Department of Mechanical Engineering

Minutes of Board of Studies Meeting

The 6th Board of Studies meeting of Department of Mechanical Engineering was held on 22nd July 2023 at 10:30 A.M in the R&D Lab, Department of Mechanical Engineering, Sri Manakula Vinayagar Engineering College with the Head of the Department in the Chair.

The following members were present for the BoS meeting:

Sl.No	Name of the Member with Designation and official Address	Responsibility in the BoS
1	Dr. K.Velmurugan Professor and Head Department of MECH, SMVEC	Chairman
External Members		
2	Dr. N. Alagumurthi, Ph.D, Professor & Head(Former) Department of Mechanical Engineering, Pondicherry Engineering College, Puducherry-605014. Email id: alagumurthi@pec.edu Mobile No.: 9486143090	University Nominee
3	Dr. M. Leenus Jesu Martin, Ph.D, Director - Campus Professor & Head, Department of Automobile Engineering, SRM Institute of Science and Technology, Tamil Nadu – 603203 Email id: hod.auto@ktr.srmuniv.ac.in Mobile No.: 9940036021	Member
4	Dr. A.T. Ravichandran, Ph.D, Dean - Academics Vel Tech Rangarajan Dr.Sagunthala R & D Institute of Science and Technology, Avadi, Chennai – 600062 Email id: hodmech@veltech.edu.in Mobile No.: 9942940600	Member

Internal Members		
5	Dr.G.G.Sozhamannan, Professor, **Specialization: *Manufacturing Engineering***	Member
6	Dr.R.Ravisankar, Associate Professor, **Specialization: *Thermal Engineering***	Member
7	Dr.K.Hemalatha, Associate Professor, **Specialization: *Engineering Design***	Member
8	Dr.A.Thiagarajan, Associate Professor, **Specialization: *Product Design & Manufacturing***	Member
9	Dr.T.Poovaragavan, Assistant Professor, **Department of *Mathematics***	Member
10	Dr.T.Jayavarthanan Associate Professor, **Department of *Physics***	Member
11	Dr.K.Karthikeyan Associate Professor, ***Department of Chemistry***	Member
12	Dr.D.Jaichithra, Professor and Head, **Department of *English***	Member
Co-opted Members		
13	Dr. Anand Gurupatham Deputy General Manager, CAE- Department Head at Renault Nissan, Technology & Business Center, Chennai, Tamil Nadu, India	Industrial Member
Alumni		
14	Mr.P.Madavan, Research Scholar MIT, Anna university, Chennai.	Alumni

2.A.6.2

AGENDA OF THE MEETING

Item No. : BOS / 2023/MECH/UG /6.1	
	Consideration of the confirmation of minutes of the previous meeting held on October 8, 2022
Item No. : BOS / 2023/MECH/UG /6.2	
	Consideration of Regulations 2023 for the students admitted from the academic year 2023 - 24
Item No. : BOS / 2023/MECH/UG /6.3	
	Consideration of the review of feedback received from various stakeholders like Academic Expert, industry Experts, Alumni, and NGO, etc..,
Item No. : BOS / 2023/MECH/UG /6.4	
	Consideration of the revision of curriculum and syllabus of B.Tech. Mechanical to be offered under Regulations 2023 to the students admitted from the academic year 2023 - 24 and Approval syllabus for Semester I and II under Regulations 2023.
Item No. : BOS / 2023/MECH/UG /6.5	
	Consideration of the offering of Professional and Open electives for the curriculum and syllabus of B.Tech. Mechanical to be offered under Regulations 2023
Item No. : BOS / 2023/MECH/UG /6.6	
	Consideration of revision of the list of panel of question paper setters and Examiners for the examinations of UG and PG programs for the academic year 2023 - 24
Item No. : BOS / 2023/MECH/UG /6.7	
	Consideration of the assessment of quality of question papers of the U.G. Program drawn and result analysis in the previous examinations
Item No. : BOS / 2023/MECH/UG /6.8	
	To consider the various professional bodies, club activities, Ability Enhancement Courses (AEC) and department committees to monitor the Academic Activities
Item No. : BOS / 2023/MECH/UG /6.9	
	Any other item with the permission of the chair

M.Tech & Ph.D Program

Item No. : BOS / 2023/MECH/PG /6.1	
	Consideration of the confirmation of minutes of the previous meeting held on October 8, 2022
Item No. : BOS / 2023/MECH/PG /6.2	
	Consideration of Regulations 2023 for the students admitted from the academic year 2023–24
Item No. : BOS / 2023/MECH/PG /6.3	
	Consideration of the revision of curriculum and syllabus of M.Tech. Manufacturing Engineering to be offered under Regulations 2023 to the students admitted from the academic year 2023–24

Item No. : BOS / 2023/MECH/PG /6.4	
	Consideration and approval of the students admitted in the Academic Year 2023–24
Item No. : BOS / 2023/MECH/PHD /6.5	
	Consideration of admission and course work in the research program (Ph.D., Mechanical Engineering) in the Academic Year 2023–24
Item No. : BOS / 2023/MECH/PHD /6.6	
	Any other item with the permission of the chair

UG Minutes of the Meeting

Dr. K. Velmurugan, Chairman, BoS, opened the meeting by welcoming and introducing the external members to the internal and co-opted members and thanked them for accepting the invitation to attend the Board of Studies meeting. The meeting thereafter deliberated on agenda items that had been approved.

The following points were discussed in the meeting:

Item No.: BOS / 2023/MECH/UG /6.1 **Consideration of the confirmation of minutes of the previous meeting held on October 8, 2022**
• The committee endorsed the previous meeting's discussions after reviewing them.
Item No.: BOS / 2023/MECH/UG /6.2 **Consideration of Regulations 2023 for the students admitted from the academic year 2023 – 2024**
• The members of the BoS committee reviewed the Regulations 2023 and gave their approval.
Item No. : BOS / 2023/MECH/UG /6.3 **Consideration of the review of feedback received from various stakeholders like Academic Expert, industry Experts, Alumni, and NGO, etc..**
• The committee reviewed the feedback and approved. **Enclosed in Annexure - I**
Item No. : BOS / 2023/MECH/UG /6.4 **Consideration of the revision of curriculum and syllabus of B.Tech. Mechanical to be offered under Regulations 2023 to the students admitted from the academic year 2023 - 24 and Approval syllabus for Semester I and II under Regulations 2023.**
• The committee suggested that Overall credit distribution is high and can be reduced to 160 as per AICTE norms. • Subject code must clearly define the foundation, Core elective, Professional elective courses clearly. • **Enclosed in Annexure - II**
Item No.: BOS / 2023/MECH/UG /6.5 **Consideration of the offering of Professional and Open electives for the curriculum and syllabus of B.Tech. Mechanical to be offered under Regulations 2023**

- The distribution of domain papers in professional electives has to be evenly distributed.
- Computer-related courses like Python, Java, and data structure can be offered to students as open electives.
- Elective selection should be a little flexible, and a pre-request can be added to certain elective papers so that the order of selection of elective papers can be clearly defined.
- Research methodology need to be reviewed for the mandatory course for UG students.

Professional Elective and Open Electives is enclosed in Annexure -III

Item No.: BOS / 2023/MECH/UG /6.6

Consideration of revision of the list of panel of question paper setters and Examiners for the examinations of UG and PG programs for the academic year 2023–24

The committee suggested that

- The evaluation scheme for internal marks must be uniform for theory, practical, and theory plus practical papers.
- A clear statement about the pass details for theory cum practical papers must be given to students.

The committee recommended

- The question paper setter must have a minimum of five years of experience.
- End-semester question papers must be audited by the external examiner, either from NIT or PU.

The question papers and their Blooms taxonomy levels were discussed, and the members expressed their satisfaction.

Enclosed in Annexure -IV

Item No.: BOS / 2023/MECH/UG /6.7

Consideration of the assessment of quality of question papers of the U.G. Program drawn and result analysis in the previous examinations

- The feedbacks were reviewed by the members

Item No.: BOS / 2023/MECH/UG /6.8

To consider the various professional bodies, club activities, Ability Enhancement Courses (AEC) and department committees to monitor the Academic Activities

- The committee reviewed the professional bodies, club activity and approved

Enclosed in Annexure -V

Item No.: BOS / 2023/MECH/UG /6.9

Any other item with the permission of the chair

- The committee members approved the honours degree and suggested that the six theory papers and Credit point of each paper be 3; they also recommended allowing the students to opt for any NPTEL course.
- Electrical machine, Sensor and control system papers may be added to the curriculum as per industrial needs.
- Students can be offered with minors like Artificial Intelligence in manufacturing, e-Vehicle, Computer science engineering, Thermal and Design
- The theory courses in the VIII semester may be avoided, instead students can be sent for internships and projects.
- Paper like Environmental sustainability can be added in the curriculum to PO.
- NPTEL course completion by the students must be credited by credit score.
- Micro projects can be community oriented and titles can be floated by the department. Micro project requires no mathematical analysis or calculation.
- Internship duration must be minimum of 3 months.

