor running at 1500 rpm is mounted on five springs and the force transmitted is one eleventh of the impressed force. The weight of the motor is 125 N while the armature weighs 35 N with its center of gravity 0.05 cm from the rotational axis. Determine: (i) Stiffness of each spring, (ii) Natural frequency of the system, (iii) Dynamic force transmitted to the base at operating speed. **[10]**



b) Explain the concept of torsionally equivalent shaft and derive the equation for its equivalent length. [8]

OR

Q6) a) Two subway cars as shown in Fig. have 2000 kg mass each and are connected by a coupler. The coupler can be modelled as a spring of stiffness k = 280 kN/m. Write down the equations of motion and determine the natural frequencies and mode shapes. [10]



b) Explain the combined rectilinear and angular modes of vibration. [8]

UNIT - IV

Q7) a) What are various frequency measuring instruments? Explain any one in detail. [8]

b) Explain in brief various sources of noise. [5]

c) Explain anechoic chamber and reverberant chamber? [4]

OR

Q8) a) What is meant by time domain and frequency domain analysis? Explain how frequency spectrum can be used to detect vibration related faults. [8]

b) Write short note on "Noise control in industries". [5]

c) Write short note on Condition monitoring of machines. [4]

❄ ❄ ❄

Total No. of Questions : 10]

SEAT No. :

P3265

[Total No. of Pages : 3

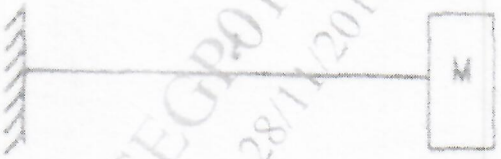
[5670]-533
B.E. (Mechanical)
DYNAMICS OF MACHINERY
(2015 Pattern) (Semester - I) (402043) (End Sem.)

Time : 2½ Hours] *[Max. Marks :70*

Instructions to the candidates:

1) *Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q7 or Q.8, Q.9 or Q.10*
2) *Draw neat diagrams wherever necessary.*
3) *Use of scientific calculator is allowed.*
4) *Assume Suitable data if necessary.*
5) *Figures to the right indicate full marks.*

Q1) a) A light cantilever of length l, has a mass M, fixed at its free end. Find the frequency of its lateral vibrations. In the vertical plane. **[4]**



b) Explain frequency response curve with neat labeled diagram. **[6]**

OR

Q2) a) Explain following terms: **[4]**

i) Zero frequency deflection

ii) Node point

b) An underdamped shock absorber is to be designed for a motorcycle of mass 200kg, such that during a road bump, the damped period of vibration is limited to 2 seconds and the amplitude of vibration should reduce to one-sixteenth in one cycle. Find the spring stiffness and damping coefficient of the shock absorber. **[6]**

Q3) a) Explain torsionally equivalent shaft. **[4]**

b) Explain mathematical model of a bicycle with a rider. **[6]**

OR

P.T.O.

Q4) A periodic torque having a maximum value of 0.65 Nm at a frequency corresponding to 5 rad/sec is impressed upon a flywheel suspended from a wire. The wheel has a moment of inertia of 0.15kg.m^2 and a wire is having a diameter of 6 mm and a length of 1.2 m. The modulus of rigidity of the material is equal to 0.8×10^{11} N/m^2. A viscous dashpot applies damping couple of 0.693 Nm at an angular velocity of 1.5 rad/sec. Calculate: **[10]**

a) The maximum angular displacement from the rest position

b) The maximum couple applied to dashpot

c) The angle by which the angular displacement lags the torque.

Q5) The successive cranks of a 5 cylinder inline engine are at 144° apart. The spacing between cylinder center lines is 400 mm. The lengths of crank and connecting rod are 100 mm and 450 mm respectively and the reciprocating mass of each cylinder is 20 kg. The engine speed is 630 rpm. Determine the maximum values of the primary and secondary unbalance forces and couples and the position of the central crank at which these occur. **[16]**

OR

Q6) a) Explain with neat diagram why single cylinder engine cannot be completely balanced. **[6]**

b) In a three cylinder radial engine, axes of cylinder are coplanar and angles between neighbouring axes are 60°. All cylinders drive same crank of length 220 mm. Each connecting rod is 850 mm long. Reciprocating mass per cylinder is 1.5kg and the engine runs at 1200 rpm. Find primary and secondary direct and reverse unbalance forces. **[10]**

Q7) a) Explain condition monitoring of machines. Explain different techniques for it. **[6]**

b) Explain the working of FFT Analyzer. **[6]**

c) It is required to measure the maximum acceleration of a machine, which vibrates violently with the frequency of 700 cycles per min. Accelerometer with negligible damping is attached to it and the indicator travels by 8.2 mm. If the accelerometer weighs 0.5kg and has a spring rate of 17500 N/m, what is the maximum amplitude and maximum acceleration of the part? **[6]**

OR

Q8) a) What are the different methods of vibration control? Explain any one. **[6]**

b) Explain working of Magneto-Rheological dampers with neat sketch and application. **[6]**

c) A vibrometer has a natural frequency of 5 rad/sec and a damping factor of 0.2. An instrument is used to measure a vibrations of a body having a harmonic frequency of 45 rad/sec. The difference between the maximum and minimum reading is 7 mm. Find the amplitude of motion of vibrating body. **[6]**

Q9) a) Explain following terms with respect to sound: **[6]**

i) Anechoic chamber

ii) Reverberation chamber

b) State and explain various types of sound fields? **[6]**

c) Calculate the total noise, if there are 4 sources of noise having magnitudes 45 dB, 54 dB, 53 dB, and 52 dB. What would be effect on total noise, if 45 dB noise is switched off? **[4]**

OR

*Q10)*a) Explain in brief various sources of noise and how to control the same. **[6]**

b) Explain acoustic material & its characteristics **[6]**

c) Show that if the sound power is doubled, then the sound power level increases by approximately 3 dB. **[4]**

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Total No. of Questions : 10]

SEAT No. :

P3294

[Total No. of Pages : 3

[5461]-523

B.E. (Mechanical)

Dynamics of Machinery (402043)

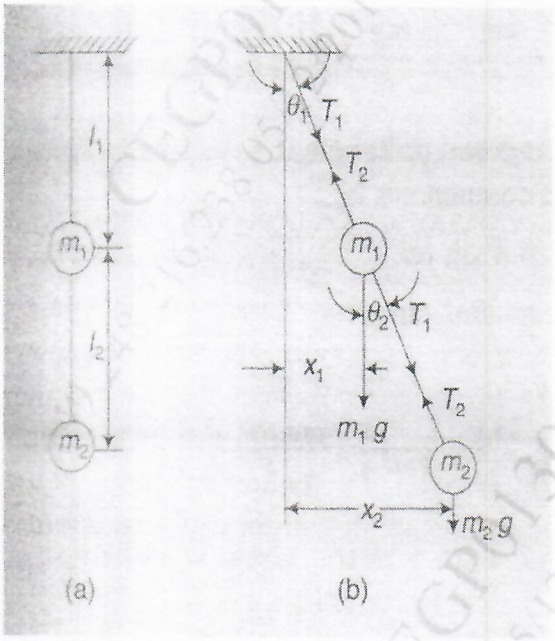
(2015 Course) (Semester-I) (End Sem.)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) *Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10.*
2) *Draw neat diagrams wherever necessary.*
3) *Use of scientific calculator is allowed.*
4) *Assume suitable data where ever necessary.*
5) *Figures to the right indicate full marks.*

Q1) Find the natural frequency of oscillations of the double pendulum as shown in following fig. where $m_1 = m_2 = m$ and $l_1 = l_2 = l$. Draw mode shapes and locate the nodes for each mode of vibration. **[10]**



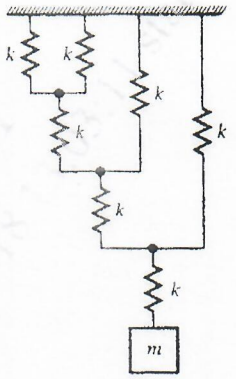
OR

Q2) a) Explain frequency response curve with neat labeled diagram. **[5]**

P.T.O.

b) Find the natural frequency of the system shown in following fig.

Take $K = 2 \times 10^5$ N/m and m = 20 kg. **[5]**



Q3) The static deflection of an automobile on its springs is 100 mm. Find the critical speed when the automobile is travelling on a road, which can be approximated by a sine wave of amplitude 80 mm and a wavelength of 16 m. Assume the damping to be given by (damping ratio : 0.05) also determine the amplitude of vibration at 75 km/hr. **[10]**

OR

Q4) a) Explain following terms: **[4]**

i) Zero frequency deflection

ii) Node point

b) A body of mass 5 kg is supported on a spring of stiffness 1960 N/m and has a dashpot connected to it which produces a resistance of 1.96 N at a velocity of 1 m/sec. In what ratio will the amplitude of vibration be reduced after 5 cycles. **[6]**

Q5) a) A rotating shaft carries three unbalanced masses of 4 kg, 3 kg and 2.5 kg at radial distances of 75 mm, 85 mm and 50 mm and at the angular positions of 45°, 135° and 240° respectively. The second and the third masses are in the planes at 200 mm and 375 mm from the plane of the 1st mass. The angular positions are measured counter clockwise from the reference line along x axis and viewing the shaft from the first mass end. The shaft length is 800 mm between bearings and the distance between the plane of 1st mass and the bearing at that end is 225mm. Determine the amount of counter masses in plane at 75 mm from the bearings for the complete balance of the shaft. The first counter mass is to be in a plane between the first mass and the bearing at a radius 75 mm. The second mass is in a plane between the third mass and the bearing at that end at a radius 40 mm. **[14]**

b) Explain direct and reverse crank method with neat diagram. **[4]**

OR

Q6) a) Each crank and the connecting rod of a six cylinder four stroke in line engine are 60 mm and 240 mm respectively. The pitch distances between the cylinder centre lines are 80 mm, 80mm 100 mm, 80 mm and 80 mm respectively. The reciprocating mass of each cylinder is 1.4 kg. The engine speed is 1000 rpm. Determine the out of balance primary and secondary forces and couples on the engine, if the firing order be 1-4-2-6-3-5. Take a plane midway between the cylinders 3 and 4 as the reference plane. **[14]**

b) Why single cylinder engine cannot be completely balanced? **[4]**

Q7) a) Explain condition monitoring of machines. Explain different techniques for it. **[6]**

b) A seismic instrument is used to find the displacement, velocity and acceleration of a machine running at 250 rpm.If the natural frequency of instrument is 5 Hz and it records the displacement 5 mm, find the displacement, velocity and acceleration of vibrating machine assuming no damping. **[6]**

c) Explain the working of FFT Analyzer. **[4]**

OR

Q8) a) Explain working of Magneto - Rheological dampers with neat sketch and application. **[6]**

b) A vibrometer with a natural frequency of 2 Hz and with negligible damping is attached to a vibrating system which performs a harmonic excitation. Assuming the difference between the maximum and minimum recorded values are 0.6 mm determine the amplitude of motion of the vibrating system when its frequency is 20 Hz and 4 Hz. **[6]**

c) Explain ISO standards used in vibration. **[4]**

Q9) a) Show that if the sound pressure is doubled, then the sound pressure level increases by almost 6 dB. **[6]**

b) State and explain various types of sound fields? **[6]**

c) Noise at the construction site is contributed by a few construction activities such as Piling work:104 dB, Scraper : 93 dB, Bulldozer : 94 dB, Mobile compressor: 73 dB and Machanical Shovel: 76 dB on A weighing network. What is the overall sound pressure level? **[4]**

OR

*Q10)*a) Explain acoustic material & its characteristics. **[6]**

b) Explain in brief various sources of noise and how to control the same. **[6]**

c) Determine the sound pressure level of a source that generate a following rms sound pressure. **[4]**

i) 1.7 N/m^2

ii) 0.7 Pa



Total No. of Questions : 10]

SEAT No. :

P3878

[Total No. of Pages : 3

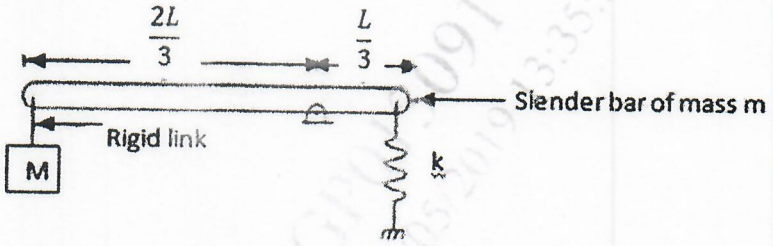
[5561]-534
B.E. (Mechanical)
DYNAMICS OF MACHINERY
(2015 Course) (402043) (Semester - I)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

