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TERNA ENGINEERING COLLEGE, NERUL, NAVI MUMBAI

Date: 01/07/2023
C. No: TEC-23-24

ACADEMIC CALENDAR - Second Half of 2023

Activity Plan (UG III/V/VII)

Sr. No.	Date	Activity	Dept.	Responsibility	Remarks
		Pre-Commencement Activities			
A	03-07-2023	Declaration of Institute Level Academic Calendar	All Departments	Dean Academic	
B		Verified Division-Wise student list/Batch formation	Student Section	Registrar	New Semester Requirement
C		New Faculty Joining	Admin	Registrar	
D	04-07-2023	Department wise requirement (Equipment, Consumables if any)	All	HOD/Store in charge	New Semester Requirement
		Department-wise Academic Calendar	Admin	APC HODs	New Semester Requirement
E	01-07-2023 to 05-07-2023	Interviews for New Faculty/Staff/Lab Asst. Recruitment	Admin	Registrar, HODs	New Semester Requirement
F	01-07-2023 to 07-07-2023	Completion of Preventive/Breakdown Maintenance, Calibration, Installation of Software etc.	Admin	Maintenance Engineering System Staff, Technical/Lab Assts.	New Semester Requirement
H	05-07-2023	Checking ERP Readiness	Admin	Principal/Dean Academic/ ERP coordinator	HODs should notify to authorities, in time and monitor the progress
J	07-07-2023	Display of Timetable	All	HOD/APCs Time Table In-charge	On Website Also Class, Lab & master Time table
K	07-07-2023	Submission and display of teaching plans/Display of Assignments, Experiment List in ERP	All	All Faculties, Lab in Charges, Jr Programmer	HODs would verify and see their display on the ERP/website/Noticeboar

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Commencement of Term (Semester V and VII) 10-07-2023					
Week-1	10-07-2023	1. HOD's Address to students-Information about department facilities and policies 2. Orientation for TE/BE 3. Undertaking from Students to be taken 4. INSTRUCTIONAL DAY	All depts.	HOD/ APC	Undertaking for Attendance
	11-07-2023 to 14-07-2023	INSTRUCTIONAL DAYs	All depts	All Staff	
Commencement of Term (Semester III) 17-07-2023					
Week-2	17-07-2023 to 21-07-2023	INSTRUCTIONAL DAY	All depts.	All Staff	
		Mentor Meeting-1 Mentor list is to be prepared and circulated. The report of Mentor meetings needs to be kept ready.	All depts.	All Staff	
Week-3	24-07-2023 to 28-07-2023	INSTRUCTIONAL DAYs	All depts.	All Staff	
	29-07-2023	MUHARRAM	All depts.	All Staff	
Week-4	31-07-2023 to 04-08-2023	INSTRUCTIONAL DAYs	All depts.	All Staff	
	01-08-2023	Defaulter's List-1(Period 10/07/2023 to 31/07/2023)	All depts.	All Staff	
Week-5	07-08-2023 to 11-08-2023	INSTRUCTIONAL DAYs	All depts.	All Staff	
Week-6	14-08-2023	Instructional Day	All depts.	All Staff	
	15-08-2023	INDEPENDENCE DAY	All dept.	All Staff	
	16-08-2023	PARSI NEW YEAR	All dept.	All Staff	
	17-08-2023 to 18-08-2023	INSTRUCTIONAL DAYs	All dept.	All Staff	
	17-08-2023 to 19-08-2023	Mentor Meeting-2	All depts.	All Staff	
Week-7	21-08-2023 to	INSTRUCTIONAL DAYs (SE/TE/BE)	All dept.	All Staff/APCs/HODs	

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	25-08-2023	C.R Nomination/Election	All depts.	All Staff	
		Submission of Internal Assessment Test Paper-1 SE/TE/BE	All dept.	All Staff	
		PROJECT REVIEW 1	All depts	Project coordinators / Project guides /APCs/HoDs	
	25-08-2023	Students Council Formation	All depts. Higher Education Cell	All Staff, I/C Higher education cell	
Week-8	28-08-2023 to 29-08-2023	Instructional Days	All depts.	All Staff, Exam Incharges	
	30-08-2023 to 01-09-2023	Internal Assessment Test 1 (SE, TE and BE) (IAT 1)	All depts.	All Staff, Exam Incharges	
	01-09-2023	Defaulter's List-2(Period 10/07/2023 to 31/08/2023)	All depts.	All Staff/APCs/HOD	
Week-9	04-09-2023 to 06-09-2023, 08-09-2023	INSTRUCTIONAL DAYs (SE/TE/BE)	All depts.	All Staff/APCs/IV coordinator/HODs	
	04-09-2023	Result declaration of IAT-1 SE/TE/BE	All depts.	All Staff/APCs/HODs	
	05-09-2023	TEACHER'S DAY	All depts.	All Staff	
	07-09-2023	GOPALKALA - DAHIHANDI	All depts.	All Staff	
	05-09-2023 to 08-09-2023 and 11-09-2023	Remedial Classes	All depts.	All Staff	
		Infrastructure Feedback	Institute	Dean, IQAC	
Week-10	11-09-2023 to 15-09-2023	INSTRUCTIONAL DAYs	All depts.	All Staff/APCs/HODs	
	15-09-2023	ENGINEER'S DAY	All depts.	All Staff	
Week-11	18-09-2023	INSTRUCTIONAL DAY	All depts.	All Staff/APCs/HODs	
	19-09-2023 to 23-09-2023	GANESH CHATURTHI MID SEM BREAK	All depts	All Staff	
Week-12	25-09-2023 to 27-09-2023, 29-09-2023	INSTRUCTIONAL DAYs Industrial Visits	All depts.	All Staff/APCs/HODs	

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		Orientation on Institute level and program specific Elective subjects TE and BE for sem VI and VIII	All depts.	APCs/HODs	
	28-09-2023	ANANT CHATURDASHI & ID-E-MILAD	All depts.	All Staff	
Week-13	02-10-2023	MAHATMA GANDHI JAYANTI	All depts.	All Staff	
	03-10-2023 to 06-10-2023	INSTRUCTIONAL DAYs	All depts.	All Staff/APCs/HODs	
		Mentor Meeting-3			Review of the progress of project
	03-10-2023	Defaulters list-3 (Period 10/07/2023 to 30/09/2023)	All depts.	All Staff/APCs/HODs	
	03-10-2023 to 07-10-2023	FEEDBACK ON ACADEMIC PERFORMANCE	ALL dept./HOD's/Class Advisors	Online Feedback	
Week-14	09-10-2023 to 13-10-2023	INSTRUCTIONAL DAYs (SE/TE/BE)	All depts.	All Staff/APCs/HODs	
		Finalization of Institute level and program specific Elective subjects TE and BE for sem VI and VIII			
		PROJECT REVIEW 2			
Week-15	16-10-2023 to 19-10-2023	INSTRUCTIONAL DAYs (SE/TE/BE)			
		Course End Survey			
	20-10-2023	Internal Assessment Test (IAT) – 2 SE/TE/BE	All depts.	All Staff/APCs/HODs	
Week 16	23-10-2023, 25-10-2023	Internal Assessment Test (IAT) – 2 SE/TE/BE	All depts.	All Staff/APCs/HODs	
	24-10-2023	DASARA	All depts.	All Staff	
	26-10-2023 to 27-10-2023	INSTRUCTIONAL DAYs (SE/TE/BE)	All depts.	All Staff/APCs/HODs	
		Term work submission	All depts.	All Staff/APCs/HODs	
Semester Ends (TE/BE) - 27-10-2023					
	28-10-2023 to 09-11-2023	Conducting Oral/Practical Examination TE, BE	All depts.	All HOD's	
	30-10-2023 to 03-11-2023	INSTRUCTIONAL DAYs (SE)	All depts.	All Staff/APCs/HODs	
	02-11-2023 to 03-11-2023	Term work submission (SE)	All depts.	All Staff/APCs/HODs	
Semester Ends (SE) - 03-11-2023					

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	04-11-2023 to 11-11-2023	Conducting Oral/Practical Examination for SE	All depts.	All HOD's	
	12-11-2023	DIWALI LAXMI POOJAN	All depts.	All Staff	
	14-11-2023	DIWALI BALIPRATIPADA	All depts.	All Staff	
	15-11-2023	BHAUBEEJ	All depts.	All Staff	
		Audit by Internal Quality Assurance Cell (IQAC)	All depts.	All staff	
	22-11-2023 to 06-12-2023	Commencement of Theory Exam SE, TE and BE Sem III, Sem V and Sem VII	All depts.	Exam In charge/All staff	
	27-11-2023	GURU NANAK JAYANTI	All Dept.	All Staff	
	08-12-2023 to 20-12-2023	Commencement of Theory Exam SE, TE and BE Sem IV, sem VI and Sem VIII	All depts.	Exam In charge/All staff	
	08-01-2024	Commencement of New Term	All depts.	All staff	

Dean Academics

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Principal

Copy to

1. CEO, TPCT
2. Deans / All HOD's - for necessary actions
3. Section in-charges (TP/LIB./EXAM/Maintenance/Store/Registrar) – for necessary actions
4. Staff Circulation Copy
5. Office Copy
6. Notice Board
7. Web Copy

Summary: 1) Total Working Weeks: 17
2) Total Working Days: 64
3) Examination, Placement, Training, Workshop, FDP, R&D and III activities are mentioned however separate schedule can be maintained by respective heads.

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Date: 30/12/2023
C. No: TEC-23-24-71

ACADEMIC CALENDAR - First Half of 2024

Activity Plan for the year (UG II/IV/VI/VIII)

Sr. No.	Date	Activity	Dept.	Responsibility	Remarks
		Pre-Commencement Activities			
A	04-12-2019 to 18-12-2019	Governing body Meeting	Admin	Principal, Management coordinator	
B	04-12-2023 - 11-12-2023	1. Discussion and finalization on a value added course. 2. Review and Planning of activities of all professional bodies. 3. Planning of Soft skills and Technical Skill Trainings for Sem II, IV, VI and VIII Students 4. Planning of E Cell, Higher Education Cell Activities 5. Planning of Cultural and Sports activities 6. Planning of NSS, ICC/WDC activities 7. Review of all MoUs and collaborations and related activities	All	Principal/Dean Academics/Dean IQAC/HODs/ TPO/ Professional society chapter coordinators/ Cultural and Sport Incharges/ Higher Education Cell Incharge/ E-cell incharge/ICC/WDC Incharge	The next semester activity plans and previous semester activity reports are to be presented.
C	18-12-2023 to 30-12-2023	Placement Review, discussion and actionable	All	All HODs /TPO / Training coordinator	
		Completion of Preventive / Breakdown Maintenance, Calibration, Installation of software etc	Admin	Maintenance Engineer System Staff, Technical, Lab assts	Lab incharges should be in touch with system staff. HOD need to verify and submit completion report to principal

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D	01-01-2024	First draft of Time table	All dept	Time table In-charge, Time table committee members, HODs, APCs	
I	01-01-2024 to 05-01-2024	Staff Trainings: FDP/Orientation Program	All depts	Faculty Development Committee/HODs/R&D Committee member	Report need to be prepared and submitted within 15 days from the activity
J	01-01-2024	Display of Time Table	All	Time Table committee Incharge/HODs/APCs	On website also [Class, lab., Master Time Table]
K	01-01-2024	Display of Divisions/Roll No/ Batches	FE/SE/TE/BE in all depts..	Registrar	The duly signed student list to be forwarded to depts.
L	01-01-2024	New faculty Joining	Admin	Registrar/HR section/office	
M	03-01-2024	Display of teaching plan in ERP	All	All faculties/APCs/HODs	
Commencement of term – 08-01-2024					
Week-1	08-01-2024	1. HOD's Address to students-Information about department facilities and policies 2. Undertaking from Students related to attendance is to be taken	All depts.	HOD/ APCs/ CAs	Undertaking for Attendance from students has to be collected
	08-01-2024 to 12-01-2024	INSTRUCTIONAL DAYs	All depts	All Staff	
	12-01-2024	Aptitude & Soft Skill Training - Offline Mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	2:00 pm to 6:00 pm
		R&D Team meeting/ R&D activity/Review of Research activities	All depts	Dean, R&D, R&D committee, HODs	Review of the consultancy projects and research progress
		National Youth Day	All Depts		
	13-01-2024	Aptitude & Soft Skill Training - Offline Mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	10:00 am to 6:00 pm
	14-01-2024	Placement Activity - MOCK TEST 01 - Offline Mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	
Week-2	15-01-2024 to 19-01-2024	INSTRUCTIONAL DAYs	All depts.	All Staff	
		Department Mentor Meeting-1	All depts.	All staff	The report of meetings needs to be kept ready.

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		Project Review 1	All BE	Project Coordinators / Guides/	Evaluate UG Project through the Internal Panel
	16-01-2024	National Startup Day	All depts.		
	19-01-2024	Aptitude & Soft Skill Training - Offline Mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	2:00 pm to 6:00 pm
		Workshop on "Entrepreneurship and Innovation" as Career Opportunity	All depts.	IIC/E Cell	
		Women's Self-Defense and Fitness workshop	All depts	ICC/WDC	
	20-01-2024	Aptitude & Soft Skill Training - Offline Mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	10:00 am to 6:00 pm
	21-01-2024	Placement Activity - MOCK TEST 02 - Offline Mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	
Week-3	22-01-2024 to 25-01-2024	INSTRUCTIONAL DAYs	All depts.	All Staff	
		Audit by Internal Quality Assurance Cell (IQAC)	All depts.	Dean, IQAC, HODs, Members, IQAC, All staff	
	25-01-2024	My Story - Motivational Session by Successful Entrepreneur/Start-up founder	All depts.	IIC/E Cell	
		Awareness session on personal hygiene	FE Girls	ICC/WDC	
		Haldi Kumkum	All depts.	ICC/WDC	
	26-01-2024	**Republic Day**			
Week-4	29-01-2024 to 02-02-2024	INSTRUCTIONAL DAYs	All depts.	All Staff	
	01-02-2024	Defaulter's List-1 (Period 08/01/2024 to 31/01/2024)	All depts.	HODs/APCs/Class Advisors	
	02-02-2024	Aptitude & Soft Skill Training - Offline Mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	2:00 pm to 6:00 pm
		Session on Problem Solving and Ideation Workshop	All dept	IIC/E Cell	
		Seminar on healthcare	All dept	ICC/WDC	
	03-02-2024	Aptitude & Soft Skill Training - Offline Mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	10:00 am to 6:00 pm

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	04-02-2024	Placement Activity - MOCK TEST 03 - Offline Mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	
Week-5	05-02-2024 to 09-02-2024	INSTRUCTIONAL DAYs	All depts.	All Staff	
		Stakeholders' Feedback - 1	All departments	ERP coordinator / HODs / APCs/CAs	
	09-02-2024	Aptitude & Soft Skill Training - Offline Mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	2:00 pm to 6:00 pm
		Inter/Intra Institutional Idea Competition/ Challenge/Hackathon and Reward Best ideas.	All dept	IIC/E Cell	
		Health Check-up camp for All	All depts.	ICC/WDC	
	10-02-2024	Aptitude & Soft Skill Training - Offline Mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	10:00 am to 6:00 pm
	11-02-2024	Placement Activity - MOCK TEST 04 - Offline Mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	
Week-6	12-02-2024 to 16-02-2024	INSTRUCTIONAL DAYs	All dept.	All Staff	
		Department Mentor Meeting-2	All depts.	All staff	The report of meetings needs to be kept ready.
	14-02-2024	Submission of IAT – I paper	All dept.	All Staff	
	16-02-2024	Aptitude & Soft Skill Training - Offline Mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	2:00 pm to 6:00 pm
		R&D Team meeting/ R&D activity/Review of Research activities	All depts	Dean, R&D, R&D committee, HODs	
		Health Check-up camp for All	All dept	ICC/WDC	
		Workshop on Design Thinking, Critical thinking and Innovation Design	All dept	IIC/E Cell	
	17-02-2024	Aptitude & Soft Skill Training - Offline Mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	10:00 am to 6:00 pm
	18-02-2024	Placement Activity - MOCK TEST 05 - Offline mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	
Week-7	19-02-2024	Chhatrapati Shivaji Maharaj Jayanti			
	20-02-2024 to 22-02-2024	Internal Assessment Test 1 (IAT 1)	All dept.	All Staff/APCs/HODs	Aptitude & Soft Skill Training - Online Mode

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	20-02-2024 to 23-02-2024	Sports team formation – Department level	All depts.	Sports/TPL Coordinator and Team	Monday to Thursday - 7:00 pm to 9:00 pm Friday - 2:00 pm to 6:00 pm
	23-02-2024	INSTRUCTIONAL DAY	All dept.	All Staff	
		Expert talk on Process of Innovation Development, Technology Readiness Level (TRL); Commercialization of Lab Technologies & Tech-Transfer	All dept	IIC/E Cell	
	24-02-2024	Aptitude & Soft Skill Training - Online Mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	10:00 am to 3:00 pm
	25-02-2024	Placement Activity - MOCK TEST 06 - Offline mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	
Week-8	26-02-2024 to 01-03-2024	INSTRUCTIONAL DAYs	All depts.	All Staff/APCs/HODs	Aptitude & Soft Skill Training - Online Mode Monday to Thursday - 7:00 pm to 9:00 pm Friday - 2:00 pm to 6:00 pm
		Industrial Visit	All dept	IV Coordinator/ HODs	
	26-02-2024	Result declaration of IAT-1	All depts.	All Staff/APCs/HODs	
	27-02-2024 to 01-03-2024	Remedial Classes	All depts.	All Staff/APCs/HODs	
	01-03-2024	Defaulter's List-1 (Period 08/01/2024 to 29/02/2024)	All depts.	HODs/APCs/Class Advisors	
		Parent Teacher Interaction Meeting	All depts.	All Staff/ Class Advisors/APCs/HODs	
	02-03-2024	Aptitude & Soft Skill Training - Online Mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	10:00 am to 3:00 pm
	03-03-2024	Placement Activity - MOCK TEST 07 - Offline mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	
Week-8 & 9	01-03-2024 - 04-03-2024	SPORTEC	All	Sports In charge	Separate program schedule needs to be prepared
	05-03-2024 - 06-03-2024	AVALON - Technical Festival	All	Technical program in charge & Students Council	Separate program schedule needs to be prepared
		Session on Achieving Problem-Solution Fit and Product-Market Fit	All	IIC/E Cell	

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	06-03-2024, 07-03-2024, 09-03-2024	RESONANCE - Cultural festival	All	Cultural Festival In-charge & Students Council	Separate program schedule needs to be prepared
		Poster Making, Drawing competition, slogan making, mehendi competition etc	All	ICC/WDC	
	04-03-2024 - 09-03-2024	Technical Training - Online Mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	Monday to Thursday - 7:00 pm to 9:00 pm Friday - 2:00 pm to 6:00 pm Saturday - 10:00 am to 3:00 pm
	10-03-2024	Placement Activity - MOCK TEST 08 - Offline mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	
	08-03-2024	MAHASHIVRATRI			
Week-10	11-03-2024 - 15-03-2024	Instructional Days	All depts.		
		Industrial Visit	All dept	IV coordinator/ HODs	
		Visit to Pre-incubation units such as Idea Lab, Fab lab, Makers Space, Design Centers, City MSME clusters, workshops etc	All	IIC/E Cell	
	11-03-2024 - 16-03-2024	Technical Training - Online Mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	Monday to Thursday - 7:00 pm to 9:00 pm Friday - 2:00 pm to 6:00 pm Saturday - 10:00 am to 3:00 pm
	11-03-2024	Women's day Celebration	All depts	ICC/WDC	
	15-03-2024	R&D Team meeting/ R&D activity/Review of Research activities	All depts	Dean, R&D, R&D committee, HODs	
	17-03-2024	Placement Activity - MOCK TEST 09 - Offline mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	
Week-11	18-03-2024 to 22-03-2024	Instructional Days	All depts	All staff	

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		PROJECT REVIEW 2	All depts..	Department Project Coordinators , All Staff, APCs, HODs	
	22-03-2024	Session/ Workshop on Business Model Canvas (BMC)	All	IIC/E Cell	
	18-03-2024 - 23-03-2024	Technical Training - Online Mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	Monday to Thursday - 7:00 pm to 9:00 pm Friday - 2:00 pm to 6:00 pm Saturday - 10:00 am to 3:00 pm
	23-03-2024	Visit to Incubation Unit/Patent Facilitation Centre/Technology Transfer Centre such as Atal Incubation Centre etc.	All	IIC/E Cell	
	24-03-2024	Placement Activity - MOCK TEST 10 - Offline mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	
Week-12	25-03-2024	HOLI			
	26-03-2024 to 28-03-2024	INSTRUCTIONAL DAYs	All depts.	All Staff,APCs, HODs	
		Department Mentor Meeting-3	All depts.	All staff	The report of meetings needs to be kept ready.
	25-03-2024 - 30-03-2024	Technical Training - Online Mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	Monday to Thursday - 7:00 pm to 9:00 pm Friday - 2:00 pm to 6:00 pm Saturday - 10:00 am to 3:00 pm
	29-03-2024	GOOD FRIDAY			
Week-13	01-04-2024 To 05-04-2024	INSTRUCTIONAL DAYs	All depts.	All Staff/APCs/HODs	
		Stakeholders' Feedback - 2	All departments	ERP coordinator, HODs, APCs, Class Advisors	
	1-04-2024	Defaulters list-3 (Period 08/01/2024 to 31/03/2024)	All depts.	Class advisors, HODs, Dean Academics	
		Choice of Institute level and program specific Elective subjects TE and BE for sem V and VII	All depts.	Class advisors, HODs, Dean Academics	
		Manpower requirement for next semester	All depts.	HODs,HR	

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	01-04-2024 - 06-04-2024	Technical Training - Online Mode	Sem VI - All depts	TPO, Training Coordinator, Department T&P Coordinators	Monday to Thursday - 7:00 pm to 9:00 pm Friday - 2:00 pm to 6:00 pm Saturday - 10:00 am to 3:00 pm
	05-04-2024	Workshop on Intellectual Property Rights (IPRs) and IP management for start up	All	IIC/E Cell	
Week-14	08-04-2024, 10-04-2024	INSTRUCTIONAL DAYs	All depts.	All Staff, APCs, HODs	
		Submission of IAT – II paper	All dept.	All Staff	
	09-04-2024	Gudhi Padawa			
	11-04-2024	Ramazan Id			
	12-04-2024	Internal Assessment Test II	All depts.	All Staff, APCs, HODs	
		Submission of load distribution of SH2024	All depts.	HODs	
	14-04-2024	**Dr Babasaheb Ambedkar Jayanti**			
Week-15	15-04-2024 and 16-04-2024	Internal Assessment Test II	All depts.	All Staff,APCs, HODs	
	17-04-2024	RAMNAVAMI			
	18-04-2024	Display of Final defaulter list (Period 08/01/2024 to 18/04/2024)	All depts	Class advisors/HODs/Dean Academics	
		Result declaration of IAT - II	All depts	All Staff/APCs/HODs	
	18-04-2024 and 19-04-2024	Final Certification and Submission of Term Work Display of viva schedule	All depts.	All Staff, APCs, HODs	
		Course End Survey, Graduate Exit Survey	All depts.	All HOD's, APCs, Class Advisors	
		Submission of Project Reports and certification	All depts.	EPIC Coordinator, All Staff, APCs, HODs	
		Finalization of Institute level and program specific Elective subjects TE and BE for sem VI and VIII	All depts.	Class Advisors,HODs, Dean Academics	
End of the Term - 19-04-2024					
	21-04-2024	World Creativity and Innovation Day	All	IIC/E Cell	
	26-04-2024	World Intellectual Property Day	All	IIC/E Cell	
	24-04-2024 to 07-05-2024	Conduction of Oral/Practical exam (FE/SE/TE/BE)	All Dept.	All Staff/APCs/HODs	

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	01-05-2024	Maharashtra Din			
	01-05-2024 – 31-05-2024	Academic Advisory committee Meeting	HOD's	HOD's	PO/PSO attainment of 2022-23 is to be presented and discussed in meeting
	13-05-2024 to 24-05-2024	Theory Exam for FE, SE, TE and BE (Sem II,IV, VI and VIII) and ME sem II	All Dept.	Exam controller	As per University schedule
	13-05-2024 to 24-05-2024	IQAC End Semester Audit	All Dept	Dean IQAC	
	27-05-2024 to 07-06-2024	Theory Exam for SE, TE and BE (Sem I, III, V and VII) and FE sem I ATKT	All Dept.	Exam controller/CC/SS/US	As per University schedule
	13-05-2024	Commencement of CAP	All Dept.	Cap Incharge	As per University schedule
	10-06-2024 to 10-07-2024	Summer Training Program – All students	All depts	Training Coordinator, TPO, HODs	

Dean Academics

Principal

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Copy to

1. CEO, TPCT
2. Deans / All HOD's - for necessary actions
3. Section in-charges (TP/LIB./EXAM/Maintenance/Store/Registrar) – for necessary actions
4. Staff Circulation Copy
5. Office Copy
6. Notice Board
7. Web Copy

Summary: 1) Total Working Weeks: 15
2) Total Working Days: 67
3) Examination, Placement, Training, Workshop, FDP, R&D and III activities are mentioned however separate schedules can be maintained by respective heads.
4) Expected instructional days: 62

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09/09

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TPCT'S

Report Generation Date : 27-09-2023

Terna Public Charitable Trust
Terna Engineering College
Plot No. 12, Sector-22, Opp. Nerul Railway Station,
Phase-II, Nerul (W),
Phone No. : Website : https://www.ternaengg.ac.in Email ID : principal@ternaengg.ac.in

Master Attendance
10-07-2023 till 27-09-2023 SH2023
2023-2024 B.E.
SEM-III

STUDENT LECTURE WISE ATTENDANCE

					CAD –Modeling Ms. SULEKHA WALUNJ			Engineering Mathematics-III Mr. ABHISHEK JADHAV			Engineering Mathematics-III Mr. ABHISHEK JADHAV			Machine Shop Practice Mr. VAISHNAVKUMAR WAGH			Materials and Metallurgy Mr. TAHSIN AKHTAR			Materials Testing Mr. MANGESH NALAWADE			Mini Project – 1A Ms. SULEKHA WALUNJ			Production Processes Mr. VAISHNAVKUMAR WAGH , Mr. LALIT BHOYE			Strength of Materials Mr. MANGESH NALAWADE			Thermodynamics Mr. BANDU MULE			H	P	%
Sr. No.	Class	GR No.	Student Name	Roll No.	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%			
1.	SE-A(MECH)	TU5F2223001	SAXENA SHIVAM RAJNARAYAN	A1	11	6	54.55	17	9	52.94	7	5	71.43	0	0	0.00	20	9	45.00	10	5	50.00	2	1	50.00	9	2	22.22	29	13	44.83	17	7	41.18	122	57	46.72
2.	SE-A(MECH)	TU5F2223011	KAMBLE SAGAR BHAGWAN	A10	11	7	63.64	17	14	82.35	7	5	71.43	0	0	0.00	20	15	75.00	10	6	60.00	2	2	100.00	9	3	33.33	29	15	51.72	17	11	64.71	122	78	63.93
3.	SE-A(MECH)	TU5F2223013	SINHA AMAN LAXMAN	A12	11	8	72.73	17	15	88.24	7	7	100.00	0	0	0.00	20	13	65.00	10	8	80.00	2	2	100.00	9	8	88.89	29	17	58.62	17	14	82.35	122	92	75.41
4.	SE-A(MECH)	TU5F2223021	SAHANI SAURAV DHANRAJ	A18	11	9	81.82	17	10	58.82	7	4	57.14	0	0	0.00	20	9	45.00	10	6	60.00	2	2	100.00	9	0	0.00	29	14	48.28	17	8	47.06	122	62	50.82
5.	SE-A(MECH)	TU5F2223022	SINGH ADITYA VIRENDRA	A19	11	7	63.64	17	4	23.53	7	1	14.29	0	0	0.00	20	7	35.00	10	3	30.00	2	2	100.00	9	1	11.11	29	15	51.72	17	5	29.41	122	45	36.89
6.	SE-A(MECH)	TU5F2223023	SHAIKH QASIM ABDUL HAMID	A20	11	10	90.91	17	16	94.12	7	7	100.00	0	0	0.00	20	16	80.00	10	8	80.00	2	1	50.00	9	6	66.67	29	17	58.62	17	11	64.71	122	92	75.41
7.	SE-A(MECH)	TU5F2122015	ANKALA ROHITHARIPRASAD	A21	0	0	0.00	17	11	64.71	7	5	71.43	0	0	0.00	20	6	30.00	0	0	0.00	0	0	0.00	9	4	44.44	29	7	24.14	17	10	58.82	99	43	43.43
8.	SE-A(MECH)	TU5S2324001	PANDERE PRATIK SANDEEP	A22	0	0	0.00	1	1	100.00	1	1	100.00	0	0	0.00	1	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	3	2	66.67
9.	SE-A(MECH)	TU5S2324002	PATIL ROHIT DEEPAK	A23	0	0	0.00	1	1	100.00	1	1	100.00	0	0	0.00	1	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	3	2	66.67
10.	SE-A(MECH)	TU5S2324003	JADHAV AMOD RAJENDRA	A24	0	0	0.00	1	0	0.00	1	0	0.00	0	0	0.00	1	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	3	0	0
11	SE-A(MECH)	TU5S2324004	LAD ATHARVA RAKESH	A25	0	0	0.00	1	0	0.00	1	0	0.00	0	0	0.00	1	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	3	0	0
12.	SE-A(MECH)	TU5S2324005	DUSHING YASH BHAUSAHEB	A26	0	0	0.00	1	0	0.00	1	0	0.00	0	0	0.00	1	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	3	0	0
13.	SE-A(MECH)	TU5S2324006	WAYAL ANIKET VIJAY	A27	0	0	0.00	1	0	0.00	1	0	0.00	0	0	0.00	1	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	3	0	0
14.	SE-A(MECH)	TU5S2324007	DHARNE ROHAN SUDHIR	A28	0	0	0.00	1	1	100.00	1	1	100.00	0	0	0.00	1	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	3	2	66.67
15.	SE-A(MECH)	TU5S2324008	SHINDE PRANALI SHRIKANT	A29	0	0	0.00	1	1	100.00	1	1	100.00	0	0	0.00	1	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	3	2	66.67
16.	SE-A(MECH)	TU5S2324009	YADAV RISHABH MANOJ	A30	0	0	0.00	1	1	100.00	1	1	100.00	0	0	0.00	1	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	3	2	66.67
17.	SE-A(MECH)	TU5S2324011	SINGH RISHI VIJAYPAL	A31	0	0	0.00	1	1	100.00	1	1	100.00	0	0	0.00	1	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	3	2	66.67
18.	SE-A(MECH)	TU5S2324010	GHARAT ARYAN BALKRISHNA	A32	0	0	0.00	1	1	100.00	1	1	100.00	0	0	0.00	1	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	3	2	66.67
19.	SE-A(MECH)	TU5S2324012	SHAIKH MIRAN JAFAR	A33	0	0	0.00	1	0	0.00	1	0	0.00	0	0	0.00	1	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	3	0	0
20.	SE-A(MECH)	TU5S2324013	THAKUR ATHARVA RAJENDRA	A34	0	0	0.00	1	1	100.00	1	1	100.00	0	0	0.00	1	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	3	2	66.67
21.	SE-A(MECH)	TU5S2324014	KHAN HAMDAN AMJAD	A35	0	0	0.00	1	1	100.00	1	1	100.00	0	0	0.00	1	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	3	2	66.67
22.	SE-A(MECH)	TU5S2324015	SINGH KISHAN MANOJ	A36	0	0	0.00	1	0	0.00	1	0	0.00	0	0	0.00	1	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	3	0	0
23.	SE-A(MECH)	TU5S2324016	JANGLE VIGHNESH	A37	0	0	0.00	1	0	0.00	1	0	0.00	0	0	0.00	1	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	3	0	0
24.	SE-A(MECH)	TU5S2324017	HASE DARSHAN SATISH	A38	0	0	0.00	1	0	0.00	1	0	0.00	0	0	0.00	1	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	3	0	0
25.	SE-A(MECH)	TU5S2324018	MEHER KARAN MAHESH	A39	0	0	0.00	1	1	100.00	1	1	100.00	0	0	0.00	1	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	0	0	0.00	3	2	66.67
			H : Held/Conducted P : Present	TOTAL	66	47		137	89		67	44		0	0		158	75		60	36		12	10		63	24		203	98		119	66				

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TERNA ENGINEERING COLLEGE ★ Nerul, Navi Mumbai - 400706 ★ TPCT'S

Report Generation Date : 20-10-2023

TERNA ENGINEERING COLLEGE,NERUL NAVI MUMBAI

MECHANICAL ENGINEERING DEPARTMENT

TE-A DEFAULTER-01 (10JULY2023 TO 18 OCTOBER 2023) SH2023

STUDENT LECTURE WISE ATTENDANCE				Dynamics of Machinery Mr. LALIT BHOYE			Dynamics of Machinery Mr. LALIT BHOYE			Finite Element Analysis Dr. CHANDRASHEKHAR CHOUDHARI , Mr. VAIBHAV AJMIRE			Finite Element Analysis Mr. VAIBHAV AJMIRE , Mr. SHRIDHAR JOSHI			Mechanical Measurements and Controls Mr. MAHESH KAVRE			Mini Project – 2 A Mr. LALIT BHOYE , Mr. CHETAN DESHMUKH			Professional Comm. & Ethics II Dr. TAISEEN SHAIKH			Professional communication and ethics –II Dr. TAISEEN SHAIKH			Statistical Techniques Mr. VAISHNAVKUMAR WAGH , Mr. SHRIDHAR JOSHI			Thermal Engineering Ms. SULEKHA WALUNJ			Thermal Engineering Ms. SULEKHA WALUNJ			H	P	%
Sr. No.	GR No.	Student Name	Roll No.	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%			
1.	TU5F2122005	JAISWAR YASHRAJ	A3	33	18	54.55	10	6	60.00	30	14	46.67	11	2	18.18	18	11	61.11	9	7	77.78	16	6	37.50	11	6	54.55	39	12	30.77	30	23	76.67	9	6	66.67	216	111	51.39
2.	TU5F2122006	BARVE ANISH	A5	33	15	45.45	10	4	40.00	30	18	60.00	10	2	20.00	18	8	44.44	9	6	66.67	16	10	62.50	11	9	81.82	39	8	20.51	30	16	53.33	9	5	55.56	215	101	46.98
3.	TU5F2122003	. ASHHAR ALI TAHSEEN AHMAD	A6	33	26	78.79	10	8	80.00	30	13	60.00	11	4	36.36	18	8	44.44	9	7	77.78	16	5	31.25	11	6	54.55	39	11	28.21	30	23	76.67	9	9	100.00	216	125	57.87
4.	TU5F2122007	MALLAH ROSHAN	A7	33	27	81.82	10	9	90.00	30	22	73.33	11	6	54.55	18	14	77.78	9	7	77.78	16	11	68.75	11	8	72.73	39	15	38.46	30	29	96.67	9	9	100.00	216	157	72.69
5.	TU5F2122009	LAHANGE ATHARV	A9	33	18	54.55	10	5	50.00	30	13	43.33	11	1	9.09	18	11	61.11	9	6	66.67	16	6	37.50	11	9	81.82	39	7	17.95	30	21	70.00	9	5	55.56	216	102	47.22
6.	TU5F2122011	GAIKWAD VARUN	A10	33	25	75.76	10	9	90.00	30	17	56.67	11	2	18.18	18	11	61.11	9	7	77.78	16	9	56.25	11	9	81.82	39	10	25.64	30	23	76.67	9	8	88.89	216	130	60.19
7.	TU5F2122014	THAKUR VISHAL KUMAR	A12	33	21	63.64	10	7	70.00	30	16	53.33	11	7	63.64	18	8	44.44	9	7	77.78	16	7	43.75	11	10	90.91	39	10	25.64	30	25	83.33	9	7	77.78	216	125	57.87
8.	TU5F2122017	PATIL KEVAL UDAY	A15	33	20	60.61	10	4	40.00	30	11	36.67	11	0	0.00	18	5	27.78	9	6	66.67	16	9	56.25	11	7	63.64	39	4	10.26	30	12	40.00	9	5	55.56	216	83	38.43
9.	TU5F2122019	DUBAL SANGRAM	A17	33	22	66.67	10	9	90.00	30	16	53.33	11	1	9.09	18	11	61.11	9	7	77.78	16	8	50.00	11	9	81.82	39	9	23.08	30	23	76.67	9	7	77.78	216	122	56.48
10.	TU5F2122022	TAMBE AYUSH	A20	33	21	63.64	10	8	80.00	30	15	50.00	11	4	36.36	18	13	72.22	9	7	77.78	16	8	50.00	11	6	54.55	39	11	28.21	30	25	83.33	9	8	88.89	216	126	58.33
11.	TU5F2122025	SHEDGE ANUJ RAVINDRA	A23	33	32	96.97	10	8	80.00	30	21	70.00	23	4	17.39	18	16	88.89	3	0	0.00	16	10	62.50	9	10	111.11	39	18	46.15	30	30	100.00	10	8	80.00	221	157	71.04
12.	TU5F2122027	PAWAR PRATHAMESH	A24	33	19	57.58	10	7	70.00	30	16	53.33	23	4	17.39	18	9	50.00	3	0	0.00	16	10	62.50	9	3	33.33	39	9	23.08	30	24	80.00	10	9	90.00	221	110	49.77
13.	TU5S2223002	SHINDE VIRAJ GOVIND	A28	33	11	33.33	10	6	60.00	30	7	23.33	23	5	21.74	18	2	11.11	3	0	0.00	16	6	37.50	9	5	55.56	39	10	25.64	30	9	30.00	10	4	40.00	221	65	29.41
14.	TU5S2223003	WAGHMODE AVINASH	A29	33	26	78.79	10	9	90.00	30	21	70.00	23	7	30.43	18	14	77.78	3	0	0.00	16	13	81.25	9	8	88.89	39	13	33.33	30	28	93.33	10	9	90.00	221	148	66.97
15.	TU5S2223004	MHATRE HRISHIKESH	A30	33	16	48.48	10	5	50.00	30	13	43.33	23	1	4.35	18	9	50.00	3	1	33.33	16	12	75.00	9	7	77.78	39	9	23.08	30	15	50.00	10	8	80.00	221	96	43.44
16.	TU5S2223006	AVHAD SWAPNIL	A32	33	25	75.76	10	9	90.00	30	15	50.00	23	5	21.74	18	11	61.11	3	0	0.00	16	12	75.00	9	7	77.78	39	15	38.46	30	21	70.00	10	5	50.00	221	125	56.56
17.	TU5S2223007	MOHITE HARISH	A33	30	25	83.33	9	6	66.67	29	14	48.28	21	7	33.33	15	8	53.33	3	0	0.00	12	9	75.00	7	5	71.43	35	12	34.29	26	20	76.92	7	6	85.71	194	112	57.73
18.	TU5S2223008	BANSODE DIPAK	A34	33	4	12.12	10	3	30.00	30	3	10.00	23	2	8.70	18	2	11.11	3	0	0.00	16	7	43.75	9	3	33.33	39	0	0.00	30	3	10.00	10	1	10.00	221	28	12.67
19.	TU5S2223009	KENY CHAITANYA	A35	33	9	27.27	10	0	0.00	30	3	10.00	23	3	13.04	18	5	27.78	3	1	33.33	16	4	25.00	9	3	33.33	39	2	5.13	30	6	20.00	10	4	40.00	221	40	18.1
20.	TU5S2223011	BHOIR ADITYA PUNDLIK	A37	33	23	69.70	10	7	70.00	30	15	50.00	23	5	21.74	18	12	66.67	3	2	66.67	16	9	56.25	9	5	55.56	39	13	33.33	30	24	80.00	10	9	90.00	221	124	56.11
21.	TU5S2223016	KUMBHAR ROHIT VIKAS	A40	33	32	96.97	10	10	100.00	30	22	73.33	23	7	30.43	18	16	88.89	3	1	33.33	16	13	81.25	9	6	66.67	39	12	30.77	30	26	86.67	10	9	90.00	221	154	69.68
22.	TU5S2223013	GURCHAL MANAV	A41	33	9	27.27	10	4	40.00	30	3	10.00	23	2	8.70	18	2	11.11	3	1	33.33	16	4	25.00	9	3	33.33	39	1	2.56	30	7	23.33	10	5	50.00	221	41	18.55

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Terna Public Charitable Trust
Terna Engineering College
Plot No. 12, Sector-22, Opp. Nerul Railway Station,
Phase-II, Nerul (W),
Phone No. : Website : https://www.ternaengg.ac.in Email ID : principal@ternaengg.ac.in

Master Attendance
10-07-2023 till 25-09-2023 SH2023
2023-2024 T.E.-B
(SEM-V)