M.Tech & Ph.D Program

Item No. : BOS / 2023/MECH/PG /6.1 **Consideration of the confirmation of minutes of the previous meeting held on October 8, 2022**
• The committee endorsed the previous meeting's discussions after reviewing them.
Item No. : BOS / 2023/MECH/PG /6.2 **Consideration of Regulations 2023 for the students admitted from the academic year 2023 – 24**
• The committee approved the PG Regulation 2023
Item No. : BOS / 2023/MECH/PG /6.3 **Consideration of the revision of curriculum and syllabus of M.Tech. Manufacturing Engineering to be offered under Regulations 2023 to the students admitted from the academic year 2023–24**
• The committee suggested that the PG Programme credit distribution follow the AICTE norms. **Enclosed in Annexure - VI**
Item No. : BOS / 2023/MECH/PG /6.4 **Consideration and approval of the students admitted in the Academic Year 2023–24**
• The Committee members recommended following the PG admission process as per university norms.
Item No. : BOS / 2023/MECH/PHD /6.5 **Consideration of admission and course work in the research program (Ph.D., Mechanical Engineering) in the Academic Year 2023–24**
• The Committee members approval the course work in the research programme. **Enclosed in Annexure - VII**
Item No. : BOS / 2023/MECH/PHD /6.6 **Any other item with the permission of the chair**
• The Committee members suggest that the research scholars do their course work along with PG students.

BoS Chairman

(Dr.K.Velmurugan)

2.A.6.6

The meeting was concluded at 01:30PM with vote of thanks by Dr. K. Velmurugan, Dean R&D ,Head of Department, Mechanical Engineering

Sl.No	Name of the Member with Designation and official Address	Responsibility in the BoS	Signature
1	Dr. K.Velmurugan Professor and Head Department of MECH, SMVEC	Chairman	
External Members			
2	Dr. N. Alagumurthi, Ph.D, Professor & Head (former) Department of Mechanical Engineering, Pondicherry Engineering College, Puducherry-605014. Email id: alagumurthi@pec.edu Mobile No.: 9486143090	University Nominee	
3	Dr. M. Leenus Jesu Martin, Ph.D, Director -Campus Professor & Head, Department of Automobile Engineering, SRM Institute of Science and Technology, Tamil Nadu – 603203 Email id: hod.auto@ktr.srmuniv.ac.in Mobile No.: 9940036021	Member	
4	Dr. A.T. Ravichandran, Ph.D, Dean -Academics Vel Tech Rangarajan Dr.Sagunthala R & D Institute of Science and Technology, Avadi, Chennai – 600062 Email id: hodmech@veltech.edu.in Mobile No.: 9942940600	Member	22/7/23

2.A.6.7

2.A.6.8

Internal Members			
5	Dr.G.G.Sozhamannan, Professor, **Specialization:** ***Manufacturing Engineering***	Member	
6	Dr.R.Ravisankar, Associate Professor, **Specialization:** ***Thermal Engineering***	Member	
7	Dr.K.Hemalatha, Associate Professor, **Specialization:** ***Engineering Design***	Member	
8	Dr.A.Thiagarajan, Associate Professor, **Specialization:** ***Product Design & Manufacturing***	Member	
9	Dr.T.Poovaragavan, Assistant Professor, **Department of** ***Mathematics***	Member	22.7.23.
10	Dr Jeyavardhanan Associate Professor, **Department of** ***Physics***	Member	
11	Dr.K.Karthikeyan Associate Professor, ***Department of Chemistry***	Member	
12	Dr.D.Jaichithra, Professor and Head, **Department of** ***English***	Member	
Co-opted Members			
13	Dr. Anand Gurupatham Deputy General Manager, CAE-Department Head at Renault Nissan, Technology & Business Center, Chennai, Tamil Nadu, India	Industrial Member	Online
Alumni			
14	Mr.P.Madavan, Research Scholar MIT, Anna university, Chennai.	Alumni	

2.A.6.9

2.A.6.10

ANNEXURE – II

SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE
(An Autonomous Institution)

Puducherry

B.TECH. - MECHANICAL ENGINEERING

ACADEMIC REGULATIONS 2023
(R-2023)

CURRICULUM AND SYLLABI
Volume – I

14/7/23

2.A.6.11

2.A.6.12

COLLEGE VISION AND MISSION

VISION

To be globally recognized for excellence in quality education, innovation and research for the transformation of lives to serve the society.

Mission

M1: Quality Education:

To provide comprehensive academic system that amalgamates the cutting edge technologies with best practices.

M2: Research and Innovation:

To foster value-based research and innovation in collaboration with industries and institutions globally for creating intellectuals with new avenues.

M3: Employability and Entrepreneurship:

To inculcate the employability and entrepreneurial skills through value and skill based training.

M4: Ethical Values:

To instill deep sense of human values by blending societal righteousness with academic professionalism for the growth of society.

DEPARTMENT VISION AND MISSION

VISION

The Mechanical Engineering department strives to be recognized as an excellent academic and research center for creating outstanding Engineers, Entrepreneurs and Leaders

Mission

M1: Professional Skills:

To provide quality education to enhance students inter-personal and intra-personal skills

M2: State-of-art facilities:

To render excellent infrastructure facilities and laboratories to excel as skilled professionals

M3: Research Exposure:

To Strengthen Research and Development within the department through industrial associations

M4: Employability:

To put enthusiastic exertions to enhance employability and entrepreneurship skills of students

M5: Human Values:

To empower students with professional ethics and human values to serve the society

2.A.6.13

PROGRAMME OUTCOMES (POs)

PO1: Engineering knowledge:

Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis:

Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions:

Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems:

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage:

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society:

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability:

Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of and need for sustainable development.

PO8: Ethics:

Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work:

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication:

Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance:

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning:

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

2.A.6.17.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Technical knowledge

To foster our young graduates with cogent technical knowledge so as to make them employable

PEO2: Real-Time Applications

To apply the acquired knowledge in the field of Mathematics, Science and Engineering in developing real-time projects

PEO 3: Design Ability

To design a system, component or process to meet the desired needs within realistic constraints such as manufacturing, economy, environmental sustainability, social, health and safety

PEO 4: Ethics

To prepare the students to become entrepreneurs with professional attitude in the broader ethical perspective

PEO 5: Life - Long Learning

To craft curiosity among students for life-long learning through self-study

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1: Solving real time problems

To develop capability to identify, analyze and solve engineering problems in concern to mechanical engineering along with associated engineering streams.

PSO 2: Pursue Professional career

To bestow quality learning environment to pursue professional career in mechanical engineering with integrated knowledge

PSO 3: Concentrating on skill development

To enflame the student's technical capabilities in engineering design process, intra and inter personnel, linguistic and higher level professional skills required in engineering.

2.A.6.15

2.A.6.16

STRUCTURE FOR UNDERGRADUATE ENGINEERING PROGRAM

S.No	Course Category	Breakdown of Credits
1	Humanities and Social Science and Management courses (HS)	15
2	Basic Sciences (BS)	20
3	Engineering Sciences (ES)	29
4	Professional Core (PC)	66
5	Professional Electives (PE)	18
6	Open Electives (OE)	09
7	Professional Activities (PA)	13
8	Ability Enhancement Courses (AEC*)	-
9	Mandatory courses (MC*)	-
Total		**170**

SCHEME OF CREDIT DISTRIBUTION – SUMMARY

Sl. No	Course Category	Credits per Semester								Total Credits
		I	II	III	IV	V	VI	VII	VIII	
1	Humanities and Social Sciences and Management courses (HS)	3	5	1	1	2	-	-	3	15
2	Basic Sciences(BS)	7	4	5	4	-	-	-	-	20
3	Engineering Sciences (ES)	9	8	4	4	4	-	-	-	29
4	Professional Core (PC)	3	4	14	11	8	15	11	-	66
5	Professional Electives (PE)	-	-	-	3	3	3	3	6	18
6	Open Electives (OE)	-	-	-	-	3	3	3	-	09
7	Professional Activities (PA)	-	-	-	-	1	1	3	8	13
8	Ability Enhancement Courses (AEC*)	-	-	-	-	-	-	-	-	-
9	Mandatory courses (MC*)	-	-	-	-	-	-	-	-	-
Total		**22**	**21**	**24**	**23**	**21**	**22**	**20**	**17**	**170**