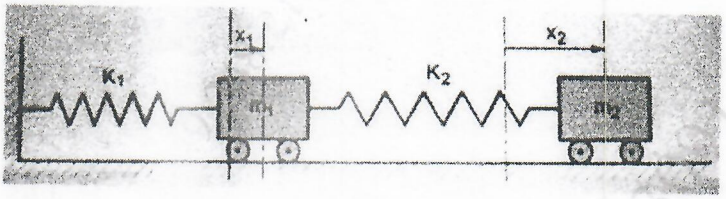
1) ***Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10.***
2) ***Draw neat diagrams wherever necessary.***
3) ***Use of scientific calculator is allowed.***
4) ***Assume suitable data, wherever necessary.***
5) ***Figures to the right indicate full marks.***

Q1) What is natural frequency? Determine natural frequency of the system shown in following fig. **[10]**



OR

Q2) a) What is 2 DOF systems? Write governing differential equations for system given below **[5]**



b) What is damping factor? Draw and explain displacement-time curves for over damped system, critically damped and under damped vibratory system. **[5]**

Q3) a) Explain Torsionally equivalent shaft with respect to 2 DOF free vibration. **[5]**

P.T.O.

b) A 45 kg machine is mounted on four parallel springs each of stiffness 2×10^5 N/m. When the machine operates at 32 Hz, the machine's steady-state amplitude is measured as 1.5 mm. What is the magnitude of the excitation force provided to the machine at this speed? **[5]**

OR

Q4) a) What is Coulomb Damping? Show that the loss of amplitude per cycle is given by 4F/k. **[5]**

b) Explain with neat diagram mathematical model of a motorbike. **[5]**

Q5) a) A rotating shaft carries three unbalanced masses of 4 kg, 3 kg and 2.5 kg at radial distances of 75 mm, 85 mm and 50 mm and at the angular positions of 45°, 135° and 240° respectively. The second and the third masses are in the planes at 200 mm and 375 mm from the plane of the 1st mass. The angular positions are measured counter clockwise from the reference line along × axis and viewing the shaft from the first mass end. The shaft length is 800 mm between bearings and the distance between the plane of 1st mass and the bearing at that end is 225 mm. Determine the amount of counter masses in plane at 75 mm from the bearings for the complete balance of the shaft. The first counter mass is to be in a plane between the first mass and the bearing at a radius 75 mm. The second mass is in a plane between the third mass and the bearing at that end at a radius 40 mm. **[14]**

b) State and explain condition for static and dynamic balancing. **[4]**

OR

Q6) a) Each crank and the connecting rod of a six cylinder four stroke in line engine are 60 mm and 240 mm respectively. The pitch distances between the cylinder centre lines are 80 mm, 80 mm, 100 mm, 80 mm and 80 mm respectively. The reciprocating mass of each cylinder is 1.4 kg. The engine speed is 1000 rpm. Determine the out of balance primary and secondary forces and couples on the engine, if the firing order be 1-4-2-6-3-5. Take a plane midway between the cylinders 3 and 4 as the reference plane. **[14]**

b) Explain the need of balancing. **[4]**

Q7) a) Explain the working principle of seismic instrument. Discuss the response curve and variation of phase angle with frequency ratio. **[6]**

b) In a seismic instrument if mass m = 0.1 kg, stiffness of spring, K = 1 N/mm and damping ratio as 0.5, determine the amplitude of recorded motion if the motion of the vibrating body is $3\sin 200t$ (mm). **[6]**

c) What are vibration exciters? Explain any one exciter. **[4]**

OR

Q8) a) Explain working of Magneto-Rheological dampers with neat sketch and application. **[6]**

b) A device used to measure torsional acceleration consists of a ring having a moment of inertia of 0.049 kg-m^2 connected to a shaft by a spiral spring having a scale of 0.98 N-s/rad and a viscous damper having a constant of 0.11 N-m-s/rad. When the shaft vibrates with a frequency of 15 cpm, the relative amplitude between the ring and the shaft is found to be 2°, what is the maximum acceleration of the shaft? **[6]**

c) Explain the working principle of accelerometer. **[4]**

Q9) a) Explain the working of sound level meter with neat diagram. **[6]**

b) An operator in textile mill is operating six machines. The sound pressure levels of the machines at his position are 60 dB, 56 dB, 62 dB, 53 dB, 51 dB and 54 dB respectively. What is the total noise level when **[6]**

i) All machine are working.

ii) First and second are not working.

c) Define following term and write expression for it. **[4]**

i) Sound power level.

ii) Sound pressure level.

OR

*Q10)*a) Explain acoustic material & its characteristics. **[6]**

b) Explain following terms **[6]**

i) Sound reflection coefficient.

ii) Sound absorption coefficient.

iii) Sound transmission coefficient.

c) Determine the sound power level of a source that generate a sound power of **[4]**

i) 1.0 W.

ii) 3.0 W.



Total No. of Questions : 6]

SEAT No. :

P5014

[Total No. of Pages : 3

B.E. /Insem. - 16

B.E. (Mechanical / Automobile Eng. / Mech - SW)

DYNAMICS OF MACHINERY

(2012 Pattern) (Semester - I)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4 and Q.5 or Q.6.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Use of Nonprogrammable Calculator is allowed.***
5) ***Assume suitable data, if necessary.***

Q1) A shaft carries four masses A, B, C and D which are placed in parallel planes perpendicular to the longitudinal axis. The unbalanced masses at planes B and C are 3.6 kg. and 2.5 kg. respectively and both are assumed to be concentrated at a radius of 25 mm while the masses in planes A and D are both at radius of 40 mm. The angle between the planes B and C is 100° and that between B and A is 190°, angles being measured in counter clockwise direction from the plane B. The plane containing A and B are 250 mm apart and those containing B and C are 500 mm. If the shaft is to be completely balanced, determine:

i) Masses at planes A and D

ii) The distance between the planes C and D

iii) The angular position of the mass D **[10]**

OR

Q2) The cranks of four cylinder marine oil engine are arranged at angular intervals of 90°. The engine speed is 70 rpm and the reciprocating mass per cylinder is 800 kg. The inner cranks are 1 m apart and are symmetrically arranged between the outer cranks which are 2.6 m apart. Each crank is 400 mm long. Draw the primary force and couple polygon for the firing order 1-4-2-3 and comment on balancing. **[10]**

P.T.O.

Q3) a) Determine the expression for the natural frequency of the system shown in fig. Q.3 (A). Assume that the wires connecting the masses do not stretch and are always in tension. **[4]**

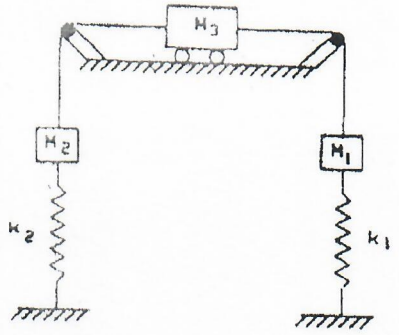


fig.Q.3(A)

b) A body vibrating with viscous damping makes five complete oscillations per second, and in 50 cycles its amplitude diminishes to 10 percent. Determine the logarithmic decrement and the damping ratio. What will be the effect on period of vibration if damping is removed? **[6]**

OR

Q4) a) Derive equation of motion for the system shown in Pig.Q.4 (a), If m =1.5 kg. k=4900N/m, a = 6 cm and b = 14 cm. determine the value of C for which the system is critically damped. **[4]**

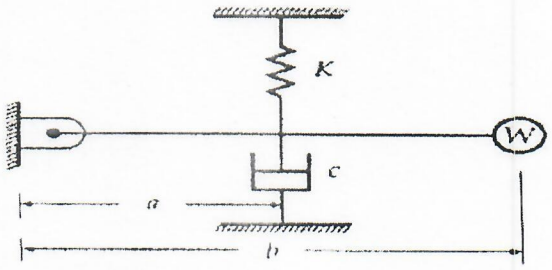


Fig.Q.4(a)

b) A vibrating system is defined by the following parameters m=3kg, k=l00N/m, C=3 N – sec/m. Determine (a) Damping factor.(b)Natural frequency of damped vibration ,(c)I Logarithmic decreinent,(d)Ratio of two consecutive amplitudes and (e) Number of cycles after which the original amplitude is reduced to 20 percent. **[6]**

Q5) a) The damped natural frequency of a system as obtained from a free vibration test is 9.8Hz. During forced vibration test, with constant exciting force on the same system, the maximum amplitude of vibration is found be at 9.6Hz, Determine the damping factor for the system and it's natural frequency. **[4]**

b) A compressor weighing 600N and operating at 1000 rpm, is mounted on six parallel springs of sliffness 6000 N/m each. Determine the maximum permissible unbalance in order to limit the steady state deflection to 5mm peak to peak. **[6]**

OR

Q6) a) A spring – mass-damper systems is subjected to a harmonic force. The amplitude is found to be 0.02 m at resonance and 001 m at a frequency 0.75 times the resonani frequency. Find the damping ratio of the system. **[4]**

b) A machine part of mass 4 kg vibrates in a viscous fluid. Find the damping coefficient when a harmonic exciting force of 50N results in resonant amplitude of 250 mm with a period of 0.4 sec. If the excitation frequency is 2 Hz, find the percentage increase in the amplitude of forced vibration when the damper is removed. **[6]**

Theory Attendance Record

Subject Code	Name of the Subject	Theory (Hrs. / Week)
402042	Dynamic of Machinery	03

Start of the Class w.e.f. : 18-07-2022

No. of Classes Planned : 50

No. of Classes Conducted : 50.

Signature of Staff

Signature of H.O.D.

Year 2022-20-23	Semester Start	End of I Month	End of II Month	Semester End
Signature of Staff				
Signature of H.O.D.				
Signature of Principal				

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering * Karjule Harya * Tal. Parner, Dist. Ahmednagar

Principal
R G COE, Karjule Harya.

Rajiv Gandhi College of Engineering

Karjule Harya, Tal. Parner, Dist. Ahmednagar-414 304.

Subject : DOM Sem./Section: VII Academic

Roll No.	Name	Date of Month	18/7	19/7	20/7	24/7	26/7	27/8	1/8	3/8	8/8	10/8	16/8	17/8
		No.	1	2	3	4	5	6	7	8	9	10	11	12
(1)	MORE VISHAL HARIBHAR		1	2	3	4	5	5	6	7	8	9	9	10
2)	AGARKAR ASHUTOSH SUDHA		1	2	3	4	5	6	7	8	9	10	10	11
3)	AHER TUSHAR ANIL		1	2	3	4	5	5	6	7	8	9	10	10
4)	AJABE SAGAR KAILAS		1	2	3	4	4	5	6	7	8	9	10	10
5	AKHANDE AKASH PRAKASH		1	2	3	4	5	6	6	7	8	9	10	10
6)	ASWAR PAYAL GOVIND		1	2	3	4	4	5	5	6	7	7	8	9
7)	AUTI GAURAV ANIL		1	2	3	3	4	5	6	7	8	9	9	10
8)	BADGUJAR UMESH SURESH		1	1	2	2	3	3	4	4	5	5	6	6
9)	BAJULE BHARAT POPAT		A	2	3	4	5	5	6	6	7	7	8	8
10)	BHASKAR AMAR SHRIKANT		1	2	3	4	5	5	6	6	7	7	8	8
11	BHOGADE OMKAR MAHDEO		1	2	3	4	5	6	7	8	9	10	11	12
12	BHOJANE SWAPNIL SHIVAJI		A	1	2	2	3	3	4	4	5	5	6	6
13	BORASE AMOL BHAGWANTRAO		1	2	3	3	4	4	5	5	6	6	7	7
14	DHAS PAVANKUMAR SUBHASH		A	1	2	2	3	3	4	4	5	5	6	7
15	DHUMAL AJINKYA PARASI		1	2	3	4	5	5	6	7	7	8	8	9
16	DHUMAL SHUBHAM RAJENDRA		1	1	2	2	3	3	4	4	5	5	6	6
17)	GAIKWAD LOKESH RAJAN		1	2	3	4	5	6	7	8	9	10	11	12
18)	GAWADE GAYTRI GOPICHAND		1	1	2	2	3	3	4	4	5	6	7	8
19)	GODE MAHESH NANDU		A	2	3	4	5	6	6	7	7	8	8	9
20	HINGMIRE ANAND BHARAT		1	1	2	2	3	3	4	4	5	5	6	6
21	INGLE SANKET SIDDHARTA		1	2	3	4	5	6	7	8	9	9	10	10
22	ISAE RUTIK NITIN		1	2	3	4	5	6	7	8	9	10	11	12
23	JADHAV MAHESH BALU		A	1	2	2	3	3	4	4	5	5	6	6
24	JADHAV NILESH RAMESH		1	2	2	3	3	4	4	5	5	6	7	8
25	KADAM SOMESHWAR NANASAHEB		1	2	3	4	4	5	5	6	7	7	8	9
26	KARANDE NITIN DADASAHEB		A	1	2	2	3	3	4	4	5	5	6	6
27	KATKAR VISHAL RAGHUNATA		1	1	2	2	3	3	4	4	5	6	7	8
28	KHADE ANIKET SUBHASH.		1	1	2	2	3	3	4	4	5	5	6	8
	Signature of the Staff													
	Signature of H.O.D.													