STUDENT LECTURE WISE ATTENDANCE					Dynamics of Machinery Mr. BANDU MULE			Dynamics of Machinery Mr. BANDU MULE			Finite Element Analysis Mr. MAHESH KAVRE , Dr. CHANDRASHEKHAR CHOUDHARI			Finite Element Analysis Mr. MAHESH KAVRE			Mechanical Measurements and Controls Mr. MAYUR BEMBDE			Mini Project – 2 A Mr. MAYUR BEMBDE , Mr. SHARAD BARGAT			Professional communication and ethics –II Dr. TAISEEN SHAIKH			Professional communication and ethics –II Dr. TAISEEN SHAIKH			Statistical Techniques Mr. LALIT BHOYE , Mr. SHRIDHAR JOSHI			Thermal Engineering Mr. SHARAD BARGAT			Thermal Engineering Mr. SHARAD BARGAT			H	P	%
Sr. No.	Class	GR No.	Student Name	Roll No.	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%			
1.	TE-B(MECH)	TU5S2223020	PANCHAL PRATHAMESH SANTOSH	B1	19	14	73.68	6	5	83.33	16	12	75.00	3	3	100.00	25	14	56.00	9	8	88.89	9	6	66.67	16	9	56.25	20	13	65.00	20	12	60.00	7	6	85.71	150	102	68
2.	TE-B(MECH)	TU5S2223021	RANE SANSKAR SANJAY	B2	19	14	73.68	6	6	100.00	16	12	75.00	3	3	100.00	25	13	52.00	9	7	77.78	9	6	66.67	16	9	56.25	20	10	50.00	20	12	60.00	7	5	71.43	150	97	64.67
3.	TE-B(MECH)	TU5S2223022	JADHAV HARSHITA PRAVIN	B3	19	9	47.37	6	4	66.67	16	13	81.25	3	2	66.67	25	9	36.00	9	7	77.78	9	6	66.67	16	11	68.75	20	14	70.00	20	12	60.00	7	6	85.71	150	93	62
4.	TE-B(MECH)	TU5S2223023	PATIL OMKAR CHANDRAKANT	B4	19	4	21.05	6	2	33.33	16	1	6.25	3	0	0.00	25	4	16.00	9	1	11.11	9	3	33.33	16	3	18.75	20	2	10.00	20	3	15.00	7	0	0.00	150	23	15.33
5.	TE-B(MECH)	TU5S2223024	NAIK SOHAM GIRIDHAR	B5	19	11	57.89	6	3	50.00	16	13	81.25	3	3	100.00	25	13	52.00	9	5	55.56	9	7	77.78	16	10	62.50	20	16	80.00	20	14	70.00	7	5	71.43	150	100	66.67
6.	TE-B(MECH)	TU5S2223026	GUPTA VIVEK DINESH	B7	19	8	42.11	6	3	50.00	15	7	46.67	3	2	66.67	21	12	57.14	8	5	62.50	8	3	37.50	14	6	42.86	17	9	52.94	19	11	57.89	6	4	66.67	136	70	51.47
7.	TE-B(MECH)	TU5S2223027	SAGVEKAR SARVESH ANIL	B8	19	8	42.11	6	4	66.67	16	6	37.50	3	1	33.33	25	7	28.00	9	2	22.22	9	5	55.56	16	7	43.75	20	6	30.00	20	9	45.00	7	1	14.29	150	56	37.33
8.	TE-B(MECH).	TU5S2223028	BELOSE SOURABH SURYAKANT	B9	19	12	63.16	6	4	66.67	15	8	53.33	3	2	66.67	22	14	63.64	8	4	50.00	8	3	37.50	14	3	21.43	20	9	45.00	19	9	47.37	6	4	66.67	140	72	51.43
9.	TE-B(MECH)	TU5S2223032	YELLARAM VINIT VENKATESH	B12	19	7	36.84	6	3	50.00	16	6	37.50	3	2	66.67	25	11	44.00	9	8	88.89	9	4	44.44	16	6	37.50	20	10	50.00	20	10	50.00	7	5	71.43	150	72	48
10.	TE-B(MECH)	TU5S2223034	PATIL YUGAL KESHAV	B14	19	10	52.63	6	4	66.67	16	10	62.50	3	3	100.00	25	13	52.00	9	6	66.67	9	4	44.44	16	11	68.75	20	10	50.00	20	11	55.00	7	4	57.14	150	86	57.33
11.	TE-B(MECH)	TU5S2223037	SONAWANE CHETAN JAYWANT	B16	19	5	26.32	6	1	16.67	16	2	12.50	3	0	0.00	25	3	12.00	9	0	0.00	9	3	33.33	16	4	25.00	20	1	5.00	20	0	0.00	7	0	0.00	150	19	12.67
12.	TE-B(MECH)	TU5S2223039	LONDHE SOHAM NITIN	B19	19	15	78.95	6	5	83.33	16	12	75.00	3	3	100.00	25	18	72.00	9	5	55.56	9	8	88.89	16	15	93.75	20	13	65.00	20	16	80.00	7	4	57.14	150	114	76
13.	TE-B(MECH)	TU5S2223040	GAIKWAD RAMESH MADHUKAR	B20	19	6	31.58	6	2	33.33	16	2	12.50	3	1	33.33	25	3	12.00	9	2	22.22	9	5	55.56	16	8	50.00	20	4	20.00	20	6	30.00	7	0	0.00	150	39	26
14.	TE-B(MECH)	TU5S2223042	KAMBLE ROHAN NILESH KAMBLE	B22	19	12	63.16	6	4	66.67	16	12	75.00	3	1	33.33	25	6	24.00	9	6	66.67	9	6	66.67	16	9	56.25	20	12	60.00	20	7	35.00	7	3	42.86	150	78	52
15.	TE-B(MECH)	TU5T2223001	SHELAR DARSHAN MOHAN	B23	19	3	15.79	6	1	16.67	16	3	18.75	3	0	0.00	25	3	12.00	9	1	11.11	9	4	44.44	16	7	43.75	20	3	15.00	20	3	15.00	7	0	0.00	150	28	18.67
16.	TE-B(MECH)	TU5S2223043	PAWSE MIHEER RAMAN	B24	19	14	73.68	6	2	33.33	16	7	43.75	3	1	33.33	25	10	40.00	8	3	37.50	5	5	100.00	16	13	81.25	20	7	35.00	20	12	60.00	6	5	83.33	144	79	54.86
17.	TE-B(MECH)	TU5S2223044	THAKUR SUBODH SUBHASH	B25	19	7	36.84	6	1	16.67	16	5	31.25	3	1	33.33	25	7	28.00	8	2	25.00	5	2	40.00	16	6	37.50	20	6	30.00	20	2	10.00	6	2	33.33	144	41	28.47
18.	TE-B(MECH)	TU5S2223045	KAMBLE YASH MANOJ	B26	19	0	0.00	6	1	16.67	16	1	6.25	3	0	0.00	25	3	12.00	8	3	37.50	5	1	20.00	16	6	37.50	20	1	5.00	20	1	5.00	6	0	0.00	144	17	11.81
19.	TE-B(MECH)	TU5S2223047	KADAM KALPESH ANANT	B28	19	15	78.95	6	5	83.33	16	12	75.00	3	2	66.67	25	10	40.00	8	6	75.00	5	4	80.00	16	10	62.50	20	14	70.00	20	14	70.00	6	6	100.00	144	98	68.06
20.	TE-B(MECH)	TU5S2223048	AVDUTH HARSHAL BALRAM	B29	19	9	47.37	6	3	50.00	16	8	50.00	3	0	0.00	25	10	40.00	8	5	62.50	5	2	40.00	16	9	56.25	20	10	50.00	20	7	35.00	6	4	66.67	144	67	46.53
21.	TE-B(MECH)	TU5S2223052	PAWAR DIVYANK KRISHNA	B32	19	6	31.58	6	2	33.33	16	5	31.25	3	2	66.67	25	8	32.00	8	1	12.50	5	3	60.00	16	9	56.25	20	4	20.00	20	1	5.00	6	2	33.33	144	43	29.86
22.	TE-B(MECH)	TU5S2223053	RAJGE PRATHAMESH VITTHAL	B34	19	14	73.68	6	5	83.33	16	10	62.50	3	2	66.67	25	11	44.00	8	6	75.00	5	3	60.00	16	11	68.75	20	15	75.00	20	14	70.00	6	6	100.00	144	97	67.36
23.	TE-B(MECH)	TU5S2223054	GIRKAR SARTHAK SUNIL	B35	19	1	5.26	6	1	16.67	15	2	13.33	3	0	0.00	21	4	19.05	8	2	25.00	4	2	50.00	14	8	57.14	17	2	11.76	19	3	15.79	6	1	16.67	132	26	19.7
24.	TE-B(MECH)	TU5S2223055	SOLANKI PRANAV KAUSHIK	B36	19	6	31.58	6	2	33.33	16	3	18.75	3	2	66.67	25	7	28.00	8	3	37.50	5	3	60.00	16	12	75.00	20	5	25.00	20	8	40.00	6	2	33.33	144	53	36.81
25.	TE-B(MECH)	TU5S2223056	CHAUGULE ADITYA DATTA	B37	19	17	89.47	6	4	66.67	16	12	75.00	3	1	33.33	25	15	60.00	8	4	50.00	5	4	80.00	16	12	75.00	20	14	70.00	20	17	85.00	6	6	100.00	144	106	73.61
26.	TE-B(MECH)	TU5S2223057	SHINDE OMKAR CHANDRASHEKHAR	B38	19	2	10.53	6	0	0.00	16	1	6.25	3	0	0.00	25	2	8.00	8	0	0.00	5	3	60.00	16	8	50.00	20	2	10.00	20	0	0.00	6	0	0.00	144	18	12.5
27.	TE-B(MECH)	TU5S2223058	SAWANT PRATIK GAJANAN	B39	19	11	57.89	6	5	83.33	16	10	62.50	3	0	0.00	25	11	44.00	8	5	62.50	5	5	100.00	16	10	62.50	20	8	40.00	20	7	35.00	6	6	100.00	144	78	54.17
28.	TE-B(MECH)	TU5S2223061	MASULE PRASHANT CHUDAMAN	B42	19	14	73.68	6	6	100.00	16	12	75.00	3	3	100.00	25	14	56.00	8	7	87.50	5	4	80.00	16	14	87.50	20	14	70.00	20	17	85.00	6	6	100.00	144	111	77.08
29.	TE-B(MECH)	TU5S2223063	SAWANT AMEY MAHESH	B44	19	10	52.63	6	5	83.33	16	10	62.50	3	1	33.33	25	10	40.00	8	5	62.50	5	4	80.00	16	5	31.25	20	12	60.00	20	7	35.00	6	4	66.67	144	73	50.69
30.	TE-B(MECH)	TU5S2223064	KHEDEKAR HRISHIKESH KISHOR	B45	19	2	10.53	6	0	0.00	15	1	6.67	3	0	0.00	21	1	4.76	8	0	0.00	4	1	25.00	14	3	21.43	17	0	0.00	19	2	10.53	6	1	16.67	132	11	8.33
				TOTAL	570	266		180	93		476	218		90	41		735	266		253	119		206	119		472	254		591	246		596	247		193	98				

PRINCIPAL
TERNA ENGINEERING COLLEGE
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Report Generation Date : 27-09-2023

Terna Public Charitable Trust
Terna Engineering College
Plot No. 12, Sector-22, Opp. Nerul Railway Station,
Phase-II, Nerul (W),
Phone No. : Website : https://www.ternaengg.ac.in Email ID : principal@ternaengg.ac.in

Master Attendance
10-07-2023 till 25-09-2023 SH23
2023-2024 B.E.
SEM-VII

STUDENT LECTURE WISE ATTENDANCE					Design of Mechanical System Mr. CHETAN DESHMUKH			Design of Mechanical System Mr. CHETAN DESHMUKH			Disaster Management and Mitigation Measures Mr. SAYED FARAZ JAGIRDAR			Industrial Skills Mr. VAISHNAVKUMAR WAGH , Mr. SHARAD BARGAT , Mr. TAHSIN AKHTAR			Logistics and Supply Chain Management Dr. RAJESH JAWARE			Machinery Diagnostics Mr. MAYUR BEMBDE			Maintenance Engineering Lab Mr. MAYUR BEMBDE			Major Project I Mr. TAHSIN AKHTAR			Renewable Energy Systems Mr. SHARAD BARGAT			H	P	%
Sr. No.	Class	GR No.	Student Name	Roll No.	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%			
1.	BE-A(MECH)	TU5F2021001	SURYAVANSHI MAYUR	A1	31	14	45.16	11	7	63.64	26	10	38.46	2	2	100.00	21	11	52.38	25	11	44.00	6	2	33.33	9	6	66.67	25	13	52.00	156	76	48.72
2.	BE-A(MECH)	TU5F2021002	BHOIR SUYASH	A2	31	6	19.35	11	0	0.00	26	3	11.54	2	0	0.00	21	3	14.29	25	5	20.00	6	0	0.00	9	0	0.00	25	0	0.00	156	17	10.9
3.	BE-A(MECH)	TU5F2021004	BHAGAT CHANDAN RAJEEV	A3	31	12	38.71	11	5	45.45	26	3	11.54	2	0	0.00	21	9	42.86	25	8	32.00	6	2	33.33	9	8	88.89	25	18	72.00	156	65	41.67
4.	BE-A(MECH)	TU5F2021005	PADHYE LEELADHAR	A4	31	17	54.84	11	8	72.73	26	7	26.92	2	2	100.00	21	14	66.67	25	10	40.00	6	5	83.33	9	7	77.78	25	17	68.00	156	87	55.77
5.	BE-A(MECH)	TU5F2021006	ALANGE ABHAY DHANRAJ	A5	31	14	45.16	11	8	72.73	26	3	11.54	2	2	100.00	21	12	57.14	25	7	28.00	6	3	50.00	9	6	66.67	25	15	60.00	156	70	44.87
6.	BE-A(MECH)	TU5F2021007	MHATRE HARDIK VILAS	A6	31	13	41.94	11	7	63.64	26	8	30.77	2	1	50.00	21	9	42.86	25	8	32.00	6	3	50.00	9	3	33.33	25	14	56.00	156	66	42.31
7.	BE-A(MECH)	TU5F2021008	MHATRE HRISHIKESH CHANDAN	A7	31	7	22.58	11	4	36.36	26	3	11.54	2	1	50.00	21	7	33.33	25	5	20.00	6	4	66.67	9	6	66.67	25	12	48.00	156	49	31.41
8.	BE-A(MECH)	TU5F2021009	GHARAT VED SANDEEP	A8	31	6	19.35	11	5	45.45	26	5	19.23	2	0	0.00	21	9	42.86	25	6	24.00	6	2	33.33	9	1	11.11	25	12	48.00	156	46	29.49
9.	BE-A(MECH)	TU5F2021012	GHATWAL SAHIL SANDEEP	A11	31	10	32.26	11	7	63.64	26	3	11.54	2	1	50.00	21	12	57.14	25	6	24.00	6	3	50.00	9	6	66.67	25	12	48.00	156	60	38.46
10.	BE-A(MECH)	TU5F2021013	PARDESHI RAJ	A12	31	11	35.48	11	3	27.27	26	8	30.77	2	2	100.00	21	11	52.38	25	9	36.00	6	1	16.67	9	8	88.89	25	12	48.00	156	65	41.67
11	BE-A(MECH)	TU5F2021014	KUWARE JAYESH NARENDRA	A13	31	10	32.26	11	6	54.55	26	6	23.08	2	1	50.00	21	9	42.86	25	4	16.00	6	1	16.67	9	7	77.78	25	14	56.00	156	58	37.18
12.	BE-A(MECH)	TU5F2021015	MAITY SURAJIT SANTOSH	A14	31	11	35.48	11	7	63.64	26	10	38.46	2	1	50.00	21	12	57.14	25	10	40.00	6	2	33.33	9	5	55.56	25	10	40.00	156	68	43.59
13.	BE-A(MECH)	TU5F2021016	NAIR KRISH	A15	31	1	3.23	11	1	9.09	26	2	7.69	2	0	0.00	21	4	19.05	25	2	8.00	6	0	0.00	9	4	44.44	25	1	4.00	156	15	9.62
14.	BE-A(MECH)	TU5F2021017	KADAM DHAMMESH	A16	31	1	3.23	11	0	0.00	26	2	7.69	2	0	0.00	21	4	19.05	25	3	12.00	6	0	0.00	9	1	11.11	25	2	8.00	156	13	8.33
15.	BE-A(MECH)	TU5F2021018	KADAM JAYESH	A17	31	7	22.58	11	3	27.27	26	5	19.23	2	0	0.00	21	4	19.05	25	4	16.00	6	1	16.67	9	6	66.67	25	5	20.00	156	35	22.44
16.	BE-A(MECH)	TU5F2021041	ALAM SARFARAZ	A18	31	7	22.58	11	10	90.91	26	8	30.77	2	1	50.00	21	9	42.86	25	7	28.00	6	5	83.33	9	7	77.78	25	13	52.00	156	67	42.95
17	BE-A(MECH)	TU5F2021040	PARATE YASH MANOJ	A19	31	7	22.58	11	10	90.91	26	4	15.38	2	1	50.00	21	9	42.86	25	8	32.00	6	1	16.67	9	4	44.44	25	12	48.00	156	56	35.9
18.	BE-A(MECH)	TU5F2021036	GUPTA RISHABH	A20	31	15	48.39	6	2	33.33	26	9	34.62	4	2	50.00	21	8	38.10	25	13	52.00	11	5	45.45	9	6	66.67	25	9	36.00	158	69	43.67
19.	BE-A(MECH)	TU5F2021033	GAWADE VISHWANATH	A21	31	3	9.68	6	5	83.33	26	6	23.08	4	1	25.00	21	5	23.81	25	4	16.00	11	2	18.18	9	7	77.78	25	9	36.00	158	42	26.58
20.	BE-A(MECH)	TU5F2021028	BHARATI ADITYA	A22	31	5	16.13	6	2	33.33	26	7	26.92	4	3	75.00	21	8	38.10	25	5	20.00	11	9	81.82	9	8	88.89	25	6	24.00	158	53	33.54
21.	BE-A(MECH)	TU5F2021027	BISHT ABHAY	A23	31	14	45.16	6	2	33.33	26	10	38.46	4	2	50.00	21	8	38.10	25	12	48.00	11	4	36.36	9	6	66.67	25	9	36.00	158	67	42.41
22.	BE-A(MECH)	TU5F2021026	HASE OMKAR DATTATRAY	A25	31	17	54.84	6	5	83.33	26	10	38.46	4	3	75.00	21	15	71.43	25	11	44.00	11	10	90.91	9	8	88.89	25	23	92.00	158	102	64.56
23.	BE-A(MECH)	TU5F2021038	SONI YOGESH	A26	31	5	16.13	6	1	16.67	26	7	26.92	4	2	50.00	21	10	47.62	25	8	32.00	11	3	27.27	9	7	77.78	25	9	36.00	158	52	32.91
24.	BE-A(MECH)	TU5F2021037	SHAIKH WAJID	A27	31	4	12.90	6	1	16.67	26	3	11.54	4	0	0.00	21	9	42.86	25	5	20.00	11	4	36.36	9	3	33.33	25	6	24.00	158	35	22.15
25.	BE-A(MECH)	TU5F2021024	SINGH AMAN	A30	31	10	32.26	6	4	66.67	26	7	26.92	4	2	50.00	21	1	4.76	25	14	56.00	11	3	27.27	9	5	55.56	25	9	36.00	158	55	34.81
26.	BE-A(MECH)	TU5F2021032	JADHAV PRATHAMESH	A32	31	2	6.45	6	0	0.00	26	1	3.85	4	0	0.00	21	2	9.52	25	2	8.00	11	0	0.00	9	1	11.11	25	0	0.00	158	8	5.06
27.	BE-A(MECH)	TU5F2021031	SURYAVANSHI PRANAV BALWANT	A33	31	0	0.00	6	0	0.00	26	1	3.85	4	0	0.00	21	3	14.29	25	0	0.00	11	0	0.00	9	0	0.00	25	0	0.00	158	4	2.53
28.	BE-A(MECH)	TU5F2021029	WAGLE SAHIL RAFIQ AHMED	A34	31	8	25.81	6	4	66.67	26	7	26.92	4	3	75.00	21	11	52.38	25	5	20.00	11	9	81.82	9	8	88.89	25	10	40.00	158	65	41.14
29.	BE-A(MECH)	TU5F2021022	KARBELKAR AYMAN	A35	31	11	35.48	6	2	33.33	26	10	38.46	4	1	25.00	21	9	42.86	25	11	44.00	11	6	54.55	9	5	55.56	25	8	32.00	158	63	39.87
30.	BE-A(MECH)	TU5F2021025	KHAN MUBEEN	A36	31	3	9.68	6	3	50.00	26	6	23.08	4	1	25.00	21	6	28.57	25	6	24.00	11	2	18.18	9	2	22.22	25	8	32.00	158	37	23.42
31.	BE-A(MECH)	TU5F2021030	DESHMUKH PURVA	A37	31	4	12.90	6	3	50.00	26	3	11.54	4	1	25.00	21	12	57.14	25	12	48.00	11	7	63.64	9	6	66.67	25	13	52.00	158	61	38.61
32	BE-A(MECH)	TU5F2021021	GOKHALE AKSHAT	A38	31	3	9.68	6	4	66.67	26	5	19.23	4	2	50.00	21	11	52.38	25	5	20.00	11	8	72.73	9	8	88.89	25	8	32.00	158	54	34.18
33.	BE-A(MECH)	TU5F2021019	PATIL VARUN	A39	31	6	19.35	4	2	50.00	26	6	23.08	9	1	11.11	21	5	23.81	25	8	32.00	7	4	57.14	9	7	77.78	25	8	32.00	157	47	29.94
34.	BE-A(MECH)	TU5F2021042	GUPTA VISHAL SANTOSH	A40	31	10	32.26	4	3	75.00	26	8	30.77	9	5	55.56	21	12	57.14	25	12	48.00	7	4	57.14	9	7	77.78	25	14	56.00	157	75	47.77
35.	BE-A(MECH)	TU5F2021044	NIGAM SHIVAM	A43	31	9	29.03	4	4	100.00	26	3	11.54	9	9	100.00	21	12	57.14	25	14	56.00	7	2	28.57	9	6	66.67	25	11	44.00	157	70	44.59
36.	BE-A(MECH)	TU5F2021045	KOLI BHARGAVA	A44	31	8	25.81	4	1	25.00	26	7	26.92	9	2	22.22	21	7	33.33	25	6	24.00	7	2	28.57	9	3	33.33	25	8	32.00	157	44	28.03
37.	BE-A(MECH)	TU5F2021048	SINGH YASH DHARMENDRA	A46	31	12	38.71	4	3	75.00	26	9	34.62	9	7	77.78	21	9	42.86	25	13	52.00	7	3	42.86	9	2	22.22	25	12	48.00	157	70	44.59
38.	BE-A(MECH)	TU5F2021049	TURE ATHARVA PRAVIN	A4[illegible]	31	11	35.48	4	1	25.00	26	6	23.08	9	3	33.33	21	7	33.33	25	11	44.00	7	6	85.71	9	6	66.67	25	9	36.00	157	60	38.22
39.	BE-A(MECH)	TU5F2021050	PARKAR SAI PRASAD	A4[illegible]	31	2	6.45	4	0	0.00	26	2	7.69	9	1	11.11	21	1	4.76	25	4	16.00	7	0	0.00	9	1	11.11	25	0	0.00	157	11	7.01
40.	BE-A(MECH)	TU5F2021051	FODKAR HAMZA PARVEZ	A50	31	1	3.23	4	0	0.00	26	2	7.69	9	0	0.00	21	3	14.29	25	4	16.00	7	0	0.00	9	0	0.00	25	1	4.00	157	11	7.01
41.	BE-A(MECH)	TU5F2021052	GUPTA DEVANSHU KAMLESH	A51	31	1	3.23	4	3	75.00	26	2	7.69	9	2	22.22	21	7	33.33	25	1	4.00	7	0	0.00	9	5	55.56	25	0	0.00	157	21	13.38
42.	BE-A(MECH)	TU5F2021053	PANDEY SHIVAM SURESH	A52	31	9	29.03	4	4	100.00	26	8	30.77	9	8	88.89	21	13	61.90	25	13	52.00	7	5	71.43	9	7	77.78	25	15	60.00	157	82	52.23
43.	BE-A(MECH)	TU5F2021055	UBALE ADITYA JAGDISH	[illegible]	31	8	25.81	4	1	25.00	26	6	23.08	9	[illegible]	77.78	21	11	52.38	25	11	44.00	7	3	42.86	9	4	44.44	25	11	44.00	157	62	39.49

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44.	BE-A(MECH)	TU5F2021056	CHOGALE YASH VISHAL	A54	31	8	25.81	4	2	50.00	26	6	23.08	9	6	66.67	21	7	33.33	25	10	40.00	7	5	71.43	9	6	66.67	25	12	48.00	157	62	39.49
45.	BE-A(MECH)	TU5F2021057	SINGH ANURAG DIGVIJAY SINGH	A55	31	3	9.68	4	1	25.00	26	1	3.85	9	1	11.11	21	1	4.76	25	2	8.00	7	3	42.86	9	1	11.11	25	3	12.00	157	16	10.19
46.	BE-A(MECH)	TU5F2021058	PATIL SHREEYASH ASHOK	A56	31	6	19.35	4	1	25.00	26	1	3.85	9	2	22.22	21	3	14.29	25	7	28.00	7	2	28.57	9	6	66.67	25	5	20.00	157	33	21.02
47.	BE-A(MECH)	TU5F2021059	VISPUTE TEJAS PRAMOD	A57	31	2	6.45	4	1	25.00	26	3	11.54	9	1	11.11	21	6	28.57	25	5	20.00	7	1	14.29	9	0	0.00	25	2	8.00	157	21	13.38
48.	BE-A(MECH)	TU5F2021063	THAKUR OMKAR	A58	31	7	22.58	7	0	0.00	26	2	7.69	7	2	28.57	21	8	38.10	25	1	4.00	6	3	50.00	8	2	25.00	25	7	28.00	156	32	20.51
49.	BE-A(MECH)	TU5F2021062	VISHWAKARMA AJAY RAJENDRA PRASAD	A59	31	9	29.03	7	4	57.14	26	6	23.08	7	3	42.86	21	7	33.33	25	10	40.00	6	4	66.67	8	6	75.00	25	13	52.00	156	62	39.74
50.	BE-A(MECH)	TU5F2021061	CHAUHAN SUNNY KRISHNAPRASAD CHAUHAN	A60	31	2	6.45	7	5	71.43	26	4	15.38	7	5	71.43	21	6	28.57	25	3	12.00	6	6	100.00	8	3	37.50	25	8	32.00	156	42	26.92
51.	BE-A(MECH)	TU5F2021065	DINGANKAR SAHIL SAMIR	A62	31	16	51.61	7	5	71.43	26	7	26.92	7	6	85.71	21	14	66.67	25	13	52.00	6	6	100.00	8	6	75.00	25	15	60.00	156	88	56.41
52.	BE-A(MECH)	TU5S2122082	TARE AJINKYA ULHAS	A63	31	14	45.16	7	3	42.86	26	11	42.31	7	5	71.43	21	12	57.14	23	14	60.87	6	5	83.33	7	3	42.86	23	13	56.52	151	80	52.98
53.	BE-A(MECH)	TU5S2122084	MARWADE SIDDHANT NANDKUMAR	A64	31	19	61.29	7	2	28.57	26	15	57.69	7	5	71.43	21	14	66.67	25	21	84.00	6	5	83.33	8	3	37.50	25	18	72.00	156	102	65.38
54.	BE-A(MECH)	TU5S2122085	THORAT HRISHIKESH SUKIR	A65	31	10	32.26	7	5	71.43	26	10	38.46	7	4	57.14	21	10	47.62	25	14	56.00	6	5	83.33	8	2	25.00	25	10	40.00	156	70	44.87
55.	BE-A(MECH)	TU5S2122086	SALEKAR SWAPNIL	A66	31	14	45.16	7	5	71.43	26	9	34.62	7	4	57.14	21	9	42.86	25	17	68.00	6	4	66.67	8	7	87.50	25	12	48.00	156	81	51.92
56.	BE-A(MECH)	TU5S2122087	NAIK CHINMAY BALKRISHNA	A68	31	22	70.97	7	5	71.43	26	18	69.23	7	6	85.71	21	16	76.19	25	20	80.00	6	5	83.33	8	6	75.00	25	20	80.00	156	118	75.64
57.	BE-A(MECH)	TU5S2122089	SHAIKH MOSIN MURAD	A69	31	18	58.06	7	6	85.71	26	16	61.54	7	4	57.14	21	15	71.43	25	21	84.00	6	5	83.33	8	6	75.00	25	18	72.00	156	109	69.87
58.	BE-A(MECH)	TU5S2122090	KUMBLE PRANIL KISHORE	A70	31	18	58.06	7	5	71.43	26	14	53.85	7	5	71.43	21	16	76.19	25	20	80.00	6	5	83.33	8	6	75.00	25	18	72.00	156	107	68.59
59.	BE-A(MECH)	TU5S2122091	PANCHAL ZILL BHARAT	A71	31	14	45.16	7	1	14.29	26	11	42.31	7	5	71.43	21	14	66.67	25	18	72.00	6	6	100.00	8	7	87.50	25	16	64.00	156	92	58.97
60.	BE-A(MECH)	TU5S2122092	SHAIKH REHAN	A72	31	16	51.61	7	2	28.57	26	11	42.31	7	4	57.14	21	12	57.14	25	15	60.00	6	3	50.00	8	7	87.50	25	14	56.00	156	84	53.85
61.	BE-A(MECH)	TU5S2122094	SHAIKH INSHA	A74	31	11	35.48	7	5	71.43	26	10	38.46	7	3	42.86	21	7	33.33	25	14	56.00	6	2	33.33	8	5	62.50	25	10	40.00	156	67	42.95
62.	BE-A(MECH)	TU5S2122095	MALANDKAR VISHWANATH	A75	31	4	12.90	7	4	57.14	26	3	11.54	7	2	28.57	21	6	28.57	25	4	16.00	6	3	50.00	8	5	62.50	25	3	12.00	156	34	21.79
				TOTAL H : Held/Conducted P : Present	1922	548		442	213		1612	399		334	156		1302	536		1548	552		462	214		542	300		1548	615				

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Report Generation Date : 30-10-2023

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Terna Public Charitable Trust
Terna Engineering College
Plot No. 12, Sector-22, Opp. Nerul Railway Station,
Phase-II, Nerul (W)

Master Attendance
10-07-2023 till 27-10-2023
2023-2024 B.E.B (Overall)
SEM-VII

STUDENT LECTURE WISE ATTENDANCE					Design of Mechanical System			Design of Mechanical System			Disaster Management and Mitigation Measures			Industrial Skills Dr. RAJESH JAWARE			Logistics and Supply Chain Management			Machinery Diagnostics			Maintenance Engineering Lab			Major Project I Mr. SAYED FARAZ			Renewable Energy Systems			H	P	%
Sr. No.	Class	GR No.	Student Name	Roll No.	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%	H	P	%			
1.	BE-B(MECH)	TU5S2122002	CHOUGLE SHOAIB ALTAF	B02	34	11	32.35	10	2	20.00	24	9	37.50	5	0	0.00	21	3	14.29	30	8	26.67	11	1	9.09	8	2	25.00	24	10	41.67	167	46	27.54
2.	BE-B(MECH)	TU5S2122003	PATIL BHUSHAN	B03	40	30	75.00	12	7	58.33	30	15	50.00	6	5	83.33	25	11	44.00	32	22	68.75	11	7	63.64	11	8	72.73	25	21	84.00	192	126	65.62
3.	BE-B(MECH)	TU5S2122005	GHARAT KUNAL GURUNATH	B04	40	28	70.00	12	8	66.67	30	15	50.00	6	5	83.33	25	14	56.00	32	23	71.88	11	7	63.64	11	9	81.82	25	20	80.00	192	129	67.19
4.	BE-B(MECH)	TU5S2122007	BAIDYA MANOJ MANTU	B05	28	7	25.00	8	1	12.50	21	9	42.86	5	1	20.00	21	4	19.05	22	4	18.18	8	0	0.00	8	2	25.00	20	3	15.00	141	31	21.99
5.	BE-B(MECH)	TU5S2122008	MOTAN ANKIT RAMCHANDER	B06	40	22	55.00	12	2	16.67	30	11	36.67	6	2	33.33	25	3	12.00	30	13	43.33	11	0	0.00	11	5	45.45	24	6	25.00	189	64	33.86
6.	BE-B(MECH)	TU5S2122009	CHAVAN PRATIK	B07	40	19	47.50	12	8	66.67	30	11	36.67	6	2	33.33	25	9	36.00	31	10	32.26	11	6	54.55	11	7	63.64	24	9	37.50	190	81	42.63
7.	BE-B(MECH)	TU5S2122011	KHULE SHUBHAM	B09	40	20	50.00	12	7	58.33	30	14	46.67	6	5	83.33	25	14	56.00	32	16	50.00	11	5	45.45	11	8	72.73	25	15	60.00	192	104	54.17
8.	BE-B(MECH)	TU5S2122012	VAITY PRATHAM DEEPAK	B10	40	31	77.50	12	9	75.00	30	15	50.00	6	4	66.67	25	11	44.00	32	18	56.25	11	7	63.64	11	7	63.64	25	19	76.00	192	121	63.02
9.	BE-B(MECH)	TU5S2122014	MASKARE ADITYA VINAYAK	B11	40	27	67.50	12	8	66.67	30	16	53.33	6	6	100.00	25	14	56.00	32	24	75.00	11	7	63.64	11	7	63.64	25	19	76.00	192	128	66.67
10.	BE-B(MECH)	TU5S2122013	KALEL VISHAL	B12	40	28	70.00	12	6	50.00	29	13	44.83	6	5	83.33	25	11	44.00	30	21	70.00	11	7	63.64	11	8	72.73	24	15	62.50	188	114	60.64
11.	BE-B(MECH)	TU5S2122015	KHARAT PRATHAMESH AJIT	B13	40	28	70.00	12	7	58.33	30	16	53.33	6	6	100.00	25	12	48.00	30	22	73.33	11	7	63.64	11	7	63.64	24	15	62.50	189	120	63.49
12.	BE-B(MECH)	TU5S2122016	THENGAL AKSHAY	B14	40	24	60.00	12	7	58.33	30	17	56.67	6	5	83.33	25	15	60.00	32	18	56.25	11	7	63.64	11	8	72.73	25	17	68.00	192	118	61.46
13.	BE-B(MECH)	TU5S2122017	GIJE TEJAS	B15	40	16	40.00	12	6	50.00	30	12	40.00	6	4	66.67	25	8	32.00	32	4	12.50	11	3	27.27	11	5	45.45	25	9	36.00	192	67	34.9
14.	BE-B(MECH)	TU5S2122018	MAYEKAR ROHAN	B16	40	23	57.50	12	8	66.67	30	13	43.33	6	5	83.33	25	13	52.00	32	13	40.63	11	7	63.64	11	7	63.64	25	20	80.00	192	109	56.77
15.	BE-B(MECH)	TU5S2122019	MORE YASH VIRENDRA	B17	40	14	35.00	12	6	50.00	30	12	40.00	6	2	33.33	25	10	40.00	32	8	25.00	11	3	27.27	11	3	27.27	25	14	56.00	192	72	37.5
16.	BE-B(MECH)	TU5S2122020	RATHOD UMESH SHIVDHAN	B19	40	17	42.50	12	7	58.33	30	10	33.33	6	1	16.67	25	7	28.00	32	12	37.50	11	4	36.36	11	5	45.45	25	12	48.00	192	75	39.06
17.	BE-B(MECH)	TU5S2122022	BHOI OM	B20	40	1	2.50	10	3	30.00	30	9	30.00	6	0	0.00	25	4	16.00	30	0	0.00	11	0	0.00	11	0	0.00	24	2	8.33	187	19	10.16
18.	BE-B(MECH)	TU5S2122023	GANGAVE PIYUSH PRABHAKAR	B21	40	16	40.00	10	5	50.00	30	11	36.67	6	2	33.33	25	7	28.00	30	8	26.67	11	3	27.27	11	3	27.27	24	4	16.67	187	59	31.55
19.	BE-B(MECH)	TU5S2122025	KUMBHAR CHAITANYA	B22	40	25	62.50	10	7	70.00	30	13	43.33	6	6	100.00	25	17	68.00	32	21	65.63	12	9	75.00	11	6	54.55	25	18	72.00	191	122	63.87
20.	BE-B(MECH)	TU5S2122024	PATIL AKSHAY RAVINDRA	B23	40	22	55.00	10	9	90.00	30	15	50.00	6	5	83.33	25	10	40.00	32	10	31.25	12	8	66.67	11	7	63.64	25	12	48.00	191	98	51.31
21.	BE-B(MECH)	TU5S2122027	ASAWALE PRATHAMESH	B25	40	8	20.00	10	6	60.00	30	10	33.33	6	4	66.67	25	2	8.00	32	3	9.38	12	3	25.00	11	1	9.09	25	3	12.00	191	40	20.94
22.	BE-B(MECH)	TU5S2122028	SHINDE SANKESH RAJENDRA	B26	40	37	92.50	10	10	100.00	30	20	66.67	6	6	100.00	25	18	72.00	32	28	87.50	12	8	66.67	11	9	81.82	25	20	80.00	191	156	81.68
23.	BE-B(MECH)	TU5S2122029	SASULKAR SNEHAL	B27	28	15	53.57	7	6	85.71	21	10	47.62	6	4	66.67	21	11	52.38	22	8	36.36	9	7	77.78	8	4	50.00	20	13	65.00	142	78	54.93
24.	BE-B(MECH)	TU5S2122030	SAWANT PRATIK RAJAN	B28	40	35	87.50	10	10	100.00	30	20	66.67	6	6	100.00	25	19	76.00	32	27	84.38	12	8	66.67	11	9	81.82	25	19	76.00	191	153	80.1
25.	BE-B(MECH)	TU5S2122032	YEGADE KARTIKEY PANDURANG	B30	38	21	55.26	10	5	50.00	30	12	40.00	6	5	83.33	25	8	32.00	31	11	35.48	12	7	58.33	11	5	45.45	25	12	48.00	188	86	45.74
26.	BE-B(MECH)	TU5S2122033	PARAB GANESH RAJENDRA	B31	40	30	75.00	10	9	90.00	30	19	63.33	6	4	66.67	25	19	76.00	32	21	65.63	12	8	66.67	11	7	63.64	25	19	76.00	191	136	71.2
27.	BE-B(MECH)	TU5S2122035	GAIKWAD SHUBHAM	B32	40	21	52.50	10	4	40.00	30	10	33.33	6	2	33.33	25	15	60.00	32	18	56.25	12	8	66.67	11	3	27.27	25	18	72.00	191	99	51.83
28.	BE-B(MECH)	TU5S2122036	SALEKAR PRAJWAL SOPAN	B34	40	24	60.00	10	5	50.00	30	11	36.67	6	5	83.33	25	14	56.00	32	15	46.88	12	4	33.33	11	5	45.45	25	14	56.00	191	97	50.79
29.	BE-B(MECH)	TU5S2122037	DHASAL ADITYA	B35	40	18	45.00	10	3	30.00	30	9	30.00	6	1	16.67	25	7	28.00	32	15	46.88	12	3	25.00	11	4	36.36	25	9	36.00	191	69	36.13
30.	BE-B(MECH)	TU5S2122039	PATIL ATHARVA	B36	40	16	40.00	10	3	30.00	30	16	53.33	6	3	50.00	25	8	32.00	32	10	31.25	12	2	16.67	11	5	45.45	25	6	24.00	191	69	36.13
31.	BE-B(MECH)	TU5S2122040	MORE GAURAV SHEKHAR	B37	40	33	82.50	10	9	90.00	30	18	60.00	6	5	83.33	25	14	56.00	32	23	71.88	12	9	75.00	11	9	81.82	25	20	80.00	191	140	73.3
32.	BE-B(MECH)	TU5S2122041	BANSODE RAJ PRASHANT	B38	40	34	85.00	10	10	100.00	30	19	63.33	6	6	100.00	25	17	68.00	32	24	75.00	12	10	83.33	11	9	81.82	25	24	96.00	191	153	80.1
33.	BE-B(MECH)	TU5S2122042	PEDNEKAR HARSHAL RAJAN	B39	40	25	62.50	9	5	55.56	30	17	56.67	4	2	50.00	25	10	40.00	32	19	59.38	12	8	66.67	11	9	81.82	25	10	40.00	188	105	55.85
34.	BE-B(MECH)	TU5S2122043	CHOWDHARY OMKAR	B40	40	17	42.50	9	5	55.56	30	13	43.33	4	0	0.00	25	12	48.00	32	10	31.25	12	4	33.33	11	7	63.64	25	13	52.00	188	81	43.09
35.	BE-B(MECH)	TU5S2122046	KHAN MOHD ADEEB MOHD YAHIYA	B42	40	22	55.00	9	4	44.44	30	14	46.67	4	1	25.00	25	6	24.00	32	11	34.38	12	2	16.67	11	2	18.18	25	7	28.00	188	69	36.7
36.	BE-B(MECH)	TU5S2122045	CHAVAN YASH	B43	40	12	30.00	9	3	33.33	30	12	40.00	4	1	25.00	25	5	20.00	32	3	9.38	12	2	16.67	11	2	18.18	25	7	28.00	188	47	25
37.	BE-B(MECH)	TU5S2122047	MOMIN SAAD ASLAM	B44	40	28	70.00	9	5	55.56	30	16	53.33	4	1	25.00	25	7	28.00	32	13	40.63	12	10	83.33	11	6	54.55	25	9	36.00	188	95	50.53
38.	BE-B(MECH)	TU5S2122051	PATIL MAHESH DNYANESHWAR	B46	40	31	77.50	9	7	77.78	30	16	53.33	4	3	75.00	25	20	80.00	32	22	68.75	12	9	75.00	11	8	72.73	25	23	92.00	188	139	73.94
39.	BE-B(MECH)	TU5S2122053	KHANDARE HARSH	B48	40	27	67.50	9	6	66.67	30	16	53.33	4	1	25.00	25	17	68.00	32	20	62.50	12	5	41.67	11	7	63.64	25	17	68.00	188	116	61.7
40.	BE-B(MECH)	TU5S2122054	SIDDIQUI SALEEM	B4[illegible]	40	14	35.00	9	2	22.22	30	11	36.67	[illegible]	[illegible]	[illegible]	25	7	28.00	32	18	56.25	12	0	0.00	11	3	27.27	25	8	32.00	188	63	33.51