**** AEC and MC are not included for CGPA calculation***

2.A.6.17

2.A.6.18

SEMESTER – I										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23MATC01	Engineering Mathematics - I	BS	3	1	0	4	25	75	100
2	U23BSTC01	Physical Science for Engineers	BS	3	0	0	3	25	75	100
3	U23ESTC02	Engineering Mechanics	ES	2	1	0	3	25	75	100
4	U23ESTC03	Basics of Electrical and Electronics Engineering	ES	3	0	0	3	25	75	100
5	U23MET101	Concept of Engineering Design	PC	3	0	0	3	25	75	100
Theory cum Practical										
6	U23ENBC01	Communicative English - I	HS	2	0	2	3	20	80	100
Practical										
7	U23ESPC01	Basics of Electrical and Electronics Engineering Laboratory	ES	0	0	2	1	50	50	100
8	U23ESPC02	Design Thinking and IDEA Lab	ES	0	0	2	1	50	50	100
9	U23ESP101	Engineering Mechanics Laboratory	ES	0	0	2	1	50	50	100
Ability Enhancement Course										
10	U23MEC1XX	Certification Course - I **	AEC	0	0	4	-	100	-	100
Mandatory Course										
11	U23MEM101	Induction Programme	MC	2 Weeks			-	-	-	-
TOTAL							**22**	**395**	**605**	**1000**

SEMESTER – II										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23MATC02	Engineering Mathematics – II	BS	3	1	0	4	25	75	100
2	U23CSTC01	Programming in C	ES	3	0	0	3	25	75	100
3	U23ESTC01	Basics of Civil and Mechanical Engineering	ES	3	0	0	3	25	75	100
4	U23MET202	Engineering Metallurgy	PC	3	0	0	3	25	75	100
5	U23HSTC01	Universal Human Values-II	HS	2	0	0	2	25	75	100
Theory cum Practical										
6	U23ENBC02	Communicative English - II	HS	2	0	2	3	20	80	100
Practical										
7	U23CSPC01	Programming in C Laboratory	ES	0	0	2	1	50	50	100
8	U23ESPC03	Engineering Graphics using AutoCAD Laboratory	ES	0	0	2	1	50	50	100
9	U23MEP201	Manufacturing and Metallurgy Laboratory	PC	0	0	2	1	50	50	100
Ability Enhancement Course										
10	U23MEC2XX	Certification Course – II **	AEC	0	0	4	-	100	-	100
Mandatory Course										
11	U23MEM202	Sports, Yoga and NSS	MC	0	0	2	-	100	-	100
TOTAL							**21**	**495**	**605**	**1100**

 # Professional Electives are to be selected from the list given in Annexure I

$ Open electives are to be selected from the list Annexure III

*** Certification courses are to be selected from the list given in Annexure II*

2.A.6.19

SEMESTER – III										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23MATC03	Probability and Statistics	BS	3	1	0	4	25	75	100
2	U23ADTC01	Programming in Python	ES	3	0	0	3	25	75	100
3	U23MET303	Applied Thermodynamics	PC	2	1	0	3	25	75	100
4	U23MET304	Fluid Mechanics and Hydraulic Machines	PC	2	1	0	3	25	75	100
5	U23MET305	Manufacturing Processes	PC	3	0	0	3	25	75	100
Theory cum Practical										
6	U23MEB301	Strength of Materials	PC	2	0	2	3	20	80	100
Practical										
7	U23ENPC01	General Proficiency - I	HS	0	0	2	1	50	50	100
8	U23MAPC01	Engineering Mathematics Laboratory	BS	0	0	2	1	50	50	100
9	U23ADTP01	Programming in Python Laboratory	ES	0	0	2	1	50	50	100
10	U23MEP302	Manufacturing Processes Laboratory	PC	0	0	2	1	50	50	100
11	U23MEP303	Fluid Mechanics and Hydraulic Machines Laboratory	PC	0	0	2	1	50	50	100
Ability Enhancement Course										
12	U23MEC3XX	Certification Course – III	AEC	0	0	4	-	100	-	100
13	U23MES301	Skill Development Course - I*	SEC	0	0	2	-	100	-	100
Mandatory Course										
14	U23MEM303	Climate Change	MC	2	0	0	-	100	-	100
TOTAL							**24**	**695**	**705**	**1400**

SEMESTER – IV										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23MATC04	Numerical Methods and Optimization	BS	3	1	0	4	25	75	100
2	U23ITTC03	Programming in Java	ES	3	0	0	3	25	75	100
3	U23MET407	Heat and Mass Transfer	PC	2	1	0	3	25	75	100
4	U23MET408	Computer Aided Design	PC	3	0	0	3	25	75	100
5	U23MEE4XX	Professional Elective – I #	PE	3	0	0	3	25	75	100
Theory cum Practical										
6	U23MEB402	Kinematics of Machinery	PC	2	0	2	3	20	80	100
Practical										
7	U23ENPCO2	General Proficiency - II	HS	0	0	2	1	50	50	100
8	U23ITPC03	Programming in Java Laboratory	ES	0	0	2	1	50	50	100
9	U23MEP404	CAD/CAM Laboratory	PC	0	0	2	1	50	50	100
10	U23MEP405	Heat Transfer Laboratory	PC	0	0	2	1	50	50	100
Ability Enhancement Course										
11	U23MEC4XX	Certification Course – IV	AEC	0	0	4	-	100	-	100
12	U23MES402	Skill Development Course - II*	SEC	0	0	2	-	100	-	100
Mandatory Course										
13	U23MEM404	Right to Information and Good Governance	MC	2	0	0	-	100	-	100
TOTAL							**23**	**645**	**655**	**1300**

** Skill Enhancement Courses (I and II) are to be selected from the list given in Annexure III*

2.A.b.20

SEMESTER – V										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23HSTC02	Research Methodology	HS	2	0	0	2	25	75	100
2	U23CSTC03	Data Structures	ES	3	0	0	3	25	75	100
3	U23MET510	Dynamics of Machinery	PC	2	1	0	3	25	75	100
4	U23MET511	Design of Machine Elements	PC	2	1	0	3	25	75	100
5	U23MEE5XX	Professional Elective – II #	PE	3	0	0	3	25	75	100
6	U23MEO5XX	Open Elective - I	OE	3	0	0	3	25	75	100
Practical										
7	U23CSPC02	Data Structures Laboratory	ES	0	0	2	1	50	50	100
8	U23MEP506	Analysis and Simulation Laboratory	PC	0	0	2	1	50	50	100
9	U23MEP507	Dynamics of Machinery Laboratory	PC	0	0	2	1	50	50	100
Project Work										
10	U23MEW501	Micro Project	PA	0	0	2	1	100	-	100
Ability Enhancement Course										
11	U23MEC5XX	Certification Course – V	AEC	0	0	4	-	100	-	100
12	U23MES503	Skill Development Course -III	SEC	0	0	2	-	100	-	100
Mandatory Course										
13	U23MEM505	Essence of Indian Traditional Knowledge	MC	2	0	0	-	100	-	100
TOTAL							**21**	**700**	**600**	**1300**

SEMESTER – VI										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23MET612	Metrology and Measurement	PC	3	0	0	3	25	75	100
2	U23MET613	Thermal Engineering	PC	2	1	0	3	25	75	100
3	U23MET614	Manufacturing Technology and Automation	PC	3	0	0	3	25	75	100
4	U23MEE6XX	Professional Elective – III #	PE	3	0	0	3	25	75	100
5	U23MEO6XX	Open Elective - II	OE	3	0	0	3	25	75	100
Theory cum Practical										
6	U23MEB603	Automobile Engineering	PC	2	0	2	3	20	80	100
Practical										
7	U23MEP608	Thermal Engineering Laboratory	PC	0	0	2	1	50	50	100
8	U23MEP609	Metrology and Measurements Laboratory	PC	0	0	2	1	50	50	100
9	U23MEP610	Advanced Manufacturing Laboratory	PC	0	0	2	1	50	50	100
Project Work										
10	U23MEW602	Mini Project	PA	0	0	2	1	100	-	100
Ability Enhancement Course										
11	U23MEC6XX	Certification Course – VI	AEC	0	0	4	-	100	-	100
Mandatory Course										
12	U23MEM606	Gender Equality	MC	2	0	0	-	100	-	100
TOTAL							**22**	**595**	**605**	**1200**