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Principal
R.G.C.O.E. Karjule Harya.

Year 2022 20-23

Branch : mech.

22/8	23/8	24/8	29/8	30/8	5/9	6/9	7/9	12/9	14/9	19/9	20/9
13	14	15	16	17	18	19	20	21	22	23	24
11	11	12	12	13	13	13	15	16	17	18	19
11	12	13	14	15	16	16	17	18	19	19	20
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9	9	10	10	11	12	13	14	15	16	17	18
9	10	10	11	12	13	14	15	16	17	18	19
13	14	15	16	17	18	19	20	21	22	23	24
7	7	8	9	9	10	11	12	13	14	15	16
8	8	9	9	10	11	12	13	14	15	16	17
8	9	10	11	12	13	14	15	16	17	18	19
9	10	10	11	11	12	12	13	13	14	15	16
7	8	9	10	11	12	13	14	15	16	17	18
12	13	13	14	14	15	15	16	16	17	17	19
9	10	11	12	13	14	15	16	17	18	19	20
9	10	10	11	11	12	12	13	13	14	15	16
7	8	9	10	11	12	13	13	15	16	17	18
11	11	12	12	13	13	14	15	16	17	17	19
12	13	13	14	14	15	15	16	16	17	17	18
7	7	8	8	9	10	11	12	13	14	15	16
9	10	11	12	13	14	15	16	17	18	19	20
9	10	11	12	12	13	14	15	16	17	18	19
7	7	8	8	9	10	11	12	13	14	15	16
9	10	11	12	13	14	15	16	17	18	19	20
7	8	9	10	11	12	13	14	15	16	17	18

	Attendance in Percentage			Internal Test			Attend-ance in % upto end of semester	Marks out of
	I st Month	II st Month	III st Month	I Max Marks	II Max Marks	III Max Marks		

Year 2022-2023

21/9	27/9	28/9	E 29/09	E 30/09	B 01/10	11/10	12/10	17/10	18/10	19/10	1/11
25	26	27	28	29	30	31	32	33	34	35	36
20	21	22	23	24	25	26	27	28	29	30	31
21	22	23	24	25	26	27	28	29	30	31	32
19	20	21	22	23	24	25	26	27	28	29	30
20	21	22	23	24	25	26	27	28	29	30	31
21	22	23	24	25	26	27	28	29	30	31	32
18	19	20	21	22	23	24	25	26	27	28	29

Year 2022 2023

24/11	30/11									
49	50	51	52							
44	45									
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41	42									
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23	44									

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering ★ Tal. Parner Dist. Ahmednagar ★ Karjule Harya

Year 20 20-

Principal
R.G.C.O.E. Karjule Harya

PRACTICAL ATTENDANCE RECORD

Subject Code	Name of the Subject	Practical (Hrs. / Week)
402042	Dynamics of machinery	02

Start of the Class w.e.f. : 18-07-2022

No. of Practical Planned : 14

No. of Practical Conducted : 14.

Signature of Staff

Signature of H.O.D.

Year 2022-2023	Semester Start	End of I Month	End of II Month	Semester End
Signature of Staff				
Signature of H.O.D.				
Signature of Principal				

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Dist. Ahmednagar 414304

Rajiv Gandhi College of Engineering Tal. Parner, Dist. Ahmednagar Karjule Harya

Principal
R G COE, Karjule Harya.

Karjule Harya, Tal. Parner, Dist. Ahmednagar-414 304.

Subject : DOM - B1 Sem./Section: VII Academic

Roll No.	Name	Date of Month	22/7	29/7	5/8	6/8	2/9	9/9	16/9	23/9	30/9	30/10	21/10	11/10
		No.	1	2	3	4	5	6	7	8	9	10	11	12
1	More Vishal Haribhau		1	2	3	4	5	6	7	8	9	10	10	10
2	Agarkar ~~Tushar~~ Ashutosh Sudhir		1	2	3	3	4	5	6	7	8	9	9	10
3	Aher Tushar Anil		1	2	3	4	5	6	7	8	9	10	11	12
4	Ajabe Sagar Kailash		1	2	3	4	5	6	7	8	8	9	9	10
5	Akhande Akash Prakash		1	2	3	4	5	6	7	8	8	9	10	10
6	Aswar Payal Govind		1	2	3	4	5	6	7	8	9	10	11	12
7	Auti Gaurav Anil		1	2	3	4	5	6	7	8	8	9	9	10
8	BADGUJAR UMESH SURAESH		1	2	3	4	5	6	7	8	8	9	10	11
9	BATULE BHARAT POPAT		1	2	3	4	5	6	7	8	9	10	11	12
10	BHASKAR AMAR SHRIKANT		1	2	2	3	4	5	5	6	6	7	8	9
11	BHOGADE OMKAR MAHADEO		1	2	3	4	4	5	5	6	7	8	9	10
12	BHOJANE SWAPNIL SHIVAJI		1	2	3	4	5	6	7	7	8	9	9	10
13	BORASE AMOL BAHGWANTRAO		1	2	2	3	4	5	6	7	7	8	9	10
14	DHAS PAVANKUMAR SUBASH		1	2	3	3	4	5	6	7	8	9	10	11
15	DHUMAL ASHRYA PARAJI		1	2	2	3	4	5	5	6	6	7	8	9
16	DHUMAL SHUBHAM RAJENDRA		1	2	3	4	4	5	6	7	8	9	10	11
17	GAIKWAD LOKESH RAJAN		1	2	2	3	4	5	5	6	7	8	9	10
18	GAVADE GAYATRI GOPICHAND		1	2	3	4	4	5	6	7	7	8	9	10
19	GODE MAHESH NANDU		1	2	2	3	4	5	6	7	8	9	10	11
20	HINGMIRE ANAND BHARAT		1	2	3	4	4	5	6	6	7	8	9	10
21	INGLE SANKET SIDDHRTH		1	2	2	3	4	5	5	6	7	8	9	10
22	ISAEE RUTIK NITIN		1	1	2	3	4	5	6	6	7	8	9	10
23	JADHAV MAHESH BALU		1	2	3	4	4	5	6	7	8	9	10	11
24	JADHAV NILESH RAMESH		1	2	2	3	4	5	6	6	7	8	9	10
25	KADAM SOMESHAR NANASAHEB		1	1	2	3	4	5	5	6	7	8	9	10

Signature of the Staff

IQAC Incharge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering Tal. Parner, Dist. Ahmednagar Karjule Harya

Signature of H.O.D.

Principal
R G COE, Karjule Harya.

18/11	25/11	28/09					
23	24	25	23	24	25	26	27
11	12	Ex					
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Expt. No.				Expt. No.				Attendance in % upto end of semester	Avg. Marks out of 15	Internal 10	A M o Tot
Evaluation				Evaluation							
*R 5	*C 5	*V 5	*T 15	*R 5	*C 5	*V 5	*T 15				

Rajiv Gandhi College of Engineering

Karjule Harya, Tal. Parner, Dist. Ahmednagar-414 304.

Subject : DOM- B2 Sem./Section: VII Academic

Roll No.	Name	Date of Month	21/7	28/7	4/8	25/8	1/9	8/9	15/9	22/9	29/9	13/10	20/10	10/11
		No.	1	2	3	4	5	6	7	8	9	10	11	12
26	KARANDE NITIN DADASAHEB		1	2	3	4	4	5	6	7	8	9	10	
27	KATKAR VISHAL RAGHUNATH		1	2	3	4	4	5	6	7	7	8	9	10
28	KHADE ANIKET SUBHASH		1	1	2	3	4	5	6	7	8	9	10	11
29	KHEMNAR VISHAL SATISH		1	2	3	4	4	5	6	7	8	9	10	11
30	KHESE AJIT DNYANDEV		1	2	3	4	5	6	7	8	8	9	10	10
31	KHERKADE TUSHAR MOHAN		1	2	2	3	4	5	6	7	8	8	9	10
32	KHONDNE AJAY SOPAN		1	2	3	3	4	5	5	6	6	7	7	8
33	KIRTEKANI SUMEDH DILIP		1	2	3	4	5	6	7	8	8	9	10	10
34	KSHIRSAGAR HIMANSHU KAMAL		1	2	2	3	4	5	6	7	8	8	9	10
35	LOKHANDE AKASH SANTOSH		1	2	3	3	4	5	6	7	8	9	10	10
36	MALVE DHIRAJ RAJENDRA		1	2	3	4	4	5	6	7	8	9	9	10
37	MANDLIK ANIKET BHARAT		1	1	2	3	4	5	6	7	8	8	9	10
38	MORE SIDHDANT SATYAVIJAY		1	2	3	3	4	5	6	7	8	9	10	11
39	MURKUTE YOGESH PANDURANG		1	2	3	4	4	5	6	7	8	9	9	10
40	NAGARKAR CHINMAY SHARAD		1	2	2	3	4	5	6	7	8	8	9	10
41	NAGWADE CHANDSHEKHAR BAP		1	2	2	3	4	5	6	7	8	8	9	10
42	NETKE RAHUL BALASAHEB		1	2	3	4	4	5	6	7	8	9	10	10
43	NILE SIDDHARTH BHAUSAHEB		1	2	3	3	4	5	6	7	8	9	9	10
44	PADWAL GAURAV SUNIL		1	2	2	3	4	5	6	7	8	8	9	10
45	PAROJI RAMANNA SHABU		1	2	3	4	5	6	7	8	8	9	10	10
46	PATHARE KARAN DEEPAK		1	2	2	3	4	5	6	7	8	8	9	10
47	PATIL BHUSHAN DILIP		1	2	3	3	4	5	6	7	7	8	9	10
48	PATIL HEMANT SUNIL		1	2	3	4	4	5	6	7	8	9	10	11
49	PATIL VAIBHAV SHARAD		1	2	3	4	4	5	6	7	7	8	9	10
50	PAWAR SHARAD VASANT		1	2	2	4	4	5	6	7	7	8	8	9

IQAC In-charge
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Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering Tal. Parner, Dist. Ahmednagar Karjule Harya

Principal
RGCOE, Karjule Harya.

Signature of the Staff

Signature of H.O.D.

Year 2022 20-23

17/11	24/11													
13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
11	12													
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Ahmednagar-414 304.

Attendance in % upto end of semester	Avg. Marks out of 15	Internal 10	A Mi ou Tot

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering ★ Tal. Parner Dist. Ahmednagar ★ Karjule Harya

Principal
R G COE, Karjule Harya.

Subject : DOM - BJ Sem./Section: VII Academic

Roll No.	Name	Date of Month	21/7	28/7	4/8	7/8	1/9	8/9	15/9	22/9	29/9	13/10	20/10	10/11
		No.	1	2	3	4	5	6	7	8	9	10	11	12
51	RAJPUT NILESH MADANSINGH		1	2	3	3	4	5	6	7	8	9	10	11
52	RAJPUT SURAJ PREMSINGH		1	2	3	4	5	5	6	7	8	8	9	9
53	RAMPHALE BHAUSAHEB KISAN		1	2	2	3	4	5	6	7	8	8	9	10
54	RANE SHUBHAM RAJENDRA		1	2	3	4	5	5	6	7	8	8	9	9
55	SANAP JAGADISH DHARMA		1	2	3	4	5	5	6	7	8	09	10	11
56	SARODE RAHUL DATTATRAYA		1	2	3	4	5	6	6	7	8	9	9	10
57	SHAIKH ARSHAD BADSHAHA		1	2	2	3	4	5	6	7	8	9	9	10
58	SHARMA SHIVAM HARISH		1	2	3	4	5	6	7	8	8	9	10	11
59	SHEKADE TEJAS AJIT		1	2	2	3	4	5	6	7	8	8	9	9
60	SHELKE SHUBHAM SHIVAJI		1	2	2	3	4	5	6	7	8	9	9	10
61	SHEVANT VIKRAM RAJENDRA		1	2	3	4	5	6	7	8	9	10	10	11
62	SINGH NIMESH SUBHASH		1	2	2	3	4	5	6	7	8	9	10	11
63	TANTAK OMKAR VIJAY		1	2	3	4	5	6	7	7	8	9	9	10
64	THUBE SWAPNIL DADASAHEB		1	2	3	3	4	5	6	7	8	8	9	09
65	VADAK MAHESH DNYANDEV		1	2	2	3	4	5	6	7	7	8	8	09
66	VEDE PAVAN VIJAY		1	2	3	4	5	5	6	7	8	8	9	10
67	WAGHMARE BHUSHAN JAYSINGH		1	2	3	4	5	5	6	6	7	8	9	10	11
Signature of the Staff														
Signature of H.O.D.														