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Report Generation Date : [illegible]

41.	BE-B(MECH)	TU5S2122056	DHENDE RUSHIKESH DHANAJI	B51	40	30	75.00	9	7	77.78	30	18	60.00	4	1	25.00	25	17	68.00	32	24	75.00	12	9	75.00	11	7	63.64	25	15	60.00	188	128	68.09
42.	BE-B(MECH)	TU5S2122057	MHASKE GITESH SANTOSH	B52	40	24	60.00	9	5	55.56	30	15	50.00	4	1	25.00	25	14	56.00	32	18	56.25	12	6	50.00	11	7	63.64	25	15	60.00	188	105	55.85
43.	BE-B(MECH)	TU5S2122058	KAMBLI ATHARVA MILIND	B53	40	19	47.50	9	4	44.44	30	13	43.33	4	0	0.00	25	10	40.00	32	16	50.00	12	1	8.33	11	5	45.45	25	13	52.00	188	81	43.09
44.	BE-B(MECH)	TU5S2122059	KHAN SAHAAF	B54	40	26	65.00	9	4	44.44	30	10	33.33	4	0	0.00	25	13	52.00	32	19	59.38	12	5	41.67	11	4	36.36	25	19	76.00	188	100	53.19
45.	BE-B(MECH)	TU5S2122063	DESHMUKH MOHD KAIF	B56	40	27	67.50	9	4	44.44	30	17	56.67	4	1	25.00	25	11	44.00	32	19	59.38	12	12	100.00	11	7	63.64	25	11	44.00	188	109	57.98
46.	BE-B(MECH)	TU5S2122066	MALIK MD KAIF EQBAL	B60	40	18	45.00	10	3	30.00	30	11	36.67	12	4	33.33	25	10	40.00	32	16	50.00	7	5	71.43	11	4	36.36	25	8	32.00	192	79	41.15
47.	BE-B(MECH)	TU5S2122067	SARFRAZ AHMED	B61	28	6	21.43	7	1	14.29	21	7	33.33	10	3	30.00	21	1	4.76	24	6	25.00	6	4	66.67	8	3	37.50	21	5	23.81	146	36	24.66
48.	BE-B(MECH)	TU5S2122068	REGAR SURAJ	B62	40	15	37.50	10	2	20.00	30	11	36.67	12	2	16.67	25	4	16.00	32	6	18.75	7	0	0.00	11	4	36.36	25	8	32.00	192	52	27.08
49.	BE-B(MECH)	TU5S2122069	PATIL SAHIL	B63	40	25	62.50	10	7	70.00	30	15	50.00	12	5	41.67	25	10	40.00	32	21	65.63	7	5	71.43	11	7	63.64	25	14	56.00	192	109	56.77
50.	BE-B(MECH)	TU5S2122070	KAMBLE ROHIT SITARAM	B64	40	32	80.00	10	5	50.00	30	14	46.67	12	6	50.00	25	15	60.00	32	23	71.88	7	7	100.00	11	9	81.82	25	19	76.00	192	130	67.71
51.	BE-B(MECH)	TU5S2122072	SHAIKH MUDABBIR	B66	36	19	52.78	9	1	11.11	29	10	34.48	12	2	16.67	25	12	48.00	30	14	46.67	7	5	71.43	9	4	44.44	24	10	41.67	181	77	42.54
52.	BE-B(MECH)	TU5S2122074	SINGH NAVNEET RAJESHWAR	B67	40	15	37.50	10	2	20.00	30	17	56.67	12	4	33.33	25	6	24.00	30	7	23.33	7	4	57.14	11	6	54.55	24	9	37.50	189	70	37.04
53.	BE-B(MECH)	TU5S2122076	KARANDEKAR CHINMAY UMESH	B69	40	35	87.50	10	9	90.00	30	19	63.33	12	10	83.33	25	16	64.00	32	26	81.25	7	7	100.00	11	10	90.91	25	20	80.00	192	152	79.17
54.	BE-B(MECH)	TU5S2122077	CHAVAN VISHAL SUNIL	B71	40	20	50.00	10	9	90.00	30	11	36.67	12	11	91.67	25	16	64.00	32	18	56.25	7	7	100.00	11	5	45.45	25	17	68.00	192	114	59.38
55.	BE-B(MECH)	TU5S2122079	SHETTY BHARGAV	B72	40	21	52.50	10	1	10.00	30	10	33.33	12	2	16.67	25	6	24.00	32	15	46.88	7	6	85.71	11	5	45.45	25	10	40.00	192	76	39.58
56.	BE-B(MECH)	TU5S2122078	BAVDANE HARSH RAMESH	B73	33	10	30.30	8	2	25.00	22	10	45.45	10	4	40.00	21	6	28.57	27	11	40.74	7	5	71.43	8	4	50.00	24	13	54.17	160	65	40.62
57.	BE-B(MECH)	TU5S2122081	DHOKE KETAN CHANDRAKANT	B75	40	28	70.00	10	9	90.00	30	11	36.67	12	11	91.67	25	22	88.00	31	24	77.42	7	7	100.00	11	9	81.82	24	23	95.83	190	144	75.79
58.	BE-B(MECH)	TU5F1920010	PATEL JAINISH KANTI	B77	40	16	37.50	10	2	20.00	30	8	26.67	12	2	16.67	25	8	32.00	32	16	50.00	0	0	0.00	0	0	0.00	25	11	44.00	174	62	35.63
			H : Held/Conducted P : Present	TOTAL	2265	1262		584	317		1697	772		394	200		1430	630		1804	893		599	310		610	328		1425	771				

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Terna Engineering College, Nerul

Department of Mechanical Engineering

DLOC & ILOC subject Orientation

(Sem V and sem VII)

FH2024

Date: 16/04/2024
Time: 12.15 - 1.15PM

Venue
Class-room 12 (for TE students)
Class-room 19 (for SE students)

List of DLOC subjects for TE (sem V)

1. Statistical Techniques (Prof. Tahsin Akthar)
2. Optimization Techniques (Dr. C. M. Choudhari)
3. Computational methods (Prof. Mahesh Kavre)

Google form link: https://forms.gle/HSpvpbUKXS8EETJ86

List of DLOC 1 subjects for BE (sem VII)

1. Automotive Power Systems (Prof. Mangesh Nalawade)
2. Renewable Energy Systems (Prof. Sharad Bargat)
3. Vehicle Systems (Prof. Vaibhav Ajmire)

List of DLOC 2 subjects for BE (sem VII)

1. Machinery Diagnostics (Dr. Mayur Bembde)
2. Vibration Controls (Prof. Chetan Deshmukh)
3. Advanced Vibration (Dr. C. M. Choudhari)

Google form link: https://forms.gle/3ac9NzVtk3WMoxQSA

List of ILOC subjects for BE (sem VII)

1. Product Life cycle Management (Prof. Mahesh Kavre)
2. Reliability Engineering
3. Management of Information system
4. Design Of Experiments (Dr. C. M. Choudhari)
5. Operation Research (Prof. Vaibhav Ajmire)
6. Cyber Securities and Laws
7. Disaster Management and Mitigation Measures (Prof. Mangesh Nalawade)
8. Energy Audit and Management
9. Development Engineering

Google form link: https://forms.gle/wWJj2kwmj4LfAzc28

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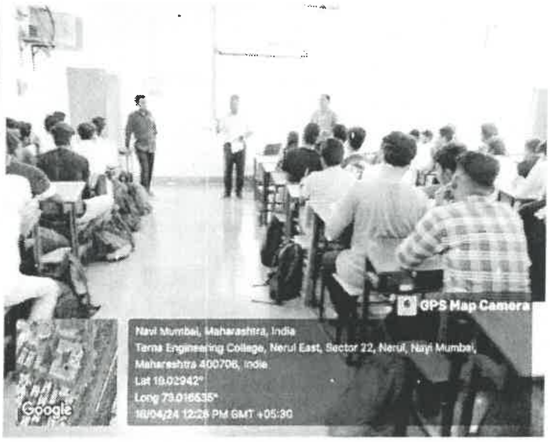
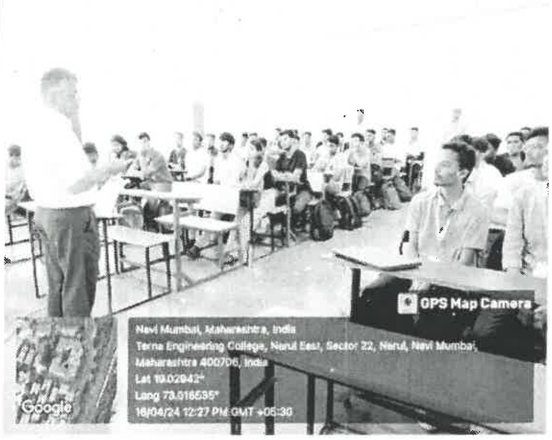
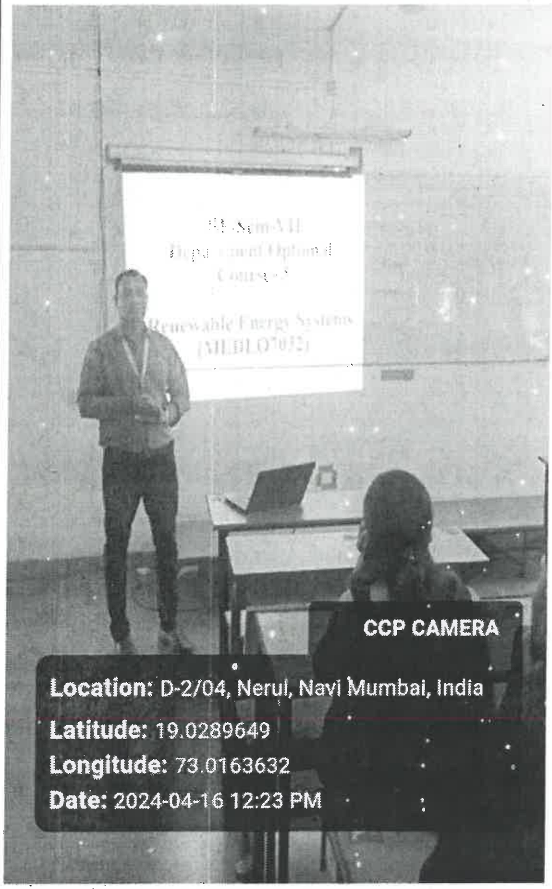
Photos of orientation program







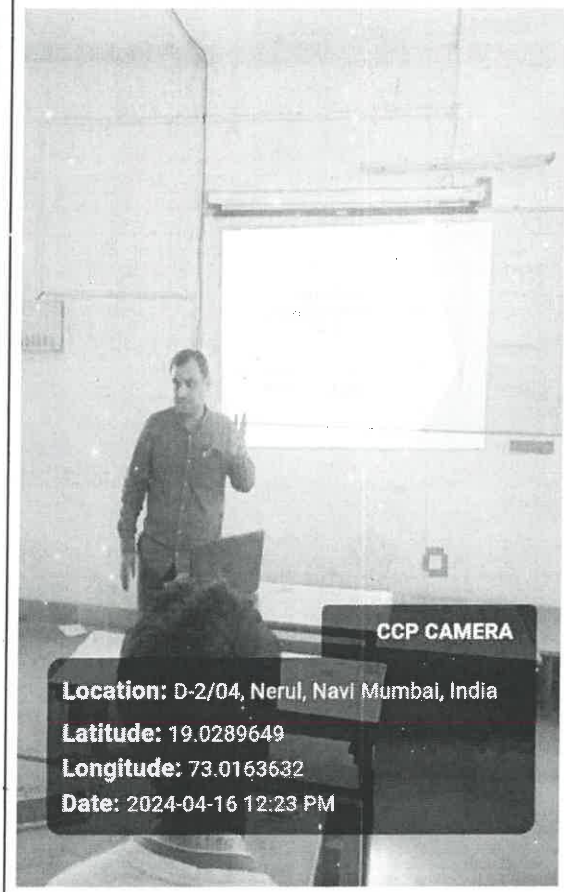


Photo 1: Subject Orientation by Faculties

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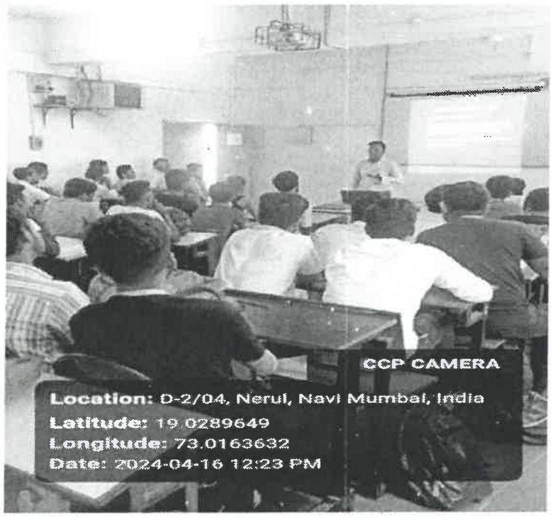

Photo 2: Subject Orientation by Faculties

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CERTIFICATE

Certified that Yugal Keshav Patil

Exam Seat No. ______ *Course* B.E.

ID No. TU5S2223034 *of* 3rd *Year has completed the required number of Practical / Tutorials / Assignment Tests in the Subject* Thermal engg. *Semester* V *in the Department of* mechanical engg. *during the academic year* 23-24

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Subject Incharge
1/11/23

Head of the Dept.

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INDEX

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2]	Experiment NO 2		31/7	7/8	8		
3]	Experiment NO 3		7/8	14/8	8		
4]	Experiment NO 4		14/8	21/8	9		
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DEPARTMENT OF MECHANICAL ENGINEERING

(~~F~~H/SH- 2023)

Rubrics Sheet

Student Name	Jugal Keshav patil						
Year	3rd	Sem.	V	Div.	B	Roll No.	14

Subject	TE	~~Assignment~~ / Practical No.	1
Title: To Determin the thermal Conductivity OF composite wall			
Date of Performance	24/7/23	Date of Submission	31/7/23

Criteria	Marks	Marks Obtained	Total Marks (10)	Faculty Signature With Date
Content / Performance	4/3/2/1	4	10/10	31/7/23
Understanding	4/3/2/1	4		
Time Line Submission	2/1	2		

Criteria for Evaluation of Performance	Self Involvement (01 Marks)	Correctness of Output / Calculations (01 Marks)	Skilled Observed (01 Marks)	Team Work (01 Marks)
Criteria for Evaluation of Content	Legible Handwriting (01 Marks)	Well Labelled Diagram (01 Marks)	Accurate Explanation/ Definition/ Working Principle/ Laws, etc. (01 Marks)	Correctness of answer with units (01 Marks)
Criteria for Evaluation of Understanding	Viva Voce (Questions related to Assignment/ Practical)			
Criteria for Time Line Submission	One week from the Date of Performance (02 Marks)	Two weeks from the Date of Performance (01 Marks)	Late Submission - After Three Weeks (00 Marks)	

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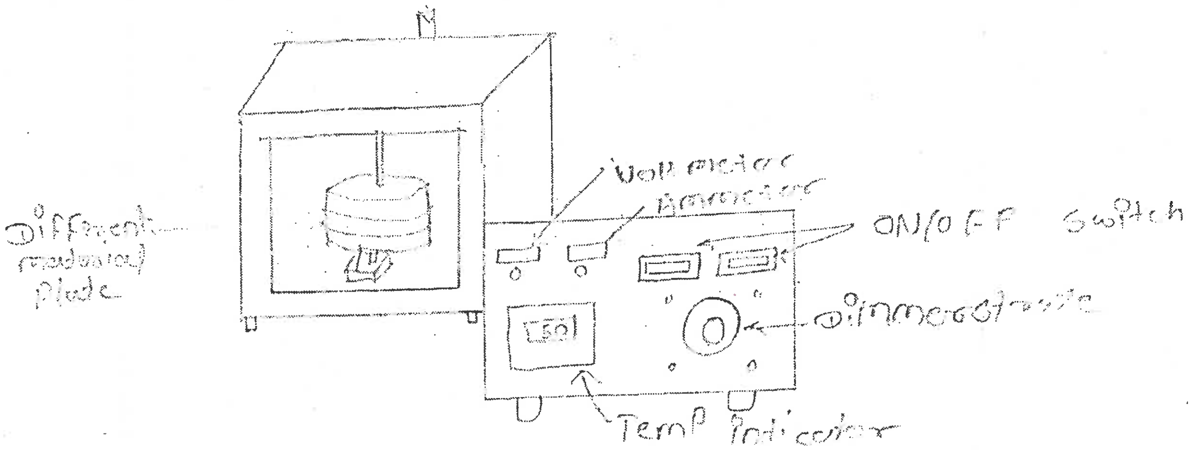

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TPCT'S TERNA ENGINEERING COLLEGE ★ Nerul, Navi Mumbai - 400706 ★

Experiment NO. 1

Titale:

To Determin the thermal conductivity of Composite wall

Objective:

① To determine total thermal resistance and thermal conductivity of Composite wall.

② To plot temperature gradient along composite wall Structure.

Description:

The apparatus is mounted on a table. It Consists of a central heater Sandwiched Between two sheets. Three types of slabs are provided on Both sides of heater which forms a Composite Structure. A Small hand press frame is provided to ensure the perfect Contact Between the slabs. A Dimmerstat is provided for Varying the input to the heater and measurement of input is carried out By a Voltmeter, ammeter. Thermocouples are embedded Between interface of the slab to read the temperature at the Surface.

Specification:

① slab assembly arranged symmetrically on Both side of heater formation of slab. assembly.

a. M.S. plate size 20mm thick X 200 mm dia ---- 2 NO.

b. Backelite plate - Size 12 mm thick x 200 mm dia. .... 2 NO

c. press wood - size 12 mm thick X 200 mm dia ... 2 NO

Enclosure Size : 58 cm X 35 cm X 35 cm with acrylic cover in front.

2. Heater :-

Nichrome heater wound on mica former and insulted having Capacity 300 watt maximum 200 mm ∅ 200 Volts

3. Heater Control unit :

Dimmerstat, 0-2A, single phase, open type.

4. Voltmeter :

Digital, range 0 to 200 V AC.

5. Ammeter -

Digital, range 0 to 200 A AC

6. Temperature Indicator (digital type) 0-200°C, 0.1°C LC with selector Switch

7. Table & Stand made up of ms square hallow pipe and Angle. Both side laminated Boards are fixed on the top and front side of the table.

Procedure :

① Arrange the plate in proper fashion (symmetrically) on Both side of the heater plates. (Already assembled)

② See that the plates are symmetrically arranged on Both side of the heater plates.

(3) operate the hand press properly to ensure perfect Contact Between the plates.

(4) Close the Box By Acrylic Cover to achive study environmental Conditions.

(5) Start the Supply of heater. By Varying the Dimmerstat, adjust the input at desired value.

(6) Take readings of all the thermocouples at an interval of 10 minutes until Fairly Steady temperature are achived and rate of rise is ~~per~~ negligible.

(7) Note down the readings in observation table.

Observations:

Composite Slabs

1. wall thickness
   - (a) mild steel = 20 mm
   - (b) Bakelite = 12 mm
   - (c) press wood = 12 mm
2. Slab diameter = 200 mm

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Sr. NO.	Set. I	Set II	Set III
1. Voltmeter	70.13	88.27	
2. Ammeter	0.523	0.657	
Heat supplied $Q = V \times I$	$\frac{36.677}{2}$ $= 18.338$	$\frac{58.27 \times 0.657}{2}$ $= 28.99$	
Thermometer Readings °C	80°C	100°C	
T_1	46°C	51.2°C	
T_2	46.2°C	51.6°C	
T_3	45.9°C	51.°C	
T_4	46.1°C	51.3°C	
T_5	39.9°C	42.8°C	
T_6	40.2°C	43.2°C	
T_7	31.6°C	32.7°C	
T_8	31.5°C	32.6°C	

mean reading

$$T_A = \frac{(T_1 + T_2)}{2} = \frac{46 + 46.2}{2} = 46.1°C$$

$$T_B = \frac{(T_3 + T_4)}{2} = \frac{45.9 + 46.1}{2} = 46°C$$

$$T_C = \frac{(T_5 + T_6)}{2} = \frac{39.9 + 40.2}{2} = 40.05°C$$

$$T_D = \frac{(T_7 + T_8)}{2} = \frac{31.6 + 31.5}{2} = 31.55°C$$

For set II

(1) P = 200 mm

(2) $R_{th} = \frac{T_A - T_B}{Q/2} = \frac{51.4 - 32.66}{28.04} = 0.668$ K/W

(3) $K = \frac{Q/2 \times L}{A(T_A - T_B)} = \frac{28.04 \times 14 \times 10^{-3}}{0.0314(51.4 - 32.66)} = 669.35$

$= 0.689$ W/mK

Result
As per original result
For set I

uni-directional i.e axial flow. Thus for calculation central half dia. Area where unidirectional flow is assumed is considered accordingly, thermocouples are fixed at a close to centre of the plates.

Now q = Heat Flux $= \frac{Q}{A}$ W/m²

where $A = \frac{\pi}{4} D^2$ m² where d = dia of plates.

① Total thermal resistance of composites slab:

$$R_{total} = \frac{T_A - T_D}{q} = \frac{(51.4 - 32.65)}{28.99} = \underline{0.64677}\ °C/W$$

② Thermal Conductivity of Composite Slab:

$$K_{composite} = \frac{q \times b}{A \times (T_A - T_D)} = \underline{0.34}\ W/m°C$$

b = Total thickness of composite slab = 20 + 12 + 12 = 44 mm

③ To plot thickness of slab material against temperature gradient.

Precautions:

① Keep Dimmerstat to zero before starting the experiment

② Keep all the assembly undisturbed

③ Operate selector switch of temperature indicator gently

Result :

Conclusion : In this experiment we calculated thermal Resistance (R_{th}) and thermal conductivity (K) by using formula of heat transfer in 'conduction' heat mode.

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DEPARTMENT OF MECHANICAL ENGINEERING

(FH/SH- 2023)

Rubrics Sheet

Student Name	Yugal Keshav patil					
Year	3rd	Sem.	V	Div.	B	Roll No.	14

Subject	TE	Assignment / Practical No.	2
Title: measurement of thermal Conductivity of a metal (copper) Bar			
Date of Performance	31/7/23	Date of Submission	7/8/23

Criteria	Marks	Marks Obtained	Total Marks (10)	Faculty Signature With Date
Content / Performance	4/3/2/1	3	8/10	21/8/2023
Understanding	4/3/2/1	4		
Time Line Submission	2/1	1		

Criteria for Evaluation of Performance	Self Involvement (01 Marks)	Correctness of Output / Calculations (01 Marks)	Skilled Observed (01 Marks)	Team Work (01 Marks)
Criteria for Evaluation of Content	Legible Handwriting (01 Marks)	Well Labelled Diagram (01 Marks)	Accurate Explanation/ Definition/ Working Principle/ Laws, etc. (01 Marks)	Correctness of answer with units (01 Marks)
Criteria for Evaluation of Understanding	Viva Voce (Questions related to Assignment / Practical)			
Criteria for Time Line Submission	One week from the Date of Performance (03 Marks)	Two weeks from the Date of Performance (01 Marks)	Late Submission - After Three Weeks (00 Marks)	

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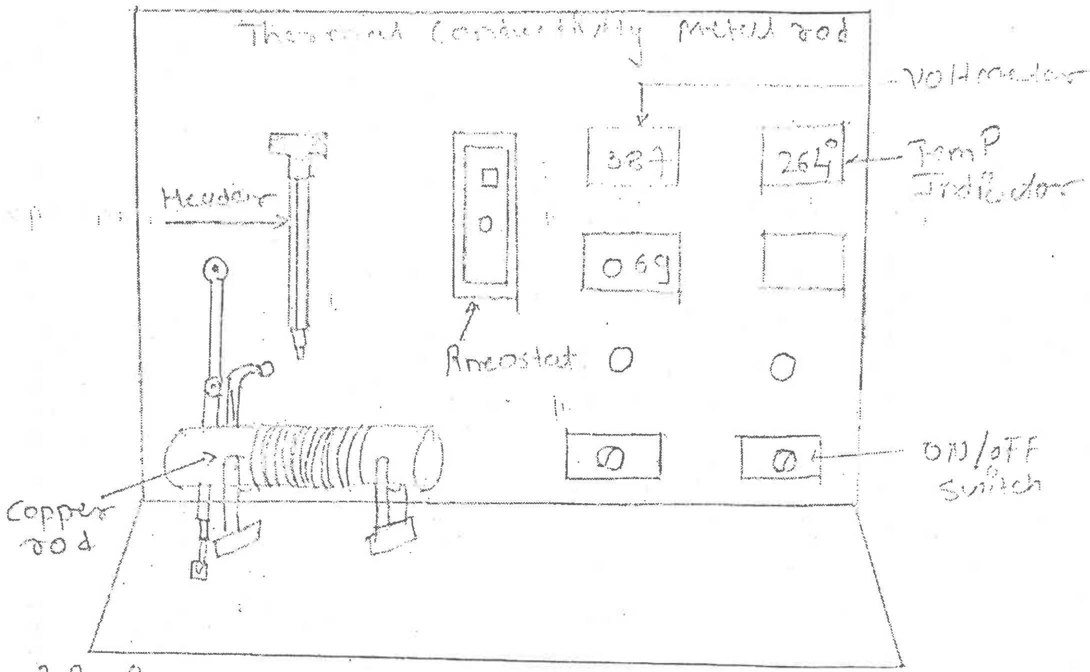
* Experimental setup



Specifications :

1. O.D of Copper Size : 32 mm Dia
2. Length of pipes : 400 mm
3. Dimmerstat : 4 Amps
4. Ammeter Selector Switch : Standard
5. Heater : Band Heater
6. Temperature Indicator : 0-300°C. 18 channel with cold Junction compensation
7. Thermocouples : Chromel - Alumel
8. Digital Voltmeter : 0- 200 Volts
9. Digital Ammeter : 0 - 5 Amp.

Experiment No:02.

Title : Measurement of thermal conductivity of a Metal (copper) Bar

Objective : To Determine The Thermal Conductivity of a metal rod.

Introduction :

Thermal Conductivity is an important thermo physical property of conducting materials, By the virtue of which the material conducts the heat energy through it symbol k is used for denoting the thermal conductivity. It provided an indication of the rate at which energy is transferred By diffusion process. It depends on the physical structure of matter, atomic and molecular, which is related to the state of matter. The minus sign is consequence of the fact that heat is transferred in the direction of decreasing temp. from Fourier's law of heat conduction, thermal conductivity is defined as :

$$k = \frac{Q\,dT}{A\,dx}$$

$$k = q\,\frac{dT}{dx}$$

where :

Q = heat transfer rate, ~~w~~ W

q = heat flux, W/m^2

A = area normal to heat transfer, m^2

dT = temperature gradient in the direction of heat flow.

Description:

The appratus is mounted on a table. It consists of a Copper pipe. The bond type heaters are used and mounted on the heating sections of the pipe. The surface temperature along the length of pipes are measured By thermocouples. Dimmerstat is provided for the Variation in the heat input to test pipe.

procedure:

1. start the supply
2. give known stedy input to the heater with the help of a dimmerstat.
3. check the input to the heater with help of voltmeter and ammeter
4. Allow an initial heating period of about 45 minutes for stedy state
5. measure the end point temperature of the pipe with help of selector Switch the temp pannel

Limits and precausions:

1. operate gently the selector Switch of the temp indicator from 1 to 16
2. Stir the water with the stirrer Before taking readings with thermometer.
3. Do not exceed 140 Watts.
4. Do not Disturb valve position of the heat pipe otherwise readings will not be satisfactory the vaccum may break.

observation table :

Temp of the end point of metal bar		Heat input to heater	
T_1 °C	T_2 °C	Voltage	Current
36	30	45 V	0.210 A

Calculation

- Heat input $(V \times I) = 45 \times 0.210 = 9.45$ W
- Calculate cross sectional area of pipe
- length of pipe
- Temperature difference.

By using Fourier's law of heat transfer thermal conductivity can be calculated

$$K = \frac{Q}{A}\frac{dx}{dT}$$

$$K = \frac{9.45 \times 400 \times 10^{-3}}{97.39 \times 10^{-3} \times 6}$$

$$K = 6.469 \times 10^{3} \text{ W/mK}$$

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Result: The thermal Conductivity of the Copper Bar 64.69×10^{-3} W/mK

Conclusions:

① Compare the value of thermal Conductivity obtained By experimentation with a Standard Value State the reason for any deviation.

② From the experiment, it is Concluded that the temperature goes on decreasing along the length of the rod

③ The thermal Conductivity of Bar decrease with the increase in temperature. This is due to an obstruction in the flow of free electrons caused By the increase in the amplitude of the lattice vibration.

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Rubrics Sheet

Student Name	Yugal Keshav patil						
Year	3rd	Sem.	V	Div.	B	Roll No.	14

Subject	TE	Assignment / Practical No.	1
Title: Assignment no 1			
Date of Performance	24/7/23	Date of Submission	7/8/23

Criteria	Marks	Marks Obtained	Total Marks (10)	Faculty Signature With Date
Content / Performance	4/3/2/1	4	9	7/8/23
Understanding	4/3/2/1	3		
Time Line Submission	2/1	2		

Criteria for Evaluation of Performance	Self Involvement (01 Marks)	Correctness of Output / Calculations (01 Marks)	Skilled Observed (01 Marks)	Team Work (01 Marks)
Criteria for Evaluation of Content	Legible Handwriting (01 Marks)	Well Labelled Diagram (01 Marks)	Accurate Explanation/ Definition/ Working Principle/ Laws, etc. (01 Marks)	Correctness of answer with units (01 Marks)
Criteria for Evaluation of Understanding	Viva Voce (Questions related to Assignment / Practical)			
Criteria for Time Line Submission	One week from the Date of Performance (02 Marks)	Two weeks from the Date of Performance (01 Marks)	Late Submission - After Three Weeks (00 Marks)	

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Assignment No 1

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Modes of Heat transfer.

Q.1 Derive the equation for critical radius of insulation for cylinder

Ans→ The thickness upto which heat flow increases and after which it decreases

In case of cylinder and sphere, it is critical radius of insulation.

Case I - Cylinder

$$R_{th} = \left(\frac{\ln(r_2/r_1)}{2\pi kL}\right) + \left(\frac{1}{h_o \cdot 2\pi r_2 L}\right)$$

Diff. w.r.t. r_2

$$\frac{dR_{th}}{dr_2} = \frac{d}{dr_2}\left(\frac{\ln(r_2/r_1)}{2\pi kL}\right) + \frac{d}{dr_2}\,\frac{1}{2\pi h_o L}\left(\frac{1}{r_2}\right)$$

$$\therefore 0 = \frac{d}{dr_2}\left(\frac{\ln(r_2) - \ln(r_1)}{2\pi kL}\right) + \frac{d}{dr_2}\,\frac{1}{2\pi h_o L}\left(\frac{1}{r_2}\right)$$

$$\therefore \frac{1}{2\pi kL}\left(\frac{1}{r_2}\right) = -\frac{1}{2\pi h_o L}\left(\frac{-1}{r_2^2}\right)$$

$$\therefore \frac{1}{k} = \frac{1}{h_o \cdot r_2}$$

$$\therefore r_2 = \frac{k}{h_o}$$

$$\therefore r_c = \frac{k}{h_o} \quad \text{--- for cylinder}$$

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Case II - (For sphere)

$$R_{th} = \frac{r_2 - r_1}{4\pi k\, r_1 r_2} + \frac{1}{h_o . A}$$

$$\therefore R_{th} = \frac{r_2 - r_1}{4\pi k\, r_1 r_2} + \frac{1}{h_o\, 4\pi r_2^2}$$

Diff. w.r.t. r_2

$$\frac{dR_{th}}{dr_2} = \frac{d}{dr_2}\left[\left(\frac{r_2 - r_1}{4\pi k\, r_1 r_2}\right) + \left(\frac{1}{h_o . 4\pi r_2^2}\right)\right]$$

$$\therefore 0 = \frac{d}{dr_2}\left[\frac{1}{4\pi k}\left(\frac{r_2 - r_1}{r_1 r_2}\right) + \frac{1}{4\pi h_o}\left(\frac{1}{r_2^2}\right)\right]$$

$$= \frac{d}{dr_2}\left[\frac{1}{4\pi k}\left(\frac{\cancel{r_2}}{r_1 \cancel{r_2}} - \frac{\cancel{r_1}}{\cancel{r_1} r_2}\right) + \frac{1}{4\pi h_o}\left(r_2^{-2}\right)\right]$$

$$= \frac{1}{4\pi K}\left[0 - \left(\frac{-1}{r_2^2}\right)\right] + \frac{1}{4\pi h_o}\left(-2\, r_2^{-3}\right)\Big]$$

$$\therefore 0 = \frac{1}{\cancel{4\pi} k}\left(\frac{1}{r_2^2}\right) + \frac{1}{\cancel{2}\cancel{4\pi} h_o}\left(\frac{-\cancel{2}}{r_2^{\cancel{3}}}\right)$$

$$\therefore r_2 = \frac{\cancel{2} K}{\cancel{2}\, h_o}$$

$$\therefore r_2 = \frac{2K}{h_o}$$

$$\therefore r_c = \frac{2K}{h_o}$$ --- for sphere

Q.2 Explain the significance of thermal diffusivity with its unit

→ Thermal diffusivity is defined as the ratio of thermal conductivity k of the material to heat capacity e.c

$$\alpha = \frac{K}{e.c}$$

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- It is a crucial parameter in heat transfer and has several significant implications

(1) Heat Conduction : materials with higher thermal diffusivity values can conduct heat more rapidly which is important in application like heat exchanges and electronic devices

(2) Temp response : It influence how quickly a material response to change in temp

(3) material selection : engineers and scientists use thermal diffusivity as a factor when selecting materials for various appln

(4) Thermal Insulation : In contrast, materials with low thermal diffusivity are often chosen as insulates to slow down the transfer of heat.

(5) Geological and Environmental Sciences :- It is used in geology the units of thermal diffusivity is $\boxed{\alpha = \frac{m^2}{s}}$ //

3) Q.3] Calculate the rate of heat losses through the vertical walls of a boiler furnace of size 4m by 3m by 3m high. The walls are constructed from an inner fire brick wall 2.5cm thick of thermal conductivity 0.4 w/mk, a layer of ceramic blanket insulation of k = 0.2 w/mk and 8cm thick and a steel protective layer of thermal conductivity 55 w/m.k and 2mm thick. The inside temp of the brick layer is 608°C and the temp. outside is 60°C Also find the interface temp. of layers

→ Given $t_1 = 608°C$

$t_4 = 60°C$

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$K_1 = 0.4\ w/mK$

$K_2 = 0.2\ w/mK$

$K_3 = 55\ w/mK$

$L_1 = 25cm = 0.25m$

$L_2 = 8cm = 0.08\ m$

$L_3 = 2mm = 0.002 m$

Area of vertical walls = Area of two front wall + area of two side wall

$\therefore A = 42\ m^2$

Now, Rate of heat loss,

$$Q = \frac{t_1 - t_4}{R_{eq}}$$

$$R_{eq} = R_1 + R_2 + R_3$$

$$= \frac{L_1}{K_1 A} + \frac{L_2}{K_2 A} + \frac{L_3}{K_3 A}$$

$$\therefore R_{eq} = \frac{0.25}{0.4 \times 42} + \frac{0.08}{0.2 \times 42} + \frac{0.002}{55 \times 42}$$

$\therefore R_{eq} = 0.0243\ K/w$ //

$\therefore Q = \dfrac{608 - 60}{0.0243}$ $\therefore$ 22551.44 W // — Ans

Now, $Q = \dfrac{t_1 - t_2}{R_1} = \dfrac{t_2 - t_3}{R_2}$, $\therefore 22551.44 = \dfrac{608 - t_2}{0.0148}$

$\therefore t_2 = 274.23°C$ ... — Ans

$\therefore Q = t_2 - t_3 = \dfrac{274.23 - t_3}{0.0095} = 22551.44$

$\therefore t_3 = 59.99 \simeq 60°C$ — Ans

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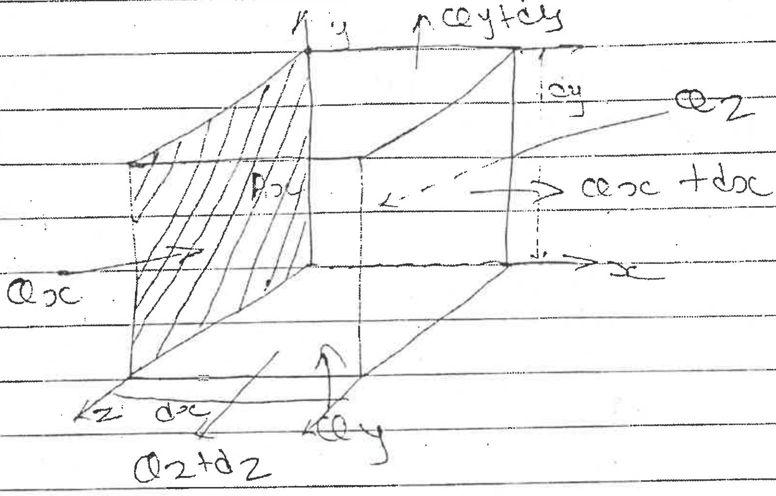
Q. 4 Derive the general heat Conduction eqn in Cartesian Co-ordinate

→



Energy balance :

$\left(\text{Energy accumulated during heat flow}\right) + \left(\text{Heat generated in element}\right) = \text{Energy stored in element (in time } d\tau)$

Rate of heat transfer $= Q$ (J/s)

Total heat flow in time $(d\tau) = Q = Q \cdot d\tau$ $\left[\begin{array}{l}\text{time} \Rightarrow d\tau \\ \text{temp} \Rightarrow t\end{array}\right.$

Total heat enters in x direction $= Q'_x$

$$= -K A_x \frac{\partial t}{\partial x} \cdot d\tau \qquad \therefore A_x = dz\,dy$$

Heat flow count in x direction,

$$Q_{x+dx} = Q_x + \frac{d}{dx}(Q'_x)\,dx$$

Heat accumulated in x direction $= Q_{in} - Q_{out} =$

$$\cancel{Q_x} - \left(Q'_x + \frac{\partial}{\partial x}(Q'_x)\,dx\right)$$

$$= -\frac{\partial}{\partial x} Q'_x\,dx = -\frac{\partial}{\partial x}\left(-K\,dz\,dy \cdot \frac{\partial t}{\partial x}\,d\tau\right) dx$$

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Heat accumulated in x direction $= \frac{\partial}{dx}\left(K \cdot \frac{dt}{dx}\right) dx\, dy\, dz\, d\tau$

Similarly,

Heat accumulated in y direction $= \frac{\partial}{\partial y}\left(K \cdot \frac{\partial t}{\partial y}\right) dx\, dy\, dz\, d\tau$

Heat accumulated in z direction $= \frac{\partial}{\partial y}\left(K \cdot \frac{\partial t}{\partial z}\right) dx\, dy\, dz\, d\tau$

$\therefore$ Total heat accumulated in all direction

$$= \left[\frac{\partial}{\partial x}\left(K \cdot \frac{\partial t}{\partial x}\right) + \frac{\partial}{\partial y}\left(K \cdot \frac{\partial t}{\partial y}\right) + \frac{\partial}{2}\left(K \cdot \frac{\partial t}{\partial z}\right)\right] dx\, dy\, dz\, d\tau$$

Total heat generation in time $d\tau = q_g (dx\, dy\, dz) d\tau$

$\therefore$ Total heat stored in element $= \rho\, dv\, C_p \frac{\partial t}{d\tau} \cdot d\tau$

$[\because dv = dx\, dy\, dz]$

$$= \rho\, dx\, dy\, dz = C_p \frac{\partial t}{\partial t} \cdot d\tau$$

Now, Energy balance eqn will be

$$\left[\frac{\partial}{dx}\left(K \frac{dt}{dx}\right) + \frac{d}{dy}\left(K \frac{dt}{dy}\right) + \frac{d}{dz}\left(K \frac{dt}{dz}\right)\right] dx\, dy\, dz\, d\tau + q_g\, dx\, dy\, dz\, d\tau$$

$$= \rho\, C_p \cdot \frac{dt}{d\tau}\, dx\, dy\, dz\, d\tau$$

$$\therefore \frac{\partial}{\partial x}\left(K \cdot \frac{dt}{dx}\right) + \frac{\partial}{\partial y}\left(K \cdot \frac{\partial t}{\partial y}\right) + \frac{d}{dz}\left(K \cdot \frac{dt}{dz}\right) + q_g = \rho\, C_p \cdot \frac{dt}{d\tau}$$

- If material is isotropic:

$$\left(\frac{\partial^2 t}{dx^2} + \frac{\partial^2 t}{\partial y^2} + \frac{\partial^2 t}{\partial z^2}\right) + \frac{q_g}{K} = \frac{\rho C_p}{K} \cdot \frac{\partial t}{\partial \tau}$$

$$\therefore \frac{\partial^2 t}{\partial x^2} + \frac{\partial^2 t}{\partial y^2} + \frac{\partial^2 t}{\partial z^2} + \frac{q_g}{K} = \frac{1}{\alpha} \cdot \frac{dt}{d\tau}$$

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Q.5 A wire of 6.5mm dia. at a temp of 60°C is to be insulated by a material having $k = 0.174\ W/m^\circ C$ convection heat transfer coeff. $h_o = 8.722\ W/m^2\ ^\circ C$. The ambient temp is 20°C. For max heat loss what is the min thickness of insulated and heat loss per meter length? Also find % increase in the heat dissipation

→ Given = $d_1 = 6.5\ m$

$\therefore r_1 = \frac{6.5}{2} = \cancel{x} \ 3.25\ m = 3.25 \times 10^{-3}\ m$

$t_0 = 20^\circ C,\ t_s = 60^\circ C$

$K = 0.174\ W/m^\circ C,\ h_o = 8.722\ W/m^2\ ^\circ C$

i) Critical radius of insulator, r_c

$\therefore$ Critical radius, $r_c = \frac{k}{h_o}$ -- For cylinder (wire).