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SEMESTER – VII										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23MET715	Production Planning and Cost Estimation	PC	3	0	0	3	25	75	100
2	U23MET716	Industrial Automation and Robotics	PC	3	0	0	3	25	75	100
3	U23MET717	Design of Transmission System	PC	2	1	0	3	25	75	100
4	U23MEE7XX	Professional Elective - IV #	PE	3	0	0	3	25	75	100
5	U23MEO7XX	Open Elective - III	OE	3	0	0	3	25	75	100
Practical										
6	U23MEP711	Industrial Automation and Robotics Laboratory	PC	0	0	2	1	50	50	100
7	U23MEP712	Seminar	PC	0	0	2	1	100	-	100
Project Work										
8	U23MEW703	Project Phase – I	PA	0	0	4	2	50	50	100
9	U23MEW704	Internship / Inplant Training	PA	-	-	2	1	100	-	100
TOTAL							**20**	**610**	**390**	**900**

SEMESTER – VIII										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23HSTC03	Entrepreneurship and Business Management	HS	3	0	0	3	25	75	100
2	U23MEE8XX	Professional Elective – V#	PE	3	0	0	3	25	75	100
3	U23MEE8XX	Professional Elective – V I #	PE	3	0	0	3	25	75	100
Project Work										
4	U23MEW805	Project Phase – II	PA	0	0	16	8	50	100	150
Total							**17**	**125**	**325**	**450**

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DEPARTMENT OF MECHANICAL ENGINEERING

ANNEXURE - III

PROFESSIONAL ELECTIVE COURSES

Professional Elective – I (Offered in Semester IV)		
Sl. No.	**Course Code**	**Course Title**
1	U23MEE401	Gas Dynamics and Jet propulsion
2	U23MEE402	Geometric Tolerance and Dimensioning
3	U23MEE403	Product design and Development
4	U23MEE404	Industrial Casting Technology
5	U23MEE405	Non-Conventional Energy Sources
Professional Elective – II (Offered in Semester V)		
Sl. No.	**Course Code**	**Course Title**
1	U23MEE506	Turbo Machinery
2	U23MEE507	Powder Metallurgy and Surface Coating
3	U23MEE508	Green Manufacturing
4	U23MEE509	Fluid Power Automation
5	U23MEE510	IoT and Smart Manufacturing
Professional Elective – III (Offered in Semester VI)		
Sl. No.	**Course Code**	**Course Title**
1	U23MEE611	Finite Element Analysis
2	U23MEE612	Computational Fluid Dynamics
3	U23MEE613	Fuzzy Logic And Neural Networks
4	U23MEE614	Additive Manufacturing
5	U23MEE615	Energy And Climate Change
Professional Elective – IV (Offered in Semester VII)		
Sl. No.	**Course Code**	**Course Title**
1	U23MEE716	Industrial Tribology
2	U23MEE717	Advanced Welding Technology
3	U23MEE718	Artificial Intelligence and Machine Learning
4	U23MEE719	Nano Technology
5	U23MEE720	Modelling and Simulation of Manufacturing Systems
Professional Elective – V (Offered in Semester VIII)		
Sl. No.	**Course Code**	**Course Title**
1	U23MEE821	Lean Manufacturing
2	U23MEE822	Cryogenic Engineering
3	U23MEE823	Autotronics
4	U23MEE824	Optimization Techniques in Engineering Design
5	U23MEE825	Total Quality Management

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Professional Elective – VI (Offered in Semester VIII)		
Sl. No.	**Course Code**	**Course Title**
1	U23MEE826	Composites Material
2	U23MEE827	Alternative Fuels
3	U23MEE828	Electric and Hybrid Vehicles
4	U23MEE829	Maintenance and Safety Engineering
5	U23MEE830	Non-Destructive Evaluation and Testing

OPEN ELECTIVE COURSES

Sl. No.	Course Code	Course Title
1	U23MEOC01	Rapid Prototyping
2	U23MEOC02	Material Handling System
3	U23MEOC03	Industrial Engineering for Textile
4	U23MEOC04	Heating, ventilation and air conditioning system (HVAC)
5	U23MEOC05	Creativity Innovation and New Product Development
6	U23MEOC06	Principles of Hydraulic and Pneumatic System
7	U23MEOC07	Supply Chain Management

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DEPARTMENT OF MECHANICAL ENGINEERING

List of Honour Degree Courses

S.No.	Honour Degree Courses	Semester	Credit
1	Additive Manufacturing	IV	4
2	Sensors and Controls of Mechanical System	V	4
3	Industrial Internet of Things	VI	4
4	Quality Inspections and Product Validation	VII	4
5	Machine Learning Techniques for Smart Manufacturing	VIII	4

Hod/Mech

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DEPARTMENT OF MECHANICAL ENGINEERING

ANNEXURE - IV

EXAMINERS PANEL LIST

Sl.No	Name of the Examiner	Specialization	Designation, Department and Institution in which currently working	Contact number and mail id
			External Examiners	
1	Dr.V.Gnanamoorthy	Thermal Engineering	Assistant Professor Department of Mechanical Engineering University college of Engineering Villupuram-605103	9942005782 cvgnana@gmail.com
2	Dr. A.Sathiamourtty	Energy Technology	Associate Professor Dept. of Mechanical Engg. Pondicherry Engineering College	8300460801 asm@pec.edu
3	Dr.Nadanakumar	Thermal Engineering	Assistant Professor (S.G) School of Mechanical Science Hindustan Institute of Science Chennai	9443693363 vin.nadanakumar@gmail.com
4	Dr.U.Mohammed.Iqbal	Manufacturing Engineering	Associate Professor Department of Mechanical Engineering S.R.M Institute of Science and Technology Kattankulathur-603203.	9600429006 mohammeu@srmist.edu.in
5	Dr.S.Sivakumar	Manufacturing Engineering	Associate Professor Department of Mechanical Engineering Hindustan Institute of technology Padur, Chennai	9894523361 Sivakumar71078@gmail.com

6	Dr.R.Srinivasan	Thermal Engineering	Professor & Head Salem college of Engineering and Technology Salem.	9443708013 sri_eniya@yahoo.com
7	Dr.V.K.Krishnan	Thermal Engineering	Associate Professor Department of Mechanical Engineering Vinayaka Mission's kirupananda Variyar Engineering College, Salem	9976881749 vkkrishnaphd@gmail.com
8	Dr.S.Arunkumar	Manufacturing Engineering	Associate Professor Department of Mechanical Engineering Vinayaka Mission's kirupananda Variyar Engineering College,Salem	9952722454 arun_da78@yahoo.co.in
9	Dr.C..Senthilkumar	Manufacturing Engineering	Assistant Professor Department of Mechanical Engineering University college of Engineering Panruti-607106	9894856176 csmfgau@gmail.com
		Internal Examiners		
10	Dr.G.G.Sozhamannan	Manufacturing Engineering	Professor Department of Mechanical Engineering Sri Manakula Vinayagar Engineering college Madagadipet-605107	9677858206 cholaking3007@gmail.com
11	Dr.T.Coumaressin	Energy Engineering	Associate Professor Department of Mechanical Engineering Sri Manakula Vinayagar Engineering college Madagadipet-605107	9994138268 coumaressinmech09@gmail.com
12	Dr.K.Hemalatha	Engineering Design	Associate Professor Department of Mechanical Engineering Sri Manakula Vinayagar Engineering college, Madagadipet-605107	9443536684 hemalatharohit@gmail.com
13	Dr.A.Thiyagarajan	Manufacturing Engineering	Associate Professor Department of Mechanical Engineering Sri Manakula Vinayagar Engineering college, Madagadipet-605107	6379367126 thiagusmvec@gmail.com

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DEPARTMENT OF MECHANICAL ENGINEERING

ANNEXURE – V

PROFESSIONAL BODIES, CLUB ACTIVITY

LIST OF PROFESSIONAL BODIES

S. No	Name of the Professional Bodies
1	The American Society of Mechanical Engineers (ASME)
2	The Robotics Society (TRS)
3	Society Of Automotive Engineers (SAE)
4	Society Of Aerospace and Mechanical Professionals (SAMP)

LIST OF CLUBS

S. No	Name of the Professional Bodies
1	Design and Innovative Club
2	Energy and Environment Club
3	Embedded Integrated and IoT Club
4	Yoga and Health Club

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Department of Mechanical Engineering

M.Tech Manufacturing Engineering

ANNEXURE VI

Regulation R23 - Curriculum 2023-24

SEMESTER – I											
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory											
1	P23MAT106	Engineering Probability and Statistics	BS	2	2	0	3	40	60	100
2	P23MET101	Mechanical Behavior of Materials	PC	3	0	0	3	40	60	100
3	P23MET102	Advanced Manufacturing Processes	PC	3	0	0	3	40	60	100
4	P23MET103	Advanced Tool Engineering	PC	3	0	0	3	40	60	100
5	P23HSTC01	Research Methodology and IPR	HS	3	0	0	2	40	60	100
6	P23MEE1XX	Professional Elective- I *	PE	3	0	0	3	40	60	100
Practical											
7	P23MEP101	Computer Aided Engineering Laboratory	PC	0	0	4	2	50	50	100
8	P23HSPC01	Technical Report Writing and Seminar	HS	0	0	4	2	100	0	100
Ability Enhancement Course											
9	P23MEC1XX	Certification Course –I #	AEC	0	4	0	0	100	0	100
10	P23ACT10X	Audit Course -I **	AEC	0	0	2	0	100	0	100
Total							21	590	410	1000