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering Ahmednagar Karjule Harya

Principal
R.G.COE, Karjule Harya.

* R=Record, C=Conduction & V-Viva (Evaluated for 5 marks each T = Total for 15 marks)

Year 2022-23

Expt. No.																														
17/11																														
Evaluation																														
*T 15	*C 5	*P 5	*A 5	*T 15	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	Internal 10
12	13																			
10	11																			
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Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner,
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering Tal. Parner, Dist. Ahmednagar Karjule Harya

Principal
RGCOE, Karjule Harya.

6	Dhavale Magan C.	B151130822	Turbo Roof Ventilator Power Generation	Prof. Momin H.S.
	Dhobi Amol A.	B151130823		
	Gaidhane Saurabh C.	B151130826		
	Gaikwad Sagar S.	B151130828		
7	Somwanshi Ganesh D.	B151130878	Hydro Pneumatic Bending and Cutting Equipment	Prof. Korade E.S.
	Manchare Shivaji N.	B151130854		
	More Archana B.	B151130856		
	Inamdar Sannofer R.	B151130838		
8	Kamble Ashitosh B.	B151130848	Average Improving Kit for IC Engine	Prof. Aher V.B.
	Mandhare Atul G.	B151130855		
	Nagawade Shekhar S.	B151130857		
	Rajput Balaji V.	B151130867		
9	Akolkar Akshay M.	B151130807	To Study the Effect of Cryogenic Heat Treatment on D2-D3 Tool Steel	Prof. Gunjal S.B.
	Bhandari Shubham V.	B151130814		
	Choudhari Prajakta S.	B151130820		
10	Rokade Virad A.	B151130869	Seatbelt Operated Hand Brake System	Prof. Korade E.S.
	Tarte Navnath C.	B151130880		
	Rohokale Pravin D.	B151130864		
	Kute Shubham B.	B151130851		
11	Rao Sumit B.	B151130868	Automatic Drainage Cleaning System	Prof. Gunjal S.B.
	Shinde Sandeep S.	B151130876		
	Shinde Rahul A.	B151130875		
	Shide Maruti P.	B151130874		

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Rajiv Gandhi College of Engineering * Karjule Harya * Tal. Parner, Dist. Ahmednagar

Principal
R G COE, Karjule Harya.

12	Vidhate Sopan B.	B151130884	Single Motor Dual Pump		Prof. Aher V.B.
	Jadhav Vishal S.	B151130843			
	Gore Bhagwat N.	B151130834			
	Jagtap Rushiraj S.	B151130844			
13	Pathare Shubham S.	B151130861	Automatic breaking by using adaptive light control system		Prof. Kudal G.B.
	Chaskar Sagar B.	B151130819			
	Khemnar Rahul J.	B151130866			
	Shaikh Ubaid T.	B151130871			
14	Chipade Shubham S.	B151130801	Bi-directional mixer		Prof. Korade E.S.
	Ghule Rushikesh P.	B151130802			
	Patil Pramod V.	B151130804			
15	Kulkarni Vasudev D.	B151130803	Design and manufacturing of ceramic heat distributor for oven seperation of heat for heating plate		Prof. Patne B.V.
	Pawar Yogita P.	B151130805			
	Raykar Amol N.	B151130806			
16	Bankar Aditya S.	B151130809	Tracking of Solar Panel by Hydraulic System		Prof. Momin H.S.
	Bhadange Swapnil D.	B151130811			
	Bhanage Babasaheb S.	B151130812			
	Girhe Indrajit R.	B151130831			
17	Bhand Sachin S.	B151130813	Experimental Investigation on Thermal Energy Storage By PCM		Prof. Gunjal S.B.
	Bhujbal Sachin B.	B151130815			
	Gunjal Yogesh S.	B151130835			
	Salunke Mangesh G.	B151130870			

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Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering * Tal. Parner, Dist. Ahmednagar * Karjule Harya

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R G COE, Karjule Harya.

Matoshri Shaikshanik Pratishthan's

RAJIV GANDHI COLLEGE OF ENGINEERING

Estd. 2012

Recognised by Govt.of Maharashtra, Approved by AICTE & to Savitribai Phule Pune University/MSBTE, Mumbai.

Vitthalnagar, Kokate Vasti, Karjule Harya, (Takali Dhokeshwar) Nagar Kalyan Highway, Tal.Parner, Dist.Ahmednagar, Pin-414304.

Phone : 8975578687, 8975178687, 7447275353 **Visit us at :** www.rgcoe.org / **email :** rajivgandhi.iot@gmail.com

18	Thube Hemant M.	B151130881	Design and Analysis of composite Drive shaft by using Ansys	Prof. Gaikwad S. A.
	Thube Sagar K.	B151130882		
	Gopale Ajay N.	B151130833		
	Pund Sandip H.	B151130865		
19	Patil Omkar P.	B151130862	Hydraulic Press Machine by using Hydraulic Jack	Prof. Patne B.V.
	Paswan Mahesh S.	B151130860		
	Padekar Mahesh P.	B151130859		
	Kadlag Nilesh S.	B151130846		
20	Shinde Shubham G.	B151130877	Electricity Generation from Bike Silencer using Thermocouple	Prof. Aher V.B.
	Kakade Saurabh R.	B151130847		
	Dhumal Atul V.	B151130824		
	Keskar Nitin S.	B151130849		
21	Thube Sagar V.	B151130883	Comparative Analysis of Household Refrigerator with Low Alternative Global Warming Potential Refrigerant.	Prof. Gaikwad S. A.
	Lalage Suyog N.	B151130852		
	Navale. Amol T.	B151130858		
22	Ghegade Pratik M.	B151130830	Design and weight optimization of lift platform by using composite material and ANSYS software	Prof. Gaikwad S. A.
	Harde Yogesh S.	B151130836		

Total Number of Groups - 22

Number of Industry Sponsored Groups - 02

Number of Non-Sponsored Groups – 20

HOD **PROJECT COORDINATOR** **PRINCIPAL**

Principal
R G COE, Karjule Harya.

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering Tal. Parner, Dist. Ahmednagar Karjule Harya

Matoshri Shaikshanik Pratishthan's

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PROJECT STAGE II DETAILS

Academic Year- 2019-20

Name of Project Coordinator- Prof Gunjal S. B.

Group No.	Name of Students	Exam Seat No.	Name of Project Title	Project Guide
1	Patil Somanath Basaweshwar	71806701M	Design and manufacturing of screw conveyor for metal chip handling in machine	Prof. Korade E. S.
	Dorge Akshay Raju	71752903H		
	Telangi Raghavendra Gopal	71806728C		
	Khilari Tushar Laxman	71752935F		
2	Ambilwade Prasad Vasant	71752874L	Performance of Bio Oil on journal bearing instead of synthetic oil	Prof. Kurpatwar B. P.
	Atkar Prasad Balasaheb	71543737C		
	Atkar Pooja Balasaheb	71752876G		
	Bhand Akshay Chandrabhan	71632517k		
3	Kohak Mahesh Namdev	71632515c	Emergency evacuation kit (skysaver)	Prof. Gadadhe P. B.
	Singh Kisan Haribansh	71632514E		
	Patil Tushar Namdeo	71632518H		
	Bhamre Kapil Keshavrao	71632521H		
4	Kute Suvarna Nana	71752942J	Design of crane self locking system	Prof. Kudal G. B.
	Lahu Manik Jogdand	71752943G		
	Pawar Pravin Kedarnath	71752961E		
	Jagtap Dashrath Balasaheb	71752922D		
5	Patil Bhushan Arun	71752958E	Design and analysis of Aqua Silencer	Prof. Momin H. S.
	Hallale Mahesh Dattatray	71752915M		
	Vaidya Krushna Dattatray	71752998D		
	Padalkar Darshan Machhindra	71656586c		

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6	Kambale Prasad Gahininath	71752928C	Automatic water tank cleaning machine	Prof. Gunjal S. B.
	Swapnil Kailas Rajguru	71752991G		
	Thorat Yogesh Balasaheb	71752994M		
	Shelar Jaydeep Shankar	71752982H		
7	Patare Bharat Namdev	71752955L	Head Light Turning Mechanism	Prof. Aher V. B.
	Pathare Pravin Machhindra	71752956J		
	Rajale Dhiraj Shivaji	71752970D		
	Kadam Nikhil Prabhakar	71806682M		
8	Kshirsagar Mahesh Namdev	71752939J	Wireless bomb disposal robot	Prof. Kurpatwar B. P.
	Borkar Rushikesh Goraksh	71752891L		
	Kate Somnath Dattatray	71752932M		
	Shinde Yogesh Vitthal	71752988G		
9	Pravin Rajaram Mule	71806706B	Magnetic Fuel Saver Device	Prof. Korade E. S.
	Naik Sagar Ranjan	71656582L		
	Khatekar Akash Ashok	71656568E		
	Shinde Pratik Bhagchand	71752985B		
10	Kothare Prakash Tatyaram	71656571E	Automatic Wiper Controller	Prof. Gadadhe P. B.
	Sake Kiran Dattu	71656601L		
	Warkad Rushikesh Somnath	71656636c		
	Abhale Yogesh Pandurang	71468908E		
11	Khandge Virag Ramdas	71656567G	Experimental investigation wear rate of PPS composites rainforced with carbon fiber MOS2 and Bronze	korade sir
	Jadhav Akshay Ankush	71656552J		
	Kudnar Ravindra Tanhaji	71752940B		
	Harde Rushikesh Rajaram	71806675J		
	Bande Sandip Vitthal	71656504J		

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12	Londhe Kiran Maruti	71752944E	Advance Parking System	Prof. Patne B. V.
	Palve Vaibhav Vitthal	71752953D		
	Shaikh Junaid Shafi	71752979H		
	Kadam Hemant Shankar	71806681C		
13	Pingale Nikhil Nandkishor	71656594D	Multi seed plantation	Prof. Momin H. S
	Ugale Tejes Nandkumar	71656628B		
	Anandkar Sushant Mohan	71524512M		
	Kale Aniket Rajendra	71806683K		

Total Number of Groups - 13

Number of Industry Sponsored Groups - 00

Number of Non-Sponsored Groups - 13

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PROJECT STAGE II DETAILS

Academic Year- 2020-21 **Name of Project Coordinator-** Prof Gunjal S. B.

Group No.	Name of Students	Name of Project Title	Project Guide
1	Shinde Bapu Dhondiram Shinde Sumit Kailas Tambe Vilas Annasaheb Sable Nikhil Balasaheb	Zero turn machine	Prof. Gunjal S.B.
2	Agale Ajay Harischandra Ambekar Yogesh Shrikant Bhaik Shubhangi Madhav Salve Shubham Devdatta	Pneumatic Hand Brake Operation Using Seat Belt	Prof. Korade E.S.
3	Taksale Ganesh Vijay Pavase Ganesh Shridhar Daspute Shatrughna Chandrakant Shirsat Vikas Mhatardev Kakasaheb Vikram Potbhare	Fourway Hacksaw Cutting Machine	Prof. Aher V.B.
4	Datir Rahul Sharad Tad Bharat Pandurang Aghav Gorakh Suryabhan Bhalerao Richard Kiran	Pneumatic Lemon Cutting Machine	Prof. Patne B.V.
5	Nehe Akshay Rajendra Dhonge Swapnil Rajaram Kamble Ashwini Vishvanath Bhamare Yugandhar Dilip	Power Generation using Speed Breaker	Prof. Jagdale A.A.
6	Rupnar Nilesh Popat Sabale Yogesh Salu Adulkar Bhagoji Lakhoji Sapkal Mahesh Ashok	Advance Automatic Gate opening System	Prof. Gunjal S.B.