$\therefore R_c = \frac{0.174}{8.722}$

$\therefore R_c = 0.0199\ m$

$\therefore r_c = 19.94\ mm$.

$\therefore$ Critical thickness of the insulation $= r_c - r_1$

$= 19.94 - 3.25 = 16.69\ mm$

$\therefore$ The mini thickness of insulation for max. heat loss

$= 16.69 \times 10^{-3}\ m$

(ii) Heat loss per meter length

Case I :- without insulation

$Q_1 = \frac{t_s - t_0}{R} = \frac{t_s - t_1}{\frac{1}{h_o \cdot A}}$

$\therefore Q_1 = \frac{t_s - t_0}{1/(h_o \cdot 2\pi r_1 L)}$ $\quad Q = h_o \cdot 2\pi r_1 L\,(t_s - t_0)$

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$\therefore \frac{Q}{L} = 7.124 \ W/m$

Case II : with insulation

$$Q_2 = \frac{t_s - t_o}{R}$$

$$= \frac{t_s - t_o}{\left[\frac{\ln(r_c/r_1)}{2\pi k L} + \frac{1}{h_o \cdot 2\pi r_c L}\right]}$$

$$\therefore Q_2 = \frac{2\pi L(t_s - t_o)}{[\ln(r_c/r_1)/k + 1/r_c \cdot h_o]}$$

$$\therefore \frac{Q_2}{L} = \frac{2\pi(t_s - t_o)}{\left[\frac{\ln(r_c/r_1)}{k} + \frac{1}{r_c \cdot h_o}\right]}$$

$$\therefore \frac{Q_2}{L} = \frac{2\pi(60-20)}{\left[\frac{\ln(0.0199/3.25\times10^{-3})}{0.174} + \frac{1}{0.0199\times 8.722}\right]}$$

$$\therefore \frac{Q_2}{L} = 15.53 \ W/m$$

Now heat dissipation rate is,

$$= \frac{Q_2 - Q_1}{Q_1} \times 100$$

$$= \frac{15.53 - 7.124}{7.124} \times 100$$

$$= 117.99$$

$\therefore$ % increase $\approx 118\%$

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DEPARTMENT OF MECHANICAL ENGINEERING

(FH/SH- 2023)

Rubrics Sheet

Student Name	Yugal Keshav patil						
Year	3rd	Sem.	V	Div.	B	Roll No.	14

Subject	TE	Assignment / Practical No.	2
Title: Assignment No 2			
Date of Performance	7/8/23	Date of Submission	21/8/23

Criteria	Marks	Marks Obtained	Total Marks (10)	Faculty Signature With Date
Content / Performance	4/3/2/1	4	9	21/8/23
Understanding	4/3/2/1	3		
Time Line Submission	2/1	2		

Criteria for Evaluation of Performance	Self Involvement (01 Marks)	Correctness of Output / Calculations (01 Marks)	Skilled Observed (01 Marks)	Team Work (01 Marks)
Criteria for Evaluation of Content	Legible Handwriting (01 Marks)	Well Labelled Diagram (01 Marks)	Accurate Explanation/ Definition/ Working Principle/ Laws, etc. (01 Marks)	Correctness of answer with units (01 Marks)
Criteria for Evaluation of Understanding	Viva Voce (Questions related to Assignment / Practical)			
Criteria for Time Line Submission	One Week from the Date of Performance (02 Marks)	Two weeks from the Date of Performance (01 Marks)	Late Submission - After Three Weeks (00 Marks)	

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$\therefore Q_{fin} = \sqrt{hPk \cdot A_{cs}}\,(t_0 - t_a)\left[\dfrac{\tanh(ml) + \frac{h}{km}}{1 + \frac{h}{mk} \cdot \tanh(ml)}\right]$

here, $m = \sqrt{\dfrac{hP}{k \cdot A_{cs}}} = \sqrt{\dfrac{h \times 2(b+y)}{(b \times y) \times k}}$

$P = 2(b+y) = (0.24 + 0.015) \times 2 = 0.51\ m$

$A = b \times y = 0.0036\ m^2$

$\therefore m = \sqrt{\dfrac{40 \times 0.51}{40 \times 0.0036}}$ $\quad \therefore m = 11.90\ m^{-1}$

$\therefore ml = 11.90 \times 0.04 = 0.476$

$\therefore Q_{fin} = \sqrt{40 \times 0.51 \times 40 \times 0.0036}\,(56 - 30)\left[\dfrac{\tanh(0.476) + \frac{40}{11.9 \times 40}}{1 + \frac{40}{11.9 \times 40} \times \tanh(0.476)}\right]$

$Q_{fin} = 22.63\ W$

$\therefore$ Number of fin required $= \dfrac{Q\ total}{Q\ fin} = \dfrac{340}{22.63} = 15.02$

$\simeq$ 16 fins ---Ans

Q.3 A steel rod ($k = 32\ W/mK$), 12 mm dia, and 60 mm long with an insulated end is to be used as a spine It is exposed to surrounding with a temp of of $40°C$ and $h = 55\ W/m^2K$. The temp at the base is $90°C$ Determine (1) Fin efficiency (2) Temp. at the end of the spine (3) Heat dissipation

→ Given $\theta - t_0 = 90°C$, $t_0 = 90°C$

$K = 32\ W/mK$, $h = 55\ W/m^2 K$

$d = 12\ mm = 0.012\ m$

$L = 60\ mm = 0.06\ m$

It is mentioned that it is insulated at the end (tip)

$\therefore$ Fin is of type insulated at the tip

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$P = \pi d = \pi(0.012) = 0.0377\,m.$

$A = \frac{\pi}{4} d^2 = \frac{\pi}{4}(0.012)^2 = 0.000113\,m^2$

$m = \sqrt{\frac{hP}{kA_{cs}}} = \sqrt{\frac{55 \times 0.0377}{32 \times 0.000113}} = 23.94\,m^{-1}$

$ml = 23.94 \times 0.06 = 1.4367$

(1) Fin efficiency $\eta = \frac{\tanh ml}{ml} = \frac{\tanh(1.4367)}{1.4367}$

$\therefore \eta = 0.6215 = 62.15\%$ -- Ans

(2) Temp at the end of spine, t.

$\frac{t - t_a}{t_o - t_a} = \frac{1}{\cosh ml}$

$\therefore \frac{t - 40}{90 - 40} = \frac{1}{\cosh(1.4367)}$

$\therefore \frac{t - 40}{50} = 0.4499$

$\therefore t - 40 = 22.49$

$\therefore t = 62.49°C$

(3) Heat dissipation

$Q = \sqrt{hPkA_{cs}}\,(t_o - t_a)\tanh ml$

$= \sqrt{55 \times 0.0377 \times 32 \times 0.000113}\,(90 - 40) \times \tanh(1.4367)$

$Q = 0.0865 \times 50 \times 0.8930$

$\therefore Q = 3.862\,W.$

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Q.4 What are the diff applications of unsteady state heat transfer?

→ Unsteady-state heat transfer, also known as transient heat transfer, is the study of heat transfer processes that occur when temperature changes with respect to time. This phenomenone has various applications in different fields, including:

(1) Electronics Cooling: Unsteady-state heat transfer is crucial in cooling electronic component and devices

(2) Food processing: it is used in process like pasteurization and sterilization

(3) Aerospace: it is important in aerospace engineering for analyzing the heating and cooling of spacecraft

(4) Automotive & Engineering: It plays a role in analyzing engine cooling, exhaust system behavius and thermal management in vehicles

(5) Building HVAC system: it is considered in the design of heating ventilation and air conditioning

Q.5 Derive the temp and heat transfer through rectangular fin insulated at the tip

→ Fin insulated at tip

At $x = 0$, $t = t_b$

and at $x = L$, $\frac{dt}{dx} = 0$

$$t - t_a = \theta = C_1 e^{mx} + C_2 e^{-mx}$$

at $x = 0$, $\theta = \theta_b = t_b - t_a$

$\therefore \theta_b = C_1 + C_2$ —— (1)

$$\frac{dt}{dx} = m C_1 e^{mx} - m C_2 e^{-mx}$$

at $x = L$, $\frac{dt}{dx} = 0$

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$\therefore 0 = m[C_1 e^{ml} - C_2 e^{-ml}]$

$\therefore C_1 e^{ml} - C_2 e^{-ml} = 0 \quad \text{——} (2)$

For eqn (1) $\longrightarrow C_2 = \theta_b - C_1$

$\therefore C_1 e^{ml} - (\theta_b - C_1) e^{-ml} = 0$

$\therefore C_1 e^{ml} - \theta_b \cdot e^{-ml} + C_1 e^{-ml} = 0$

$\therefore C_1 (e^{ml} + e^{-ml}) = \theta_1 \cdot e^{-ml}$

$\therefore C_1 = \theta_b \cdot \dfrac{e^{-ml}}{e^{ml} + e^{-ml}}$

$\therefore C_2 = \theta_b - \dfrac{\theta_b e^{-ml}}{e^{ml} + e^{-ml}}$

$\therefore C_2 = \theta_b \left(1 - \dfrac{e^{-ml}}{e^{ml} + e^{-ml}} \right)$

$\therefore C_2 = \theta_b \left(\dfrac{e^{ml} + \cancel{e^{-ml}} - \cancel{e^{-ml}}}{e^{ml} + e^{-ml}} \right)$

$\therefore C_2 = \dfrac{\theta_b \, e^{ml}}{e^{ml} + e^{-ml}}$

$\theta = \dfrac{\theta_b e^{-ml}}{e^{ml} + e^{-ml}} \cdot e^{mx} + \dfrac{\theta_b \cdot e^{ml} \cdot e^{-mx}}{e^{ml} + e^{-ml}}$

$\therefore \theta = \dfrac{\theta_b}{e^{ml} + e^{-ml}} \left(e^{-m(l-x)} + e^{m(l-x)} \right)$

$\therefore \theta = \dfrac{\theta_b}{\frac{e^{ml} + e^{-ml}}{2}} \left[\dfrac{e^{-m(l-x)} + e^{m(l-x)}}{2} \right]$

$\therefore \theta = \theta_b \dfrac{\cosh m(l-x)}{\cosh ml}$

$\therefore \dfrac{\theta}{\theta_b} = \dfrac{\cosh m(l-x)}{\cosh ml}$

$\therefore \dfrac{t - t_a}{t_b - t_a} = \dfrac{\theta}{\theta_b} = \dfrac{\cos m(l-x)}{\cosh ml}$

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– Temp distribution (fin insulated at tip)

Temp at the tip, t_2 i.e, at $x = L$,

$$\frac{t - t_a}{t_b - t_a} = \frac{1}{\cosh mL}$$

Heat transfer from the fin :-

$$Q_{fin} = -k A_{cs} \cdot \left.\frac{dt}{dx}\right|_{x=0}$$

$$(t - t_a) = (t_b - t_a) \frac{\cosh m(L-x)}{\cosh mL}$$

$$\left.\frac{dt}{dx}\right|_{x=0} = (t_b - t_a) \frac{\sinh m(L-x)(-1)(m)}{\cosh mL}$$

$$\left.\frac{dt}{dx}\right|_{at\, x=0} = -(t_b - t_a) \tanh mL$$

$$\therefore Q_{fin} = -k A_{cs} (m)(t_b - t_a) \tanh mL$$

$$\therefore Q_{fin} = \sqrt{hPkA_{cs}} \cdot \tanh mL \, (t_b - t_a)$$

– Heat transfer.

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CERTIFICATE

Certified that Abhay D Alange

Exam Seat No. ______ *Course* B.E

ID No. TUJF2021006 *of* 4 *Year has completed the required number of Practical / Tutorials / Assignment Tests in the Subject* IS *Semester* VII *in the Department of* Mechanical *during the academic year* 2023-24

Subject Incharge
28/10/2023

Head of the Dept.

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5.	Engineering Aptitude question.	20-25	9/8	13/8	8		
6.	To learn w-suite	26-28	23/8	1/09			
7.	Goal setting for major project.	29-31	27/09	4/10	9		
8.	Group discussion	32-34	4/10	11/10	10		
9.	preparing for an Interview.	35-36	11/10	18/10	9		

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DEPARTMENT OF MECHANICAL ENGINEERING

(FH/SH-23-24) SH2023

Rubrics Sheet

Student Name	Abhay Dhanraj Alange				
Year	4th	Sem.	VII	Div.	A	Roll No.	05

Subject	IS	~~Assignment/~~ Practical No.	1
Title: To understand basic of computer and application of laptop & desktop			
Date of Performance	12/7/23	Date of Submission	19/7/23

Criteria	Marks	Marks Obtained	Total Marks (10)	Faculty Signature With Date
Content / Performance	4/3/2/1	3	7/10	18/10/23
Understanding	4/3/2/1	4		
Time Line Submission	2/1	0		

Criteria for Evaluation of Performance	Self Involvement (01 Marks)	Correctness of Output / Calculations (01 Marks)	Skilled Observed (01 Marks)	Team Work (01 Marks)
Criteria for Evaluation of Content	Legible Handwriting (01 Marks)	Well Labelled Diagram (01 Marks)	Accurate Explanation/ Definition/ Working Principle/ Laws, etc. (01 Marks)	Correctness of answer with units (01 Marks)
Criteria for Evaluation of Understanding	Viva Voce (Questions related to Assignment / Practical)			
Criteria for Time Line Submission	One week from the Date of Performance (02 Marks)	Two weeks from the Date of Performance (01 Marks)	Late Submission - After Three Weeks (00 Marks)	

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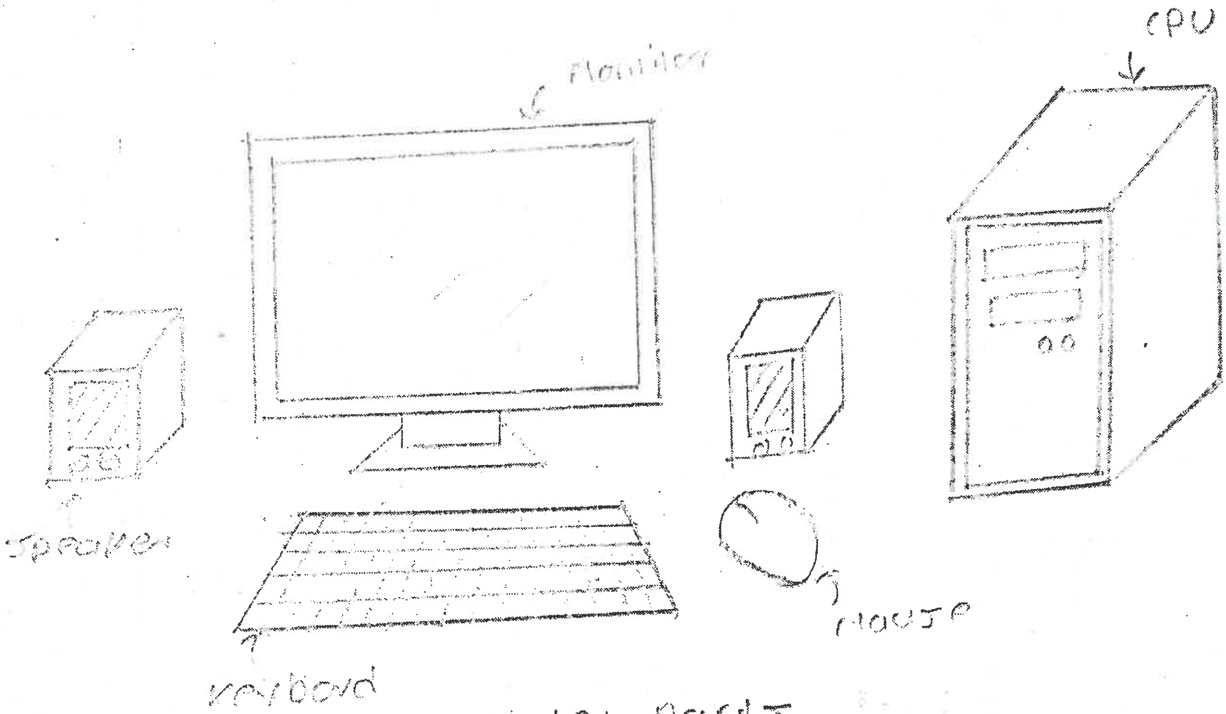
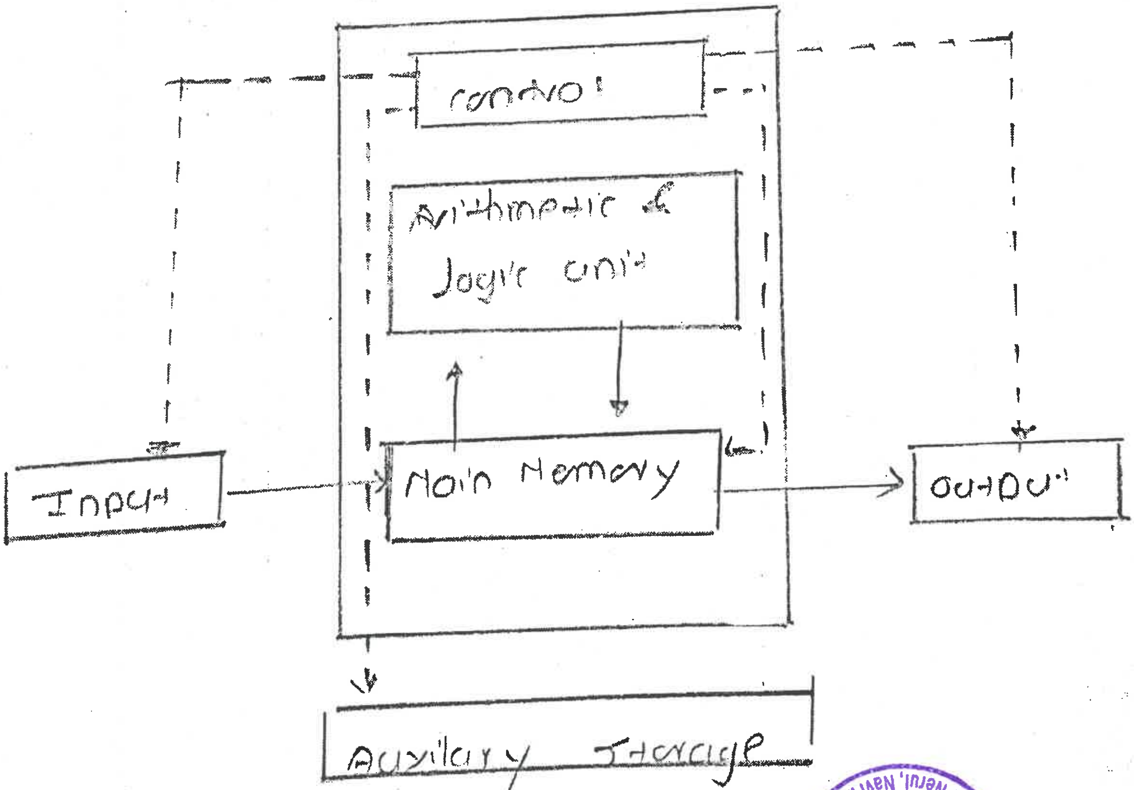


Computer parts



Block diagram of computer

Practical NO-1

To understand the Basic of computer & Application of desktop/Laptop operation.

A computer is an electronic device that can perform various operations or tasks by executing pre-defined instructions. This tasks can include calculations, data processing, communication, and more. modern computers are incredibly versatile and have become an integral part of our daily lives.

Input devices of computer:

Input devices allow you to interact with the computer, such as through typing on a keyboard or using a mouse to navigate.
It is essential components of a computer system. They allow users to interact with the computer and receive information from it. Some of common input devices are:

i) Keyboard
ii) Mouse
iii) Touchpad
iv) Trackball
v) Scanner
vi) Microphone

vii) webcam
viii) Touchscreen

Output devices of computer:

Output devices display or present information to the user, like a monitor showing graphics and text or a printer producing a physical copy of a document.

Some of common output devices are:

i) Screen
ii) Printer
iii) Projector
iv) Speakers
v) Plotter
vi) Braille Display

Hardware and software:

A computer consists of two main components: Hardware & software.

* Hardware - It refers to the physical components of the computer, such as the central processing unit, input devices, output devices etc.

* Software:

The programs and data that instruct the computer the perform specific tasks. This includes operating systems (e.g. windows, macOS, Linux), applications (e.g. web browsers, word processors) and various utilities.

* Operating system (OS):

The operating system is the core software that manages computer hardware and software resources. It provides a user-friendly interface for interaction and runs applications. Examples of popular operating systems include windows, macOS, and Linux.

* CPU (central processing unit):

The CPU is the "brain" of the computer. It carries out instructions from programs by performing arithmetic, logical and input/output operations. CPU speed is measured in GHz (gigahertz).

* RAM (Random Access Memory):

RAM is the temporary memory that the CPU uses to store data and programs that are currently in use. It allows quick access to information and its size is measured in gigabytes (GB)

* Storage:

Computers use storage devices (e.g. hard drives, solid-state drives) to store data permanently, storage capacity is measured in gigabytes (GB) or terabytes (TB).

* Internet and Networking:

Computers can be connected to the internet and other devices through networking technologies like Ethernet, wi-fi and Bluetooth

* Read-only memory (ROM):

Read-only memory or ROM is a type of computer storage containing non-volatile, permanent data that, normally can only be read, not written. ROM contains the programming that allows a computer to start up or regenerate each time it is turned on.

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* Destop & laptop:

parameter	Destop	Laptop
i) Form factor	A desktop computer is a stationary system that typically consists of a separate monitor or tower containing the cpu and other components, keyboard and mouse.	A laptop, also known as a notebook, is a portable computer with an integrated display, keyboard and also mouse and trackpad in it.
ii) ~~Pro~~ portability	Not a portable design ed to be set up in a fixed location	portable and designed to be carried around allowing you to work form various locations
iii) performance	Generally offer better performance are more powerfull.	usually have lower powerfull than desktop.
iv) price	Generally more cost effective for similar performance to laptop	The convenience or portability comes a higher cost.

* Destop & laptop:

Parameter	Destop	Laptop
i) Form factor	A desktop computer is a stationary system that typically consists of a separate monitor, tower containing the CPU and other components, keyboard and mouse.	A laptop, also known as a notebook, is a portable computer with an integrated display, keyboard and also mouse and trackpad in it.
ii) ~~Pre~~ Portability	Not a portable design. ed to be set up in a fixed location	portable and designed to be carried around allowing you to work from various locations.
iii) performance	Generally offer better performance are more powerful.	usually have lower powerful than desktop.
iv) price	~~Generally~~ more cost-effective for similar performance ~~to~~ laptop	The convenience or probability comes at a higher cost.

v)	power consumption	Tend to consume more power due to their larger compo. needs and higher performance capabilities	Designed to energy efficient and consume less power, which is essential for longer battry life.

Advantages of desktop computers:

i) performance:- Desktops typically offer more processing power and storage and making them ideal for resource-intensive tasks like gaming or videos.

ii) customizability:- Desktops can be easily upgraded and customized with additional hardware allowing users to tailor the system to their specific needs.

iii) comfort:- larger screens, full-sized keyboards, and ergonomic accessories make desktops more comfortable for extended use.

Disadvantages of desktops:

i) portability: Desktops are not designed to be portable and are usually restricted to fixed loin.

ii) space requirements: They require a dedicated workspace and can take up significant physical space.

iii) Power consumption: Desktops tend to consume more power compared to laptops.

Advantages of laptops:

i) Portability: Laptop are lightweight and compact, allow users to carry them anywhere for work anything.

ii) Battery-powered: They have built-in batteries, enabling usage even without a direct power source for several hours.

iii) Versatility: Laptops can be used on a desk or on the go, making them suitable for various environments.

Disadvantages of laptops:

i) Performance limitations: Laptop may have lower performance compared to desktops due to their smaller size and power constraints.

ii) Limited upgradeability: Upgrading laptop components can be challenging or impossible in some models.

iii) Ergonomics: Extended laptops use may lead to discomfort or strain due to the built-in keyboard and small screen size.

Application of computers:-

i) Communication:- Computers facilitate communication through email, instant messaging, video conferencing and social media platforms.

ii) Business & Finance:- Computers are used for accounting payroll management, financial analysis, inventory management, and other business-related tasks.

iii) Education:- Computers are integrated into classroom and educational institutions to learning through interactive software, online course and digital-resources.

iv) Research: Scientists and researchers use computers for data analysis, simulations, modeling and conducting experiments.

v) Healthcare: computers are used for patient record keeping, medical imaging, diagnostics and research in medical fields.

vi) Design and Engineering:- Computers aid in computer-aided design (CAD), computer aid engineering (CAE), and 3D modeling for designing products and structures.

conclusion:

The conclusion, Excel is a versatile & widely used spreadsheet software. It offers a vast array ~~of~~ of tools & features that enable users to organize, analyze and visualize data effectively.

18/10/23

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CERTIFICATE

Certified that yugal k. patil

Exam Seat No. ______ Course B.E.

ID No. TU5S2223034 of 3rd Year has completed the required number of Practical / Tutorials / Assignment Tests in the Subject HUAC Semester 6th in the Department of mech. engg. during the academic year 2024

Subject Incharge

16/4/2024

A38

Head of the Dept.

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INDEX

Sr no.	Title of Experiment/Assignment	Page no.	D.O.P.	D.O.S.	Marks (10)	Sign	Remarks
1	performence on Domestic refrigerator test rig		18/1	26/3	8		
2	Study and performance on window air Condition as test rig as heat pump		14/3	26/3	8		A38
3	performance on window air Conditioner test rig with dehudrefication		24/3	26/3	8		
4	Study and perfomence trial on cooling tower		21/3	26/3	8		16/4/24
5	perfemance analysis from water Cooler System		1/3	8/3	8		
6	Industrial visit report		1/4	8/4	8		
7	Case Study Report		1/4	8/4	7		
8	Heat load Calculation		1/4	8/4	7		

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DEPARTMENT OF MECHANICAL ENGINEERING

(FH/~~S~~H- 24)

Rubrics Sheet

Student Name	Yugal Keshav patil						
Year	3rd	Sem.	VI	Div.	A	Roll No.	38

Subject	HVAC	~~Assignment~~ / Practical No.	1
Title: performance trail on Domestic Refrigerator (Simple vapour Copression) test			
Date of Performance	18/1	Date of Submission	26/3/24

Criteria	Marks	Marks Obtained	Total Marks (10)	Faculty Signature With Date
Content / Performance	4/3/2/1	3	8	26/3/24
Understanding	4/3/2/1	3		
Time Line Submission	2/1	2		

Criteria for Evaluation of Performance	Self Involvement (01 Marks)	Correctness of Output / Calculations (01 Marks)	Skilled Observed (01 Marks)	Team Work (01 Marks)
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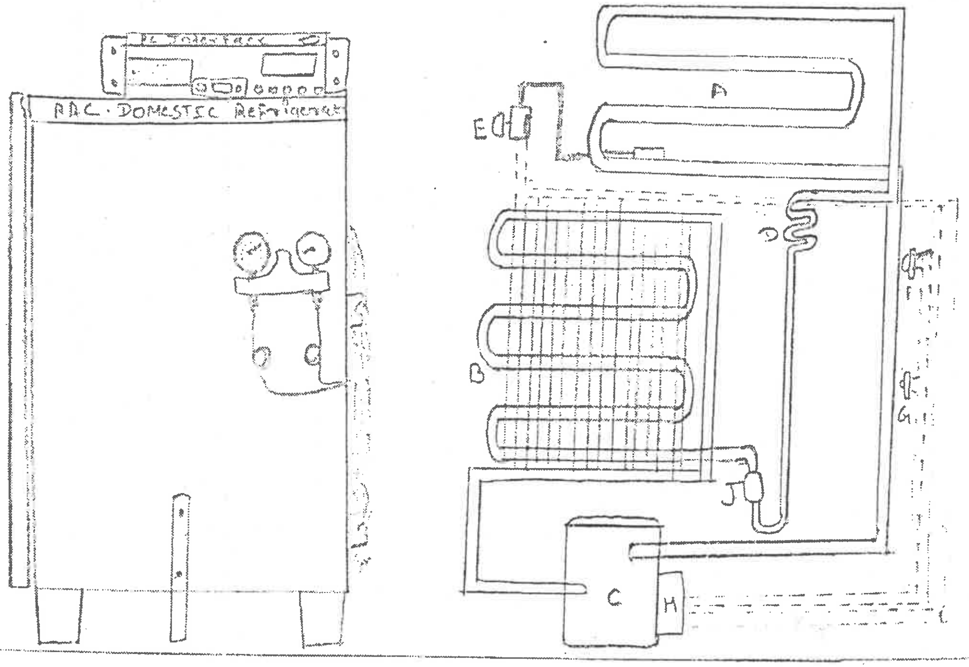
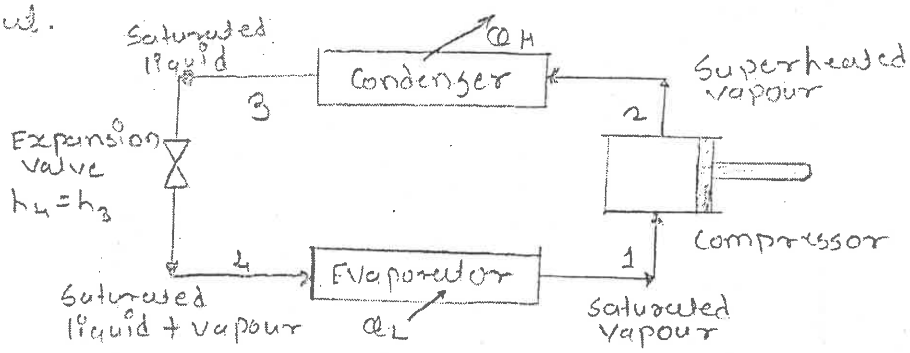
Original Set-up



A = evaporator
B = Condensor
C : Compressor
D = Capillary
E = thermostator
F = Infesion light
G = Door Switch
H = Compressor cont. valve
J = filter drier
K = main electrical supply.

Layout.



Specification

Sr. No	Name	Make	Specification	Qty
01	Refrigerating unit	GODR	capacity : 195 Ltr	01
02	pressure gauge	WIKA	Suction pressure gauge : Range : 0-150 PSI. Discharge pressure gauge : Range : 0-300 PSI	02
03	RTD	YOGI ELECTROPROCESS	Length : 50 mm Diameter : 6 mm	08
04	Con[illegible]	EEE	1 phase, 240V AC with control card	01

HVAC

Experiment no. 1

Aim: Performance trail on Domestic Refrigetor (simple vapour compression) Test Rig.

objective: Vapour compression refrigerator cycle is a very widely used cycle of refrigeration in ground air, space and marine applications. It uses a variety of refrigerant such as Ammonia (NH_3) Freon group (R_{12}, R_{22}, etc), sulphur dioxide (SO_2) and carbon dioxide (CO_2). The vapour compression refrigeration system has fundamentally four basic components and four basic process nowdays, R600a gas is used as it is ozone-friendly.

① EVAPORATOR

Liquid refrigerant at a low pressure evaporates at a low temperature and produces refrigerating effect

② COMPRESSOR

Low-pressure vapour from evaporator is suked and compressed to high temperature and pressure. The work supplied to compassion (W_c).

③ CONDENSOR.

Low-pressure vapour is compressed by compressor to high-pressure vapour and is condensed, rejecting heat to cooling medi observation :-

Sr. NO	Description	Symbol	Units
1	Condenser inlet ~~pressure~~ temp	T_1	°C
2	Condenser outlet temp	T_2	°C
3	Evaporator inlet temp	T_3	°C
4	Evaporator outlet temp	T_4	°C
5	Temperature of refrigerated area	T_5	°C
6	Saturation temp at evaporating High pressure	T_H	°C
7	saturation temp at evaporating low pressure	T_L	°C
8	Suction pressure.	P_s	PSI
9	Discharge power	P_d	PSI
10	Compressor pressure.	P_c	W

observation Table :

Condenser Temperature		Evaporator Temperature		Temperature of Refrigerated Area	Suction pressure P_s (PSI)	Discharge pressure P_D (PSI)
Inlet temp (T_1 °C)	outlet temp (T_2 °C)	Inlet (T_3 °C)	outlet (T_4 °C)			
56 °C	47.8 °C	-12.3	-9	4.6	30	

Observation table :-

Sr NO	pressure (bar)		Condenser Temp (°C)		Evaporation temp (°C)		Temperature of refrigerated Space (°C)
	Comp discharge Pressure	Evaporator Suction pressure	Inlet	outlet	Inlet		
	P_c	P_e	T_1	T_2	T_3	T_4	T_5
1	10.88	2.04	54	47.3	-12.3	-9	9.6

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4] CAPILLARY EXPANTION DEVICE.

High-pressure liquid from condenser is Expanded to low pressure. A thermostatic expansion valve is an expansion device through which liquid refrigerant is throttled

Set-up Description

The domestic refrigerant trainer Consists of a refrigerator mounted on a stand. one can see the various parts and Compartments of the "Freeze" as a household Kitchen product The Schematic diagram below shows the Component of refrigerator.

the Compressor is mounted at the Bottom and Can be see from Behind. The Condenser is mounted on the Backside of the Freeze and one can see the long pipe bent to from a network. The evaporator, there are three Section. : (a) Vegatable and fruit Crisper at the Bottom

(b) general Cold Cabinet with Space for trays.

(c) Deep Freezer

on one side two pressure gauge are fitted which Shows the pressure reading of Suction and discharge pressure Temperature indicator are fitted to find temperature of Condenser inlet, outlet, evaporator inlet, outlet and temp of refrigerator Space.

Calculation.
convert the pressure gauge reading.
BAR to PSI & BAR to mPa

1 BAR = 0.068 PSI

1 BAR = 1/10 mPa

Absolute pressure (BAR) = gauge pressure (BAR) + 1.013 (BAR)

① Theoretical co-efficient of performance
plot the refrigeration cycle centre ph. chart as shown.
in fig from the chart obtain following enthalphy values

Condenser inlet = H_{ci} = 680
Condenser outlet = H_{co} = 420
Evaporator inlet = H_{ei} = 420
Evaporator outlet = H_{eo} = 550

$$COP = \frac{RE}{W_c} = \frac{h_1 - h_4}{h_2 - h_1} = \frac{H_{eo} - H_{ei}}{H_{co} - H_{eo}}$$

R600a
(1) 1 PSI = 0.68 bar
(2) 1 kg/cm² = 14.22334 PSI
Sample Calculation ① Conversion pressure Reading
1 PSI = 0.068 BAR 1 bar = 0.1 mPa
1. Suction pressure on gauge
20 PSI = 20 * 0.068 = 1.36 bar
Absolute Suction pressure = 1.36 + 1.013 = 0.236 mpa
2. Discharge pressure on gauge = 215 PSI
= 215 * 0.068 = 14.6 bar
Absolute Suction pressure = 14.6 + 1.013
= 15.6 bar
= 0.156 mpa

2 Theoritical co-efficient of performance

$$COP_{thero} = \frac{H_{eo} - H_{ei}}{H_{co} - H_{eo}} = \frac{550 - 420}{680 - 550}$$ --- from ph chart of 600a

COP th

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All the values of these temperature are seen on the screen of the control panel fitted on top of the unit

The refrigerator works on the principle of Vapour compression type refrigeration cycle as described in the text Book.

REFRIGERATION CYCLE :

Hot Vapour from the evaporator coil are sucked By the compressor, are compressed and sent to air cooled condenser. Refrigerant R600a emerging out from the condenser coil is sent through a drier/filter. Arrangement of passing the liquid refrigerant through a capillary is provided where the liquid is throttled to low pressure and temperature, and sent to evaporator where it boils.

Experimental procedure.

① Ensure that the main switch of control panel and all other switches are OFF before switching ON control panel.

② After reaching steady state, take the reading of temperature from the control panel.

③ Take the reading of suction and discharge pressure from the gauges at the right side of unit.