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SEMESTER – II										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	P23MET204	Additive Manufacturing Technology	PC	3	0	0	3	40	60	100
2	P23MET205	Micro Electro Mechanical Systems (MEMS) and Nano Technology	PC	3	0	0	3	40	60	100
3	P23MET206	Metal Cutting Theory and Practice	PC	3	0	0	3	40	60	100
4	P23MET207	Industry 4.0	PC	3	0	0	3	40	60	100
5	P23MEE2XX	Professional Elective –II *	PE	3	0	0	3	40	60	100
6	P23MEE2XX	Professional Elective- III *	PE	3	0	0	3	40	60	100
Practical										
7	P23MEP202	Additive Manufacturing Technology Laboratory.	PC	0	0	4	2	50	50	100
8	P23HSPC02	Seminar on ICT a hands-on approach	HS	0	0	4	2	100	0	100
Ability Enhancement Course										
9	P23MEC2XX	Certification Course –I #	AEC	0	0	4	0	100	0	100
10	P23ACT20X	Audit Course-II **	AEC	0	0	2	0	100	0	0
Total							22	590	410	1000

SEMESTER – III										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	P23MEE3XX	Professional Elective- IV *	PE	3	0	0	3	40	60	100
2	P23MEE3XX	Professional Elective- V *	PE	3	0	0	3	40	60	100
3	P23MEE3XX	Professional Elective- VI *	PE	3	0	0	3	40	60	100
Practical										
4	P23MEW301	Project Phase - I	PA	0	0	12	6	50	50	100
5	P23MEW302	Internship	PA	0	0	4	2	100	0	100
Ability Enhancement Course										
6	P23MEC301	NPTEL/GIAN/MOOC	AEC	0	0	4	0	100	0	100
Total							17	370	230	600

** Professional Elective Courses are to be selected from the list given in Annexure I*

 # Employability Enhancement Courses are to be selected from the list given in Annexure II

*** Audit Courses are to be selected from the list given in Annexure III*

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SEMESTER – IV										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Project Work										
1	P23MEW403	Project Phase - II	PA	0	0	24	12	50	50	100
Total							12	50	50	100

(BS – Basic Science PC – Professional Core, PE – Professional Elective, PA – Professional Activity CC- Common Course AEC – Ability Enhancement Course HS - Humanities and Social Sciences)

Credit Distribution

Semester-I	Semester -II	Semester -III	Semester -IV	Total
21	22	17	12	72

Total number of credits required to complete
M.Tech in Manufacturing Engineering : **72 credits**

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PROFESSIONAL ELECTIVE COURSES

Sl. No.	Course Code	Course Title
Professional Elective – I (Offered Semester-I)		
1	P23MEE101	Green Design and Manufacturing for Sustainability
2	P23MEE102	Precision Engineering
3	P23MEE103	Virtual Manufacturing
4	P23MEE104	Manufacturing of Automotive Components
5	P23MEE105	Cellular Manufacturing Systems
Professional Elective – II (Offered Semester-II)		
1	P23MEE206	Mechatronics and Automation
2	P23MEE207	Manufacturing Information Systems
3	P23MEE208	Artificial Intelligence and Machine Learning
4	P23MEE209	Design of Hydraulic and Pneumatic system
5	P23MEE210	Sensors for Intelligent Manufacturing
Professional Elective – III (Offered Semester-II)		
1	P23MEE311	Mechatronic System Design
2	P23MEE312	Composite Materials and Processing
3	P23MEE313	Product Lifecycle Management
4	P23MEE314	Advanced Finite Element Analysis
5	P23MEE315	Tribology in Design
Professional Elective – IV (Offered Semester-III)		
1	P23MEE416	Design for manufacturing and Assembly
2	P23MEE417	Design and Analysis of Experiments
3	P23MEE418	Advanced Optimization Techniques and Applications
4	P23MEE419	Modern Machining Processes
5	P23MEE420	Manufacturing system simulation
Professional Elective – V (Offered Semester-III)		
1	P23MEE521	Production and Operations Management
2	P23MEE522	Enterprise Resource Planning
3	P23MEE523	Lean Manufacturing and Six Sigma
4	P23MEE524	Manufacturing Management
5	P23MEE525	Human Factors in Engineering
Professional Elective – VI (Offered Semester-III)		
1	P23MEE626	Advances in Casting and Welding Processes
2	P23MEE627	Fluid Power Automation
3	P23MEE628	Advances in Electric and Autonomous Vehicle
4	P23MEE629	Industrial Safety

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5	P23MEE630	Maintenance and Reliability Engineering

ABILITY ENHANCEMENT COURSES

Sl. No.	Course Code	Course Title
1	P23MECX01	CATIA
2	P23MECX02	CNC Programme
3	P23MECX03	Rapid Prototyping
4	P23MECX04	**3D Printing and Scanning**
5	P23MECX05	Fusion 360
6	P23MECX06	Solidworks
7	P23MECX07	**Autodesk Inventor**
8	P23MECX08	**CFD**
9	P23MECX09	Creo (Modeling and Simulation)
10	P23MECX10	Ansys -Multiphysics
11	P23MECX11	Automation-I (Pneumatics)
12	P23MECX12	Automation-II (Hydraulic)
13	P23MECX13	CAD/CAM
14	P23MECX14	Building Information Impelling (BIM)
15	P23MECX15	Piping Design
16	P23MECX16	Deep Learning
17	P23MECX17	NDT Level I&II
18	P23MECX18	Safety Course (Boiler)
19	P23MECX19	Six Sigma
20	P23MECX20	Tool Designing

AUDIT COURSES

Sl. No.	Course Code	Course Title
1	P23ACTX01	English for Research Paper Writing
2	P23ACTX02	Disaster Management
3	P23ACTX03	Sanskrit for Technical Knowledge
4	P23ACTX04	Value Education
5	P23ACTX05	Constitution of India
6	P23ACTX06	Pedagogy Studies
7	P23ACTX07	Stress Management by Yoga
8	P23ACTX08	Developing Soft Skills and Personality

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9	P23ACTX09	Unnat Bharat Abhiyan

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Ph.D Advanced Course work (2021-22)

ANNEXURE VII

Department of Mechanical Engineering

S.NO	NAME	Reg. No	Ph.D Advanced course
1.	G.HARISH	21RME001	Course I: Material Characterization Techniques Course II: Extrusion and 3D Printing
2.	S.PRAKASH	21RME002	Course I: Material Characterization Techniques Course II:3D Printing and Sustainable Product
3.	P.SATHIAPRATHAP	21RME003	Course I: Additive Manufacturing Course II: Mechanical Behavior of Material

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DEPARTMENT OF MECHANICAL ENGINEERING

ANNEXURE - I

CURRICULUM ADVISORY COMMITTEE

SL.NO	ADVISORY COMMITTEE	DESIGNATION
1	Dr.K.Velmurugan Dean –RD, Prof. & Head Department of Mechanical Engineering Sri Manakula Vinayagar Engineering College Pondicherry	Chairman
	Academic expert	
2	Dr. K. Pajaniradja @ Kichena Professor Department of Mechanical Engineering Pondicherry technological university Puducherry. Mobile:9894045673 E-mail:palaniradja72@pec.edu	Member
3	Dr.K.Kamalakkannan Professor Department of Automobile Engineering SRM Institute of Science & Technology Chennai Mobile: 9944226170 E-mail: kamalakannan.ka@gmail.com	Member
4	Dr. S.Muthu Former Professor Department of Mechanical Engineering PSG Tech, Coimbatore E-Mail: smuthu231155@gmail.com Mobile: 9790017157	Member
	Industry Expert	
1	Mr. A.Dhanasekaran Assistant General Manager styling studio, Ashokleyland Technical centre Chennai. Mobile: +91 9444290914 E-mail: dhana80@yahoo.com	Member
2	Mr.D.K.Jagdish General Manager UCAL FUEL SYSTEMS LTD, Chennai Phone: +91 9940073020 E-mail: dkjagdish@yahoo.co.in	Member