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7	Saswade Santosh Narayan Shahane Bhushan Santosh Bhand Shreekant Dattatraya Shaikh Samad Hasanali	Automatic Electromagnetic Punching Machine	Prof. Korade E.S.
8	Labde Sachin Ganpat Kale Sagar Keshav Gadakh Rushikesh Kailas Kambale Chitanya Pandharinath	Design and Fabrication of Double Helical Spiral Mixer	Prof. Jagdale A.A.
9	Bodke Amit Shantaram Bodke Sumitkumar Shantaram Kale Akshay Bibhishan Ghuge Ashish Eknath	Bicycle Powered Washing Machine	Prof. Patne B.V.
10	Hiwale Darshan Balasaheb Chavan Nikhil Satish Pawar Kiran Ambadas Mahajan Gaurav Suresh	Gating design optomization for yield improvement in Casting	Prof. Aher V.B.
11	Bhise Ajinkya Devidas Salve Sushant Ashok Patil Shubham Pravin Khairnar Vijaykumar Ramdas	Fabrication of Fertilizer spreading machine	Prof. Gunjal S.B.
12	Khilari Sagar Sambhaji Shaikh Noor E Abdul Rahiman Riyazoddin Khedkar Anil Shahadev Ganesh Baban Kanherkar	Advance Footstep Pawer Generation using RFID for mobile charging.	Prof. korade E.S.
13	Sirsath Shrikant Kailas Bhavsar Parag Rahul Rajendra Gaikwad Nilesh Babaji Raut	Comparison of wear parameter of Aluminium LM-25+SIC	Prof. Jagdale A.A.

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14	Makhamale Sameer Chandrakant Thombare Pritam Balasaheb Shelke Rahul Ramdas Rathod Ajay Sitaram	Oil and Grease Skimmer	Prof. Patne B.V.
15	Harde Gaurav Nandkumar Joshi Vaibhav Prakash Kadus Suraj Vasant Kshirsagar Omkar Arun	refrigeration peltier based	Prof. Aher V.B.
16	Sonawane Rushabh Ramdas Suresh Shamrao Kute Tope Aishwarya Sakharam Chavan Nikita Shrimant	Automatic metal seperator conveyor	Prof. Jagdale A.A.
17	Dalimbkar Ankita Sanjay Dane Amol Devidas Kale Dhananjay Raghunath Joshi Siddhesh Rajgopal	Three Axix Pneumatic Dumping Trolly	Prof. Korade E.S.
18	Kharade Akshay Sunil Avhad Pradip Subhash Waman Tushar Ashok Narsale Akshay Sanjay	Intellgent Reverse Braking System	Prof. Gunjal S.B.
19	Kale Rishikesh Lahu Jadhav Someshwar Babasaheb Patil Paresh Ravindra Jagtap Vijay Baban	Solar Compact Dustbin	Prof. Patne B.V.
20	Shubham Santosh Wagh Tarate Atul Bhau Datal Akshaykumar Gokul Shelke Sagar Babadev	Compressed Air Production using Vehicle Suspension	Prof. Aher V.B.

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21	Raktate Vikas Dattatrya Kale Ishwar Chandrakant Dhanraj Machhindra Kamble Jagtap Suraj Sanjay	Water Cleaning of Floating Materials	Prof. Korade E.S.
22	Matkar Pratik Bhanudas Gawali Abhijeet Uttam Surase Gokul Popat Thube Ajay Nathaji	Experimental Investigation of Pin Fin Surface for Heat Transfer in Natural Convection	Prof. Jagdale A.A.
23	Bhavsar Parag Suresh Bhumkar Ajay Tulashiram Gore Yogesh Prabhakar Hande Sandip Tulshiram	Pneumatic Gear Changer	Prof. Gunjal S.B.
24	Hinge Somanath Madhukar Jagtap Ganesh Uttam Gunjal Devendra Dattatray Kokane Shubham Rakamaji	Automatic Spray Painting Machine	Prof. Patne B.V.
25	Rokade Swapnil Prakash Sawant Satish Madhukar Nachan Machhindra Ramdas Shinde Ketan Kundlik	Design and Analysis of Ladle Cover	Prof. Korade E.S.
26	Waghade Nilesh Govardhan Phatak Ankush Satish Nimbalkar Avinash Nivrutti Shelke Devendra Baban	Automatic Pneumatic Bumper	Prof. Jagdale A.A.

Total Number of Groups - 26
Number of Industry Sponsored Groups - 00
Number of Non-Sponsored Groups - 26

HOD **PROJECT COORDINATOR** **HOD**

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PROJECT STAGE II DETAILS

Academic Year- 2021-22 **Name of Project Coordinator-**Prof Gunjal S. B.

Group No.	Name of Students	Name of Project Title	Project Guide
1	NIKAM SANCHIT BALU PAI PRITAM PANDURANG PATIL SHUBHAM SUMERSINGH SHIVANAND ALAS SHRISHAIL SADASHIV JIVANAVAR	Effortless car lifting by using exhaust air jack for preventing human efforts	Prof. Jagdale A.A. (9423409554)
2	KOLHE PRASHANT DILIP SALVE KAILAS PRAKASH BHALSING SAURABH SANJAY JADHAV RUSHIKESH NANDU	Rocker-bogie mechanism	Prof. Gunjal S.B. (9325200501)
3	DHADGE SUYOG BALU GHADAGE ADINATH SAYAJI NIVALE RAHUL DNYANOBA PAWAR BAPU BABAN	Average Improving Kit for IC Engine	Prof. Jagdale A.A. (9423409554)
4	PALWE NITIN SUBHASH WADHAVANE VAIBHAV POPAT MANDLIK YOGESH ANNASAHEB RAKESH CHANDRAKANT GADEKAR	Development of working prototype of Two in One Generator	Dr. Pawar K. P. (8329598185)
5	NIVDUNGE PRAVIN MAHADEV VISHAL SANTOSH YELVANDE THORAT VIKAS DNYANDEO KARKE SHUBHAM PRABHAKAR	LPG Cooling System	Prof. Aher V.B. (9702743555)
6	AMIT VIJAY TAPKEER BUCHUDE GANESH NANA CHORMAL SUSHILKUMAR RANGNATH WAGHMARE DINESH NARAYAN	Automatic breaking by using adaptive light control system	Dr. Pawar K. P. (8329598185)

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7	GHODE MANISH SURESH DHUMAL VARSHA BHARAT GAWARE KARTIKI SANJAY TEKE SHUBHAM CHANDRAKANT	Pneumatic Lemon Cutting Machine	Prof. Jagdale A.A. (9423409554)
8	ROHAKALE RAHUL SAVKAR BELHEKAR SHUBHAM NAMDEV KHARCHE ASHISH SONAJI DANGE PARITOSH PRAVIN	Bicycle Powered Washing Machine	Prof. Aher V.B. (9702743555)
9	BHANGARE GAURI PRAKASH BHOI RAVINA SHALIKRAO CHOUDHARI KUNDAN DAULAT DARADE RAHUL BAPU	Air Conditioning working on vehicle suspension	Prof. Gunjal S.B. (9325200501)
10	PISE SAURABH ASHOK CHAVAN POOJA SUNIL VAGHAMODE VIKAS MACHINDRA JADHAV JAYESH SUNIL	Automated gear shifting system	Prof. Gunjal S.B. (9325200501)
11	SONULE SHUBHAM RAVINDRA MHASKE DEEPAK SANJAY AHIRRAO JAYODIP HEMANT WANDHEKAR PRASHANT RAJKUMAR	Compressed Air Production using Vehicle Suspension	Dr. Pawar K. P. (8329598185)
12	KAVCHAT KESHAV GANESH JADHAV SUJIT VYANKAT KARANDE ABHIJEET RAJU UNDE PRASHANT KARBHARI	Water Cleaning of Floating Materials	Dr. Pawar K. P. (8329598185)
13	KATARIYA SHUBHAM SANTOSH THORAT SHUBHAM MURLIDHAR KADUS PRASHANT POPAT KEKAN SIDDHESH ANAND	Air Pre-heater in two Wheeler	Prof. Jagdale A.A. (9423409554)

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14	DIVATE RAVISHANKAR ASHOK DUKARE MININATH VIKRAM BHISE SOMNATH SURESH KHANDAVE VISHAL DILIP	Automatic Drainage Cleaning System	Prof. Gunjal S.B. (9325200501)
15	SINGH ADITYA TEJPRATAP KANINGDHWAJ PRASAD NIVARUTTI JAISWAL GAURAV RAVINDRA KAMBLE AKASH MAHENDRA	Single Motor Dual Pump	Prof. Jagdale A.A. (9423409554)
16	SHAIKH SHAHBAZ ABDUL HANIF PATIL SHIVAM SATISH MORE MAHESH BHARAT JADHAV DIGAMBAR VINAYAK	Design and development of automatic level track and height adjustable stretcher for hospital application: A prototype Approach	Dr. Pawar K. P. (8329598185)
17	BADAKH SIDDHARTH GORAKSHANATH BHAGWAT DINESH SANJAY SHELKE AMOL HARIBHAU WAGH SHRIRAM BAPUSAHEB	Four way Hacksaw Cutting Machine	Prof. Aher V.B. (9702743555)
18	JADHAV SHUBHAM SAKHARM KHANDVI MANOJ CHATUR AHER CHETAN SANJAY DHANAK SWAPNIL ARUN	Air Pre-heater in two Wheeler	Prof. Gunjal S.B. (9325200501)
19	PAWAR NAGESH BABAN JAGTAP GANESH UTTAM KHILARI SAGAR SAMBHAJI NACHAN MACHHINDRA RAMDAS	single Motor Dual Pump	Dr. Pawar K. P. (8329598185)
20	NIMBALKAR AVINASH NIVRUTTI PHATAK ANKUSH SATISH RANODE SHUBHAM APPASAHEB SHELKE DEVENDRA BABAN SURASE GOKUL POPAT	Automatic Wiper Controller	Prof. Gunjal S.B. (9325200501)

Total Number of Groups - 20
Number of Industry Sponsored Groups - 00
Number of Non-Sponsored Groups - 20

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PROJECT STAGE II DETAILS

Academic Year- 2022-23			Project Coordinator- Prof Kurpatwar B.P.	
Group No.	**Roll No.**	**Name of Students**	**Name of Project Title**	**Project Guide**
1	13	BORASE AMOL BAHGWANTRAO	Design and development of 3-way dumper	Prof. Jagdale A.A.
	36	MALVE DHIRAJ RAJENDRA		
	45	PAROJI RAMANNA SHABU		
	17	GAIKWAD LOKESH RAJAN		
2	62	SHEVANTE VIKRAM RAJENDRA	Tribological performance of jatropha instead of synthetic oils using journal bearing tester	Prof KurpatwarB.P.
	65	THUBE SWAPNIL DADASAHEB		
	55	SANAP JAGDISH DHARMA		
	34	KSHIRSAGAR HIMANSHU KAMALAKAR		
3	6	ASWAR PAYAL GOVIND	Comparative Analysis and Emission Testing of Bio diesel on single cylinder C.I. Engine	Prof. Jagdale A.A.
	10	BHASKAR AMAR SHRIKANT		
	11	BHOGADE OMKAR MAHADEO		
	12	BHOJANE SWAPNIL SHIVAJI		
4	19	GODE MAHESH NANDU	Air Balloon Jack	Prof KurpatwarB.P.
	26	KARANDE NITIN DADASAHEB		
	38	MORE SIDHDANT SATYAVIJAY		
	68	WAGHMARE BHUSHAN JAYSINGH		
5	3	AHER TUSHAR ANIL	Design of Development of automatic feesh feeder	Prof KurpatwarB.P.
	31	KHIRKADE TUSHAR MOHAN		
	47	PATIL BHUSHAN DILIP		
	52	RAJPUT SURAJ PREMSING		
6	7	AUTI GAURAV ANIL	Development of multi nut opener cum tighten tool	Prof. Pawar N.V.
	15	DHUMAL AJINKYA PARAJI		
	46	KARAN DEEPAK PATHARE		
	64	OMKAR VIJAY TANTAK		