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Sample Calculation

Enthalpy values from pressure - enthalpy chart for R-600a

Sr	Enthalpy (KJ/kg)		values (KJ/kg)
1	Evaporator inlet	Hei	420
2	Evaporator outlet	Heo	550
3	Condenser inlet	Hci	680
4	Condenser outlet	Hco	420

Result :- on calculating from ph chart for R-600a the COP of system is 1 //

26/3/2024

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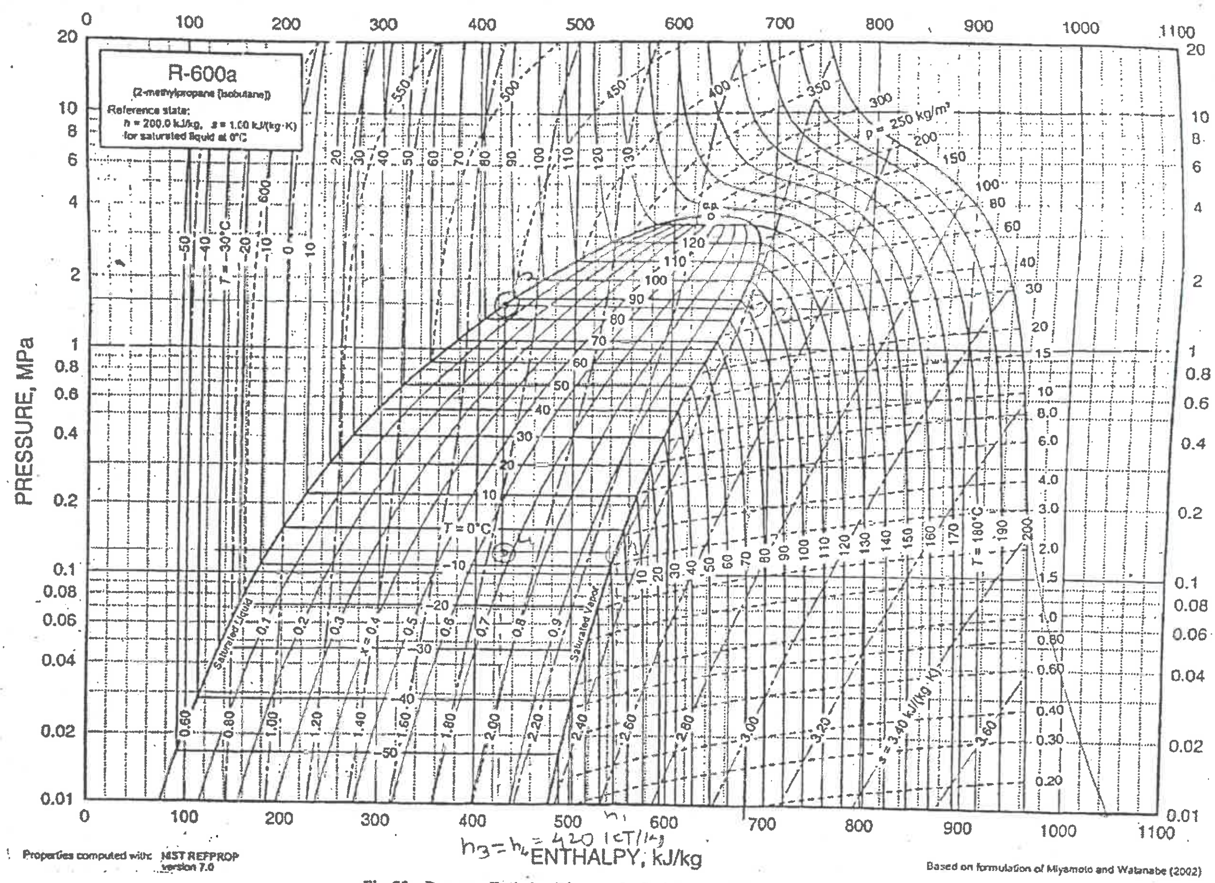

Properties computed with: NIST REFPROP version 7.0

Based on formulation of Miyamoto and Watanabe (2002)

Fig. 23 Pressure-Enthalpy Diagram for Refrigerant 600a (Isobutane)

$$Cop = \frac{h_1 - h_4}{h_2 - h_1} = \frac{550 - 420}{680 - 550}$$

$h_1 = 550$

$h_2 = 680$

$Cop = 1$

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DEPARTMENT OF MECHANICAL ENGINEERING

(FH/SH-24)

Rubrics Sheet

Student Name	Yugal Keshav patil					
Year	3rd	Sem.	VI	Div.	A	Roll No. 38

Subject	HVAC	~~Assignment~~ / Practical No.	2
Title: Study of performance on window Air-Conditioning test ring as a heat pump			
Date of Performance	14/3	Date of Submission	26/3

Criteria	Marks	Marks Obtained	Total Marks (10)	Faculty Signature With Date
Content / Performance	4/3/2/1	3	8	26/3/24
Understanding	4/3/2/1	3		
Time Line Submission	2/1	2		

Criteria for Evaluation of Performance	Self Involvement (01 Marks)	Correctness of Output / Calculations (01 Marks)	Skilled Observed (01 Marks)	Team Work (01 Marks)
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Criteria for Time Line Submission	One week from the Date of Performance (02 Marks)	Two weeks from the Date of Performance (01 Marks)	Late Submission - After Three Weeks (00 Marks)	

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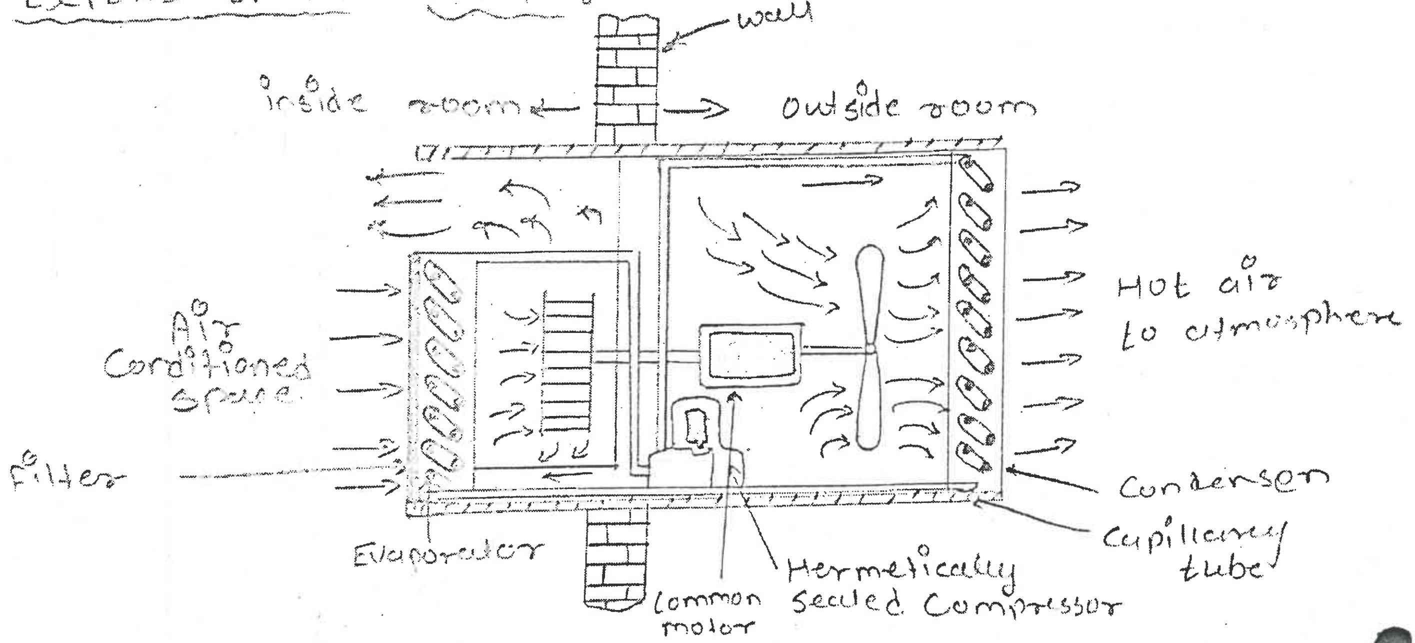
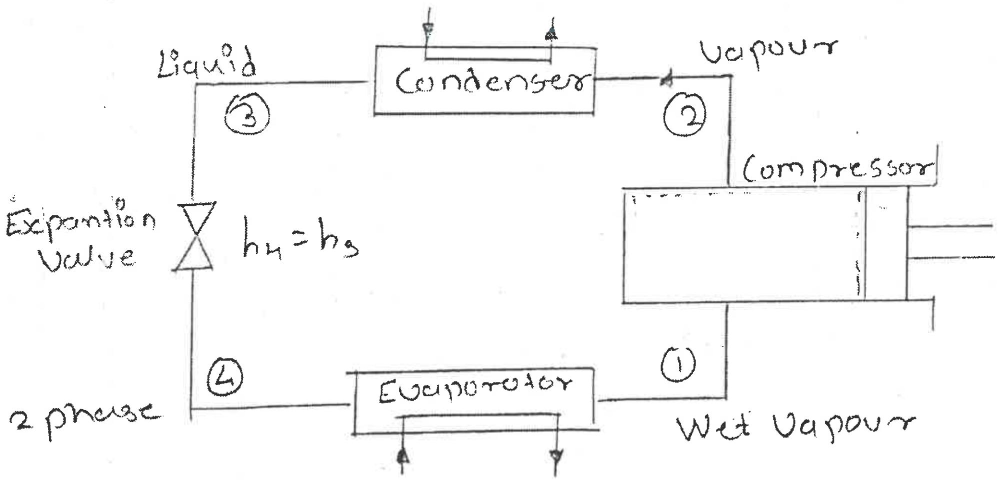
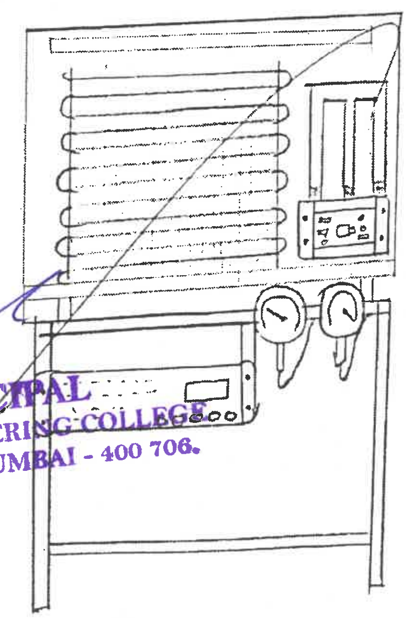
EXPERIMENTAL SETUP :





Original Seatup :



AIM : Study and performance on window Air-Conditioner test ring as a heat pump

OBJECTIVE : To obtain the cop of heat pump (co-efficient of performance)

Introduction : A heat pump is a device that transfers thermal energy Between spaces. Usually Between an enclosed space and the outdoors. when used to heat ~~pump~~ ~~can~~ building the energy is transferred from the outside into the building. A heat pump can also work as an air Conditioner by transferring heat from the building to the outside.

Setup Description :

① It is the type of air conditioning, in which the air is cooled and generally dehumidified. The schematic arrangement of a typical summer air conditioning systems, is shown in Fig. Below.

② The unit is mounted on the Frame with Caster wheels for the movement of unit.

③ A Control panel for taking the necessary reading are provided under the unit.

④ Two pressure gauge are provided which shows the suction and discharge ... during experiment.

Specification:

Sr No	Name	make	specifications	Qty
1	Air Conditioning unit	VOLTAS 123LFS	Capacity : 1 TON	01
2	pressure gauge	WIKA	suction pressure gauge Range : 0-150 PSI Discharge pressure gauge Range : 0-300 PSI	02
3	RTD	YOGI ELECTRO PROCESS	Length : 50 mm Diameter : 6 mm	08
4	Control panel	EEE	1 phase, 240V AC, with Control card	01

Observation:

Sr No.	Description	Symbol	Unit
1	Condenser inlet temp	T_1	°C
2	Condenser outlet temp	T_2	°C
3	Evaporator inlet temp	T_3	°C
4	Evaporator outlet temp	T_4	°C
5	Air inlet Temp (DBT)	T_5	°C
6	Air inlet temp (WBT)	T_6	°C
7	Air outlet temp (DBT)	T_7	°C
8	Air outlet temp (WBT)	T_8	°C
9	Saturation temp at evaporating (High) pressure	T_H	°C
10	Saturation temp at Condensing (Low) pressure	T_L	°C
11	Suction pressure	P_s	PSI
12	Discharge pressure	P_d	PSI
13	Compressor Power.	P_1	W

Observation table:

Sr no.	pressure		Compressor power	Condenser temp		Evaporator temp		Air in		Air-out	
	Dis-charge P_d (PSI)	Suction P_s (PSI)	P_1 (W)	inlet T_1 (°C)	out-let T_2 (°C)	inlet T_3 (°C)	outlet (°C)	DBT T_5 (°C)	WBT T_6 (°C)	DBT T_7 (°C)	WBT T_8 (°C)
1	82	22	1060	58.6	35.0	10.2	12.3	-	-	-	-

(5) Temperature sensors from T_1 to T_8 are provided which will sense the temperature.
(6) WBT bottles are provided to measure the temperature of AIR INLET & AIR OUTLET

Experimental procedure.
(1) ensure that the mains switch of control panel and all other switches are OFF before switching ON of MCB inside the control panel
(2) Switch ON the MCB and main switch
(3) Fill the WBT bottles with water (preferably distilled water) with the dropper
(4) Switch ON Air Conditioner unit using remote provided with air conditioner and select required air speed.
(5) After reaching steady state take the readings of temperature from the control panel
(6) Take the readings of suction and discharge pressure from the gauges near the control panel.
(7) put all this readings in the observation table and plot the reading on graph chart.

Calculation :-

- Convert the pressure gauge reading Bar to psi & Bar to mpa

1 Bar = 0.068 psi

1 Bar = 1/10 mpa

Absolute pressure (bar) = Gauge pressure (bar) + 1.013 (bar)

(1) Theoritical coefficient of performance
plot the refrigeration cycle on the p-h chart (R22). From the chart, obtain the following enthalpy values :

- Condenser Inlet = H_{ci} = KJ/kg
- Condenser outlet = H_{co} = KJ/kg
- evaporator Inlet = H_{ei} = KJ/kg
- Evaporator outlet = H_{eo} = KJ/kg

$$COP = \frac{HE}{W_c} = \frac{H_{eo} - H_{ei}}{H_{ci} - H_{co}}$$

$$COP = \frac{H_{eo} - H_{ei}}{H_{ci} - H_{co}} = \frac{430 - 205}{430 - 390}$$

$$COP = 5.625$$

Result Sheet

Sr No	pressure		Compressor power	Condensor temp		Evaporator temp		Air in		Air out	
	Dis-charge P_d (PSI)	Suction P_s (PSI)	P_1 (W)	inlet T_1 (°C)	outlet T_2 (°C)	inlet T_3 (°C)	outlet T_4 (°C)	DBT T_5 (°C)	WBT T_6 (°C)	DBT T_7 (°C)	WBT T_8 (°C)
1	5.65	1.5	1050	58.6	35	10.2	12.3	-	-	-	-

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Result :-

Therotical Calculation the COP of the System is 5.625

Calculation.

- The value of COP_{theoro} is 5.625
- Comment on performance :-

The COP values depends primary on the temp of evaporator & the Condensor. The closer the two temperature are, the higher the COP.

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enthalpy values from pressure enthalpy chart for R-22

Sr No.	Enthalpy (kJ/kg)		value (kJ/kg)
1.	Evaporator Inlet	H_{ei}	205
2.	Evaporator outlet	H_{eo}	430
3.	Condensor Inlet	H_{ci}	430
4.	Condensor outlet	H_{co}	395

* Saturated temp at evaporating (low) pressure
T_L = saturation temperature at evaporating (low) pressure

ps (Absolute) = 1.5 bar, $T_L = 233\,K$

T_L = saturation temp at condensing (High) pressure.

pd (Absolute) = 5.65 bar, $T_L = 275\,K$

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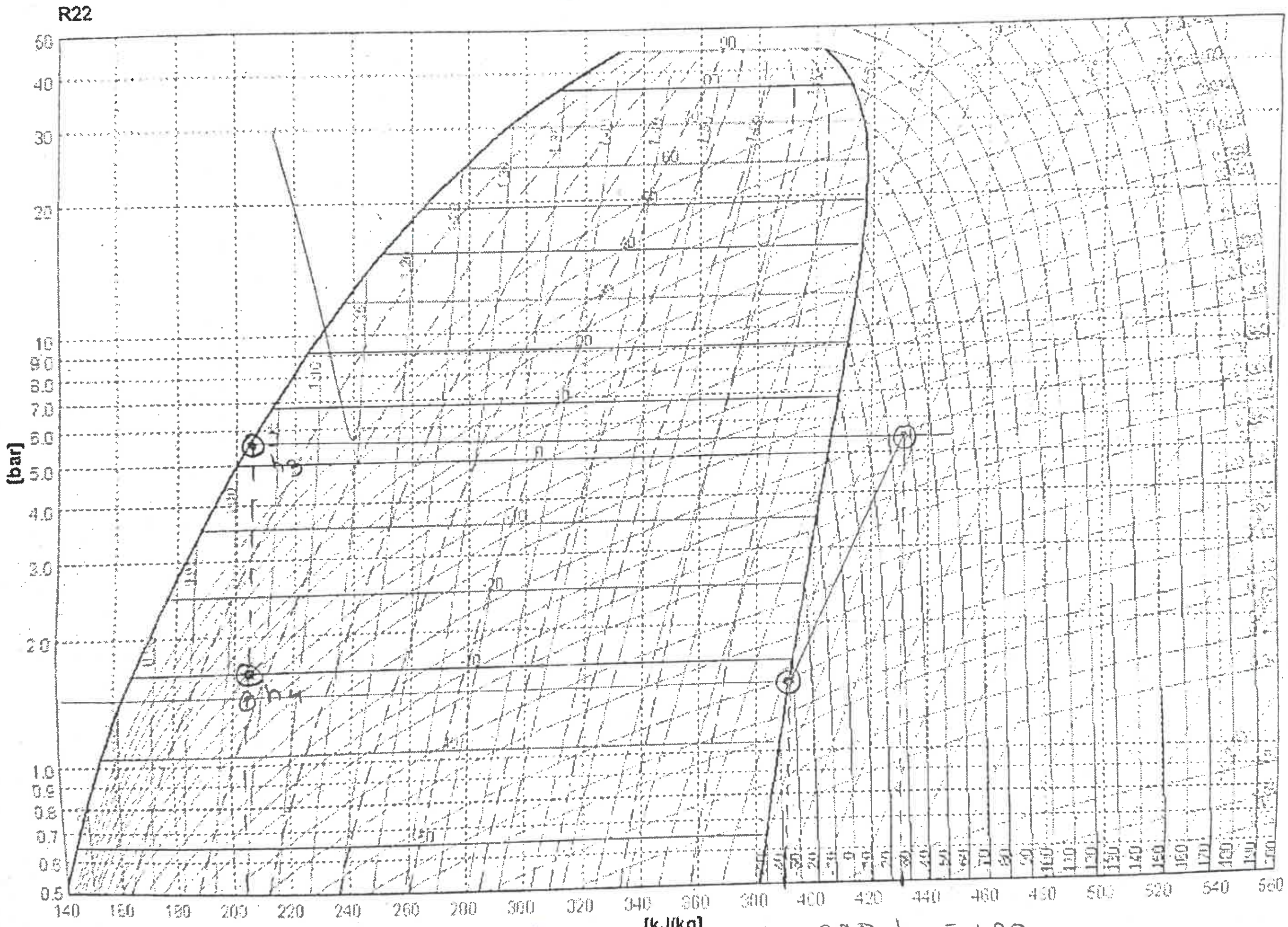

$h_3 = h_4 = 205$

$h_1 = 390$ $h_2 = 430$

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(An A Graded ISO 9001 Institution)
Nerul, Navi Mumbai - 400 706.

CERTIFICATE

Certified that Vishal Kr. thakur

Exam Seat No. ____________ Course B.E

ID No. TU5F2122014 of 3rd Year has completed the required number of Practical / Tutorials / Assignment Tests in the Subject PTD Semester 6 in the Department of Mechanical during the academic year 2023-24

Subject Incharge 22/04/24

Head of the Dept.

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INDEX

Sr. No.	Title of Experiment / Assignment	Page No.	DOP	DOS	Marks (10)	Sign.	Remarks
	Assignment - 1	1-4	8/1	29/1	08		
	Assignment - 2	5-10	30/1	5/2	08		
	Assignment - 3	11-18	5/2	18/2	08		
	Assignment - 4	19-20	18/2	1/3	09		
	Assignment - 5	21-23	1/3	15/3	09		
	Assignment - 6	24-26	15/3	2/4	09		
	IAT - 1				9		
	IAT - 2				12		
					11		

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DEPARTMENT OF MECHANICAL ENGINEERING

(FH/SH- 2024)

Rubrics Sheet

Student Name	Vishal Kr. thakur						
Year	3rd	Sem.	VI	Div.	A	Roll No.	08

Subject	PTD	Assignment / Practical No.	01
Title: Assignment - 1			
Date of Performance	8/01/24	Date of Submission	29/01/24

Criteria	Marks	Marks Obtained	Total Marks (10)	Faculty Signature With Date
Content / Performance	4/3/2/1		08	29/01/24
Understanding	4/3/2/1			
Time Line Submission	2/1			

Criteria for Evaluation of Performance	Self Involvement (01 Marks)	Correctness of Output / Calculations (01 Marks)	Skilled Observed (01 Marks)	Team Work (01 Marks)
Criteria for Evaluation of Content	Legible Handwriting (01 Marks)	Well Labelled Diagram (01 Marks)	Accurate Explanation/ Definition/ Working Principle/ Laws, etc. (01 Marks)	Correctness of answer with units (01 Marks)
Criteria for Evaluation of Understanding	Viva Voce (Questions related to Assignment / Practical)			
Criteria for Time Line Submission	One week from the Date of Performance (02 Marks)	Two weeks from the Date of Performance (01 Marks)	Late Submission - After Three Weeks (00 Marks)	

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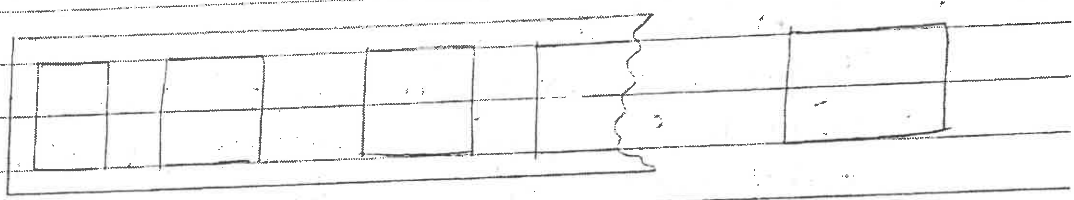
PTP

Assignment - 01

Q1 Explain sheet metal cutting operation with neat sketch?

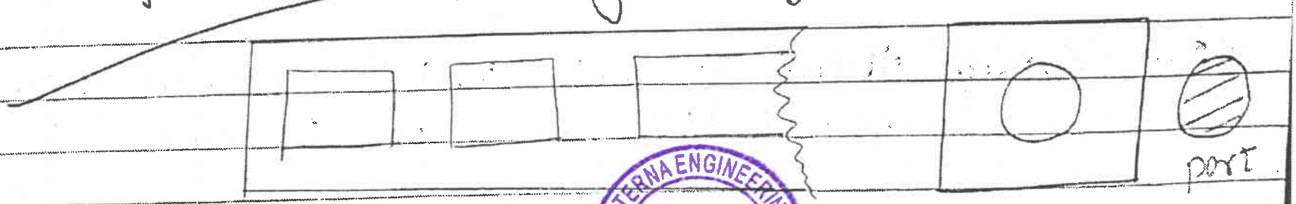
→ In cutting operation the workpiece is stressed by its ultimate strength. The cutting operation include.

i) Blanking:-
Blanking is the operation of cutting a flat shapes from sheet metal. The product punched out is called the blank & required product of the operation. The hole & the metal left ~~behing~~ behind is discarded as work.



(ii) Punching or piercing:-

It is a cut operation by which different holes opening are made in sheet metal. punching is like blanking aside from that in punching the gap is the funcied item

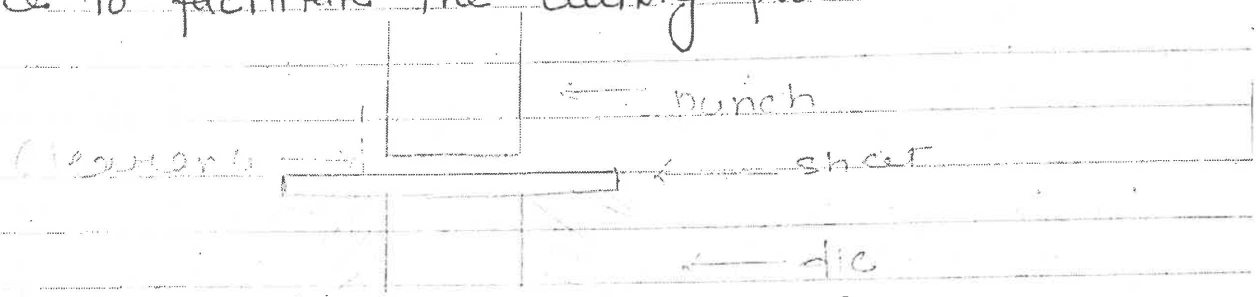


(III) Notching
Notching is ~~th~~ shearing process during which a metal scrap piece is removed from the outside edge of a metal workpiece. Notching is a typically a newally operated low - production process.

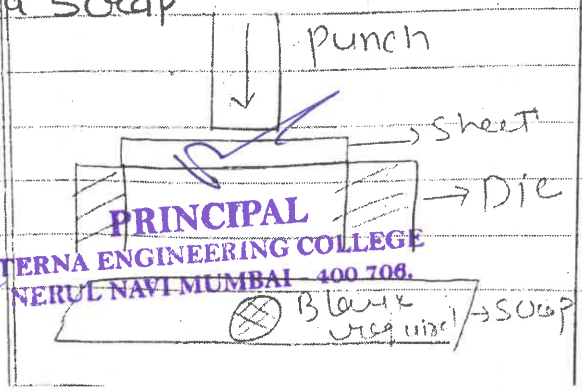
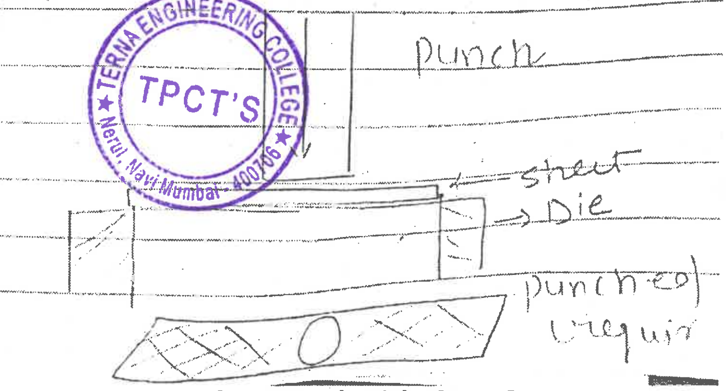
is crucial for achieving accurate & efficient result

Role of Clearance:

Clearence is a critical factor in metal cutting operation through press tool includes those involing Sheet metal. Clearance refer to the intentional Space left b/w the cutting tool & the work-piece to facilitate the cutting process.



Q3 Difference b/w punching & blanking?

	Blanking	punching.
1	It is a metal fabrication process where the final product is removed out of the largest metal Sheet.	punching is a ~~material~~ metal working process that involves creating holes in a metal work piece.
2	The final product is removed out of the large metal sheet & remaining material is a scrap	The material removed (punched out) is discraded & the final product is the remaning material.
3		

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DEPARTMENT OF MECHANICAL ENGINEERING

(FH/SH- 2024)

Rubrics Sheet

Student Name	Vishal Kr. thakur						
Year	3rd	Sem.	VI	Div.	A	Roll No.	08

Subject	PTD	Assignment / Practical No.	02
Title: Assignment-2			
Date of Performance	30/1/24	Date of Submission	5/2/24

Criteria	Marks	Marks Obtained	Total Marks (10)	Faculty Signature With Date
Content / Performance	4/5/2/1	3	08	05/2/24
Understanding	4/3/2/1	3		
Time Line Submission	2/1	2		

Criteria for Evaluation of Performance	Self Involvement (01 Marks)	Correctness of Output / Calculations (01 Marks)	Skilled Observed (01 Marks)	Team Work (01 Marks)
Criteria for Evaluation of Content	Legible Handwriting (01 Marks)	Well Labelled Diagram (01 Marks)	Accurate Explanation/ Definition/ Working Principle/ Laws, etc. (01 Marks)	Correctness of answer with units (01 Marks)
Criteria for Evaluation of Understanding	Viva Voce (Questions related to Assignment / Practical)			
Criteria for Time Line Submission	One week from the Date of Performance (02 Marks)	Two weeks from the Date of Performance (01 Marks)	Late Submission - After Three Weeks (00 Marks)	

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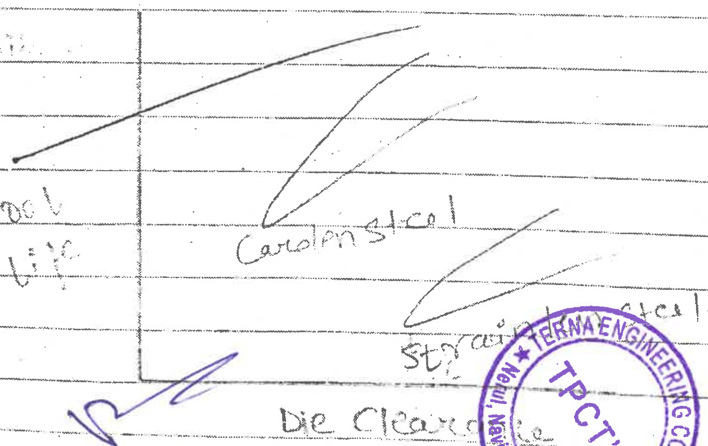
Assignment: 2

Q1 Explain method of mounting punches and dies.

→ punches mounting depends upon the Interference area b/w the punch & die set top bolster back plate when pressure exercted by the punch on the ~~b/o~~ bolster is less than $80 N/mm^2$ no back plate is necessary large punches subjected to deflection less than 0.25m during cutting can be directly screw to top bolster of die set piercing punches as well as small blanking punches ~~As well as~~ are usually housed in a punch plate.

punches subjected to bending (due to cutting on one side only) are usually anchored in die set isolers. when the requirement of blank is not very high it is convenient to ~~a~~ keep die clearence more & remove the excessive tensile burr on the blanks manually. The relationship b/w die clearance & tool life graphically is explain. It can be noted that increase in die clearnce does not enhance tool life.



- Die wall thickness depends upon the thickness of the stock to be cut.
- Sharp sharp corner may lead to cracking in heat treatment & so required greater wall thickness at such point.
- For accurate & permanent positioning two dowels should be provided on each block. They should be located as far apart as ~~pe~~ possible for maximum locating effect. Number of screws will be used depending upon the size of the element mounted. Screws & dowels are preferably located about 1.5 times their dia from the outer edge.
- Die block for small workpiece are usually constructed from a solid block of tool steel.
- Die block made in two or more section known as sectional die block are used to conserve tool steel in the construction of large die or when the complexity of the die contour is such that it is easier to machine in section.

Q3 Differentiate b/w fixed stripper & spring loaded stripper.

- Difference b/w fixed stripper and spring loaded stripper are:

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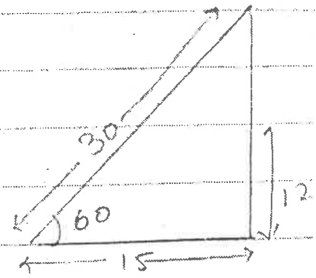
Sr.no	length	x_i	y_i	$l_i x_i$	$l_i y_i$
1	50	0	25	0	0
2	30	7.5	62.99	225	1250
3	30	22.5	62.99	675	1889.7
4	75.54	45.9	25	3604.9	1889.7
5	30	15	0	450	1963.5



$\Sigma l_i = 218.54$

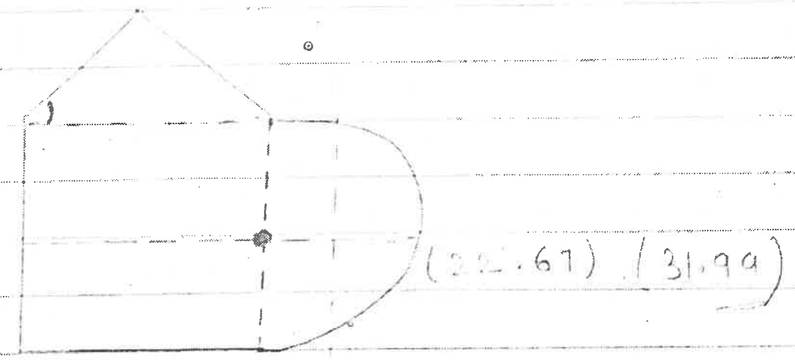
$\Sigma l_i x_i = 4954.9$

$\Sigma l_i y_i = 6992.9$

$$\bar{x} = \frac{\Sigma l_i x_i}{\Sigma l_i} = \frac{4954.9}{218.54} = 22.67$$

$$\bar{y} = \frac{\Sigma l_i y_i}{\Sigma l_i} = \frac{6992.9}{218.54} = 31.99$$

locating the centre of pressure.



05/02/24

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DEPARTMENT OF MECHANICAL ENGINEERING

SE MINI PROJECT 2023-24

Group N	Roll No	Name	Guide Name	Topic Title
1	A35	HAMDAN KHAN	Prof. Bandu Mule	Design and developement of mini grinder
	A27	ANIKET WAYAL		
	A33	MIRAN SHAIKH.		
	A25	ATHARVA LAD		
	A26	DUSHING YASH BHAUSAHEB		
2	A38	DARSHAN HASE	Prof. Mangesh Nalawade	Design and developement of Solar dryer using PCM
	A22	PRATIK PANDERE		
	A29	PRANALI SHINDE		
	A37	VIGHNESH JANGLE		
3	A32	ARYAN GHARAT	Prof. Tahsin Akhtar	Design and developement of motorised steering mechanism
	A31	Rishi Singh		
	A23	ROHIT PATIL		
	A39	KARAN MEHER		
4	A24	AMOD JADHAV	Prof. V. Ajmire	Four Wheel steering mechanism
	A36	Kishan Singh		
	A28	ROHAN DHARNE		
5	**A-01**	SHIVAM SAXENA	MAHESH KAVRE	Design and developement of trolley with braking system
	A-10	SAGAR KAMBLE		
	A-12	AMAN SINHA		
	A-20	QASIM SHAIK		
6	A19	ADITYA SINGH	Prof. Bandu Mule	Design and developement of motorised wire harness wrapping machine
	A21	ROHIT ANKALA		
	A34	ATHARVA THAKUR		
	A18	SAHANI SAURAV DHANRAJ		

Project Coordinator

Dr. C. M. Choudhari
Head of the Department

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CERTIFICATE

This is to certify that the mini project **"Design and Development of MOTORIZE WIRE HARNESS WRAPHING MASHINE** is a Bonafide record of the Mini Project work done by

ATHARVA THAKUR	**[TU5S2324013]**
ADITYA SINGH	**[TU5F2223022]**
ROHIT ANKALA	**[TU5F2122015]**
SAURAV SAHANI	**[TU5F2223021]**

In the year 2023-24 of Department of Mechanical Engineering submitted to the University of Mumbai for the partial fulfilment of the requirement for the award of the degree of **IVth Semester Bachelor of Engineering"** in **"Mechanical Engineering"**.

23/04/24

Mr. BANDU MULE

(PROJECT GUIDE)

Mrs. SULEKHA WALUNJ

(PROJECT COORDINATOR)

DR. C. M. CHOUDHARI

(HEAD OF DEPARTMENT)

DR. L. K. RAGHA

(PRINCIPAL)

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This is to certify that the mini project **"Design and Development of MINI BELT GRINDER"** is a Bonafede record of the Mini Project work done by

ATHARVA LAD [TU5S2324004]
YASH DUSHING [TU5S2324005]
ANIKET WAYAL [TU5S2324006]
MIRAN SHAIKH [TU5S2324012]
HAMDAN KHAN [TU5S2324014]

in the year 2023-24 of the Department of Mechanical Engineering submitted to the University of Mumbai for the partial fulfillment of the requirement for the award of the degree of **IVth** Semester**"Bachelor of Engineering"** in **"Mechanical Engineering"**.

23/4/24

PROF. B. MULE
(PROJECT GUIDE)

PROF. S. WALUNJ
(PROJECT COORDINATOR)

DR. C. M. CHOUDHARI
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DR. L. K. RAGHA
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Nerul, Navi Mumbai - 400706

CERTIFICATE

This is to certify that the mini project **"Design and Development of solar dryer using pcm"** is a Bonafede record of the Mini Project work done by

PRATIK PANDERE [TU5S2324001]

PRANALI SHINDE [TU5S2324008]

VIGHNESH JANGLE [TU5S2324016]

DARSHAN HASE [TU5S2324017]

In the year 2023-24 of Department of Mechanical Engineering submitted to the University of Mumbai for the partial fulfilment of the requirement for the award of the degree of **IV Semester "Bachelor of Engineering"** in **"Mechanical Engineering"**.

PROF.MANGESH. NALAWADE
(PROJECT GUIDE)

PROF. SULEKHA WALUNJ
(PROJECT COORDINATOR)

DR. C. M. CHOUDHARI
(HEAD OF DEPARTMENT)

DR. L. K. RAGHA
(PRINCIPAL)

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CERTIFICATE

This is to certify that the mini project **"Collision Avoidance System"** is a bonafide record of the Mini Project work done by **(TU5S2324002) Rohit Deepak Patil (A09)**, **(TU5S2324011) Rishi Vijaypal Singh (A-17)**, **(TU5S2324010) Aryan Balkrishna Gharat (A-18)**, **(TU5S2324018) Karan Mahesh Meher (A-25)** in the year 2023-24 of Department of Mechanical Engineering submitted to the University of Mumbai forthe partial fulfilment ofthe requirement forthe award ofthe degree of **4th Semester "Bachelor of Engineering"** in **"Mechanical Engineering"**.

TAHSIN AKHTAR
(Project Guide)

SULEKHA WALUNJ
(Project Coordinator)

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DR. D.C CHOUDHARI
(Head of Department)

DR. L.K. RAGHA
(Principal)

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CERTIFICATE

This is to certify that the mini project **"FOUR WHEEL STEERING MECHANISM"** is a Bonafede record of the Mini Project work done by

AMOD JADHAV [TU5S2324003]

ROHAN DHARNE [TU5S2324007]

RISHABH YADAV [TU5S2324009]

KISHAN SINGH [TU5S2324015]

In the year 2023-24 of Department of Mechanical Engineering submitted to the University of Mumbai for the partial fulfilment of the requirement for the award of the degree of **IVth Semester"Bachelor of Engineering"** in **"Mechanical Enginee irg"**.

PROF. V. AJMIRE
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PROF. SULEKHA WALUNJ
(PROJECT COORDINATOR)

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(HEAD OF DEPARTMENT)

DR. L. K. RAGHA
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This is to certify that the mini project "DEVELOPMENT OF RADAR USING ULTRASONIC SENSOR AND ARDUINO BOARD" is a bonafide record the mini project work done by.

STUDENT NAME	ID NUMBER
SHIVAM SAXENA	TU5F2223001
SAGAR KAMBLE	TU5F2223011
AMAN SINHA	TU5F2223013
QASIM SHAIKH	TU5F2223023

In the year 2023-24 of department of Mechanical Engineering submitted to the university of Mumbai for the partial fulfilment of the requirement for the award of the degree of 4th sem "Bachelor Engineering" in "Mechanical Engineering".

Prof. Mahesh kavre

(Project guide)

Prof. Sulekha Walunj

(Project Coordinator)

Dr. C. M. Choudhari

(Head of Department)

Dr. L. K. Ragha

(Principal)

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Mechanical Engineering Department

TE Mini Project (2023-24)

Project Group No.	Roll No.	Students Name	Project Guide	Sem-V Project Title
1	2	Yashraj Jaiswar	Prof. M. Nalawade	Design and Development of Tool Post Assembly of CNC Lathe
	7	Varun Gaikwad		
	11	Sangram Dubal		
	1	Aryan Dabholkar		
2	5	Roshan Mallah	Prof. A. V. Ajmire	Development of automated Pneumatic Holder Gripper
	8	Vishal Thakur		
	10	Keval Patil		
	13	Avinash Mane		
3	12	Ayush Tambe	Prof. M. Nalawade	Designing and Manufacturing of a 3D printer.
	14	Anuj Shedge		
	15	Pawar Prathamesh		
	16	Shirke Vinit		
4	24	Aditya Bhoir	Prof. V. A. Ajmire	Fabrication of Voice controlled wheel chair
	18	Avinash Waghmode		
	28	Srujal Patil		
	57	Hrishikesh Khedekar		
5	21	Harish Mohite	Prof. S.T. Walunj	Design and Fabrication of Pin-on-Disc wear testing Machine
	26	Manav Gurchal		
	19	Hrishikesh Mhatre		
	25	Rohit Kumbhar		

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6	17	Viraj Shinde	Prof. C. N. Deshmukh	Fabrication of narrow four wheel steering system chassis
	59	Yamin Pathan		
	29	Avishkar Patil		
	27	Siddheshvar Panghavane		
7	9	Piyush Pingale	Prof. V. A. Ajmire	Developmnet of Fuel Injector Cleaning Rig.
	3	Anish Barve		
	4	Ashhar Ali		
	6	Atharva Lahange		
8	41	Ramesh Gaikwad	Dr. C. M. Choudhari	Study of Parameters Affecting Quality of Centrifugal Casting and its Optimization
	42	Rohan Kamble		
	61	Darshan Shelar		
	60	Omkar Patil		
9	55	Prashant Masule	Prof. M. S. Kavre	Development of IOT based Smart Accident Detector System.
	23	Chaitanya Keny		
	33	Soham Naik		
	22	Dipak Bansode		
10	43	Miheer Pawse	Dr. C. M. Choudhari	Development of Natural Fibre reinforced composite and its testing.
	52	Aditya Chaugule		
	54	Pratik Sawant		
	56	Amey Sawant		
11	40	Soham Londhe	Prof. B. A. Mule	Development of Electricity generation using waste Materials
	36	Saurabh Belose		
	38	Yugal Patil		
	20	Swapnil Avhad		
12	50	Sarthak Girkar	Prof. M. Nalawade	Design and Development of headstock assembly with linear guideways with bearings.
	46	Kalpesh Kadam		
	47	Harshal Avduth		

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	51	Pranav Solanki		
13	48	Divyank Pawar	Dr. M. S. Bembde	Silent Air Purifier and Humidification using water filter
	39	Chetan Sonawane		
	44	Subodh Thakur		
	31	Sanskar Rane		
14	35	Sarvesh Sagvekar	Prof. S. P. Bargat	3D Scanner based on IR sensor
	58	Yash Shah		
	53	Omkar Shinde		
	45	Yash Kamble		
15	30	Prathamesh Panchal	Prof. S. P. Bargat	Investigation of the Effect of Ethylene Glycol in Thermal Energy Storage
	34	Vivek Gupta		
	49	Prathmesh Rajge		
	37	Vinit Yellaram		
	32	Harshita Jadhav		

Prof. S. P. Bargat
Mini Project Coordinator

Dr. C. M. Choudhari
HOD

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CERTIFICATE

This is to certify that the project entitled **Development of IoT based Smart Detection System.** Is a bona fide work of **Soham Giridhar Naik (A33), Chaitanya Chandan Keny (A23), Dipak Bharat Bansode (A22) and Prashant Chudaman Masule (A55)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of "**Bachelor of Engineering**" in "**Mechanical Engineering**".