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3	Mr.D.Dinesh Kumar Inspire Engineering Consultants Mobile: 9940388804 E-mail: dineshmech016@gmail.com	Member
	Alumni	
1	Mr. Kishan. R PG student , VIT Mobile : 8148189859 E-mail: rkishan04@gmail.com	Member
2	Mr.Pushparaj.S Senior Engineer Whirlpool of India ltd, Pondicherry E-mail: pushparajsd@gmail.com Mobile : 9597751368	Member
3	Mr.R.Stalin PG Student E-mail: stalinmech6.5@gmail.com Mobile: 975000061	Member
4	Mr.D Aravind Analyst CTS, Chennai. E-mail: aravindarun5363@gmail.com Mobile No: 995229929	Member
5	Mr.Vetrivelan Ford software ,Chennai Mobile : 9944845482	Member
	Final Year Students	
1	Mr.Hariraj. C E-mail: harirajcoumar2422@gmail.com Mobile :6382910501	Member
2	Mr.Dhanashree.S E-mail: Dhanashree050602@gmail.com Mobile :8680937233	Member
3	Mr.Divya darshine.G E-mail: gdivya2001@gmail.com Mobile :8300218121	Member
4	Mr.Pravesh saaye.N E-mail: btechmech19054@smvec.ac.in Mobile :8754172221	Member
5	Mr.Videsh Narayan.V E-mail: Btechmech190987@smvec.ac.in Mobile :6381215295	Member

CURRICULUM ADVISORY COMMITTEE FEEDBACK

- Include any two computer programming courses.
- Provide advanced courses in order to meet industry 4.0 demands.
- Provide more hands-on training courses and value-added courses related to recent technologies
- To motivate the students to do industry- and society-related projects.
- Allow the students to do more core company internships.

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SEMESTER I

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Department	Mathematics			Programme : B.Tech.			
Semester	I			Course Category: BS		End Semester Exam Type: TE	
Course Code	U23MATC01	Periods/Week			Credit	Maximum Marks	
		L	T	P	C	CAM	ESE	TM
Course Name	ENGINEERING MATHEMATICS – I	3	1	-	4	25	75	100

(Common to All Branches Except CSBS)

Prerequisite	Basic Mathematics	
Course Outcome	On completion of the course, the students will be able to	BT Mapping (Highest Level)
CO1	Understand the concept of Eigen values and Eigen vectors, Diagonalization of a Matrix	K3
CO2	Solve higher order differential equations	K3
CO3	Understand the different types of partial differential equations	K3
CO4	Know about the Applications of double and triple integrals	K2
CO5	Gain the knowledge about Vector Calculus and its Applications	K2

UNIT – I	Matrices	Periods:12
Rank of a Matrix – Systems of Linear Equations – Characteristic equation – Cayley Hamilton Theorem – Eigen values and Eigen vectors of a real Matrix – Diagonalization of Matrices.		CO1

UNIT – II	Differential Equations (Higher Order)	Periods:12
Linear Differential equations of higher order with constant coefficients – Euler's linear equation of higher order with variable coefficients – Method of Variation of parameters.		CO2

UNIT – III	Functions of Several Variables	Periods:12
Partial derivatives – Total derivatives – Maxima and Minima of two variables – Lagrange's Method of multipliers.		CO3

UNIT – IV	Multiple Integrals	Periods:12
Multiple Integrals – Change of order of integration (Cartesian form). Applications: Area as a double integral (Cartesian form) – Volume as a triple integral (Cartesian form).		CO4

UNIT – V	Vector Calculus	Periods:12
Gradient – Divergence and Curl – Directional derivatives – Irrotational and Solenoidal vector fields – Properties (Statement only) – Gauss Divergence Theorem and Stoke's Theorem (without proofs).		CO5

Lecture Periods: 45	Tutorial Periods: 15	Practical Periods: -	Total Periods: 60

Text Books

1. M.K. Venkataraman, "Engineering Mathematics, The National Publishing Company, Madras, 2016.
2. N. P Bali and Manish Goyal, "A Text Book of Engineering Mathematics", Lkshmi Publications, New Delhi, 9th Edition, 2018.
3. S. Narayanan and Manicavachagom T.K. Pillay," Differential Equations and Its Applications", Paperback, Viswanathan.S, Printers & Publishers Pvt Ltd, 2009.

Reference Books

1. Dr. G.Balaji, "Matrices and Calculus (Engineering Mathematics-1)" Balaji Publication, Paperback, June 2021 Edition
2. Dr. A. Singaravelu, "Engineering Mathematics – I", Meenakshi publications, Tamil Nadu, 2019.
3. Erwin Kreyszig, "Advanced Engineering Mathematics ", Wiley, 10th Edition, 2019.
4. B.V.Ramana," Higher Engineering Mathematics", Tata McGraw – Hill, New Delhi, 6th Edition, 2018.
5. C W. Evans, "Engineering Mathematics", A Programmed Approach, 3rd Edition, 2019.

Web References

1. http://www.yorku.ca/yaoguo/math1025/slides/chapter/kuttler-linearalgebra –slides- systems of equation-handout.pdf
2. http://www.math.cum.edu/~wn0g/2ch6a.pdf
3. https://nptel.ac.in/courses/122/104/122104017/
4. https://nptel.ac.in/courses/111/106/111106051/
5. https://nptel.ac.in/courses/111/108/111108081/

2.A.6.45

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	1	-	2	1	1	-	-	-	-	1	3	-	-
2	3	2	1	1	-	1	1	-	-	-	-	1	3	-	-
3	3	2	1	1	-	1	1	-	-	-	-	1	3	-	-
4	3	2	1	1	-	1	1	-	-	-	-	1	3	-	-
5	2	2	1	-	-	-	1	-	-	-	-	1	3	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	5	5	5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

2. A. 6. Ab.

Department	Physics / Chemistry	Programme : B.Tech.						
Semester	I	Course Category: BS			End Semester Exam Type: TE			
Course Code	U23BSTC01	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	PHYSICAL SCIENCE FOR ENGINEERS	3	-	-	3	25	75	100

(Common to **All** Branches)

Prerequisite	Physics of 12th standard or equivalent / Chemistry of 12th standard or equivalent.	
Course Outcome	**On completion of the course, the students will be able to**	BT Mapping (Highest Level)
	CO1 Understand the basic of properties of magnetic, dielectric and superconductors.	**K2**
	CO2 Identify the wave nature of the particles, physical significance of wave functions	**K3**
	CO3 Understand the basic principles of laser and fiber optics communication	**K2**
	CO4 Understand and familiar with the water treatment.	**K2**
	CO5 Understand the electrode potential for its feasibility in electrochemical reaction and uses of various batteries.	**K2**
	CO6 Understand the specific operating condition under which corrosion occurs and suggest a method to control corrosion.	**K2**

SECTION A - PHYSICS

UNIT- I **Magnetic, Dielectric and Superconducting Materials** **Periods:08**

Introduction to magnetic materials, Ferromagnetism - Domain theory-Types of energy-Hysteresis-Hard and Soft magnetic materials-ferrites-Dielectric materials-Typesof polarization – Langevin-Debye equation-Frequency effects on polarization-Dielectric breakdown- Ferroelectric materials-Superconducting materials and their properties. **CO1**

UNIT- II **Quantum Mechanics** **Periods:07**

Matter Waves - de Broglie Wavelength - Uncertainty Principle –Physical Significance of wave functions - Schrodinger wave Equation - Time Dependent - Time Independent - Application to Particle in a One Dimensional Box - Tunnel Diode. **CO2**

UNIT- III **Laser and Fiber Optics** **Periods:07**

Lasers - Principles of Laser - Spontaneous and Stimulated Emissions - Einstein's Coefficients - Population Inversion and Laser Action – components of laser - Types of Lasers - NdYAG, CO_2 laser, GaAs Laser Fiber Optics - Principle and Propagation of light in optical fiber - Numerical aperture and acceptance angle - Types of optical fibers (material, refractive index, mode) **CO3**

SECTION B – CHEMISTRY

UNIT- IV **Water and its treatment** **Periods:08**

Water: Sources and impurities, Water quality parameters: Definition and significance of -color, odour, turbidity, pH, hardness, alkalinity, TDS, COD and BOD. Desalination of brackish water: Reverse osmosis-disadvantages of using hard water in boiler - Treatment of boiler feed water: Internal treatment (phosphate, colloidal, sodium aluminate and Calgon conditioning) and External treatment–Ion exchange demineralization and zeolite process. **CO4**

UNIT- V **Electrochemical Cells and Storage Devices** **Periods:08**

Galvanic cells, single electrode potential, standard electrode potential, electrochemical series. EMF of a cell and its measurement. Nernst equation. Electrolyte concentration cell. Reference electrodes-hydrogen, calomel andAg/AgCl. Batteries and fuel cells: Types of batteries - alkaline battery-lead storage battery- nickel-cadmium battery- fuel cell H2 -O2 fuel cell-applications. **CO5**

UNIT- VI **Corrosion** **Periods:07**

Corrosion –Introduction - factors – types – chemical, electrochemical corrosion (galvanic, differential aeration), corrosion control – material selection and design aspects – electrochemical protection – sacrificial anode method and impressed current cathodic method. Uses of inhibitors, metallic coating – anodic coating, cathodic coating. Metal cladding, Electroplating of Copper and electroless plating of nickel. **CO6**

Lecture Periods: 45	Tutorial Periods: -	Practical Periods: -	Total Periods: 45

Text Books

1. V Rajendran, "Engineering Physics", 2nd Edition, TMH, New Delhi 2011.
2. S.S Dara – "A text book of Engineering Chemistry" - 15th Edition, 2021. S.Chand Publications.
3. C.Jain, Monica Jain, " Engineering Chemistryll" 17thEd. DhanpatRai Pub. Co., NewDelhi, (2015).