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7	4	AJABE SAGAR KAILAS	Design of Development of chairless chair	Prof. Gunjal S.B.
	16	DHUMAL SHUBHAM RAJENDRA		
	43	NILE SIDDHARTH BHAUSAHEB		
	50	PAWAR SHARAD VASANT		
8	49	PATIL VAIBHAV SHARAD	Bladeless wind mill	Prof. Gunjal S.B.
	54	RANE SHUBHAM RAJENDRA		
	56	SARODE RAHUL DATTATRAYA		
	1	MORE VISHAL HARIBHAU		
9	66	VADAK MAHESH DNYANDEV	Design and development of savonious hydroturbine	Prof. Gunjal S.B.
	58	SHAIKH ARSHAD BADSHAHA		
	9	BATULE BHARAT POPAT		
	61	SHELKE SHUBHAM SHIVAJI		
10	5	AKHANDE AKASH PRAKASH	Design and manufacturing of combination Pedal for accelerator and brake.	Dr.K.P. Pawar
	21	INGLE SANKET SIDDHARTH		
	35	LOKHANDE AKASH SANTOSH		
	48	PATIL HEMANT SUNIL		
11	24	JADHAV NILESH RAMESH	360 Degree Rotating Vehicle System	Dr.K.P. Pawar
	20	HINGMIRE ANAND BHARAT		
	8	BADGUJAR UMESH SURESH		
	25	KADAM SOMESHWAR D.		
12	2	AGARKAR ASHUTOSH SUDHIR	Modification in boiler with expended metal screen	Prof. Jagdale A.A.
	59	SHARMA SHIVAM HARISH		
	14	DHAS PAVANKUMAR SUBHASH		
	18	GAWADE GAYATRI GOPICHAND		
13	44	PADWAL GAURAV SUNIL	Design And Fabrication Of Adaptive Headlight System With Fog Detection & prevention	Prof. Pawar N.V.
	63	SINGH NIMESH SUBHASH		
	23	JADHAV MAHESH BALU		
	22	ISAEE RUTIK NITIN		

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14	32	KHOMANE AJAY SOPAN	SEA OIL SEPERATOR	Dr.K.P. Pawar
	41	NAGAWADE GHRUSHNESHWAR BAPURAO		
	33	KIRTISHAHI SUMEDH DILIP		
	27	KATKAR VISHAL R.		
15	37	MANDLIK ANIKET BHARAT	3D Printed arculated Arculated arm Robot	Prof. Unde A.R.
	51	RAJPUT NILESH MADANSINGH		
	53	RAMPHALE BHAUSAHEB KISAN		
	67	VEDE PAVAN VIJAY		
16	30	KHESE AJIT DNYANDEV	Front wheel steering system with moveadle headlights	Prof.JagdaleA.A.
	40	NAGARKAR CHINMAY SHARAD		
	60	SHEKADE TEJAS AJIT		
17	28	KHADE ANIKET SUBHASH	Accident preventive bumper	Prof.N.V. Pawar
	29	KHEMNAR VISHAL SATISH		
	42	NETKE RAHUL BALASAHEB		
	39	MURKUTE YOGESH PANDURANG		

Total Number of Groups -17
Total Number of Students -67
Number of Industry Sponsored Groups -1
Number of Non-Sponsored Groups -16

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PROJECT STAGE II DETAILS

Academic Year- 2023-24 | **Name of Project Coordinator-** Prof Paimode S.S.

Group No.	Roll No.	Name of Students	Name of Project Title	Project Guide
1	15	DOKE SHUBHAM BALU	Advance military spying bomb disposal robot	Prof. Kurpatwar B.P.
	16	GAIKWAD AMARDIP GOVIND		
	62	SHIMPI YOGESH BAPURAO		
	13	DHUMAL MANGESH MAHADEV		
2	23	JADHAV PUSHPAK MAHADEV	Two way operatwd oil skimmer machine	Prof N.V. Pawar
	2	BARVE MAHESH VISHNU		
	19	GITE ABHIJIT MURALIDHAR		
	11	DHONGADE PRASAD BAPUSAHEB		
3	50	PAWAR DNYANESHWAR RAVINDRA	Design and FEA analysis of Evehical battery bracket	Prof. Kurpatwar B.P.
	68	TIRKHUNDE SAGAR SANJAY		
	63	SHINDE DIPAK SUNIL		
	43	MHATRE VIVEK HARIBHAU		
	70	YEWALE ARTI BHASKAR		
4	7	BOMBALE MAHESH SUDHAKAR	use of bake paper and salection oil grade to avoiding surface irregularities	Prof. Jagdale A.A.
	14	DIVATE SHREERAM MADAN		
	18	GHODAKE PRANAV SATISH		
	45	NAVSUPE SHUBHAM SANJAY		
	26	KARALE DINESH ROHIDAS		
5	31	KOLHE VIKRAM ARUN	Design and fabrication of pneumatic bar bending machine	Prof. Jagdale A.A.
	21	HARVANE MAYUR SURESH		
	12	DHOTRE AJINKYA ASHOK		
	10	DHANWATE MAYUR BAPUSAHEB		

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6	42	MHASKE SAURAV BALASAHEB	Design and development of magnetic transmission system a prototyoe approch.	Prof. Unde A.R
	41	MEHER PRATIK ASHOK		
	9	DANGADE PRATIK SATISH		
	38	MARE PRAJWAL BALAJI		
7	49	PATIL VIGHNESH VISHNU	Design and development of automatic hill assist system for four wheeler	Prof. Gunjal S.B.
	8	BUGADE SHRIYASH PRAKASH		
	17	GAIKWAD PRAKASH NANASO		
	33	KUMATKAR KIRAN DNYANESHWAR		
8	27	KAWDE MAHESH BABASAHEB	Investigation on use of hippe bio disel for C I engine performance improvement.	Dr. Krupal Pawar
	67	TELORE NIKHIL LAXMAN		
	61	SHILAWAT VAIBHAV BHAGWAN		
	54	POTDAR SWAPNIL VILAS		
9	40	MATKAR PRASAD SAINATH	Double Disc Lapping Machine	Prof N.V.Pawar
	39	MATE TEJAS RAJENDRA		
	29	KOHAK OMKAR JALINDAR		
	52	PAWAR SACHIN RAMA		
10	35	LABADE SANKET SUKHADEV	'Paramatic optimization of EDM (electro deschrge machining) process parameter using AISI 304'	Prof. Jagtap B.M.
	36	MALVE SANTOSH MALHARI		
	30	KOLHE VIJAY RAMDAS		
	69	TRIBHUVAN RAHUL PRAKASH		
11	5	BHALEKAR PRANAY DNYANESHWAR	Reshaping parts and cost saving for customer delight	Prof. Unde A.R
	25	KAMBALE VIKAS SAHEBRAO		
	32	KOTE AKSHAY RAMESH		
	37	MANDAGE ADITYA KAILAS		
12	28	KHAIRNAR RAHUL RAJENDRA	Effect of silicon carbide carbide content on tribological properties of Aluminium ZINC Alloy Composite.	Prof.Darade P.P
	47	PATHAN ZAHID ABUBAKAR		
	48	PATIL HARSHAL RAVINDRA		
	24	KAKADE RUSHIKESH SAVKAR		

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13	53	PEHARKAR RAMKISAN PRAVIN	An autonomous cooperating robot used for delivery purpose in desert area through Wi-Fi camera	Prof Gunjal S.B.
	64	SHINDE VISHAL RAJENDRA		
	65	SOLAT SOMNATH DATTATRAY		
	55	POTE AADESH OMKAR		
14	1	ASHTEKAR SANGHARSH SACHIN	Development of AI based fire detection and water sprayer Robot.	Dr. Krupal Pawar
	4	BHAKARE ATUL SANTOSH		
	22	INAMDAR ADIL AFAJAL		
	71	ROKADE SWAPNIL PRAKASH		
15	66	SONAWANE SATISH SHARAD	Sensor operated accident safety bumper	Prof.Darade P.P
	57	SALUNKE ROHIT LAXMAN		
	3	BHADANE ANIKET NARHAR		
	6	BIDKAR SWATI RAMESH		
	44	MORE ABHISHEK SHIVAJI	AI based smart vehical system	Prof. Paimode S.S.
	46	PANDIT ADITYA KAILAS		
	51	PAWAR ROHIT ANKUSH		
17	60	SHELAR SOMESH DATTATRAY	Design and development of AI based floor cleaning robot for RGCOE office cleaning purpose.	Dr. Krupal Pawar
	20	HARALE YUVRAJ SUNIL		
	56	RAUT CHETAN DNYANESHWAR		
	59	SATPUTE APURV RAVI		
	58	SALVI JITESH GANESH		

Total Number of Groups -17

Total Number of Students -67

Number of Industry Sponsored Groups -

Number of Non-Sponsored Groups -

HOD **PROJECT COORDINATOR** **PRINCIPAL**

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PROJECT STAGE II DETAILS (E&TC)

Academic Year- 2018-19 | **Name of Project Coordinator-** Prof. Pravin D. Auti

Group No.	Name of Students	PRN No.	Name of Project Title	Project Guide
1	Mr. Pratik Ganesh Deshmukh	71656713L	"GREENHOUSE REMOTE MONITORING SYSTEM USING EMBEDDED CONTROLLED SENSOR NETWORK"	Prof. Pravin D. Auti
	Mr. Rakesh Sherichand Rajan	71656729G		

PROJECT STAGE II DETAILS (E&TC)

Academic Year- 2020-21 | **Name of Project Coordinator-** Prof. Kulkarni G.M.

Group No.	Name of Students	PRN No.	Name of Project Title	Project Guide
1	Kahane Kaustubh	71940857B	"Wireless chargeable Eco-friendly bus"	Prof. Kulkarni G.M.
	Mane Pooja	72038051M		
	Bolbhat Ashwini	71940856D		
	Nipanikar Atul	71940858L		

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PROJECT STAGE II DETAILS (E&TC)

Academic Year- 2021-22	**Name of Project Coordinator-** Prof. Auti P.D.

Group No.	Name of Students	PRN NO.	Name of Project Title	Project Guide
1	Mr. Bhilare Vishal Sharadkumar	71656710F	"Autonomous Fire Fighting Robot"	Prof. Auti P.D.
	Mr. Auti Navnath Kakasaheb	71656708D		
	Mr. More Pradip Nimba	71656723H		

Group No.	Name of Students	PRN NO.	Name of Project Title	Project Guide
2	Mr. Farande Bandu Tukaram.	71656714J	Automated Railway Gate Control System	Prof. Patil V. V.
	Mrs. Nehul Vaishali Sambhaji.	71656725D		

Group No.	Name of Students	PRN NO.	Name of Project Title	Project Guide
3	Mr. Singh Udit Tejpratap	72011445E	Adaptive Cruise Control	Prof. Dahake Supriya S.
	Mr. Indre ravindra nagorao	72011444G		

Group No.	Name of Students	PRN NO.	Name of Project Title	Project Guide
4	Chaudhari Raju Sabaji.	71524679J	Traffic Management System	Prof. Patil V. V.
	JadhavMangeshBalasaheb.	71806679M		

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Group No.	Name of Students	PRN NO.	Name of Project Title	Project Guide
5	Mr. Gagare Nikhil K.	72011442L	IOT Based Car Accident Detection and Alert System	Prof. Auti Pravin. D.
	Mr. Jadhav Rakesh S.	71656719K		
	Ms. Hangarge Shivlila S.	72011443J		

PROJECT STAGE II DETAILS (E&TC)

Academic Year- 2022-23 | **Name of Project Coordinator-** Prof. Patil V.V.

Group No.	Name of Students	PRN NO.	Name of Project Title	Project Guide
1	Mr. Gunjal Akshay Rangnath	72177082H	VEHICLE SECURITY CONTROLLING AND SURVEILLANCE	Prof. Auti Pravin D.
	Mr. Gunjal Sanket Bhaskar	72177083F		
	Mr. Thorat Rushikesh Vijay	72177092E		

Group No.	Name of Students	PRN NO.	Name of Project Title	Project Guide
2	Miss Lohkare Panchfula Ankush	72177087J	HANDWRITTEN MODI CHARACTER RECOGNITION USING DEEP LEARNING ALGORITHM	Prof. Patil V.V.
	Miss Pol Rutuja Hanmant	. 72177089E		
	Miss Shinde Snehal Vijay	72177090J		
	Mr. Zaware Omkar Jaysing	72177093C		

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Group No.	Name of Students	PRN NO.	Name of Project Title	Project Guide
3	Mr. BHUJBAL ASHISH L	72177079H	Development of Intelligent Safety System for Two-wheeler Rider	Prof. Patil V.V.
	Mr. DAHITE PRASHANT D	72177080M		
	Mr. DATIR NILESH K	72177081K		

Group No.	Name of Students	PRN NO.	Name of Project Title	Project Guide
4	Mr. Tambe Sushilkumar D.	72177091G	"IOT BASED INTELLIGENT TRANSPORTATION SYSTEM (IOT-ITS) FOR GLOBAL PERSPECTIVE: A CASE STUDY	Prof. Patil V. V.
	Mr. Jadhav Nilesh S.	72177084D		
	Mr. Kulkarni Akash S.	72177086L		

Group No.	Name of Students	PRN NO.	Name of Project Title	Project Guide
5	Mr. Pawar Sanket S.	72177088G	Intelligent Life Saver System with Gas Leakage	Prof. Auti Pravin D.
	Mr. Korde Mahesh D.	72177085B		
	Mr. Bhujade Prashant P.	72177079H		