24/4/24

Prof. Mahesh S. Kavre
Guide

Prof. S. P. Bargat
Project Coordinator

Dr. C.M. Choudhari
Head of Department

Dr. L.K. Ragha
Principal

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TPCT'S TERNA ENGINEERING COLLEGE ★ Nerul, Navi Mumbai - 400706 ★

CERTIFICATE

This is to certify that the project entitled **"DESIGN & FABRICATION OF PIN-ON-DISC WEAR TESTING MACHINE"** is a bonafide work of **Hrishikesh Mhatre (19), Harish Mohite (21), Rohit Kumbhar (25), Manav Gurchal (26)** submitted to the University of Mumbai inpartial fulfillment of the requirement for the award of the degree of **"Bachelor's of Engineering"** in **"Mechanical Engineering"**.

24/4/24.

Prof. Sulekha T .Walunj
Project Guide

Prof. Sharad. P. Bargat
Project co-ordinator

Dr. C.M. Choudhari
Head of Department

Dr. L.K. Ragha
Principal

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Nerul, Navi Mumbai - 400706

CERTIFICATE

This is to certify that the project entitled **"DESIGN AND DEVELOPMENT OF 3D PRINTER"** is a Bonafide record of the Mini Project work done by

AYUSH TAMBE	**(TU5F2122022)**
ANUJ SHEDGE	**(TU5F2122025)**
PRATHAMESH PAWAR	**(TU5F2122027)**

submitted to the University of Mumbai for the partial fulfilment of the requirement for the award of the degree of **"VIth Semester Bachelor of Engineering"** in **"Mechanical Engineering"**.

M.S.Nalawade

Prof. M. S. Nalawade
Project Guide

24/4/24

Prof. S. P. Bargat
Project Co-ordinator

TERNA ENGINEERING COLLEGE ★ Nerul, Navi Mumbai - 400706 ★ TPCT'S

Dr. C. M. Choudhari
Head of Department

Dr. L. K. Ragha
Principal

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TERNA ENGINEERING COLLEGE
NERUL NAVI MUMBAI - 400 706.

CERTIFICATE

This is to certify that the mini project "Design and Development of tool post assembly of portable CNC Lathe Machine" is a Bonafide record of the Mini Project work done by,

YASHRAJ JAISWAR	[A02]
SANGRAM DUBAL	[A11]
VARUN GAIKWAD	[A07]

in the year 2023-24 of Department of Mechanical Engineering submitted to the University of Mumbai for the partial fulfilment of the requirement for the award of the degree of VIth
Semester "Bachelor of Engineering" in "Mechanical Engineering".

Nalawade

PROF. MANGESH NALAWADE
(GUIDE)

24/4/24

PROF.S.P. BARGAT
(PROJECT COORDINATOR)

DR. C. M. CHOUDHARI
(HEAD OF DEPARTMENT)

DR. L. K. RAGHA
(PRINCIPAL)

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Nerul, Navi Mumbai - 400706

CERTIFICATE

This is to certify that the project entitled **"DESIGN AND FABRICATION OF PNEUMATIC GRIPPER"** is a bonafide work of **Roshan Mallah (A-05), Vishal Thakur (A-08), Keval Patil (A-10)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **"Baehelor's of Engineering" in "Mechanical Engineering".**

24/4/24

Under the guidance of

Prof. V. A. Ajmire

24/4/24

Prof . S. P. Bargat

(PROJECT COORDINATOR)

DR. C.M. Choudhari

(HEAD OF DEPARTMENT)

DR. L.K. Ragha

(PRINCIPAL)

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Nerul, Navi Mumbai-400706
TPCT'S

CERTIFICATE

This is to certify that the project Design and development of natural fibers Is a bona fidework of **Miheer Pawse (A-43), Aditya chaugule (A-52), Pratik Sawant (A-54), AmeySawant (A-56)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of "Bachelor of Engineering" in "Mechanical Engineering".

24/4/24

Dr. C. M. Choudhari

Guide

Prof. S. P. Bargat

Project Co-ordinator

Dr. C. M. Choudhari

Head of Department

Dr. L. K. Ragha

Principal

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CERTIFICATE

This is to certify that the project entitled "**DESIGN AND DEVELOPMENT OF SILENT AIR PURIFIER AND HUMIDIFIER**" is a Bonafide work of **Sanskar Rane (A-31), Chetan Sonawane (A-39), Divyank Pawar (A-48), Subodh Thakur (A-44)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of "**Bachelor of Engineering**" in "**Mechanical Engineering**".

24/4/24

Dr. M.S. Bembde
Guide

Prof. S. P. Bargat
Project Coordinator

Dr. C.M. Choudhari
Head of Department

Dr. L.K. Ragha
Principal

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CERTIFICATE

This is to certify that the project entitled "Developing of 3-D Scanner Based on IR sensor" is a bonafide work of YASH SACHIN SHAH (TU5S2223065), YASH MANOJ KAMBLE (TU5S2223045), SARVESH SAGVEKAR (TU5S2223027) submitted to the University of Mumbai in partial fulfilment of the requirement for the award of the degree of "BACHELOR'S OF ENGINEERING" IN "MECHANICAL ENGINEERING".

24/4/24
Prof S. Bargat
Guide

24/4/24
Prof. S. bargad
Project Coordinator

Dr. C.M. Choudhari
Head Of Department

Dr. L.K. Ragha
Principal

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CERTIFICATE

This is to certify that the project entitled **"DEVELOPMENT OF FUEL INJECTOR TESTING RIG"** is a bonafide work of **Anish Barve (A-03), Ashhar Ali (A-04), Atharv Lahange (A-06), Piyush pingale (A-09)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **"Bachelor's of Engineering"** in **"Mechanical Engineering"**.

24/4/24

Prof. V. A. Ajmire

Project Guide

Dr. C. M. Choudhari

Head Of Department

Dr. L. K. Ragha

Principal

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NERUL NAVI MUMBAI - 400 706.

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CERTIFICATE

This is to certify that the project entitled **Investigations of the Effect of Ethylene Glycol in Thermal Energy Storage** is a bonafide work of **Harshita Jadhav (A-32) Prathamesh Panchal (A-30), Vinit Yellaram (A-37), Vivek Gupta (A-34), Prathamesh Rajge (A-49)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of "Bachelor of Engineering" in "Mechanical Engineering".

24/4/24

Prof. S .P . Bargat

Guide

Prof. S . P . Bargat

Project Coordinator

Dr. C . M . Choudhari

Head of Department

Dr. L . K . Ragha

Principal

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CERTIFICATE

This is to certify that the project entitled **"FABREICATION OF 4 WHEEL STERING SYSTEM CHASSIS"** is a bonafide work done by

VIRAJ SHINDE	(A-17)
SIDDEHSWAR PANAGAVHANE	(A-27)
AVISHKAR PATIL	(A-29)
YAMIN PATHAN	(A-59)

submitted to the University of Mumbai in partial fulfillment of the requirement for

the award of the degree of "Bachelor's of Engineering" in "Mechanical Engineering".

24/4/24

Prof. C. N. Deshmukh
Guide

Prof.S.P. Bargat
Mini Project Co-ordinato

Dr. C. M. Choudhari
Head of Department

Dr. L. K. Ragha
Principal

II

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CERTIFICATE

This is to certify that the project entitled **"DESIGN & FABRICATION OF PIN-ON-DISC WEAR TESTING MACHINE"** is a bonafide work of **Hrishikesh Mhatre (19), Harish Mohite (21), Rohit Kumbhar (25), Manav Gurchal (26)** submitted to the University of Mumbai inpartial fulfillment of the requirement for the award of the degree of **"Bachelor's of Engineering"** in **"Mechanical Engineering"**.

24/4/24

Prof. Sulekha T .Walunj
Project Guide

Prof. Sharad. P. Bargat
Project co-ordinator

Dr. C.M. Choudhari
Head of Department

Dr. L.K. Ragha
Principal

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CERTIFICATE

This is the certify that the project entitled "**DEVELOPMENT OF LINEAR GUIDEWAY WITH BERINGS OF MINI CNC LATHE MACHHINE**" is a bona fide work of **Harshal Avduth (A-47), Kalpesh Kadam (A-46), Pranav Solanki (A-51), Sarthak Girkar (A-50)** submitted to the University of Mumbai in partial fulfilment of the requirement for the award of the degree of "**Bachelor of Engineering" in "Mechanical Engineering"**.

M. S. Nalawde

Prof .M.NALAWDE
Guide

Prof. S. P. Bargat
Project Coordinator

Dr. C.M. Choudhari
Head of Department

Dr. L.K. RAGHA
Principal

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T.P.C.T.S.

CERTIFICATE

This is to certify that the project entitled "Design and Development of Gear Train using 3D Printer" is a bona fide work of Yugal Keshav Patil (A-38), Sourabh Suryakant Belose (A-36), Swapnil Manohar Avhad (A-20), Soham Nitin Londhe (A-40) submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of "Bachelor's of Engineering" in "Mechanical Engineering".

24/04

Prof. B.A. Mule

Guide

Prof. S.P. Bargat

Project coordinator

Dr. C. M. Choudhari

Head of Department

Dr. L. K. Ragha

Principal

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CERTIFICATE

This is to certify that the project entitled " **DEVELOPMENT OF HEADSTOCK ASSEMBLY WITH LINEAR GUIDEWAY BEARING OF MINI CNC LATHE MACHINE** is a Bona fide work of **Kalpesh Kadam (A-46), Harshal Avduth (A-47), Pranav Solanki (A-51), Sarthak Girkar (A-50)** submitted to the University of Mumbai in partial fulfillment of the requirementfor the award of the degree of **"Bachelor of Engineering" in "Mechanical Engineering".**

MNalwade

Prof. M.NALWADE
Guide

SBargat

Prof. S. P. Bargat
Project Coordinator

Dr. C.M. Choudhari
Head of Department

Dr. L.K. Ragha
Principal

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TPCT'S

CERTIFICATE

This is to certify that the project entitled **Defect Analysis In Die Casting Process Using Industrial Engineering Concepts** Is a bona fide work of **Ramesh Gaikwad (A-41), Rohan Kamble (A-42), Omkar Patil (A-60), Darshan Shelar (A-61)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **"Bachelor of Engineering"** in **"Mechanical Engineering"**.

Dr. C.M. Choudhari
Guide

PROF. S. P. Bargat
Project Coordinator

Dr. C.M. Choudhari
Head of Department

Dr. L.K. Ragha
Principal

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Terna Engineering College

Mechanical Engineering Department

Major Project BE 2023-24

Group No.	Students Name	Project Title	Guide
1	Aditya Bharati Sahil Wagle Akshat Gokhale	Design and Development of electric Powertrain of a student formula car	Prof. C M Choudhri
2	Suyash Bhoir Rishabh Gupta Abhay Bisht Ayman Karbelkar	Design and Development of Multifilament 3 D Printer	Prof. C M Choudhri
3	Purva Deshmukh Shivam Nigam Insha Shaikh Yash Parate	Design and Development of Pneumetic Power Steering System	Prof. Rajesh Jaware
4	Swapnil Salekar Mosin Shaikh Chinmay Naik Pranil Kumble	Design and Development of Dishwasher for Indian Market	Prof. Rajesh Jaware
5	Vishal Gupta Shivam Pandey Bhargava Koli	Design and Development of Steering System for Electric Vehicle	Prof. Mahesh Kaware
6	Chandan Bhagat Raj Santosh Pardeshi Jayesh kuware	Development of machine learning model in CNC Milling Machine	Prof. Mangesh Nalawade
7	Varun Patil Hrishikesh Mhatre Leeladhar Padhye Ajay Vishwakarma	Design and Development of Rail Gun	Prof. Mahesh Kavre
8	Mayur Suryavanshi Surajit Maity Jayesh Kadam Vishwanath Gawade	Analysis of Electric Vehicle Bike	Prof. Mangesh Nalawade
9	Sahil Dingankar Sahil Ghatwal Yogesh Soni	Design, Development and Analysis of Pipe Inspection Robot	Prof. Mahesh Kavre

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	Aditya Ubale Abhay Alange		
10	Ved Gharat Omkar Thakur Hardik Mhatre Sunny Chauhan	Design and fabrication of self balancing two wheeler	Prof. Vaibhav Ajimre
11	Shreeyash Patil Omkar Hase Sarfaraz Alam Siddhant Marwade Amey Savaratkar	Design and Fabrication of Water Tank Cleaning Machine	Prof. Sulekha Walunj
12	Atharva Ture Arnan singh Yash singh Yash chogale	Designing the Universal Bottle Feeder in Machine for Product Changeover	Prof. Mahesh Kaware
13	Ajinkya Tare Panchal Zill Shaikh Rehan Vishvnash Malandkar	Performance Analysis of Heat Exchanger using Phase Change Material (PCM)	Prof. Sharad Bargat
14	Krish Nair sheikh wajid Mubin Khan Devanshu Gupta	Design and Fabrication of the Submerged Hydraulic Pump	Prof. Sulekha
15	Pranav Suryavanshi Anurag Singh Hamza Fodkar Tejas Vispute	Design and Fabrication of Banana Fiber extracting Machine	Prof. Mangesh
16	Kadam Dhammesh Parkar Sai Prasad Thorat Hrishikesh Jadhav Prathamesh	Design of floating bag using suspension mechanism	Prof. Bandu Mule
17	Chinmay Karandekar Gaurav More Raj Bansode Shubham Khule	Design of an integrated self charging system for an electric vehicle	Dr. C. M. Choudhari
18	Pratik Sawant Rushikesh Dhende Harshal Pednekar Mahesh Patil	Enhancing the Durability and Sustainability of Perforation Blade in Shampoo Sachet Machines	Dr. C. M. Choudhari
19	Tejas Gije Sankesh Shinde Atharva Patil	IOT Based condition monitoring of industrial DC motor using piezoelectric	Prof. Mahesh Kavre

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	Umesh Rathod	sensor	
20	Bhushan Patil Kartikey Yegade Kunal Gharat Sahil Patil	Design And Developement of IOT based Sustainable Multifunction Machine	Dr. Mayur Bembde
21	Prathamesh Kharat Aditya Maskare HARSH BHAVDANE VISHAL CHAVAN MANOJ BAIDYA	Predictive Maintenance Of CNC m/c Using IOT.	Prof. Mangesh Nalavade
22	Saad Momin Khan Mohd Adeeb Khan Sahaaf Kaif Deshmukh	Design og Humonoid Robotic Hand using Gesture Control.(DESIGN and Development of	Prof. Mahesh Kavre
23	Ganesh Parab KETAN DHOKE Rohan Mayekar Yash More Gitesh Mhaske	Renewable Energy Powered Sea Water Purification System.	Dr. C.M. Choudhari
24	Pratik Chavan Omkar Chowdhary Pratham Vaity Rohit Kamble	Design And Developement of EV Suspension System	Prof. Mahesh Kavre
25	Akshay Thengal Piyush Gangave Chaitanya Kumbhar Akshay Patil	Thermal Vision RC Robotic Tank With Motion Detection	Dr. C. M. Choudhari
26	Shubham Gaikwad Prathamesh Asawale Prajwal Salekar Suraj Regar	Remote Controlled Mini Forklift	Prof. V.A. Ajmire
27	Om Bhoi Vishal Kalel Aditya Dhasal Harsh Khandare	IOT colour based product sorting machine.	Dr. Mayur Bembde
28	Shetty Bhargav Shaikh Mudabbir Malik MD Kaif Ankit motan	Fault Detection and Seperation Sysytem	Prof. Bandu Mule
29	Sarfaraz Ahmed Chougle Shoaib JAINISH PATEL Saleem Siddiqui	Developement of Prototype for IOT based Industrial Protection system	Prof. C. N. Deshmukh
30	Kambli Atharva	Design and Fabrication of	Prof. V.A. Ajmire

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	Yash Chavan	Multipurpose Agriculture Machine	
	Sasulkar Snehal		
	Singh Navneet		

Prof. Mahesh Kavre
Project Coordinator

Dr. C. M. Choudhari
Head of Department

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Nerul, Navi Mumbai - 400706

CERTIFICATE

This is to certify that the project entitled **"ANALYSIS OF ELECTRIC VEHICLE BIKE"** is a bonafide work of **Mayur Sunil Suryavanshi (A-01), Surajit Santosh Maity (A-12), Jayesh Sopan Kadam (A-15), Vishwanath Laxman Gawade (A-19)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **"Bachelor's of Engineering"** in **"Mechanical Engineering"**.

Nalawade

Prof. Mangesh Nalavade

Guide

Dr. C. M. Choudhari

Head of Department

Dr. L. K. Ragha

Principal

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Nerul, Navi Mumbai - 400706

CERTIFICATE

This is to certify that the major project entitled **"Design of Universal Bottle Feeder in Machine for Product Changeover"** is a Bona-fide record of the major Project work of **"YASH CHOGALE A45 (TU5F2021056), AMAN SINGH A25 (TU5F2021024), YASH SINGH A38 (TU5F2021048), ATHARVA TURE A39 (TU5F2021049)**, submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **"Bachelor 's of Engineering"** in **"Mechanical Engineering"**.

Prof. Mahesh Kavre
Guide

Prof. Mahesh Kavre
Supervisor

Dr. C. M. Choudhari
Head of Department

Dr. L. K. Ragha
Principal

PRINCIPAL
TERNA ENGINEERING COLLEGE
NERUL NAVI MUMBAI - 400 706.

TERNA ENGINEERING COLLEGE ★ Nerul, Navi Mumbai - 400706 ★ TPCT'S

CERTIFICATE

This is to certify that the project entitled **"DESIGN AND DEVELOPMENT OF SUBMERSIBLE HYDRAULIC PUMP"** is a Bonafede work of **Devanshu Gupta (A42)**, **Krish Nair (A13)**, **Wajid Shaikh (A24)**, **Mubeen Khan (A31)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **"Bachelors of Engineering"** in **"Mechanical Engineering"**.

Prof. Mangesh Nalawade
Guide

Prof. Mahesh Kavre
Supervisor

Dr. C. M. Choudhari
Head of Department

Dr. L.K Ragha
Principal

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TPCT'S
Nerul, Navi Mumbai - 400706

CERTIFICATE

This is to certify that the project entitled **"DESIGN AND FABRICATION OF SUSPENSION BAG (FLOATING BAG)"** is a bonafide work of **Dhammesh Kadam (A-14), Prathamesh Jadhav (A-27), Sai Parkar (A-40), Hrishikesh Thorat(A-56)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **"Bachelor's of Engineering" in "Mechanical Engineering".**

Dr. C. M. Choudhari

Head of Department

Dr. L. K. Ragha

Principal

PRINCIPAL
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TPCT'S
Nerul, Navi Mumbai - 400706

CERTIFICATE

This is to certify that the project entitled **"DESIGN AND DEVELOPMENT OF DISHWASHER FOR INDIAN URBAN HOUSEHOLD"** is a bonafide work of **Swapnil Salekar (A-57), Chinmay Naik (A-58), Mosin Shaikh (A-59), Pranil Kumble (A-60)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **"Bachelors of Engineering" in "Mechanical Engineering"**.

Dr. C. M. Choudhari

Head of Department

Dr. L. K. Ragha

Principal

24/4/24

Prof. (Dr.) Rajesh R. Jaware

Project Guide

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NERUL NAVI MUMBAI - 400 706.

TERNA ENGINEERING COLLEGE ★ TPCT'S ★ Nerul, Navi Mumbai - 400706

CERTIFICATE

This is to certify that the project entitled "DESIGN AND DEVELOP OF PNUEMATIC POWER STEERING SYSTEM" is a bonafide record of the Project work done by "Yash Parate (TU5F2021040), Purva Deshmukh (TU5F2021030), Shivam Nigam (TU5F2021044), Insha Shaikh (TU5S2122094)" in the year 2023-24 of Department of Mechanical Engineering submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of "Bachelor of Engineering" in "Mechanical Engineering".

RJaware 24/4/24

Prof. (Dr.) Rajesh Jaware
Guide

Prof. Mahesh Kavre
Coordinater

Dr. C.M. Chaudhari
Head of Department

Dr. L. K. Ragha
Principal

PRINCIPAL
TERNA ENGINEERING COLLEGE
NERUL NAVI MUMBAI - 400 706.

TERNA ENGINEERING COLLEGE ★ Nerul, Navi Mumbai - 400706
TPCT'S

CERTIFICATE

This is to certify that the major project entitled "**DESIGN AND FABRICATION OF SELF-BALANCING TWO WHEELER**" is a Bonafide record of the mini Project work done by "**Hardik Mhatre (TU5F2021007), Ved Gharat (TU5F2021009), Sunny Chauhan (TU5F2021061), Omkar Thakur (TU5F2021063)**" in the year 2023-24 of Department of Mechanical Engineering submitted to the University of Mumbai in partial fulfilment of the requirement for the award of the degree of 7th Semester "Bachelor of Engineering" in "Mechanical Engineering".

24/4/24

Prof. Vaibhav Ajmire

(Guide)

Prof. Mahesh Kavre

(Project Coordinator)

Dr. C.M. Choudhari

(Head of Department)

Dr. L.K. Ragha

(Principal)

PRINCIPAL
TERNA ENGINEERING COLLEGE
NERUL NAVI MUMBAI - 400 706.

TERNA ENGINEERING COLLEGE ★ TPCT'S ★ Nerul, Navi Mumbai - 400706

CERTIFICATE

This is to certify that the project entitled **"DESIGN AND FABRICATION OF BANANA PLANT FIBER EXTRACTION MACHINE"** is a bonafide work of **Hamza Parvez Fodkar (A-41), Tejas Pramod Vispute (A-48), Pranav Suryawanshi Balwant (A-28), Anurag Digvijay Singh (A-46)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of "Bachelor's of Engineering" in "Mechanical Engineering".

Prof M.S Kavre
Project Co-ordinator

Dr.C.M. Choudhari
Head of Department

24/04/24
Prof. Bandu Mule
Project Guide

Dr.L.K. Ragha
Principal

PRINCIPAL
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NERUL NAVI MUMBAI - 400 706.

TERNA ENGINEERING COLLEGE ★ Nerul, Navi Mumbai - 400706 ★ TPCT'S

CERTIFICATE

This is to certify that the project entitled "**DESIGN AND DEVELOPMENT OF ELECTRIC POWERTRAIN OF A STUDENT FORMULA CAR**" is a Bonafide record of the project work done by "**Akshat Gokhale (A33), Aditya Bharati (A20), Sahil Wagle (A29)**" in the year 2023-24 of Department of Mechanical Engineering submitted to the University of Mumbai in partial fulfilment of the requirement for the award of the degree of VIII Semester "**Bachelor of Engineering**" in "**Mechanical Engineering**".

Dr. C.M. Choudhari

(Guide, Head of Department)

Dr. L.K. Ragha

(Principal)

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TPCT'S
Nerul, Navi Mumbai - 400706

CERTIFICATE

This is to certify that the project report on, **"DESIGN AND DEVELOPMENT OF DUAL FILAMENT 3D PRINTER."** submitted by **Suyash Bhoir (A02), Rishabh Gupta (A18), Abhay Bisht (A21), Ayman Karbelkar (A30).** Bachelor of Engineering student of Terna Engineering College, Nerul, Navi Mumbai, towards partial fulfillment of the requirements for the award of the Degree of **Bachelor of Engineering** in **Mechanical Engineering** as prescribed by the **University of Mumbai,** is a bonafide record of the work carried out by him under my supervision and guidance. The matter contained in this dissertation has not been submitted to any other University for award of any Degree.

Date of Submission:

Prof. M.S. Kavre
Project Co-coordinator

Dr. C.M. Choudhari
Project Guide

Dr. C. M. Choudhari
(HOD Mechanical Engg.)

Dr. L.K Ragha
Principal

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CERTIFICATE

This is to certify that the project entitled **"Design & Development Of Steering System For Electric Vehicle"** is a bonafide record of the Project work done by **"Shivam Pandey A43 (TU5F2021053)"**, **"Vishal Gupta A35 (TU5F2021042)"**, **"Bhargava Koli A37 (TU5F2021045)"** in the year 2023-24 of Department of Mechanical Engineering submitted to the University of Mumbai in partial fulfilment of the requirement for the award of the degree of **"Bachelor of Engineering"** in **"Mechanical Engineering"**.

Prof. Mahesh Kavre
(Guide)

Dr. C. M. Choudhari
(Head of Department)

Dr. L. K. Ragha
(Principal)

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CERTIFICATE

This is to certify that the project entitled "**DEVELOPMENT OF MACHINE LEARNING MODEL IN CNC MILLING MACHINE.** " is a bonafide Record of the Project work done by **CHANDAN BHAGAT (TU5F2021004), RAJ PARDESHI (TU5F2021013.), JAYESH KUWARE (TU5F2021014.)**, in the year 2023-24 of the Department of Mechanical Engineering submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of "**Bachelor of Engineering**" in "**Mechanical Engineering**".

Nalawade

Prof. Mangesh Nalawade.

(Guide)

Dr. C. M. Choudhari

(Head of Department)

Dr. L. K. Ragha

(Principal)

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CERTIFICATE

This is to certify that the Major Project entitled **"DESIGN AND FABRICATION OF WATER TANK CLEANING MACHINE"** is a Bonafide record of the Major Project work of **"OMKAR HASE, SARFARAZ ALAM, SHREEYASH PATIL, SIDDHANT MARWADE, AMEY SAVARATKAR"** in the year 2023-24 Department of Mechanical Engineering submitted to the University of Mumbai in partial fulfilment of the requirement for the award of the degree of **VIII Semester "Bachelor of Engineering" in "Mechanical Engineering".**

Prof. Sulekha Walunj

(Guide)

Prof. Mahesh Kavare

(Co-ordinator)

Dr. C. M. Choudhari

(Head of Department)

Dr. L. K. Ragha

(Principal)

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CERTIFICATE

This is to certify that the Major Project entitled **"Design and Development of Railgun"** is a bonafide work of **Varun Patil (TU5F2021019)**, **Hrishikesh Mhatre (TU5F2021008)**, **Ajay Vishwakarma (TU5F2021060)** and **Leeladhar Padhye (TU5F2021005)** submitted to the University of Mumbai in partial fulfilment of the requirement for the award of the Degree of **"Bachelor of Engineering"** in **"Mechanical Engineering"**.

Prof. Mahesh Kavre
Guide

Prof. Mahesh Kavre
Supervisor

Dr. C. M. Choudhari
Head of Department

Dr. L. K. Ragha
Principal

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CERTIFICATE

This is to certify that the project entitled **"DESIGN AND DEVELOPMENT OF PIPE INSPECTION ROBOT"** is a bonafide work of **YOGESH KUMAR SONI (TU5F2021038, A23) , SAHIL SANDEEP GHATWAL (TU5F2021012, A09), SAHIL SAMIR DINGANKAR (TU5F2021065, A53), ABHAY DHANARAJ ALANGE (TU5F2021006, A05), ADITYA JAGDISH UBALE (TU5F2021055,A44)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **"Bachelor's of Engineering"** in **"Mechanical Engineering"**.

Prof Mahesh Kavre	**Prof Mahesh Kavre**
Guide	Supervisor
Dr. C. M. Choudhari	**Dr. L. K. Ragha**
Head of Department	Principal

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CERTIFICATE

This is to certify that the project entitled **"Performance Analysis of Heat Exchanger using Phase Change Material (PCM)"** is a Bonafide record of the Project work done by **"Ajinkya Tare (TU5S2122085), Zill Panchal (TU5S212291), Rehan Shaikh (TU5S2122092), Vishwanath Malandakar (TU5S212295)"** in the year 2022-23 of Department of Mechanical Engineering submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **"Bachelor of Engineering"** in **"Mechanical Engineering"**.

24/4/24

Prof. S. P. Bargat
(Guide)

Dr. C. M. Choudhari
(Head of Department)

Dr. L. K. Ragha
(Principal)

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CERTIFICATE

This is to certify that the project entitled "Development prototype of IOT based industrial protection system" is a bonafide record of the Project work done by "Chougle Shoaib Altaf (TU5S2122002), Patel jainish (TU5F19120010), Saleem Siddique (TU5S2122054), Sarfraz Ahmed (TUFS2122067)"in the year 2023-24 of Department of Mechanical Engineering submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of "Bachelor of Engineering" in "Mechanical Engineering".

24/4/24

Prof. C.N. Deshmukh

(Project Guide)

Prof. Vaibhav Ajmire

(Project Co Ordinator)

Dr. C.M Choudhari

(Head of Department)

DR. L.K. Ragha

(Principal)

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CERTIFICATE

This is to certify that the project entitled **"Thermal Vision RC Robotic Tank with Motion Detection"** is a bonafide record of the Project work done by **"Akshay Thengal (TU5S2122016) Piyush Gangave (TU5S2122023) Akshay Patil (TU5S2122024) Chaitanya Kumbhar (TU5S2122025)**in the year 2023-24 of Department of Mechanical Engineering submitted to the University of Mumbai in partial fulfillment of the requirement for the awardof the degree of **"Bachelor of Engineering"**in **"Mechanical Engineering"**.

Dr. C. M. Choudhari

(Guide)

Dr. C. M. Choudhari

(Head of Department)

Dr. L. K. Ragha

(Principal)

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CERTIFICATE

This is to certify that the Major Project entitled **"Enhancing the Durability and Sustainability of Perforation Blade in Shampoo Sachet Machines"** is a Bonafide record of the Major Project work done by **"Sawant Pratik [TU5S2122030], Pednekar Harshal [TU5S2122042], Patil Mahesh [TU5S2122051], Dhende Rushikesh [TU5S2122056]"** in the year 2023-24 Department of Mechanical Engineering submitted to the University of Mumbai in partial fulfilment of the requirement for the award of the degree of **"Bachelor of Engineering"** in **"Mechanical Engineering".**

DR. C. M. Choudhari

(Project Guide)

DR. C. M. Choudhari

(Head of Department)

DR. L. K. Ragha

(Principal)

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CERTIFICATE

This is to certify that the project entitled **"RENEWABLE ENERGY POWERED SEAWATER PURIFICATION SYSTEM"** is a bonafide work of **Ganesh Parab (TU5S2122033), Rohan Mayekar (TU5S2122018), Yash More (TU5S2122019), Gitesh Mhaske (TU5S2122057), Ketan Dhoke (TU5S2122081)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **"Bachelor of Engineering" in "Mechanical Engineering".**

Dr. C. M. Choudhari
Head of Department and Guide

Dr. L. K. Ragha
Principal

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CERTIFICATE

This is to certify that the project entitled " **REMOTE CONTROL MINI FORKLIFT** " is a bonafide work of **Asawale Prathamesh Prakash (B-23), Gaikwad Shubham Sharad (B-29), Salekar Prajwal Sopan (B-30), Regar Suraj Deepak (B-51)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **"Bachelor's of Engineering"** in **"Mechanical Engineering"**.

24/4/24

Prof. V. A. Ajmire	**Dr. C. M. Choudhari**	**Dr. L. K. Ragha**
Group Guide	Head of Department	Principal

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CERTIFICATE

This is to certify that the project entitled **"Design and Development of EV Suspension System"** is a bonafide record of the Project work done by **"PratikChavan (TU5S2122009), Omkar Chowdhary (TU5S2122043), Pratham Vaity (TU5S2122012), Rohit kamble (TU5S2122070)"** in the year 2023-24 of Department of Mechanical Engineering submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **"Bachelor of Engineering"** in **"Mechanical Engineering"**.

Prof. Mahesh Kavre

(Project Guide)

Dr. C. M. Choudhari

(Head of Department)

Dr. L. K. Ragha

(Principle)

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CERTIFICATE

This is to certify that the major project entitled **"DESIGN AND DEVELOPMENT OF IOT BASED SUSTAINABLE MULTIFUNCTION MACHINE"** is a bonafide record of the major Project work done by **"KUNAL GHARAT (TU5S2122005), BHUSHAN PATIL TU5S2122003), KARTIKEY YEGADE (TU5S2122032), PATIL SAHIL (TU5S2122069)"** in the year 2023-24 of Department of Mechanical Engineering submitted to the University of Mumbai in partial fulfilment of the requirement for the award of the **"Bachelor of Engineering" in "Mechanical Engineering"**.

24/4/24

Dr. Mayur Bembde
Guide

Prof. V. Ajmire
Project Co-ordinator

Dr. C. M. Choudhari
Head of Department

Dr. L. K. Ragha
Principal

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Certificate

This is to certify that the project entitled **"Predictive Maintenance of CNC machine using IOT"** is a bonafide record of the Project work done by "Vishal Chavan (TU5S2122077), Prathamesh Kharat (TU5S2122015), Harsh Bavdane (TU5S2122078), Manoj Baidya (TU5S2122007), Aditya Maskare (TU5S2122014) " in the year 2023-24 of Department of Mechanical Engineering submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of "Bachelor of Engineering" in "Mechanical Engineering".

RNdawade

Prof. Mangesh Nalavde.
(Guide).

24/4/24

Prof. Vaibhav Ajmire
(Project Coordinator)

Dr. C. M. Choudhari
(Head of Department)

Dr. L. K. Ragha
(Principal)

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CERTIFICATE

This is to certify that the project entitled **"DESIGN AND FABRICATION OF MULTIPURPOSE AGRICULTURE MACHINE"** is a bonafide record of the Project work done by **"SNEHAL SASULKAR (TU5S2122029), ATHARVA KAMBLI (TU5S2122058), NAVNEET SINGH (TU5S2122074), YASH CHAVAN (TU5S2122045), LAKSHMI JAISWAR(TU5S2122026) "** in the year 2023-24 of Department of Mechanical Engineering submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **"BACHELOR OF ENGINEERING"** in **"MECHANICAL ENGINEERING"**.

24/4/24

Prof. V. Ajmire
(Guide)

Dr. C.M. Choudhari
(HOD)

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L.K. Ragha
(Principal)

CERTIFICATE

This is to certify that the project entitled **"HUMANOID ROBOTIC HAND USING GUESTURE CONTROL"** is a bonafide work of **Khan Mohd Adeeb (B-38) , Momin Saad (B-40), Khan Sahaaf (B-47), Deshmukh Kaif (B-48)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **"Bachelor's of Engineering" in "Mechanical Engineering".**

Dr. C.M.Choudhari

(Head of department)

Dr. L.K.Ragha

(Principal)

Prof Mahesh Kavre

(Project guide)

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CERTIFICATE

This is to certify that the project entitled **"IOT COLOUR BASED PRODUCT SORTING MACHINE"** is a bonafide record of the Project work done by **"VISHAL KALEL (TU5S2122013), OM BHOI (TU5S2122022), ADITYA DHASAL (TU5S2122037), HARSH KHANDARE (TU5S2122053)"** in the year 2023-24 of Department of Mechanical Engineering submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **"Bachelor of Engineering"** in **"Mechanical Engineering"**.

Dr. Mayur Bembde
(Guide)

Dr. C.M. Choudhari
(Head of Department)

PRINCIPAL
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Dr.L.K. Ragha
(Principal)

COLLEGE
Navi Mumbai - 400706

CERTIFICATE

This is to certify that the project entitled **"Design And Development Of An Integrated Self Charging System For EV"** is a bonafide record of the Project work done by **" Shubham Khule (TU5S2122011), Gaurav More (TU5S2122040), Raj Bansode (TU5S2122041), Chinmay Karandekar (TU5S2122076)"** in the year 2023-24 of Department of Mechanical Engineering submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **"Bachelor of Engineering"** in **"Mechanical Engineering".**

Dr. C. M. Choudhari
(Guide)

Dr. C. M. Choudhari
(Head of Department)

Dr. L. K. Ragha
(Principal)

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CERTIFICATE

This is to certify that the major project entitled "**IOT Based Condition Monitoring of Industrial DC motor Using Piezoelectric Sensor**" is a Bonafide record of the major Project work done by "**TEJAS GIJE (TU5S2122017), SANKESH SHINDE (TU5S2122028), ATHARVA PATIL (TU5S2122039), and UMESH RATHOD (TU5S2122020)** in the year 2023-24 Department of Mechanical Engineering submitted to the University of Mumbai in partial fulfilment of the requirement for the award of the degree of VIIIth Semester "Bachelor of Engineering" in "Mechanical Engineering".

24/4/24

PROF. M. S. KAVRE

GUIDE

PROF. V. B. AJMIRE

PROJECT COORDINATOR

DR. C.M. CHOUDHARI

HOD, MECHANICAL DEPT.

DR. L.K. RAGHA

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CERTIFICATE

This is to certify that the project entitled **"Faulty Product Detection And Separation System With Colour Sorting"** is a bonafide work of **Bhargav Shetty (TU5S2122079), Malik MD Kaif (TU5S2122066), Ankit Motan (TU5S2122008), Muddabir Shaikh (TU5S2122072)** the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **"Bachelor of Engineering"** in **"Mechanical Engineering"**.

Dr. C. M. Choudhari

Head of Department

Dr. L. K. Ragha

Principal

24/04/24

Prof. B. A. Mule

Project guide

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FH2024 MINI PROJECT Combine TE A&B DIV.

TE Mini Project Analysis FH2024										
FH2024 TE A Div. Date: 18th April 2024 Batch Coordinator: Prof. C. N. Deshmukh & Prof. B. A. Mule					Log Book+Repor Quality+Review					OR/PR
Project Group No.	Roll No.	Students Name	Project Guide	Sem-VI Project Title	R-I	R-II	R-III	Review AVG (10)	TW Marks (25)	External Marks (25)
1	2	Yashraj Jaiswar	Prof. M. Nalawade	Design and Development of Tool Post Assembly of CNC Lathe	0	7	7	5	13	15
	7	Varun Gaikwad			6	7	7	7	18	19
	11	Sangram Dubal			8	7	8	7	18	19
2	5	Roshan Mallah	Prof. A. V. Ajmire	Design and Fabrication of Pneumatic Gripper	8	10	9	9	23	20
	8	Vishal Thakur			8	10	8	9	23	21
	10	Keval Patil			6	10	8	8	20	18
3	12	Ayush Tambe	Prof. M. Nalawade	Designing and Development of Cartesian 3D printer.	9	8	7	9	22	20
	14	Anuj Shedge			9	8	8	9	23	20
	15	Pawar Prathamesh			9	8	8	10	23	22
4	24	Aditya Bhoir	Prof. V. A. Ajmire	Fabrication of Voice controlled wheel chair	4	7	7	6	15	17
	18	Avinash Waghmode			4	8	7	7	18	20
	28	Srujal Patil			4	7	7	6	15	17
	57	Hrishikesh Khedekar			0	8	8	6	15	17
5	21	Harish Mohite	Prof. S.T. Walunj	Design and Fabrication of Pin-on-Disc wear testing Machine	8	7	7	8	19	18
	26	Manav Gurchal			8	8	7	8	19	18
	19	Hrishikesh Mhatre			8	7	7	8	20	19
	25	Rohit Kumbhar			8	8	7	8	20	20
6	17	Viraj Shinde	Prof. C. N. Deshmukh	Fabrication of Wide 4 wheel steering system chassis	6	8	8	8	20	20
	59	Yamin Pathan			0	8	8	6	15	18
	29	Avishkar Patil			0	8	7	5	13	17
	27	Siddheshvar Panghavane			6	8	7	7	18	18
7	9	Piyush Pingale	Prof. V. A. Ajmire	Developmnet of Fuel Injector Cleaning Rig.	6	9	7	8	20	19
	3	Anish Barve			8	10	8	9	21	20
	4	Ashhar Ali			8	10	9	9	21	21
	6	Atharva Lahange			8	9	7	8	20	19
8	41	Ramesh Gaikwad	Dr. C. M. Choudhari	Study of Parameters Affecting Quality of Centrifugal Casting and its Optimization	8	6	6	7	19	20
	42	Rohan Kamble			0	6	6	4	17	18
	61	Darshan Shelar			8	6	7	7	19	18
	60	Omkar Patil			8	6	7	7	18	19

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FH2024 MINI PROJECT Combine TE A&B DIV.