2.A.6.47

Reference Books
1. R.Murugeshan, "Modern Physics", S. Chand &Co, New Delhi 2006.
2. William D Callister Jr., "Material Science and Engineering", 6th Edition, John Wiley and sons, 2009.
3. Jain & Jain "Engineering chemistry", 23rd Edition, DhanpatRai Publishing Company, 2022
4. Mars Fontana "Corrosion Engineering", July 2017
5. JinaRedlin, "Handbook of Electrochemistry", March 28, 2005
Web References
1. https://www.sciencedaily.com/terms/materials_science.htm.
2. https://www.acs.org/content/acs/en/careers/college-to-career/chemistry-careers/materials science.html.
3. https://study.com/academy/lesson/semiconductors-superconductors-definition-properties.html
4. https://mechanicalc.com/reference/engineering-materials
5. http://ndl.ethernet.edu.et/bitstream/123456789/89589/1/%5BPerez_N.%5D_Electrochemistry_and_corrosion%28BookZZ.org%29.pdf

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	2	-	-	-	-	-	-	-	-	-	-	-
2	3	2	3	2	-	-	-	-	-	-	-	-	-	-	-
3	3	2	3	2	-	-	-	-	-	-	-	-	-	-	-
4	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-
5	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	5	5	5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

2.A.b.48

Department	Mechanical Engineering	Programme : B.Tech.						
Semester	I	Course Category: ES				End Semester Exam Type: TE		
Course Code	U23ESTC02	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	ENGINEERING MECHANICS	2	1	-	3	25	75	100

(Common to EEE, ECE, MECH, CIVIL, Mechatronics Branches)

Prerequisite	Engineering Physics	
Course Outcome	**On completion of the course, the students will be able to**	BT Mapping (Highest Level)
CO1	Recognize the basics of equilibrium of particles in 2D and 3D	K2
CO2	Review the requirements of equilibrium of rigid bodies in 2D and 3D.	K2
CO3	Solve problem related to friction force.	K3
CO4	Compute the center of mass and moment of inertia of surfaces and solids.	K3
CO5	Predict displacement, velocity and acceleration of dynamic particles.	K3

UNIT- I	Basics and Statics of Particles	Periods: 09
Introduction - Units and Dimensions - Vectorial representation of forces and moments – Coplanar Forces - Lami's theorem, Parallelogram and triangular Law of forces -Resolution of forces - Equilibrium of a particle - Principle of transmissibility - Equivalent system of force - Free body diagram		CO1

UNIT- II	Equilibrium of Rigid Bodies	Periods: 09
Types of supports and their reactions -requirements of stable equilibrium - Moments and Couples - Moment of a force about a point and about an axis -Vectorial representation of moments and couples - Scalar components of a moment - Varignon's theorem -Equilibrium of Rigid bodies in two dimensions – Forces in space -Equilibrium of a particle in space - Equivalent systems of forces - Equilibrium of Rigid bodies in three dimensions (Descriptive only).		CO2

UNIT - III	Structural Analysis of Trusses and Friction	Periods: 09
Trusses - Definition of a truss - Simple Trusses - Analysis of Trusses - Method of joints - Method of sections - Friction force - Laws of sliding friction - equilibrium analysis of simple systems with sliding friction -wedge friction- Rolling resistance.		CO3

UNIT - IV	Properties of Surfaces and Solids	Periods: 09
Determination of centroid of areas, volumes and mass - Pappus and Guldinus theorems - moment of inertia of plane and areas- Parallel axis theorem and perpendicular axis theorem, radius of gyration of area- product of inertia- mass moment of inertia.		CO4

UNIT - V	Dynamics of Particles	Periods: 09
Displacements, Velocity and acceleration, their relationship - Relative motion - Curvilinear motion - Newton's law - Work Energy Equation of particles -Impulse and Momentum -Impact of elastic bodies.		CO5

Lecture Periods: 30	Tutorial Periods: 15	Practical Periods: -	Total Periods: 45

Text Books

1. Beer, and Johnston Jr. E.R. "Vector Mechanics for Engineers", McGraw-Hill Education India Pvt Ltd., 11th Edition, 2016.
2. J.L. Meriam & L.G. Karidge, Engineering Volume I and Engineering Mechanics: Dynamics, 8th edition, Wiley student edition, 2016.
3. R.C, Hibbeller, "Engineering Mechanics", Prentice Hall, 14th edition, 2016.

Reference Books

1. Arthur P. Boresi and Richard J. Schmidt, "Engineering Mechanics: Statics and Dynamics", Thomson Asia Private Limited, Singapore, 2010.
2. D.P.Sharma "Engineering Mechanics", Dorling Kindersley India Pvt. Ltd, New Delhi, 2010
3. S.Rajasekaran, Sankarasubramanian, G., Fundamentals of Engineering Mechanics, Vikas Publishing House Pvt., Ltd., 2012.
4. S.S.Bhavikatti and K.G. Rajashekarappa, Engineering Mechanics, New Age International(P) Ltd, New Delhi, 7th Edition, 2019.
5. Dr.I.SGujral, "Engineering Mechanical" second edition, Lakshmi Publication (P), Ltd., 2011.

Web References

1. http://nptel.iitm.ac.in/video.php?subjectId=112103108
2. http://www.nptel.iitm.ac.in/courses/Webcourse-contents/IIT-KANPUR/Engineeringmechanics/Table of Contents.html

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3.	https://nptel.ac.in/courses/112/106/112106286/
4.	https://www.coursera.org/learn/engineering-mechanics-statics
5.	https://nptel.ac.in/courses/122/104/122104014/

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	3	-	-	-	-	-	-	-	1	2	-	2
2	3	2	2	3	-	-	-	-	-	-	-	1	2	-	2
3	3	2	2	3	-	-	-	-	-	-	-	1	2	-	2
4	3	2	2	3	-	-	-	-	-	-	-	1	2	-	2
5	3	2	2	3	-	-	-	-	-	-	-	1	2	-	2

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	5	5	5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

2.A.6.50

Department	EEE and ECE	Programme : B.Tech.						
Semester	I	Course Category: ES			End Semester Exam Type: TE			
Course Code	U23ESTC03	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING	3	-	-	3	25	75	100

(Common to CSE, IT, MECH, CIVIL, MCTR, CCE, AI&DS, FT and CSBS Branches)

Prerequisite	Mathematics and Physics	
Course Outcome	**On completion of the course, the students will be able to**	BT Mapping (Highest Level)
CO1	Apply the basic concepts and various laws in DC circuits.	K3
CO2	Analyze the AC circuits and develop resonance conditions for transmitter and receiver circuits.	K3
CO3	Gain the knowledge of power system components, importance of electrical safety measures and real time applications of transformer and motor.	K2
CO4	Understand the operator of semiconductor diode and its applications.	K2
CO5	Explain the characteristics and operation of BJT and FET.	K2
CO6	Relate and Explain Different Communication Systems.	K2

SECTION A - Electrical Engineering

UNIT- I	DC Circuits	Periods: 08
Concept of Potential Difference, Current, Resistance, Inductance and Capacitance, Work, Power, Energy, Current and Voltage sources - ideal and practical sources - concept of dependent and independent sources, Ohm's law, Kirchhoff's law, Series parallel combination of R, L, C components, Voltage Divider and Current Divider Rules, Mesh and Nodal analysis, Star/Delta transformation, Network Theorems - Superposition, Thevenin, Norton and Maximum Power Transfer.		CO1