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ACADEMIC CALENDER OF SE TO BE (SEM - II)																		DATE-01/01/2021		
MON	TUE	WED	THUR	FRI	SAT	SUN	MON	TUE	WED	THUR	FRI	SAT	SUN	MON	TUE	WED	THUR	FRI	SAT	SUN
				1-Jan	2-Jan	3-Jan	4-Jan	5-Jan	6-Jan	7-Jan	8-Jan	9-Jan	10-Jan	11-Jan	12-Jan	13-Jan	14-Jan	15-Jan	16-Jan	17-Jan
18-Jan	19-Jan	20-Jan	21-Jan	22-Jan	23-Jan	24-Jan	25-Jan	26-Jan	27-Jan	28-Jan	29-Jan	30-Jan	31-Jan	1-Feb	2-Feb	3-Feb	4-Feb	5-Feb	6-Feb	7-Feb
8-Feb	9-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb	15-Feb	16-Feb	17-Feb	18-Feb	19-Feb	20-Feb	21-Feb	22-Feb	23-Feb	24-Feb	25-Feb	26-Feb	27-Feb	28-Feb
1-Mar	2-Mar	3-Mar	4-Mar	5-Mar	6-Mar	7-Mar	8-Mar	9-Mar	10-Mar	11-Mar	12-Mar	13-Mar	14-Mar	15-Mar	16-Mar	17-Mar	18-Mar	19-Mar	20-Mar	21-Mar
22-Mar	23-Mar	24-Mar	25-Mar	26-Mar	27-Mar	28-Mar	29-Mar	30-Mar	31-Mar	1-Apr	2-Apr	3-Apr	4-Apr	5-Apr	6-Apr	7-Apr	8-Apr	9-Apr	10-Apr	11-Apr
12-Apr	13-Apr	14-Apr	15-Apr	16-Apr	17-Apr	18-Apr	19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	24-Apr	25-Apr	26-Apr	27-Apr	28-Apr	29-Apr	30-Apr	1-May	2-May
3-May	4-May	5-May	6-May	7-May	8-May	9-May	10-May	11-May	12-May	13-May	14-May	15-May	16-May	17-May	18-May	19-May	20-May	21-May	22-May	23-May
24-May	25-May	26-May	27-May	28-May	29-May	30-May														

COLOUR INDEX			
	COMMENCEMENT OF TEACHING		LAST DATE OF SUBMISSION
	UNIT TEST I & II		CONCLUSION OF TEACHING
	HOLIDAY		UNIVERSITY THEORY EXAM
	DISPLAY OF ATTENDANCE		PARENT MEET
	ALUMNI MEET		TECHNICAL EVENT

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ACADEMIC CALENDER OF FE(SEM - II)

DATE-10/05/2021

MON	TUE	WED	THUR	FRI	SAT	SUN	MON	TUE	WED	THUR	FRI	SAT	SUN	MON	TUE	WED	THUR	FRI	SAT	SUN
																			1-May	2-May
3-May	4-May	5-May	6-May	7-May	8-May	9-May	10-May	11-May	12-May	13-May	14-May	15-May	16-May	17-May	18-May	19-May	20-May	21-May	22-May	23-May
24-May	25-May	26-May	27-May	28-May	29-May	30-May	31-May	1-Jun	2-Jun	3-Jun	4-Jun	5-Jun	6-Jun	7-Jun	8-Jun	9-Jun	10-Jun	11-Jun	12-Jun	13-Jun
14-Jun	15-Jun	16-Jun	17-Jun	18-Jun	19-Jun	20-Jun	21-Jun	22-Jun	23-Jun	24-Jun	25-Jun	26-Jun	27-Jun	28-Jun	29-Jun	30-Jun	1-Jul	2-Jul	3-Jul	4-Jul
5-Jul	6-Jul	7-Jul	8-Jul	9-Jul	10-Jul	11-Jul	12-Jul	13-Jul	14-Jul	15-Jul	16-Jul	17-Jul	18-Jul	19-Jul	20-Jul	21-Jul	22-Jul	23-Jul	24-Jul	25-Jul
26-Jul	27-Jul	28-Jul	29-Jul	30-Jul	31-Jul	1-Aug	2-Aug	3-Aug	4-Aug	5-Aug	6-Aug	7-Aug	8-Aug	9-Aug	10-Aug	11-Aug	12-Aug	13-Aug	14-Aug	15-Aug
16-Aug	17-Aug	18-Aug	19-Aug	20-Aug	21-Aug	22-Aug	23-Aug	24-Aug	25-Aug	26-Aug	27-Aug	28-Aug	29-Aug	30-Aug	31-Aug					

COLOUR INDEX

	COMMENCEMENT OF TEACHING
	DISPLAY OF ATTENDANCE
	UNIT TEST I & II
	NO VEHICLE DAY
	TECHNICAL DEPARTMENT(ALL DEPT)
	LAST DATE OF TERM WORK SUBMISSION
	DISPLAY OF ATTENDANCE OF DEPT. WISE & CLASS COORDINATOR MEETING HOD
	HOLIDAY

	LAST DATE OF SUBMISSION
	CONCLUSION OF TEACHING
	UNIVERSITY THEORY EXAM
	PARENT MEET
	ALUMNI MEET
	GATHERING
	TECHNICAL EVENTS

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ACADEMIC CALENDER OF FE(SEM - I)																				DATE-01/2/2021
MON	TUE	WED	THUR	FRI	SAT	SUN	MON	TUE	WED	THUR	FRI	SAT	SUN	MON	TUE	WED	THUR	FRI	SAT	SUN
				1-Jan	2-Jan	3-Jan	4-Jan	5-Jan	6-Jan	7-Jan	8-Jan	9-Jan	10-Jan	11-Jan	12-Jan	13-Jan	14-Jan	15-Jan	16-Jan	17-Jan
18-Jan	19-Jan	20-Jan	21-Jan	22-Jan	23-Jan	24-Jan	25-Jan	26-Jan	27-Jan	28-Jan	29-Jan	30-Jan	31-Jan	1-Feb	2-Feb	3-Feb	4-Feb	5-Feb	6-Feb	7-Feb
8-Feb	9-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb	15-Feb	16-Feb	17-Feb	18-Feb	19-Feb	20-Feb	21-Feb	22-Feb	23-Feb	24-Feb	25-Feb	26-Feb	27-Feb	28-Feb
1-Mar	2-Mar	3-Mar	4-Mar	5-Mar	6-Mar	7-Mar	8-Mar	9-Mar	10-Mar	11-Mar	12-Mar	13-Mar	14-Mar	15-Mar	16-Mar	17-Mar	18-Mar	19-Mar	20-Mar	21-Mar
22-Mar	23-Mar	24-Mar	25-Mar	26-Mar	27-Mar	28-Mar	29-Mar	30-Mar	31-Mar	1-Apr	2-Apr	3-Apr	4-Apr	5-Apr	6-Apr	7-Apr	8-Apr	9-Apr	10-Apr	11-Apr
12-Apr	13-Apr	14-Apr	15-Apr	16-Apr	17-Apr	18-Apr	19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	24-Apr	25-Apr	26-Apr	27-Apr	28-Apr	29-Apr	30-Apr	1-May	2-May
3-May	4-May	5-May	6-May	7-May	8-May	9-May	10-May	11-May	12-May	13-May	14-May	15-May	16-May	17-May	18-May	19-May	20-May	21-May	22-May	23-May
24-May	25-May	26-May	27-May	28-May	29-May	30-May	31-May													

COLOUR INDEX			
	COMMENCEMENT OF TEACHING		LAST DATE OF SUBMISSION
	DISPLAY OF ATTENDANCE		CONCLUSION OF TEACHING
	UNIT TEST I & II		UNIVERSITY THEORY EXAM
	NO VEHICLE DAY		PARENT MEET
	TECHNICAL DEPARTMENT(ALL DEPT)		ALUMNI MEET
	LAST DATE OF TERM WORK SUBMISSION		GATHERING
	DISPLAY OF ATTENDANCE OF DEPT. WISE & CLASS COORDINATOR MEETING HOD		TECHNICAL EVENTS
	HOLIDAY		

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Academic calendar SEM-I Year 2021-22 (SETO BE)

WEEK NO	MONTH/DAY	MON	TUE	WED	THU	FRI	SAT	NO OF WORKING DAYS	EVENTS
1			1	2	3	4	5	5	
2		7	8	9	10	11	12	6	
3	JUN--21	14	15	16	17	18	19	5	COMENCEMENT OF TEACHING OF SEM 1(TE&BE)
4		21	22	23	24	25	26	5	26-BUDDH POURNIMA
5		28	29	30				3	13-NO VEHICLE DAY
6					1	2	3	3	
7		5	6	7	8	9	10	6	
8	JULY--22	12	13	14	15	16	17	6	12-27 UNIVERSITY EXAM SEM II SE BE
9		19	20	21	22	23	24	5	19-BE,TE REGISTRATION,20 ASHADHI EKADASHI,
10		26	27	28	29	30	31	6	31-NO VEHICLE DAY
12		2	3	4	5	6	7	6	2-10 FE& SE UNIVERSITY EXAM
13		9	10	11	12	13	14	6	15-INDEPENDENCE DAY
14	AUG--22	16	17	18	19	20	21	4	16- PARSI NEWYEAR,17-REGISTRATION(SE) 19-MOHARAM COMMENCEMENT OF TEACHING OF SEM 1
15		23	24	25	26	27	28	6	
16		30	31					2	30- DISPLAY OF ATTENDANCE TE&BE,31 NO VEHICLE DAY
17				1	2	3	4	4	4-LETTER TO PARENT
18		6	7	8	9	10	11	5	6-11 UNIT TEST I (TE/BE),10-GANESH CHATURTHI
19	SEP--22	13	14	15	16	17	18	6	MID SEM FEEDBACK (TE/BE)
20		20	21	22	23	24	25	6	20-25 UNIT TEST I ,(SE)24-DISPLAY OF ATTENDANCE(SE)
21		27	28	29	30			4	28-LETTER TO PARENTS(SE)
						1	2	2	1-DISPLAY OF ATTENDANCE(TE/BE), 27-29 MID SEM FEEDBACK
		4	5	6	7	8	9	6	5-9 UNIT TEST III(TE/BE)
	OCT--22	11	12	13	14	15	16	5	11-14 END SEM FEEDBACK(TE/BE),15-DUSSERA,16 PARENT MEET
		18	19	20	21	22	23	5	19-EID E MILAD,29 CONCLUSION OF TEACHING(TE&BE)
		25	26	27	28	29	30	6	-29 UNIT TEST SE, 28-LETTER TO PARENT
22		1	2	3	4	5	6	6	2-6 DIWALI HOLIDAY
23		8	9	10	11	12	13	5	8-11 END SEM FEEDBACK, 12-CONCLUSION OF TEACHING SE
24	NOV--22	15	16	17	18	19	20		COMENCEMENT OF F SEM II(TE/BE),19-GURUNANK JAYANTI
25		22	23	24	25	26	27		
26		28	29	30					30- NO VEHICLE DAY
								72	
CONDUCTING THE APTITUDE &DOING ITS ANALYSIS								SE-BE	CONTINUING PROCESS
INSEM/END SEM ORAL PR EXAM AS PER SPPU								SE-BE	
MENTOR MEETING (2ND &4TH SAT OF EVERY MONTH)								SE-BE	
TECHNICAL EXPERT LECTURES & SOFTSKILLS								SE-BE	
CONDUSTING TECHNICAL INTERVIEW,PERSONAL INTERVIEW & GATE LECT								BE	

COLOUR INDEX

WORKING DAYS WITH ACTIVITY	COMMENCEMENT & CONCLUSION OF TEACHING	WORKING TEACHING DAYS	UNIVERSITY EXAM DAYS	STUDENT REGISTRATION	HOLIDAYS

INDUSTRIAL VISIT,EXPERT LECT. & OTHER ACTIVITIES WILL BE CONDUCT IN EACH MONTH OF DEC21 TO APR.2022

HOD

ACADEMIC COORDINATOR

IQAC In-charge
Rajiv Gandhi College of Engineering
Karjule Harya, Tal. Parner
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering * Karjule Harya * Tal. Parner, Dist. Ahmednagar

Principal
R G COE, Karjule Harya.