9	55	Prashant Masule	Prof. M. S. Kavre	Development of IOT based Smart Accident Detector System.	6	6	6	6	17	18
	23	Chaitanya Keny			8	6	6	7	18	17
	33	Soham Naik			8	7	6	7	19	23
	22	Dipak Bansode			8	6	6	7	18	21
10	43	Miheer Pawse	Dr. C. M. Choudhari	Development of Natural Fibre reinforced composite and its testing.	8	8	7	8	20	21
	52	Aditya Chaugule			8	8	8	8	22	19
	54	Pratik Sawant			8	9	7	8	22	20
	56	Amey Sawant			8	9	7	8	21	19
11	40	Soham Londhe	Prof. B. A. Mule	Design and Development of Gear Train using 3D Printing.	8	8	8	8	20	22
	36	Saurabh Belose			8	8	7	8	20	21
	38	Yugal Patil			8	8	6	8	20	21
	20	Swapnil Avhad			4	8	7	7	18	18
12	50	Sarthak Girkar	Prof. M. Nalawade	Design and Development of headstock assembly with linear guideways with bearings.	8	7	7	8	20	22
	46	Kalpesh Kadam			8	6	7	7	18	20
	47	Harshal Avduth			8	6	7	7	18	18
	51	Pranav Solanki			8	6	7	7	18	19
13	48	Divyank Pawar	Dr. M. S. Bembde	Design and Developement of Silent Air Purifier and Humidification using water filter	4	6	7	6	15	16
	39	Chetan Sonawane			0	7	6	5	13	17
	44	Subodh Thakur			4	7	7	6	15	17
	31	Sanskar Rane			6	7	6	7	18	19
14	35	Sarvesh Sagvekar	Prof. S. P. Bargat	Design of 3D Scanner based on IR sensor	0	6	7	5	13	14
	58	Yash Shah			0	8	7	5	13	14
	45	Yash Kamble			0	8	7	5	13	15
15	30	Prathamesh Panchal	Prof. S. P. Bargat	Investigation of the Effect of Ethylene Glycol in Thermal Energy Storage	8	8	8	8	20	20
	34	Vivek Gupta			0	8	7	8	20	21
	49	Prathmesh Rajge			8	9	8	9	22	21
	37	Vinit Yellaram			8	8	7	8	20	21
	32	Harshita Jadhav			8	9	8	9	21	22

Prof. S. P. Bargat
Mini Project Coordinator
Sem-VI FH2024

Dr. C. M. Choudhari
HOD

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Lab Photos

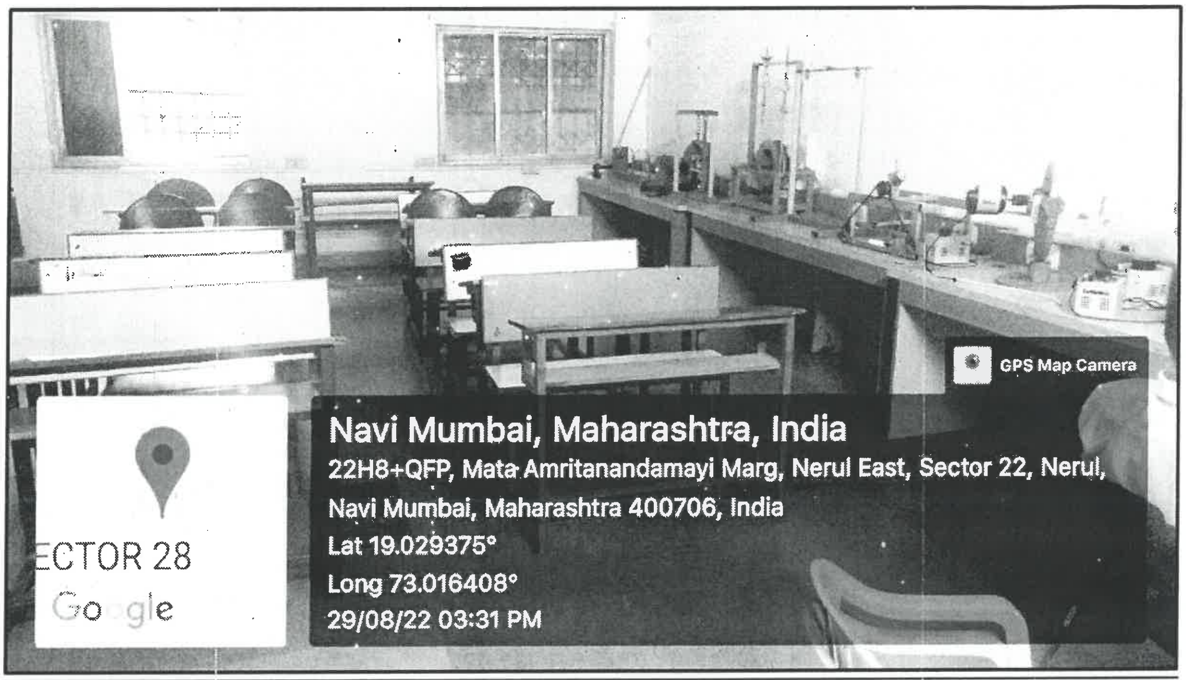

Image 1: DOM/KOM Lab Photo

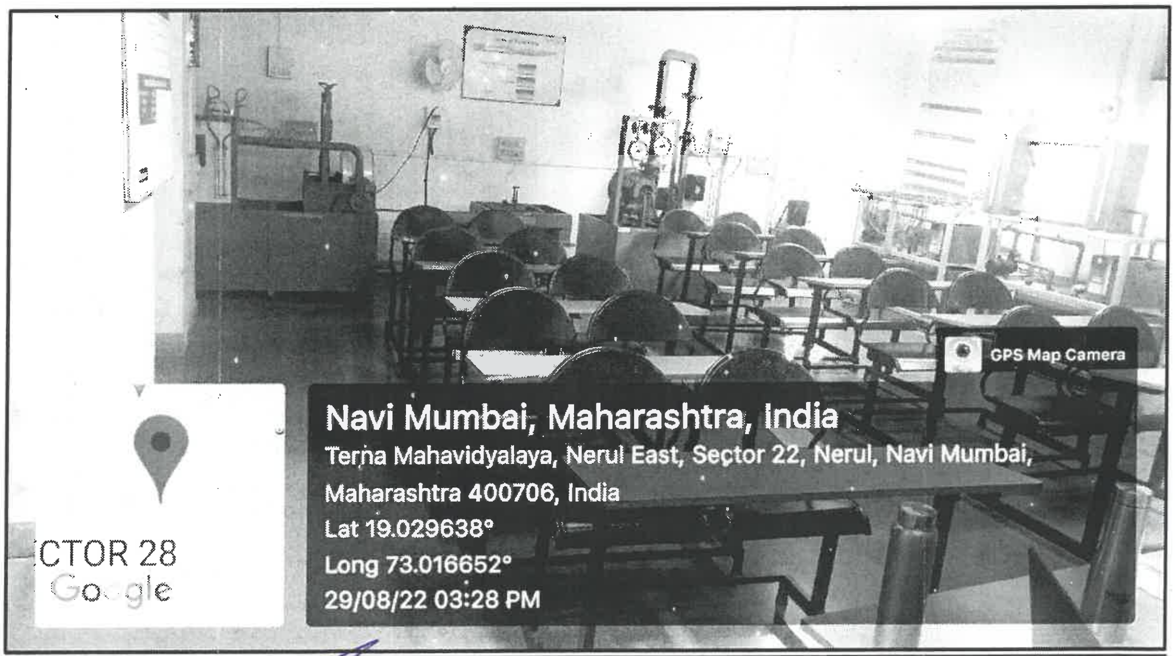

Image 2: FM Lab Photo

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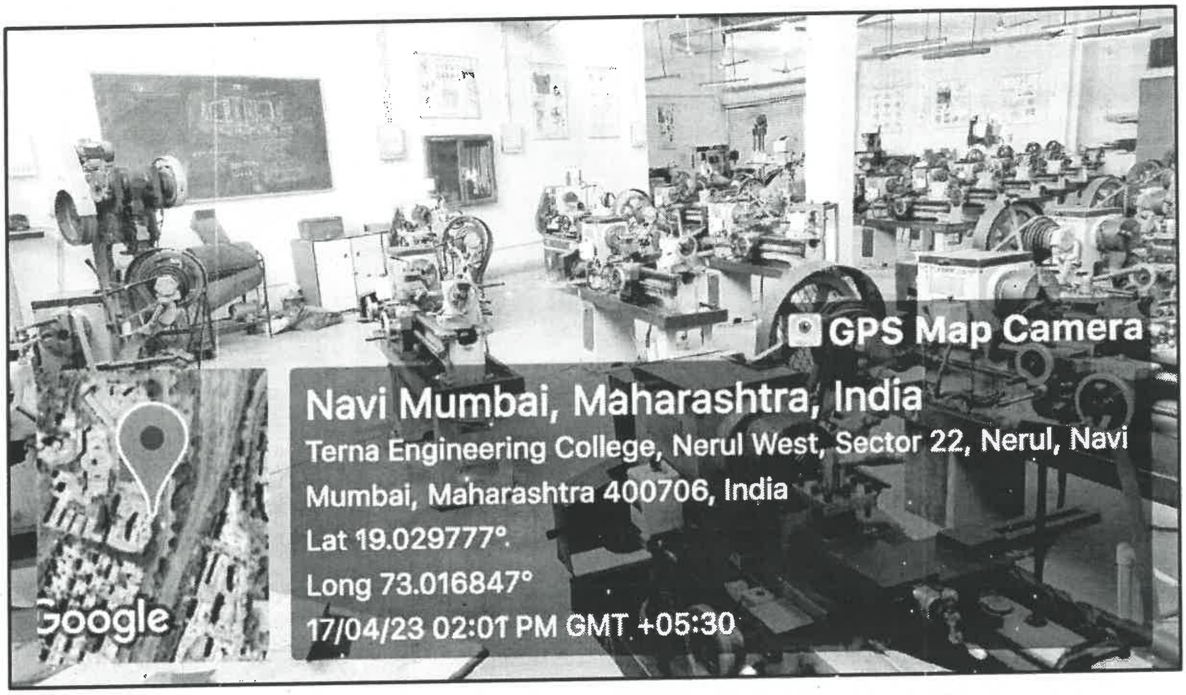

Image 3: Workshop Photo

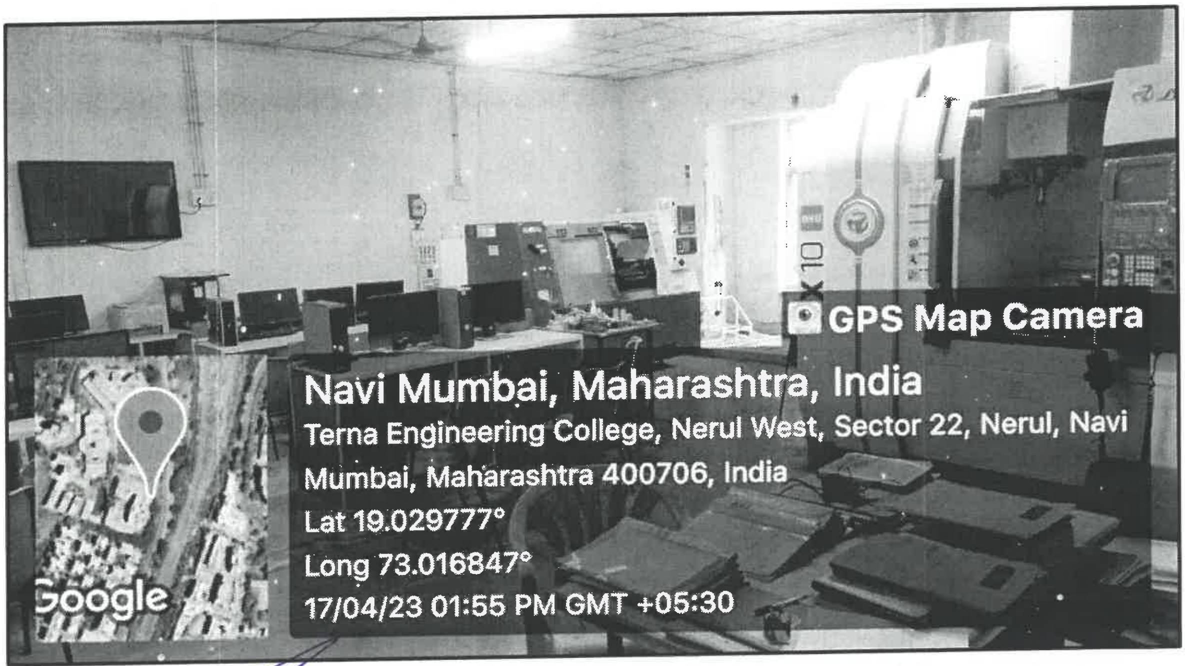

Image 4: CNC Lab Photo

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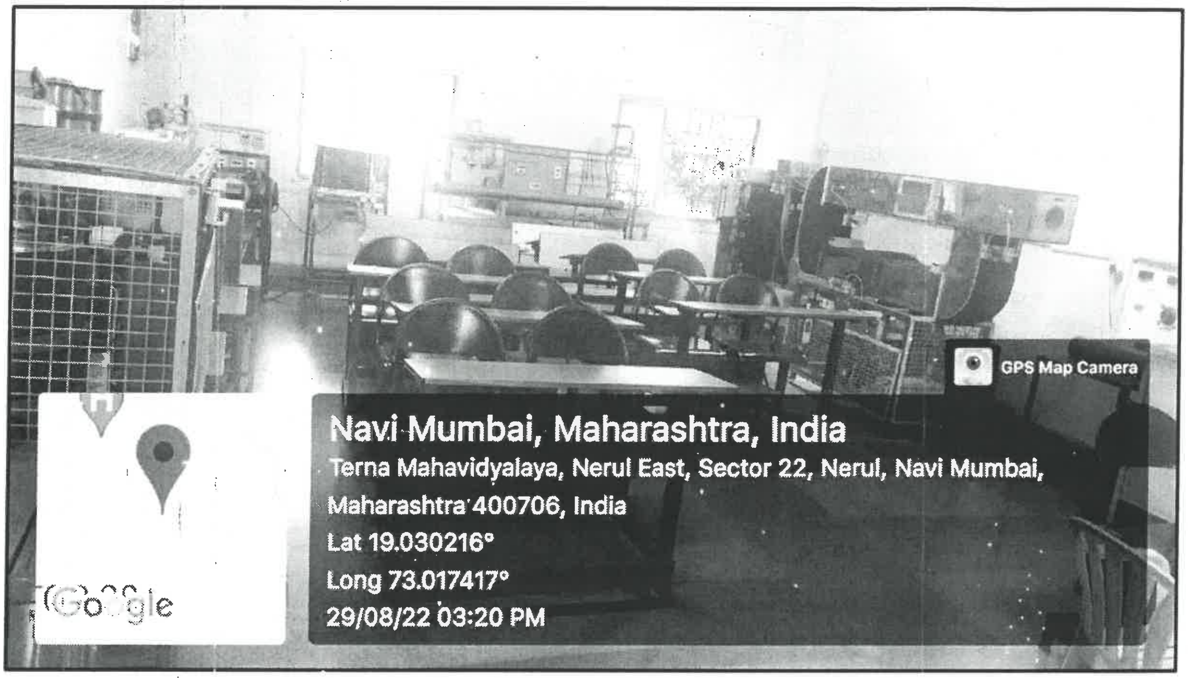

Image 5: HT/HVAC Lab Photo

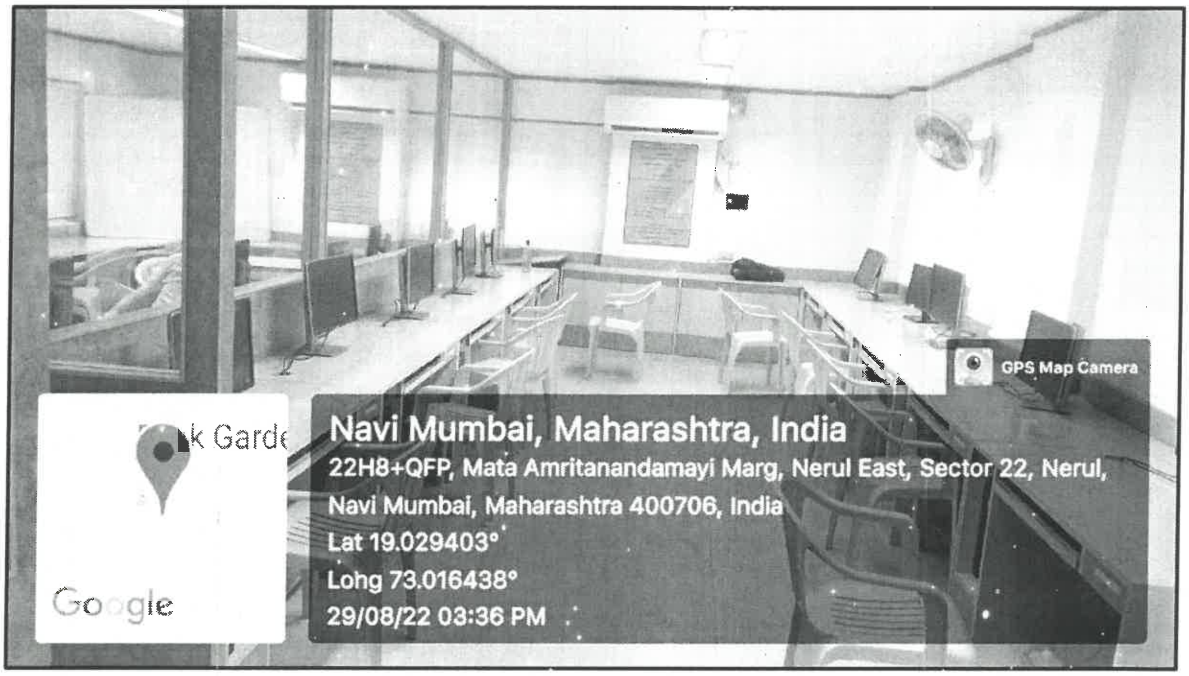

Image 6: CAD Lab Photo

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TERNA ENGINEERING COLLEGE ★ Nerul, Navi Mumbai - 400706
TPCT'S

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Terna Engineering College

Mechanical Engineering Department

Internal Assessment Test (IAT-I)

Subject: RES (MEDLO7032) **Year/Sem: IV/VII (Div: A&B)** **Date: 31st Aug. 2023**

Max. Marks: 20 **SH2023** **Duration: 1.00 hrs.**

Q. No.	Questions	IAT Marks (20)	BL	CO	PO
Q1	Each question of two marks (solve any three)	**6**			
1(a)	What are the different methods to improve the efficiency of PV cells?	2	4	3	1
1(b)	What are the different factors which affect the efficiency of PV cells?	2	2	3	1
1(c)	Explain the working principle of a solar PV systems?	2	2	3	1
1(d)	What is the need of solar tracking systems in solar PV systems?	2	2	3	1
Q2	Solve any one	**7**			
2	Explain the construction and working of solar distillation with neat sketch?	7	4	2	1
	OR				
	Explain solar pond with neat sketch?	7	4	2	1
Q3	Solve any one	**7**			
3	Calculate the variation of day length Over a Year (on 19th of each month of year 2016) of the following location and plot the same on graph and make your comments. Location Delhi (28° 35'N, 77° 42'E).	7	5	1	2
	OR				
	If the angle of declination on a particular day was +18.25° which is date assuming leap year? Calculate the day length on May 02nd on a surface sloping southward at an angle of 40° at a place of 19° 07' N latitude and 72° 51' longitude.	7	5	1	2

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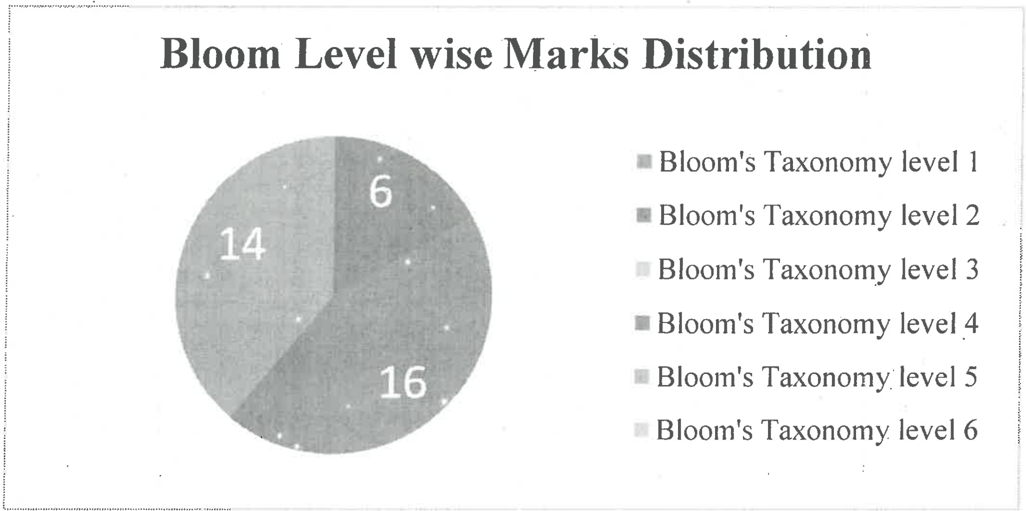
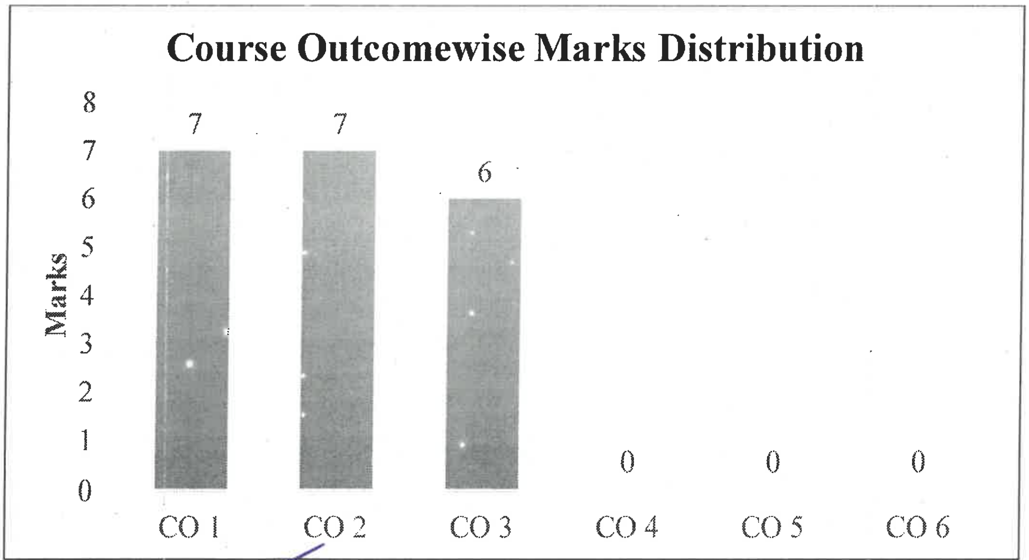
BL – Bloom's Taxonomy Levels (1- Remembering, 2- Understanding, 3 – Applying, 4 – Analysing, 5 – Evaluating, 6 -Creating)
CO – Course Outcomes
PO – Program Outcomes

The above format is recommended to follow. The Bloom's Level wise analysis is necessary to be included along with paper.

The paper which will be distributed to the students can be only questions and marks. This format is necessary for internal IAT quality assurance and will be audited.





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Terna Engineering College
Mechanical Engineering Department
Internal Assessment Test (IAT-II)

Subject: RES (MEDLO7032) **Year/Sem: IV/VII (Div: A&B)** **Date: 23rd Oct. 2023**

Max. Marks: 20 **SH2023** **Duration: 1.00 hrs.**

Q. No.	Questions	IAT Marks (20)
Q1	**Each question of two marks (solve any three)**	**6**
1(a)	Describe working of closed cycle OTEC system with the help of neat sketch?	2
1(b)	Give the advantages of closed cycle OTEC system over open cycle system.	2
1(c)	Describe in short working of low temperature binary flute system with neat sketch.	2
1(d)	Write the short note on geothermal energy.	2
Q2	**Solve any one (Assume suitable data if required)**	7
a.	Calculate (a) the volume of biogas digester suitable for output of 4 crows, and (b) the power available from the digester. Retention time is 20 days and temperature 30 °C. Dry matter consumed is 2 kg/day, biogas yield 0.24 m^3 per kg. Burner efficiency 60% methane proportion is 0.8. Heat of combustion of methane may be assumed to be 28 MJ/m^3. **OR**	7
b.	The following data are given for family biogas suitable for the output of 5 cows: the retention time is 20 days, temperature 30°C, dry matter consume per day = 2 kg, biogas yield is 0.24 m^3 per kg. The efficiency of burner is 60%, methane proportion is 0.8. Heat of combustion of methane = 28 MJ/m^3. Calculate volume of biogas digester and power available from the digester.	7
Q3	**Solve any one (Assume suitable data if required)**	7
a.	Wind at 1 standard atmospheric pressure and 15°C has a velocity of 15m/s, turbine operating speed = 40 RPM at maximum efficiency. Calculate total power density in the wind stream, maximum power density, reasonably power density, total power, torque and axial thrust. **OR**	7
b.	Describe construction and working of wind energy conversion system with neat sketch?	7

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Mechanical Engineering Department
Re-Internal Assessment Test (Re-IAT-I)

Year / Sem: III / VI (Div-A) **Subject: HVAC** **Date: 8th April 2024**
Max. Marks: 20 **FH-2024** **Duration: 1 hrs.**

Q. No.	Questions	IAT of Marks (20)	BL	CO	PO
Q1	**Each question of two marks (solve any three)**	**6**			
1(a)	Plot the psychrometric process Cooling with humidification of air?	2	2	3	1,2
1(b)	Define: Refrigeration, Air conditioning, Unit of Refrigeration, COP.	2	3	3	
1(c)	Explain Wet bulb depression & DPT?	2	1	3	
1(d)	Define ERSHF.	2	2	3	
Q2	**Solve any one**	**7**			
2	a. Explain the effect of condenser pressure on COP? **OR** b. A vapour compression system using R134A works between -10 °C to 36 °C as evaporator and condenser temperature respectively. Using P-h chart determine: i) COP ii) Mass flow of refrigerant per TR iii) Piston displacement per TR using volumetric efficiency= 85 %		2 5	2 2	3,2,1
Q3	**Solve any one**	**7**			
3	a. What are the different methods of air refrigeration systems? Explain any one. **OR** b. The following data refers to a simple air refrigeration cycle of 20 TR capacity: Ambient air temperature and pressure = 20 °C and 0.8 bar. Ram air pressure = 0.9 bar Compressor outlet pressure = 3.6 bar Temperature of air leaving H.E. = 60 °C Pressure of a living the turbine = 1 bar Temperature of air living the cabin = 22 °C Compressor efficiency = 80% Turbine efficiency = 75% Assume no pressure drop in H.E. and isentropic ramming process. Calculate net power required and COP of the system.		1 5	1 1	3,2,1

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BL – Bloom's Taxonomy Levels (1- Remembering, 2- Understanding, 3 – Applying, 4 – Analysing, 5 – Evaluating, 6 -Creating)
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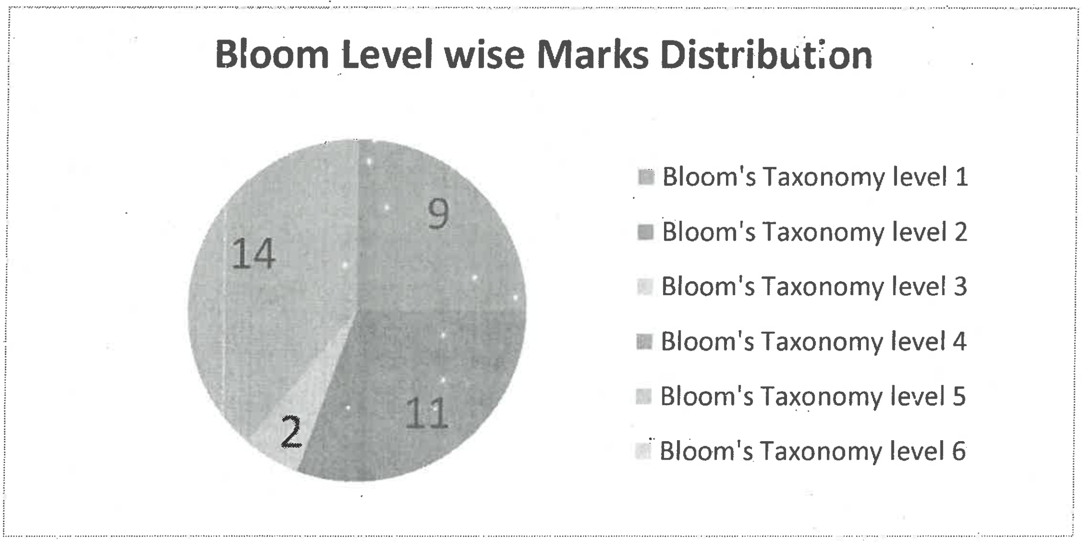

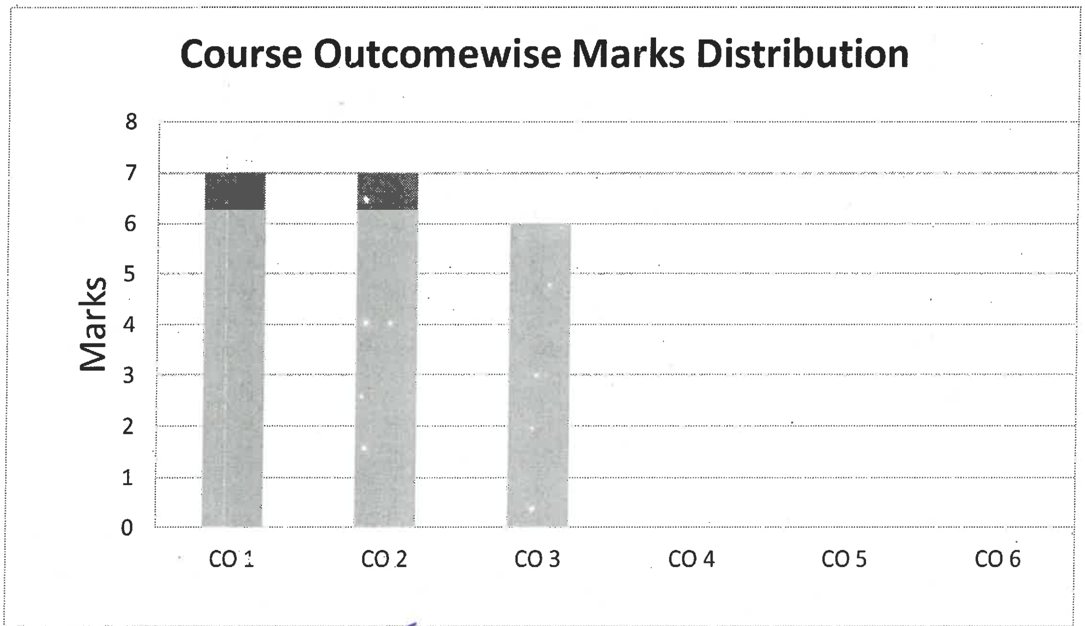

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Mechanical Engineering Department
Internal Assessment Test (IAT-II)

Year/Sem: TE/VI (Div. A) **FH2024** **Date: 15/04/2024**

Max. Marks: 20 **Subject- HVAC&R** **Duration: 1.00 hrs.**

Q. No.	Questions	Marks	BL	CO	PO
Q1	**Each question of two marks (solve any three)**	**6**			
1(a)	What is the need of transport air conditioning?	2	1	CO6	1
1(b)	Enlist the sources of cooling load for a restaurant.	2	2	CO6	1
1(c)	What is variable refrigerant flow system?	2	1	CO6	1
1(d)	What is defrosting?	2	1	CO6	1
Q2	**Solve any one**	**7**			
2	a) Explain construction and working of evaporative condensers?	7	2	CO5	1,2
	OR				
	b) Explain the different Expansion devices in HVAC&R?	7	2	CO5	
Q3	**Solve any one**	**7**			
3	a) Explain the duct design methods in details?	7	2	CO4	1,2
	OR				
	b) A 12 cm long duct passes air at the rate of 1.3 m^3/sec. If the friction factor is 0.005 calculate the pressure drop in the following cases: a) When duct is circular of diameter 270 mm. b) When the duct is 270 mm square section.	7	5	CO4	1,2

BL – Bloom's Taxonomy Levels (1- Remembering, 2- Understanding, 3 – Applying, 4 – Analyzing, 5 – Evaluating, 6 -Creating)

CO – Course Outcomes

PO – Program Outcomes

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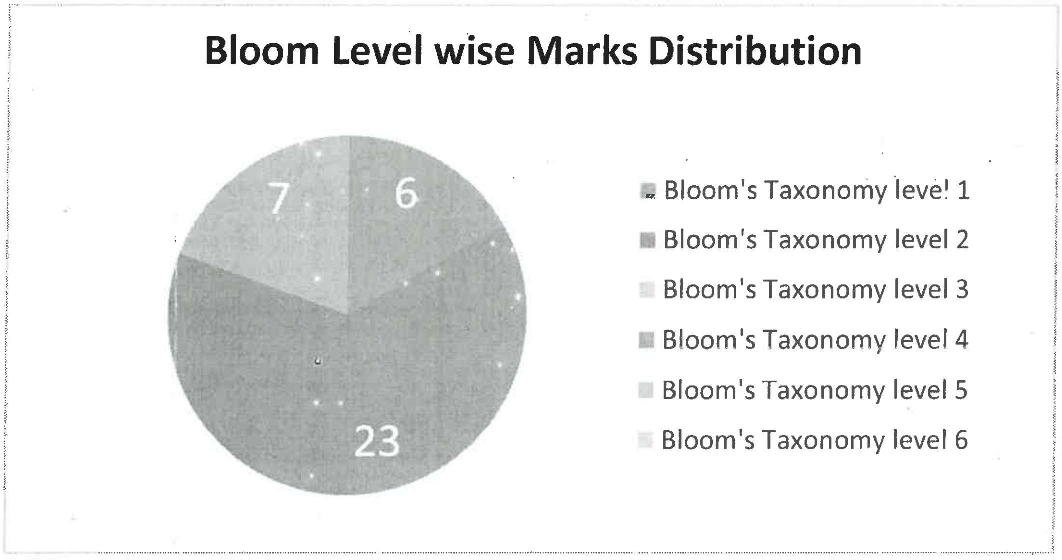

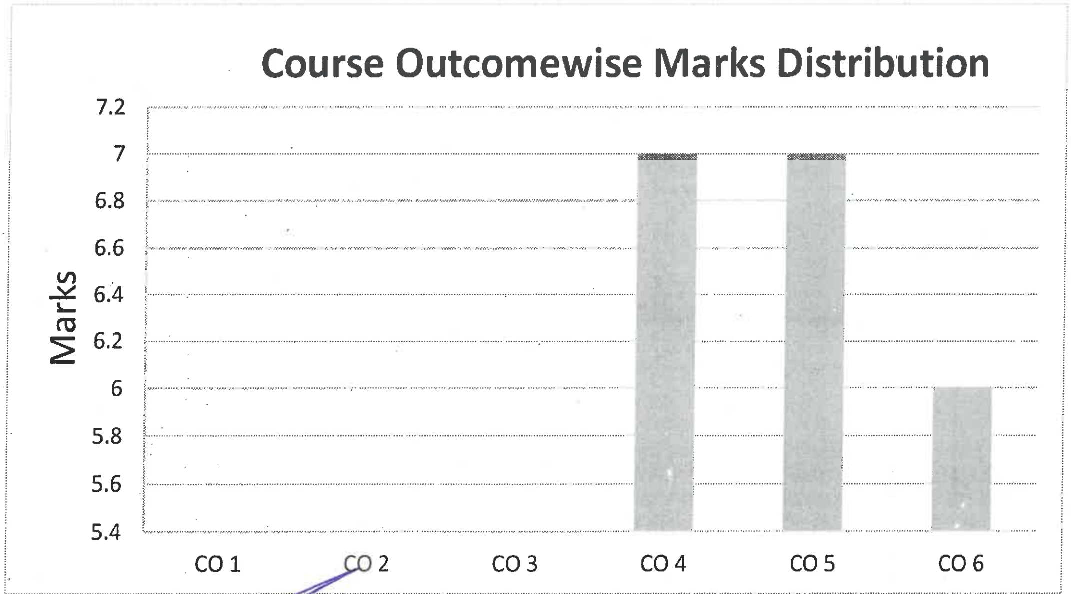

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Department of Mechanical Engineering

TIME TABLE

IAT-I

FH-2024(2023-24) **10/02/2024**

Date	20/02/2024	20/02/2024	21/02/2024	21/02/2024	22/02/2024
Time	11.15 – 12.15 am	3.15 – 4.15 pm	11.15 – 12.15 am	3.15 – 4.15 pm	11.15 – 12.15 am
BE	OPC	SM	TQM	PM	
TE	MD	TM	HVAC	AAI	PTD
SE	AM-IV	FM	KOM	CAD/CAM	IE

S.T.WALUNJ
Exam In charge
Mechanical Engineering
Department

Dr.C.M. Choudhari
HOD
Mechanical Engineering
Department

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Navi Mumbai

Department of Mechanical Engineering

TIME TABLE

IAT-I

SH-2023(2023-24) Date- 21/08/2023

Date	30/08/2023		31/08/2023		01/09/2023	
Time	10.00- 11.00 am	1.30-2.30 pm	10.00-11.00am	1.30-2.30pm	10.00-11.00am	
BE	DMS	LSCM	RES	MDS	DMM	
TE	MMC	TE	DOM	FEA	ST	
SE	EM-III	SOM	PP	MM	TD	

M.S. Bembde
Exam In charge
Mechanical Engineering
Department

Dr. C.M. Choudhari
HOD
Mechanical Engineering
Department

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UNIVERSITY OF MUMBAI

Bachelor of Engineering

in

Mechanical Engineering

Second Year with effect from AY 2020-21

Third Year with effect from AY 2021-22

Final Year with effect from AY 2022-23

(REV- 2019 'C' Scheme) from Academic Year 2019 – 20

Under

FACULTY OF SCIENCE & TECHNOLOGY

(As per AICTE guidelines with effect from the academic year 2019–2020)

AC 23/07/2020

Item No. 119

Syllabus for Approval

Sr. No.	Heading	Particulars
1	Title of the Course	**Second Year B.E. in Mechanical Engineering**
2	Eligibility for Admission	**After Passing First Year Engineering as per the Ordinance 0.6242**
3	Passing Marks	**40%**
4	Ordinances / Regulations (if any)	**Ordinance 0.6242**
5	No. of Years / Semesters	**8 semesters**
6	Level	~~P.G.~~ / **U.G.**/ ~~Diploma / Certificate~~ (Strike out which is not applicable)
7	Pattern	~~Yearly~~ / **Semester** (Strike out which is not applicable)
8	Status	**New** / ~~Revised~~ (Strike out which is not applicable)
9	To be implemented from Academic Year	**From Academic Year: 2020-2021**

Date

Dr. S. K. Ukarande
Associate Dean
Faculty of Science and Technology
University of Mumbai

Dr Anuradha Muzumdar
Dean
Faculty of Science and Technology
University of Mumbai

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Preamble

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited. In line with this Faculty of Science and Technology (in particular Engineering)of University of Mumbai has taken a lead in incorporating philosophy of outcome based education in the process of curriculum development.

Faculty resolved that course objectives and course outcomes are to be clearly defined for each course, so that all faculty members in affiliated institutes understand the depth and approach of course to be taught, which will enhance learner's learning process. Choice based Credit and grading system enables a much-required shift in focus from teacher-centric to learner-centric education since the workload estimated is based on the investment of time in learning and not in teaching. It also focuses on continuous evaluation which will enhance the quality of education. Credit assignment for courses is based on 15 weeks teaching learning process, however content of courses is to be taught in 12-13 weeks and remaining 2-3 weeks to be utilized for revision, guest lectures, coverage of content beyond syllabus etc.

There was a concern that the earlier revised curriculum more focused on providing information and knowledge across various domains of the said program, which led to heavily loading of students in terms of direct contact hours. In this regard, faculty of science and technology resolved that to minimize the burden of contact hours, total credits of entire program will be of 171, wherein focus is not only on providing knowledge but also on building skills, attitude and self learning. Therefore in the present curriculum skill based laboratories and mini projects are made mandatory across all disciplines of engineering in second and third year of programs, which will definitely facilitate self learning of students. The overall credits and approach of curriculum proposed in the present revision is in line with AICTE model curriculum.