Matoshri Shaikshanik Pratishthan's

Rajiv Gandhi College of Engineering

Karjule Harya Tal.Parner Dist.Ahmednagar

(2023-24) SEM II

MECHANICAL DEPATMENT LOAD DISTRIOBUTION TERM II 2023-24

FACULTY	SUBJECT	Class	TH	PR	TUT	TOTAL	Total Load	Responsibility
Dr. Pawar Krupal Prabhakar	CIM (402048)	BE	3	6		9	9	Incharge Principal
Prof.Jagdale aniruda avinash	FM (202049)	SE	3	6		9	12	HOD
	EAM (402050)	BE	3	0		3		
Prof.Gunjal Satish Bapu	KOM (202047)	SE	3	6		9	18	FE HOD
	DTS(302051)	TE	3	6		9		
Prof,. Jagtap B.M.	PBL(202052)	SE	0	12		12	21	SE Class Teacher
	AIML(302049)	TE	3	6		9		
Prof. Kurpatwar B.P.	MS(202051)	SE	0	6		6	15	
	MSAL(402052)	BE	0	6		6		
	SE(302052)	TE	3	0		3		
Prof.Paimiose S S	FPCL(302054)	TE	0	6		6	9	BE Class Teacher
	RET(402051)	BE	3	0		3		
Prof. Darade P P	AC IV(202053)	SE	0	0		0	15	TE Class Teacher
	ML (302053)	TE	0	6		6		
	CAE (302050)	TE	3	6		9		
Prof.Pawar N V	MP (202050)	SE	3	0		3	24	
	INTSHIP(302055)	TE	0	12		12		
	EE (402049)	BE	3	6		9		
Prof. Arti A R	ATD (202048)	SE	3	6		9	9	
	AC viII(402055)	BE	0	0		0		
	AC VI (302056)	TE	0	0		0		
Prof. Aher V B	Project -II		0	20		20	20	
						0		
						0		
Prof. Shende P.B.	M-IIII		3		1	3	3	
			TOTAL LOAD				155	

Time Table Incharge | HOD | Principal

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Karjule Harya, Tal. Pa...
Dist. Ahmednagar-414304

Rajiv Gandhi College of Engineering Tal. Parner, Dist. Ahmednagar

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STUDENT'S FEEDBACK FORM

This form is made by RGCOE: IQAC for student's feedback collection and analysis purpose.

* Indicates required question

1. Email *

2. **Email ID:** *

3. **Branch of Engineering** *

Mark only one oval.

- Mechanical Engineering
- Computer Engineering
- E&TC Engineering
- Electrical Engineering

4. **Year of Admission:** *

Mark only one oval.

- 2018-19
- 2019-20
- 2020-21
- 2021-22
- 2022-23

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5. **1.The institution provides multiple opportunities to learn & grow** *

Mark only one oval.

- Excellent
- Very Good
- Good
- Adequate
- Poor

6. **2. The teachers approach towards teaching** *

Mark only one oval.

- Excellent
- Very good
- Good
- Adequate
- Poor

7. **3. The teachers illustrate the through examples & applications** *

Mark only one oval.

- Excellent
- Very Good
- Good
- Adequate
- Poor

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8. **4. Fairness of the internal evaluation process by the teacher** *

Mark only one oval.

- Excellent
- Very good
- Good
- Average
- Poor

9. **5. The institute takes an active interest in promoting internship, student exchange, field visit opportunities** *

Mark only one oval.

- Excellent
- Very good
- Good
- Average
- Adequate
- Poor

10. **6. The institution makes effort to engage students in the monitoring, review & continuous quality improvement of the teaching learning process.** *

Mark only one oval.

- Excellent
- Very Good
- Good
- Adequate
- Poor

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11. **7. The institution encourages students for higher studies** *

Mark only one oval.

- Excellent
- Very Good
- Good
- Adeqaute
- Poor

12. **8. Efforts are made by the institute/teachers to inculcate soft skills & employ ability skills to make you ready for the world of work** *

Mark only one oval.

- Excellent
- Very Good
- Good
- Adequate
- Poor

13. **9. The overall quality of the teaching-learning process in the institute.** *

Mark only one oval.

- Excellent
- Very Good
- Good
- Adequate
- Poor

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Principal
R G COE, Karjule Harya.

14. **10. Teachers are able to identify your weaknesses & help you to overcome them.** *

Mark only one oval.

- ◯ Excellent
- ◯ Very Good
- ◯ Good
- ◯ Adequate
- ◯ Poor

15. **11. Overall Impression*** *

Mark only one oval.

- ◯ Excellent
- ◯ Good
- ◯ Fair
- ◯ Average
- ◯ Poor

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Branch of Engineering

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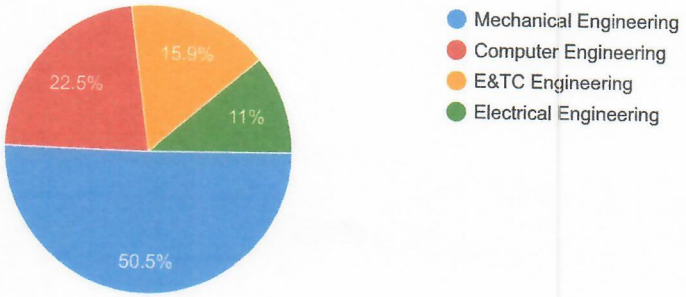
182 responses



Year of Admission:

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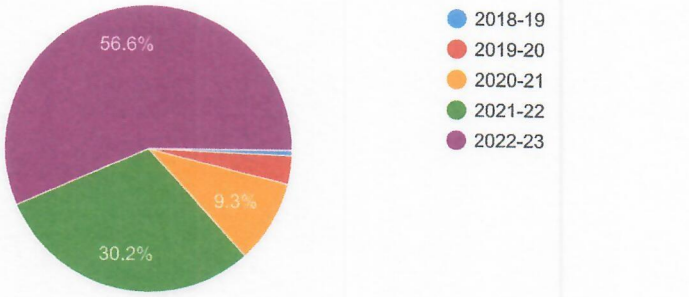

1.The institution provides multiple opportunities to learn & grow

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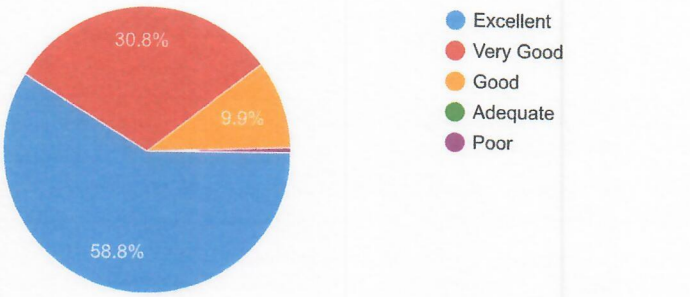

2. The teachers approach towards teaching

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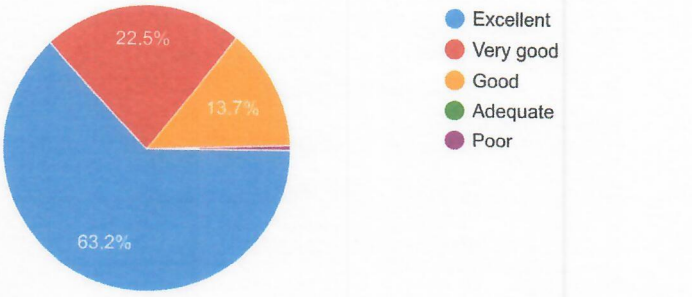

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3. The teachers illustrate the through examples & applications

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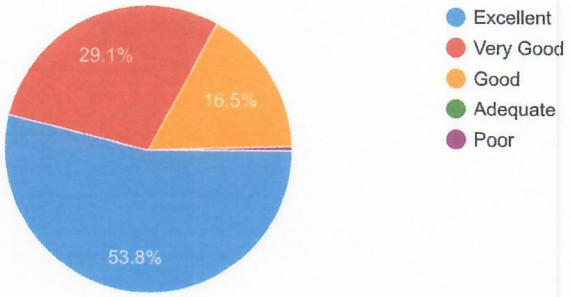

4. Fairness of the internal evaluation process by the teacher

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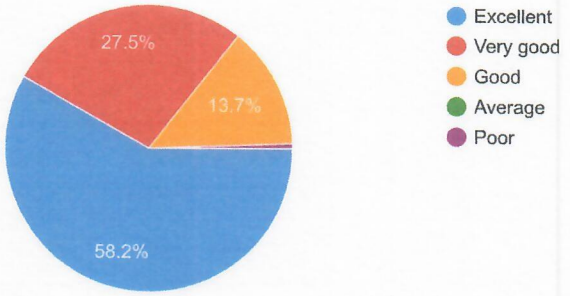

5. The institute takes an active interest in promoting internship, student exchange, field visit opportunities

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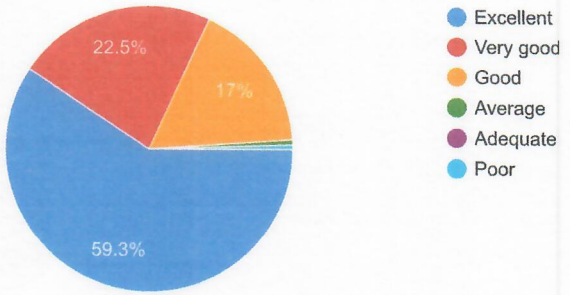

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6. The institution makes effort to engage students in the monitoring, review & continuous quality improvement of the teaching learning process.

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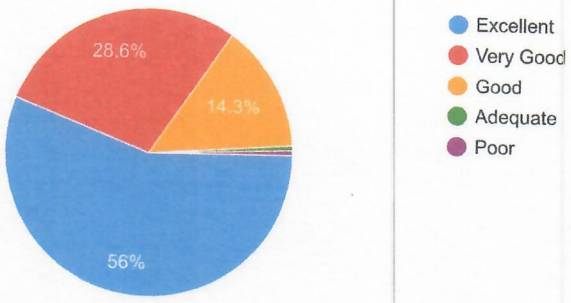

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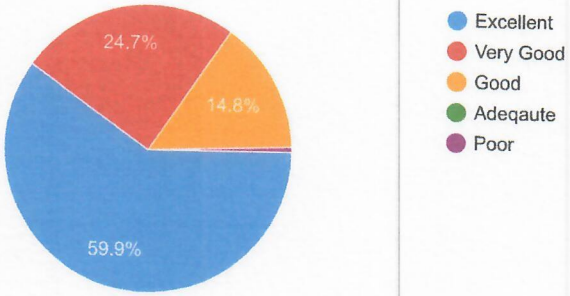

8. Efforts are made by the institute/teachers to inculcate soft skills & employ ability skills to make you ready for the world of work

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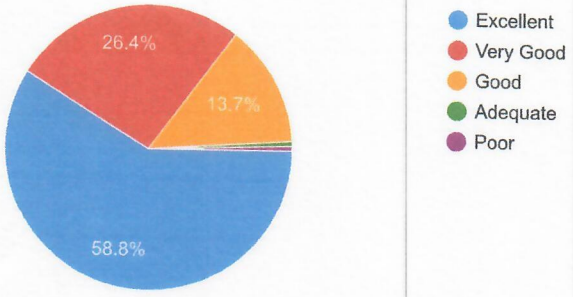

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9. The overall quality of the teaching-learning process in the institute.

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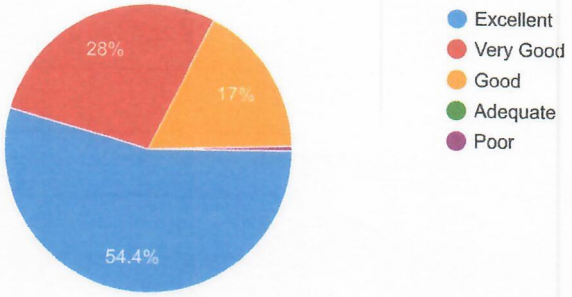

10. Teachers are able to identify your weaknesses & help you to overcome them.

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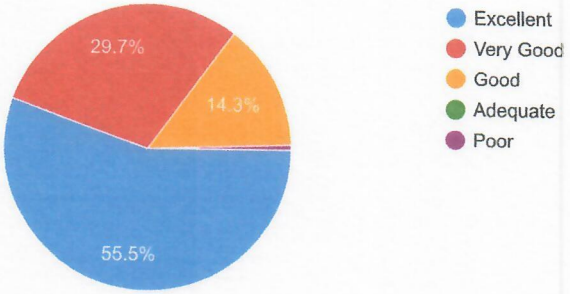

11. Overall Impression*

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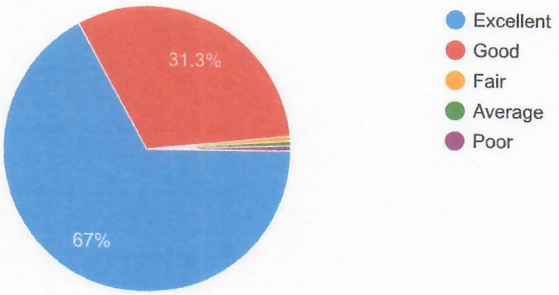

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