The present curriculum will be implemented for Second Year of Engineering from the academic year 2020-21. Subsequently this will be carried forward for Third Year and Final Year Engineering in the academic years 2021-22, 2022-23, respectively.

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Associate Dean
Faculty of Science and Technology
University of Mumbai

Dr Anuradha Muzumdar
Dean
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University of Mumbai

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Incorporation and implementation of Online Contents from NPTEL/ Swayam Platform

The curriculum revision is mainly focused on knowledge component, skill based activities and project based activities. Self learning opportunities are provided to learners. In the revision process this time in particular Revised syllabus of 'C ' scheme wherever possible additional resource links of platforms such as NPTEL, Swayam are appropriately provided. In an earlier revision of curriculum in the year 2012 and 2016 in Revised scheme 'A' and 'B' respectively, efforts were made to use online contents more appropriately as additional learning materials to enhance learning of students.

In the current revision based on the recommendation of AICTE model curriculum overall credits are reduced to 171, to provide opportunity of self learning to learner. Learners are now getting sufficient time for self learning either through online courses or additional projects for enhancing their knowledge and skill sets.

The Principals/ HoD's/ Faculties of all the institute are required to motivate and encourage learners to use additional online resources available on platforms such as NPTEL/ Swayam. Learners can be advised to take up online courses, on successful completion they are required to submit certification for the same. This will definitely help learners to facilitate their enhanced learning based on their interest.

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Associate Dean
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University of Mumbai

Dr Anuradha Muzumdar
Dean
Faculty of Science and Technology
University of Mumbai

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Preface

When the entire world is discussing about 'Industry 4.0', we are at the crossroads. There are so many expectations from the graduating engineers, who shall be the major contributors to ecosystem for development of the Nation. Engineering education in India, in general, is being revamped so as to impart the theoretical knowledge along with industrial exposure. It is our attempt, when we are introducing a new curriculum; to bridge the industry-academia gap. To enable this, we have introduced components such as skill-based laboratories and project-based learning. We trust that this will allow the learner to apply knowledge gained in previous and current semesters to solve problems for gaining better understanding. What once were pure mechanical systems have now been transformed into multidisciplinary systems of mechatronics, electronics and computer science. Interdisciplinary knowledge is gaining importance as we are moving towards automated world as technology advances. Keeping this in mind the curriculum has been designed in a way so that learner shall be acquainted with many Interdisciplinary subjects.

Engineers develop new technological solutions. During the engineering design process, the responsibilities of the engineer may include defining problems, conducting and narrowing research, analyzing criteria, finding and analyzing solutions, and making decisions. The Program Educational Objectives for Undergraduate Program were finalized in a brain storming session, which was attended by several faculty members and Industry experts. The Program Educational Objectives proposed for the undergraduate program in Mechanical Engineering are listed below:

1. To prepare the stake holder to exhibit leadership qualities with demonstrable attributes in lifelong learning to contribute to the societal needs.
2. To make ready the stake holder to pursue higher education for professional development
3. To help the stake holder to acquire the analytical and technical skills, knowledge, analytical ability attitude and behavior through the program
4. To prepare the stakeholders with a sound foundation in the mathematical, scientific and engineering fundamentals
5. To motivate the learner in the art of self-learning and to use modern tools for solving real life problems and also inculcate a professional and ethical attitude and good leadership qualities
6. To prepare the stake holder to able to 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.

We trust this revised version of syllabus come up to the expectations of all stakeholders. We trust this revised version of syllabus come up to the expectations of all stakeholders. We wish to place on record our sincere thanks and appreciations to the various contributors from the academia and industry for their most learned inputs in framing this syllabus.

Board of Studies in Mechanical Engineering

Dr. Vivek K. Sunnapwar : Chairman
Dr. S. M. Khot : Member
Dr. V. M. Phalle : Member
Dr. Siddappa Bhusnoor : Member
Dr. S.S. Pawar : Member
Dr. Sanjay U. Bokade : Member
Dr. Dhanraj Tambuskar : Member

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Program Structure for Second Year Engineering
Semester III & IV
UNIVERSITY OF MUMBAI
(With Effect from 2020-2021)

Semester III

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total
MEC301	Engineering Mathematics-III	3	--	1	3	--	1	4
MEC302	Strength of Materials	3		--	3		--	3
MEC303	Production Processes	4	--	--	4	--	--	4
MEC304	Materials and Metallurgy	3	--	--	3	--	--	3
MEC305	Thermodynamics	3	--	--	3	--	--	3
MEL301	Materials Testing	--	2	--	--	1	--	1
MEL302	Machine Shop Practice	--	4	--	--	2	--	2
MESBL301	CAD –Modeling	--	4	--	--	2	--	2
MEPBL301	Mini Project – 1A	--	$4^{\$}$	--	--	2	--	2
Total		**16**	**14**	**1**	**16**	**07**	**1**	**24**

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract/ Oral	Total
		Internal Assessment			End Sem. Exam	Exam. Duration (in Hrs)			
		Test1	Test2	Avg.					
MEC301	Engineering Mathematics-III	20	20	20	80	3	25	--	125
MEC302	Strength of Materials	20	20	20	80	3	--	--	100
MEC303	Production Processes	20	20	20	80	3	--	--	100
MEC304	Materials and Metallurgy	20	20	20	80	3	--	--	100
MEC305	Thermodynamics	20	20	20	80	3	--	--	100
MEL301	Materials Testing	--	--	--	--	--	25	25	50
MEL302	Machine Shop Practice	--	--	--	--	--	50	--	50
MESBL301	CAD – Modeling	--	--	--	--	--	25	25	50
MEPBL301	Mini Project – 1A	--	--	--	--	--	25	25	50
Total		--	--	**100**	**400**	--	**150**	**75**	**725**

\$ indicates work load of Learner (Not Faculty), for Mini Project
SBL – Skill Based Laboratory
PBL – Project Based Learning

Semester IV

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract.	Tut.	Theory	Pract.	Tut.	Total
MEC401	Engineering Mathematics-IV	3	--	1	3	--	1	4
MEC402	Fluid Mechanics	3	--	--	3	--	--	3
MEC403	Kinematics of Machinery	3	--	--	3	--	--	3
MEC404	CAD/CAM	3	--	--	3	--	--	3
MEC405	Industrial Electronics	3	--	--	3	--	--	3
MEL401	Industrial Electronics	--	2	--	--	1	--	1
MEL402	Kinematics of Machinery	--	2	--	--	1	--	1
MEL403	Python Programming	--	2	--	--	1	--	1
MESBL401	CNC and 3-D Printing	--	4	--	--	2	--	2
MEPBL401	Mini Project – 1B	--	4$	--	--	2	--	2
Total		**15**	**14**	**1**	**15**	**7**	**1**	**23**

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Pract/ Oral	Total
		Internal Assessment			End Sem. Exam	Exam. Duration (in Hrs)			
		Test1	Test 2	Avg.					
MEC401	Engineering Mathematics-IV	20	20	20	80	3	25	--	125
MEC402	Fluid Mechanics	20	20	20	80	3	--	--	100
MEC403	Kinematics of Machinery	20	20	20	80	3	--	--	100
MEC404	CAD/CAM	20	20	20	80	3	--	--	100
MEC405	Industrial Electronics	20	20	20	80	3	--	--	100
MEL401	Industrial Electronics	--	--	--	--	--	25	25	50
MEL402	Kinematics of Machinery	--	--	--	--	--	25	--	25
MEL403	Python Programming	--	--	--	--	--	25	25	50
MESBL401	CNC and 3-D Printing	--	--	--	--	--	25	25	50
MEPBL401	Mini Project – 1B	--	--	--	--	--	25	25	50
Total		--	--	**100**	**400**	--	**150**	**100**	**750**

$ indicates work load of Learner (Not Faculty), for Mini Project
SBL – Skill Based Laboratory
PBL – Project Based Learning

Students group and load of faculty per week.
Mini Project 1A / 1B: Students can form groups with minimum 2 (Two) members and not more than 4 (Four) members
Faculty Load: 1 hour per week per four groups

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Course Code	Course Name	Credits
MEC301	**Engineering Mathematics-III**	**4**

Pre-requisite: Engineering Mathematics-I, Engineering Mathematics-II,

Objectives: The course is aimed

1. To familiarize with the Laplace Transform, Inverse Laplace Transform of various functions, its applications.
2. To acquaint with the concept of Fourier Series, its complex form and enhance the problem solving skills
3. To familiarize with the concept of complex variables, C-R equations with applications.
4. To study the application of the knowledge of matrices and numerical methods in complex engineering problems.

Outcomes: On successful completion of course learner/student will be able to:

1. Apply the concept of Laplace transform to solve the real integrals in engineering problems.
2. Apply the concept of inverse Laplace transform of various functions in engineering problems.
3. Expand the periodic function by using Fourier series for real life problems and complex engineering problems.
4. Find orthogonal trajectories and analytic function by using basic concepts of complex variable theory.
5. Apply Matrix algebra to solve the engineering problems.
6. Solve Partial differential equations by applying numerical solution and analytical methods for one dimensional heat and wave equations

Module	Detailed Contents	Hrs.
01	**Module: Laplace Transform** 1.1 Definition of Laplace transform, Condition of Existence of Laplace transform, 1.2 Laplace Transform (L) of Standard Functions like e^{at}, $sin(at), cos(at)$, $sinh(at)$, $cosh(at)$ and t^n , $where\ n \geq 0$. 1.3 Properties of Laplace Transform: Linearity, First Shifting theorem, Second Shifting Theorem, change of scale Property, multiplication by t, Division by t, Laplace Transform of derivatives and integrals (Properties without proof). 1.4 Evaluation of integrals by using Laplace Transformation. **Self-learning topics:** Heaviside's Unit Step function, Laplace Transform. of Periodic functions, Dirac Delta Function.	07
02	**Module: Inverse Laplace Transform** 2.1 Inverse Laplace Transform, Linearity property, use of standard formulae to find inverse Laplace Transform, finding Inverse Laplace transform using derivative 2.2 Partial fractions method & first shift property to find inverse Laplace transform. 2.3 Inverse Laplace transform using Convolution theorem (without proof) **Self-learning Topics:** Applications to solve initial and boundary value problems involving ordinary differential equations.	06

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03	**Module: Fourier Series:** 3.1 Dirichlet's conditions, Definition of Fourier series and Parseval's Identity (without proof) 3.2 Fourier series of periodic function with period 2π and $2l$, 3.3 Fourier series of even and odd functions 3.4 Half range Sine and Cosine Series. **Self-learning Topics:** Complex form of Fourier Series, orthogonal and orthonormal set of functions, Fourier Transform.	07
04	**Module: Complex Variables:** 4.1 Function $f(z)$ of complex variable, limit, continuity and differentiability of $f(z)$, Analytic function, necessary and sufficient conditions for $f(z)$ to be analytic (without proof), 4.2 Cauchy-Riemann equations in cartesian coordinates (without proof) 4.3 Milne-Thomson method to determine analytic function $f(z)$ when real part (u) or Imaginary part (v) or its combination (u+v or u-v) is given. 4.4 Harmonic function, Harmonic conjugate and orthogonal trajectories **Self-learning Topics:** Conformal mapping, linear, bilinear mapping, cross ratio, fixed points and standard transformations	07
05	**Module: Matrices:** 5.1 Characteristic equation, Eigen values and Eigen vectors, Properties of Eigen values and Eigen vectors. **(No theorems/ proof)** 5.2 Cayley-Hamilton theorem (without proof): Application to find the inverse of the given square matrix and to determine the given higher degree polynomial matrix. 5.3 Functions of square matrix 5.4 Similarity of matrices, Diagonalization of matrices **Self-learning Topics:** Verification of Cayley Hamilton theorem, Minimal polynomial and Derogatory matrix & Quadratic Forms (Congruent transformation & Orthogonal Reduction)	06
06	**Module: Numerical methods for PDE** 6.1 Introduction of Partial Differential equations, method of separation of variables, Vibrations of string, Analytical method for one dimensional heat and wave equations. (only problems) 6.2 Crank Nicholson method 6.3 Bender Schmidt method **Self-learning Topics:** Analytical methods of solving two and three dimensional problems.	06

Term Work:

General Instructions:

1. Students must be encouraged to write at least 6 class tutorials on entire syllabus.
2. A group of 4-6 students should be assigned a self-learning topic. Students should prepare a presentation/problem solving of 10-15 minutes. This should be considered as mini project in Engineering Mathematics. This project should be graded for 10 marks depending on the performance of the students.

The distribution of Term Work marks will be as follows –

1.	Attendance (Theory and Tutorial)	05 marks
2.	Class Tutorials on entire syllabus	10 marks
3.	Mini project	10 marks

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Assessment:

Internal Assessment Test:

Assessment consists of two class tests of 20 marks each. The first class test (Internal Assessment I) is to be conducted when approx. 40% syllabus is completed and second class test (Internal Assessment II) when additional 35% syllabus is completed. Duration of each test shall be one hour.

End Semester Theory Examination:

1. Question paper will comprise of total 06 questions, each carrying 20 marks.
2. Total 04 questions need to be solved.
3. Question No: 01 will be compulsory and based on entire syllabus wherein 4 sub-questions of 5 marks each will be asked.
4. Remaining questions will be randomly selected from all the modules.
5. Weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.

References:

1. Engineering Mathematics, Dr. B. S. Grewal, Khanna Publication
2. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Eastern Limited,
3. Advanced Engineering Mathematics, R. K. Jain and S.R.K. Iyengar, Narosa publication
4. Advanced Engineering Mathematics, H.K. Das, S. Chand Publication
5. Higher Engineering Mathematics B.V. Ramana, McGraw Hill Education
6. Complex Variables and Applications, Brown and Churchill, McGraw-Hill education,
7. Text book of Matrices, Shanti Narayan and P K Mittal, S. Chand Publication
8. Laplace transforms, Murray R. Spiegel, Schaum's Outline Series

Links for online NPTEL/SWAYAM courses:

1. https://nptel.ac.in/courses/111/104/111104085/
2. https://nptel.ac.in/courses/111/106/111106139/

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AC-
Item No.-

UNIVERSITY OF MUMBAI

Bachelor of Engineering

in

Mechanical Engineering

Third Year with Effect from AY 2021-22

(REV- 2019 'C' Scheme) from Academic Year 2019 – 20

Under

FACULTY OF SCIENCE & TECHNOLOGY

(As per AICTE guidelines with effect from the academic year 2019–2020)

Syllabus for Approval

Sr. No.	Heading	Particulars
1	Title of the Course	**Third Year B.E. in Mechanical Engineering**
2	Eligibility for Admission	**After Passing Second Year Engineering as per the Ordinance 0.6243**
3	Passing Marks	**40%**
4	Ordinances / Regulations (if any)	**Ordinance 0.6243**
5	No. of Years / Semesters	**8 semesters**
6	Level	~~P.G.~~ / **U.G.**/ ~~Diploma / Certificate~~ (Strike out which is not applicable)
7	Pattern	~~Yearly~~ / **Semester** (Strike out which is not applicable)
8	Status	~~New~~ / **Revised** (Strike out which is not applicable)
9	To be implemented from Academic Year	**2021-2022**

Date

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TERNA ENGINEERING COLLEGE
NERUL NAVI MUMBAI - 400 706.

TERNA ENGINEERING COLLEGE
TPCT'S
Nerul, Navi Mumbai 400706

Dr. S. K. Ukarande
Associate Dean
Faculty of Science and Technology
University of Mumbai

Dr Anuradha Muzumdar
Dean
Faculty of Science and Technology
University of Mumbai

Preamble

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited. In line with this Faculty of Science and Technology (in particular Engineering)of University of Mumbai has taken a lead in incorporating philosophy of outcome based education in the process of curriculum development.

Faculty resolved that course objectives and course outcomes are to be clearly defined for each course, so that all faculty members in affiliated institutes understand the depth and approach of course to be taught, which will enhance learner's learning process. Choice based Credit and grading system enables a much-required shift in focus from teacher-centric to learner-centric education since the workload estimated is based on the investment of time in learning and not in teaching. It also focuses on continuous evaluation which will enhance the quality of education. Credit assignment for courses is based on 15 weeks teaching learning process, however content of courses is to be taught in 12-13 weeks and remaining 2-3 weeks to be utilized for revision, guest lectures, coverage of content beyond syllabus etc.

There was a concern that the earlier revised curriculum more focused on providing information and knowledge across various domains of the said program, which led to heavily loading of students in terms of direct contact hours. In this regard, faculty of science and technology resolved that to minimize the burden of contact hours, total credits of entire program will be of 171, wherein focus is not only on providing knowledge but also on building skills, attitude and self learning. Therefore in the present curriculum skill based laboratories and mini projects are made mandatory across all disciplines of engineering in second and third year of programs, which will definitely facilitate self learning of students. The overall credits and approach of curriculum proposed in the present revision is in line with AICTE model curriculum.

The present curriculum will be implemented for Second Year of Engineering from the academic year 2020-21. Subsequently this will be carried forward for Third Year and Final Year Engineering in the academic years 2021-22, 2022-23, respectively.

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Incorporation and implementation of Online Contents from NPTEL/ Swayam Platform

The curriculum revision is mainly focused on knowledge component, skill based activities and project based activities. Self learning opportunities are provided to learners. In the revision process this time in particular Revised syllabus of 'C' Scheme wherever possible additional resource links of platforms such as NPTEL, Swayam are appropriately provided. In an earlier revision of curriculum in the year 2012 and 2016 in Revised scheme 'A' and 'B' respectively, efforts were made to use online contents more appropriately as additional learning materials to enhance learning of students.

In the current revision based on the recommendation of AICTE model curriculum overall credits are reduced to 171, to provide opportunity of self learning to learner. Learners are now getting sufficient time for self learning either through online courses or additional projects for enhancing their knowledge and skill sets.

The Principals/ HoD's/ Faculties of all the Institute are required to motivate and encourage learners to use additional online resources available on platforms such as NPTEL/ Swayam. Learners can be advised to take up online courses, on successful completion they are required to submit certification for the same. This will definitely help learners to facilitate their enhanced learning based on their interest.

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Preface

When the entire world is discussing about 'Industry 4.0', we are at the crossroads. There are so many expectations from the graduating engineers, who shall be the major contributors to ecosystem for development of the Nation. Engineering education in India, in general, is being revamped so as to impart the theoretical knowledge along with industrial exposure. It is our attempt, when we are introducing a new curriculum; to bridge the industry-academia gap. To enable this, we have introduced components such as skill-based laboratories and project-based learning. We trust that this will allow the learner to apply knowledge gained in previous and current semesters to solve problems for gaining better understanding. What once were pure mechanical systems have now been transformed into multidisciplinary systems of mechatronics, electronics and computer science. Interdisciplinary knowledge is gaining importance as we are moving towards automated world as technology advances. Keeping this in mind the curriculum has been designed in a way so that learner shall be acquainted with many Interdisciplinary subjects.

Engineers develop new technological solutions. During the engineering design process, the responsibilities of the engineer may include defining problems, conducting and narrowing research, analyzing criteria, finding and analyzing solutions, and making decisions. The Program Educational Objectives for Undergraduate Program were finalized in a brain-storming session, which was attended by several faculty members and Industry experts. The Program Educational Objectives proposed for the undergraduate program in Mechanical Engineering are listed below:

1. To prepare the stake holder to exhibit leadership qualities with demonstrable attributes in lifelong learning to contribute to the societal needs.
2. To make ready the stake holder to pursue higher education for professional development
3. To help the stake holder to acquire the analytical and technical skills, knowledge, analytical ability attitude and behavior through the program
4. To prepare the stakeholders with a sound foundation in the mathematical, scientific and engineering fundamentals
5. To motivate the learner in the art of self-learning and to use modern tools for solving real life problems and also inculcate a professional and ethical attitude and good leadership qualities
6. To prepare the stake holder to able to 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.

We trust this revised version of syllabus come up to the expectations of all stakeholders.We trust this revised version of syllabus come up to the expectations of all stakeholders. We wish to place on record our sincere thanks and appreciations to the various contributors from the academia and industry for their most learned inputs in framing this syllabus.

Board of Studies in Mechanical Engineering

Dr. Vivek K. Sunnapwar	: Chairman
Dr. S. M. Khot	: Member
Dr. V. M. Phalle	: Member
Dr. Siddappa S.Bhusnoor	: Member
Dr. S.S. Pawar	: Member
Dr. Sanjay U. Bokade	: Member
Dr. Dhanraj Tambuskar	: Member

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Program Structure for Third Year Engineering
Semester V &VI
UNIVERSITY OF MUMBAI
(With Effect from 2021-2022)

Semester V

Course Code	Course Name	Teaching Scheme (Contact Hours)		Credits Assigned		
		Theory	Pract.	Theory	Pract.	Total
MEC501	Mechanical Measurements and Controls	3	--	3	--	3
MEC502	Thermal Engineering	3	--	3	--	3
MEC503	Dynamics of Machinery	3	--	3	--	3
MEC504	Finite Element Analysis	3	--	3	--	3
MEDLO501X	Department Level Optional Course – 1	3	--	3	--	3
MEL501	Thermal Engineering	--	2	--	1	1
MEL502	Dynamics of Machinery	--	2	--	1	1
MEL503	Finite Element Analysis	--	2	--	1	1
MESBL501	Professional Communication and Ethics –II	--	2*+2	--	2	2
MEPBL501	Mini Project – 2 A	--	$4^{\$}$	--	2	2
Total		**15**	**14**	**15**	**07**	**22**

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Prac/ Oral	Total
		Internal Assessment			End Sem Exam	Exam. Duration (in Hrs)			
		Test1	Test2	Avg					
MEC501	Mechanical Measurements and Controls	20	20	20	80	3	--	--	100
MEC502	Thermal Engineering	20	20	20	80	3	--	--	100
MEC503	Dynamics of Machinery	20	20	20	80	3	--	--	100
MEC504	Finite Element Analysis	20	20	20	80	3	--	--	100
MEDLO501X	Department Level Optional Course – 1	20	20	20	80	3	--	--	100
MEL501	Thermal Engineering	--	--	--	--	--	25	--	25
MEL502	Dynamics of Machinery	--	--	--	--	--	25	25	50
MEL503	Finite Element Analysis	--	--	--	--	--	25	25	50
MESBL501	Professional Communication and Ethics - II	--	--	--	--	--	25	25	50
MEPBL501	Mini Project – 2 A	--	--	--	--	--	25	25	50
Total		--	--	**100**	**400**	--	**125**	**100**	**725**

* Theory class to be conducted for full class; $ indicates work load of Learner (Not Faculty), for Mini Project;

SBL – Skill Based Laboratory
PBL – Project Based Learning

Department Level Optional Course – 1

Course Code	Department Level Optional Course – 1
MEDLO5011	Optimization Techniques
MEDLO5012	Statistical Techniques
MEDLO5013	Computational Methods

Semester VI

Course Code	Course Name	Teaching Scheme (Contact Hours)		Credits Assigned		
		Theory	Pract/Tut.	Theory	Pract.	Total
MEC601	Machine Design	4	--	4	--	4
MEC602	Turbo Machinery	3	--	3		3
MEC603	Heating, Ventilation, Air conditioning and Refrigeration	3	--	3	--	3
MEC604	Automation and Artificial Intelligence	3	--	3	--	3
MEDLO602X	Department Level Optional Course – 2	3	--	3	--	3
MEL601	Machine Design	--	2	--	1	1
MEL602	Turbo Machinery	--	2	--	1	1
MEL603	Heating, Ventilation, Air conditioning and Refrigeration	--	2	--	1	1
MESBL601	Measurements and Automation	--	4	--	2	2
MEPBL601	Mini Project – 2 B	--	4$	--	2	2
Total		16	14	16	07	23

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Prac/ Oral	Total
		Internal Assessment			End Sem Exam	Exam. Duration (in Hrs)			
		Test1	Test2	Avg					
MEC601	Machine Design	20	20	20	80	3	--	--	100
MEC602	Turbo Machinery	20	20	20	80	3	--	--	100
MEC603	Heating, Ventilation, Air conditioning and Refrigeration	20	20	20	80	3	--	--	100
MEC604	Automation and Artificial Intelligence	20	20	20	80	3	--	--	100
MEDLO602 X	Department Level Optional Course – 2	20	20	20	80	3	--	--	100
MEL601	Machine Design	--	--	--	--	--	25	25	50
MEL602	Turbo Machinery	--	--	--	--	--	25	--	25
MEL603	Heating, Ventilation, Air conditioning and Refrigeration	--	--	--	--	--	25	25	50
MESBL601	Measurements and Automation	--	--	--	--	--	25	25	50
MEPBL601	Mini Project – 2 B	--	--	--	--	--	25	25	50
Total		--		100	400	--	125	100	725

$ indicates work load of Learner (Not Faculty), for Mini Project;

SBL – Skill Based Laboratory;
PBL – Project Based Learning

Department Level Optional Course – 2

Course Code	**Department Level Optional Course – 2**
MEDLO6021	Press Tool Design
MEDLO6022	Tool Engineering
MEDLO6023	Metal Forming Technology

Course Code	Course Name	Credits
MEC501	**Mechanical Measurements and Controls**	**03**

Objectives:

1. To study the principles of precision measuring instruments & their significance.
2. To familiarize with the handling & use of precision measuring instruments/ equipment's.
3. To impart knowledge of architecture of the measurement system.
4. To deliver working principle of mechanical measurement system.
5. To study concept of mathematical modelling of the control system.
6. To acquaint with control system under different time domain.

Outcomes: Learner will be able to…

1. Handle, operate and apply the precision measuring instruments / equipment's.
2. Analyze simple machined components for dimensional stability & functionality.
3. Classify various types of static characteristics and types of errors occurring in the system.
4. Classify and select proper measuring instrument for displacement, pressure, flow and temperature measurements.
5. Design mathematical model of system/process for standard input responses and analyse error and differentiate various types of control systems and time domain specifications
6. Analyse the problems associated with stability.

Module	Details	Hrs.
1	**1.1** Introduction to Metrology, Need for inspection, Fundamental principles and definition, Standards of measurement, Errors in measurements, International standardization. **1.2** Limits, fits and tolerances of interchangeable manufacture, Elements of interchangeable system, Hole based and shaft based systems, Tolerance grades, Types of fits, General requirements of Go & No go gauging, Taylor's principle, Design of Go & No go gauges.	**06**
2	**2.1** Principles of interference, Concept of flatness, Flatness testing, Optical flats, Optical Interferometer and Laser interferometer. **2.2** Surface texture measurement: importance of surface conditions, roughness and waviness, surface roughness standards specifying surface roughness parameters - Ra, Ry, Rz, RMS value etc., Surface roughness measuring instruments. **2.3** Screw Thread measurement: Two wire and three wire methods, Floating carriage micrometer. **2.4** Gear measurement: Gear tooth comparator, Master gears, Measurement using rollers and Parkinson's Tester.	**08**
3	**3.1** Significance of Mechanical Measurements, Classification of measuring instruments, generalized measurement system, types of inputs: Desired, interfering and modifying inputs. **3.2** Static characteristics: Static calibration, Linearity, Static Sensitivity, Accuracy, Static error, Precision, Reproducibility, Threshold, Resolution, Hysteresis, Drift, Span & Range etc.	**06**
4	**4.1** Displacement Measurement: Transducers for displacement, displacement measurement, potentiometer, LVDT, Capacitance Types, Digital Transducers (optical encoder), Nozzle Flapper	**08**

	Transducer **4.2** Strain Measurement: Theory of Strain Gauges, gauge factor, temperature Compensation, Bridge circuit, orientation of strain gauges for force and torque, Strain gauge based load cells and torque sensors **4.3** Pressure Measurement: Elastic pressure transducers viz. Bourdon tubes, diaphragm, bellows and piezoelectric pressure sensors, High Pressure Measurements, Bridge man gauge. Vacuum measurement: Vacuum gauges viz. McLeod gauge, Ionization and Thermal Conductivity gauges **4.4** Flow Measurement: Bernoulli flowmeters, Ultrasonic Flowmeter, Magnetic flow meter, rotameter **4.5** Temperature Measurement: Electrical methods of temperature measurement Resistance thermometers, Thermistors and thermocouples, Pyrometers	
5	**5.1** Introduction to control systems, Classification of control system. Open loop and closed loop systems. **5.2** Mathematical modelling of control systems, concept of transfer function, Block diagram algebra **5.3** Transient and steady state analysis of first and second order system. Time Domain specifications. Step response of second order system. Steady-state error, error coefficients, steady state analysis of different type of systems using step, ramp and parabolic inputs	**06**
6	**6.1** Stability analysis: Introduction to concepts of stability, The Routh criteria for stability **6.2** Experimental determination of frequency response, Stability analysis using Root locus, Bode plot	**06**

Assessment:

Internal Assessment for 20 marks:

Consisting **Two Compulsory Class Tests**

First test based on approximately 40% of contents and second test based on remaining contents (approximately 40% but excluding contents covered in Test I)

End Semester Examination:

Weightage of each module in end semester examination will be proportional to number of respective lecture hours mentioned in the curriculum.

1. Question paper will comprise of total **six questions, each carrying 20 marks**
2. **Question 1** will be **compulsory** and should **cover maximum contents of the curriculum**
3. **Remaining questions will be mixed in nature** (for example if Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)
4. Only **Four questions need to be solved**

Text/Reference Books:

1. Engineering. Metrology, I.C. GUPTA, Dhanpat Rai Publications.
2. Engineering. Metrology, R. K. Jain, Khanna Publisher.
3. Measurement Systems: Applications and Design, by EO Doebelin,5th Edition, McGraw Hill
4. Mechanical Engineering Measurements, A. K. Sawhney, Dhanpat Rai & Sons, New Delhi
5. Instrumentation & Mechanical Measurements, A. K. Thayal
6. Control System Engineering by Nagrath I.J. and Gopal M, Wiley EasternLtd.
7. Modem Control engineering: by K. Ogata, Prentice Hall
8. Control systems by Dhanesh Manik, Cengage Learning
9. Engineering Metrology and Measurements by N V Raghavendra and L Krishnamurthy, OxfordUniversity Press.
10. Instrumentation and Control System, W. Bolton, Elsevier
11. Experimental Methods for Engineers by J P Holman, McGraw Hills Int. Edition
12. Engineering Experimentation by EO Doebelin, McGraw Hills Int. Edition
13. Mechanical Measurements by S P Venkateshan, John Wiley & Sons

Links for online NPTEL/SWAYAM courses:

https://nptel.ac.in/courses/112/103/112103261/ - Principles of Mechanical Measurement, IIT Guwahati
https://nptel.ac.in/courses/112/107/112107242/ - Mechanical Measurement System, IIT Roorkee
https://nptel.ac.in/courses/112/106/112106138/ - Mechanical Measurements and Metrology, IIT Madras

UNIVERSITY OF MUMBAI

Bachelor of Engineering

in

Mechanical Engineering

Final Year with Effect from AY 2022-23

(REV- 2019 'C' Scheme) from Academic Year 2019 – 20

Under

FACULTY OF SCIENCE & TECHNOLOGY

(As per AICTE guidelines with effect from the academic year 2019–2020)

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TERNA ENGINEERING COLLEGE * Nerul, Navi Mumbai - 400706 *
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Syllabus for Approval

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Date

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5. To motivate the learner in the art of self-learning and to use modern tools for solving real life problems and also inculcate a professional and ethical attitude and good leadership qualities
6. To prepare the stake holder to able to 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.

We trust this revised version of syllabus come up to the expectations of all stakeholders.We trust this revised version of syllabus come up to the expectations of all stakeholders. We wish to place on record our sincere thanks and appreciations to the various contributors from the academia and industry for their most learned inputs in framing this syllabus.

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Program Structure for Final Year Engineering
Semester VII & VIII
UNIVERSITY OF MUMBAI
(With Effect from 2021-2022)

Semester VII

Course Code	Course Name	Teaching Scheme (Contact Hours)		Credits Assigned		
		Theory	Pract. Tut.	Theory	Pract.	Total
MEC701	Design of Mechanical System	4	--	4	--	4
MEC702	Logistics and Supply Chain Management	3	--	3		3
MEDLO703X	Department Level Optional Course – 3	3	--	3	--	3
MEDLO704X	Department Level Optional Course – 4	3	--	3	--	3
ILO701X	Institute Level Optional Course – I*	3	--	3	--	3
MEL701	Design of Mechanical System	--	2	--	1	1
MEL702	Maintenance Engineering	--	2	--	1	1
MEL703	Industrial Skills	--	2	--	1	1
MEP701	Major Project I	--	6#	--	3	3
Total		**16**	**12**	**16**	**6**	**22**

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Prac/ Oral	Total
		Internal Assessment			End Sem Exam	Exam. Duration (in Hrs)			
		Test 1	Test2	Avg					
MEC701	Design of Mechanical System	20	20	20	80	3	--	--	100
MEC702	Logistics and Supply Chain Management	20	20	20	80	3	--	--	100
MEDLO703X	Department Level Optional Course – 3	20	20	20	80	3	--	--	100
MEDLO704X	Department Level Optional Course – 4	20	20	20	80	3	--	--	100
ILO701X	Institute Level Optional Course – I*	20	20	20	80	3	--	--	100
MEL701	Design of Mechanical System	--	--	--	--	--	25	25	50
MEL702	Maintenance Engineering	--	--	--	--	--	25	25	50
MEL703	Industrial Skills	--	--	--	--	--	25	25	50
MEP701	Major Project I	--	--	--	--	--	50	--	50
Total		**--**	**--**	**100**	**400**	--	**125**	**75**	**700**

# indicates work load of Learner (Not Faculty), for Major Project

* Common with all branches

Semester VIII

Course Code	Course Name	Teaching Scheme (Contact Hours)		Credits Assigned		
		Theory	Pract./Tut.	Theory	Pract.	Total
MEC801	Operations Planning and Control	3	--	3	--	3
MEDLO805X	Department Level Optional Course – 5	3	--	3	--	3
MEDLO806X	Department Level Optional Course – 6	3	--	3	--	3
ILO802X	Institute Level Optional Course – 2*	3	--	3	--	3
MEL801	Product Design and Development	--	2	--	1	1
MEL802	Laboratory based on IoT	--	2	--	1	1
MEP801	Major Project II	--	12#	--	6	6
Total		12	16	12	8	20

Course Code	Course Name	Examination Scheme							
		Theory					Term Work	Prac./ Oral	Total
		Internal Assessment			End Sem Exam	Exam. Duration (Hrs)			
		Test1	Test2	Avg					
MEC801	Operations Planning and Control	20	20	20	80	3	--	--	100
MEDLO805X	Department Level Optional Course – 5	20	20	20	80	3	--	--	100
MEDLO806X	Department Level Optional Course – 6	20	20	20	80	3	--	--	100
ILO802X	Institute Level Optional Course – 2*	20	20	20	80	3	--	--	100
MEL801	Product Design and Development	--	--	--	--	--	25	25	50
MEL802	Laboratory based on IoT	--	--	--	--	--	25	25	50
MEP801	Major Project II	--	--	--	--	--	100	50	150
Total		--	--	80	320	--	150	100	650

# indicates work load of Learner (Not Faculty), for Major Project

* Common with all branches

Students group and load of faculty per week.

Major Project 1 and 2:

Students can form groups with minimum 2 (Two) members and not more than 4 (Four) members

Faculty Load: In Semester VII – ½ hour per week per project group

In Semester VIII – 1 hour per week per project group

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Department Optional Courses

Course Code	Sem. VII: Department Optional Course- 3	Course Code	Sem. VII: Department Optional Course - 4
MEDLO7031	Automotive Power Systems	MEDLO7041	Machinery Diagnostics
MEDLO7032	Renewable Energy Systems	MEDLO7042	Vibration Controls
MEDLO7033	Vehicle Systems	MEDLO7043	Advanced Vibration

Course Code	Sem. VIII: Department Optional Course- 5	Course Code	Sem. VIII: Department Optional Course - 6
MEDLO8051	Composite Materials	MEDLO8061	Product Design and Development
MEDLO8052	Smart Materials	MEDLO8062	Design for X
MEDLO8053	Micro Electro Mechanical Systems	MEDLO8063	Total Quality Management

Institute Optional Courses

Course Code	Institute Optional Course-I #	Course Code	Institute Elective Course-II #
ILO7011	Product Lifecycle Management	ILO8021	Project Management
ILO7012	Reliability Engineering	ILO8022	Finance Management
ILO7013	Management Information System	ILO8023	Entrepreneurship Development and Management
ILO7014	Design of Experiments	ILO8024	Human Resource Management
ILO7015	Operation Research	ILO8025	Professional Ethics and CSR
ILO7016	Cyber Security and Laws	ILO8026	Research Methodology
ILO7017	Disaster Management and Mitigation Measures	ILO8027	IPR and Patenting
ILO7018	Energy Audit and Management	ILO8028	Digital Business Management
ILO7019	Development Engineering	ILO8029	Environmental Management

Common with all branches

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Course Code	Course Name	Credits
MEC701	**Design of Mechanical System**	**04**

Objectives:

1. To familiarize with the concept of system and methodology of system design
2. 2. To study system design of various systems such as Gear box, snatch block, belt conveyors, I. C. engine system and pumps

Outcomes: Learner will be able to…

1. Apply the concept of system design.
2. Select appropriate gears for power transmission on the basis of given load and speed
3. Design material handling systems such as hoisting mechanism of EOT crane,
4. Design belt conveyor systems
5. Design engine components such as cylinder, piston, connecting rod and crankshaft
6. Design pumps for the given applications

Module	Contents	Hours
1.	Methodology & Morphology of design, Optimum design, system concepts in design.	03
2.	**Design of Transmission Gear Box:**	08
	Single stage andTwo stage Gear box with fixed ratio consisting of Design of spur, helical, bevel and worm and wormwheel gear pairs, Gear box housing layout and housing design.	
3.	**Design of Hoisting Mechanism:**	08
	Design of Snatch Block Assembly including Rope Selection, Sheave, Hook, Bearing for hook, cross piece, Axle for sheave and shackle plate, Design of rope drum, selection motor with transmission system.	
4.	**Design of Belt Conveyors :**	
	Power requirement, selection of belt, design of tension take up unit, idler pulley	04
5.	**Engine Design (Petrol and Diesel):**	
	Design of cylinder, Piston with pin and rings, connecting rod & crank shaft with bearings	08
6.	**Design of Pump:**	08
	5.1 Design of main components of gear pump.	
	1 Motor selection	
	2 Gear design	
	3 Shaft design and bearing selection	
	4 Casing and bolt design	
	5 Sizing of design of suction and delivery pipe	
	5.2 Design of main components of Centrifugal Pump:	
	1 Motor selection	

	2 Suction and Delivery pipe	
	3 Design of Impeller, Impeller shaft	
	4 Design of Volute Casing	

Sr. no.	Text/Reference Books:-

1 "Machine Design Exercises", S.N.Trikha - New Delhi Khanna Publisher 1978.

2 "Mechanical Engineering Design", Shigley J E and Mischke C R,11th Edition 2019, McGraw Hill, ISBN: 9788184956207.

3 "Mechanical design analysis", MF Spotts, 3rd Edition, Prentice Hall Inc.

4 "Design of Machine Elements", Bhandari VB,5th Edition 2020, TMH,ISBN: 9789390177479

5 "Machine Design", Black PH and O Eugene Adams, 3rd Edition, McGraw Hill ISBN 10: 0070055246

6 "Design Data", P.S.G. College of Technology, Coimbatore. ISBN: 978-8192735504

7 "Engineering Design", Dieter G E, McGraw Hill Inc, ISBN: 9781260113297

8 "Mechanical System Design", SP Patil, 2nd Edition., JAICO Publishing House ISBN: 978-8179923153

9 "Material Handling Equipment", Rudenko,2nd Edition, M.I.R. publishers, Moscow

10 "Machine Design-An Integrated Approach", Robert L. Norton,6th Edition, Pearson Education, ISBN: 9780135184233

11 "Material Handling Equipments", N. Rudenko, Peace Publication

12 "Material Handling Equipments", Alexandrov,5th Edition, Mir Publication ISBN: 9780714717456

13 Machine Desgin", Reshetov, Mir Publication 1978.

14 "Machine Design", R.C.Patel, Pandya, Sikh, Vol -I & II,12th Edition, C. Jamnadas& Co.

15 "Design of Machine Elements", 4th Edition, V. M. Faires, ISBN: 978-0023359507

16 "Pumps: Theory, Design and Applications", G K Sahu, New Age International 2000 ISBN: 9788122412246

17 "Gear Design Handbook", GitinMaitra, 2nd Edition, ISBN: 978-0074602379

18 "Design Data Book- Design of engine parts",Khandare S.S & Kale A.V, 2nd Edition, ISBN: 978-9352654260

Links for online NPTEL/SWAYAM courses:

1. https://onlinecourses.nptel.ac.in/noc22_me62 - Gear And Gear Unit Design: Theory and Practice, IIT Kharagpur
2. https://nptel.ac.in/courses/112/106/112106137/ - Machine Design-II, IIT Madras

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