UNIT- II	AC Circuits	Periods: 08
AC waveform definitions - form factor, peak factor, R-L, R-C, RLC series circuit, R-L-C parallel circuit, phasor representation in polar and rectangular form, concept of impedance, admittance, active, reactive, apparent and complex power, power factor, Resonance in series and parallel circuits, band-width and quality factor, Three Phase balanced AC Circuits (Y-Δ and Y-Y) - Power Measurement – Two Wattmeter method.		CO2

UNIT- III	Electrical Safety and Electrical Machines	Periods: 07
Layout of electrical power system and its functions, Wiring Accessories, Types of domestic wiring, Necessity of earthing, insulators and cables, Safety devices - fuse, relay and circuit breaker - Sensors and its types. Faraday's Law of electromagnetic induction, Fleming's Right and Left hand rule - DC Generator and DC Motor - construction, principle, load test and performance characteristics - Auto transformer, Single phase transformer- construction, principle, load test - Single phase capacitor start and run induction motor – Load test.		CO3

SECTION B – Electronics Engineering

UNIT- IV	Semiconductor Diodes and Applications	Periods: 07
Introduction semiconductor materials – Doping - Intrinsic and Extrinsic Semiconductor – PN junction diode, structure, characteristics - diffusion and depletion capacitance - Rectifier, Half wave and Full wave rectifier - zener diode characteristics - zener diode as regulator – Light Emitting Diode (LED) - Solar Cell.		CO4

UNIT- V	Transistors	Periods: 07
Bipolar Junction Transistor - construction – operation - Common Base, Common Emitter, Common collector Configuration – characteristics – Biasing - numerical application. Junction Field Effect Transistor (JFET), Metal oxide semiconductor Field Effect Transistor, EMOSFET-DMOSFET operation characteristics - Numerical application.		CO5

UNIT- VI	Communication systems	Periods: 08
Need for Modulation – Block diagram of analog communication System - AM, FM, PM Definitions and Waveforms – Comparison of digital and analog communication system- Block diagram of digital communication system – Electromagnetic Spectrum. Wired and wireless Channel – Block diagram of communication systems – satellite communication – Cellular Mobile Communication – Fibre Optical Communication System.		CO6

Lecture Periods: 45	Tutorial Periods: -	Practical Periods: -	Total Periods: 46

2.A.6.51

Text Books
1. R. K. Rajput, "Basic Electrical and Electronics Engineering", University Science Press, 2nd Edition, 2017.
2. Dr. R. Saravanakumar, Dr.V. Jegathesan, Dr. K. Vinoth Kumar, Dr. K. Kowsalya, "Basic Electrical and Electronics Engineering", Wiley Publisher, 2nd Edition, 2022.
3. R. Muthusubramaniam, S. Salivahanan and K. A. Mureleedharan, "Basic Electrical Electronics and Computer Engineering", Tata McGraw Hill, 2018
Reference Books
1. A. Sudhakar and S. P. Shyam Mohan, "Circuits and Networks: Analysis and Synthesis", Tata McGraw Hill Publishing Company Ltd., New Delhi, 4th Edition, 2017.
2. D.P.Kothari and I.J. Nagrath, "Electric Machines", Tata McGraw Hill, New Delhi, 5th Edition, 2017.
3. B. L. Theraja, A. K. Theraja, "A Textbook of Electrical Technology – Volume - II", S Chand & Co. Ltd., New Delhi, 23rd Edition, 2009.
4. David. A. Bell, "Electronic Devices and Circuits", PHI Learning Private Ltd, India, Fourth Edition, 2020
5. Wayne Tomasi, "Electronic Communication Systems- Fundamentals Theory Advanced", Sixth Edition, Pearson Education, 2018.
Web References
1. https://nptel.ac.in/courses/108/108/108108076/
2. https://www.electrical4u.com/
3. https://nptel.ac.in/courses/108/102/108102146/
4. https://onlinecourses.nptel.ac.in/noc21_ee55/
5. https://nptel.ac.in/courses/117/102/117102059

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3	-	2	-	-	-	-	-	-	1	3	2	-
2	3	3	3	-	2	-	-	-	-	-	-	1	3	2	-
3	3	3	3	-	2	-	-	-	-	-	-	1	3	2	-
4	3	3	3	-	2	-	-	-	-	-	-	1	3	2	-
5	3	3	3	-	2	-	-	-	-	-	-	1	3	2	-

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	5	5	5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

2.A.6.52

Department	Mechanical	Programme : B.Tech.						
Semester	I	Course Category: PC			End Semester Exam Type: TE			
Course Code	U23MET101	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	CONCEPT OF ENGINEERING DESIGN	3	-	-	3	25	75	100

Prerequisite	Material Science
Course Objectives	To provide a board overview of generic concept of design, weld symbols and standards.
	To enable students to attain knowledge on design principles.
	To define various engineering materials and properties.
	To expand in depth knowledge on stress, strain and various loading conditions.
	To know about the applications of green design in industry.

Course Outcome	On completion of the course, the students will be able to	BT Mapping (Highest Level)
CO1	Understand the concepts of work, energy, torque, power and free body diagrams.	K2
CO2	Understand various design principles.	K2
CO3	Explain different classes of material and their properties.	K3
CO4	Illustrate the various loading and failures theory methods.	K3
CO5	Exposed to light engineering product and green design process.	K3

UNIT- I	Design Consideration	Periods: 9
Review of basics of work, energy, torque, power, load analysis, equilibrium equations, free-body diagrams, internal loads, force flow concept, locating critical sections, practical considerations, Fits and tolerances, surface roughness, basic of weld symbols.		CO1

UNIT- II	Design Terminology	Periods: 9
Definition-various methods and forms of design-importance of product design-static and dynamic products-various design projects-morphology of design-requirements of a good design-concurrent engineering-computer aided engineering-codes and standards-product and process cycles-bench marking		CO2

UNIT- III	Creativity in Design	Periods: 9
Creativity and problem solving-vertical and lateral thinking-invention-psychological view, mental blocks-Creativity methods-brainstorming, synectics, force fitting methods, mind map, concept map Theory of innovative problem solving (TRIZ) – conceptual decomposition creating design concepts.		CO3

UNIT- IV	Materials and Their Properties	Periods: 9
Engineering materials and their classification: Metals, Ceramics and polymers, Stress-strain diagrams of metallic, Ceramics and polymers materials, Moduli of elasticity, Poisson's ratio, shear modulus – material strength, resilience and toughness, thermal conductivity, linear thermal expansion coefficient, specific heat capacity.		CO4

UNIT- V	Green Design Process	Periods: 9
Comparison of materials, material saving by form design, possible weight and cost reduction, design concepts for light engineering products, Material life cycle, embodied energy, 80-20 rule, carbon footprint, green design in industry, sustainability.		CO5

Lecture Periods: 45	Tutorial Periods: -	Practical Periods: -	Total Periods: 45

Text Books

1. Dieter, George E., Engineering Design - "A Materials and Processing Approach", McGraw Hill International Editions Singapore, 3rd Edition, 2000.
2. Horenstein, M. N., Design Concepts for Engineers, Prentice Hall, 2010
3. Atif Aziz. "Concepts in Engineering Design" 1st Edition, New Age International, 2017.

Reference Books

1. Michael Ashby, Hugh Shercliff and David Cebon, "Materials Engineering, Science, Processing and Design", Butterworth Heinemann, 2009.
2. Robert C Juvinall, "Fundamentals of Machine Component Design", Wiley, 2011.
3. George Dieter,Linda Schmidt, "Engineering Design' ' Fifth Edition McGraw 2012.
4. Yousef Haik, Tamer M. Shahin, "Engineering Design Process" Second Edition .Cengage learning, 2016.
5. Aarron Walter," Principles of product design' Design better, 2019

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Web References
1. nptel.ac.in/courses/107/108/107108010/
2. https://nptel.ac.in/courses/113/104/113104096/
3. https://ocw.mit.edu/courses/aeronautics-and-astronautics/16-842
4. https://www.ifeu.de/en/methods/life-cycle-assessment-and-material-flow-analyses
5. https://www.webdesignerdepot.com/2011/02/the-8020-rule-applied-to-web-design

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	1	1	-	2	1	1	1	1	1	2	2	1	1
2	3	1	1	1	-	1	1	1	2	1	1	2	2	2	2
3	3	2	1	1	-	2	2	1	2	1	1	2	2	2	3
4	3	1	1	1	-	1	1	1	2	1	1	2	2	2	2
5	3	1	1	1	-	2	2	2	1	1	2	2	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	5	5	5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

2.A.6.54

Department	English			Programme : B.Tech.			
Semester	I			Course Category: HS		End Semester Exam Type: TE	
Course Code	U23ENBC01	Periods/Week			Credit	Maximum Marks	
		L	T	P	C	CAM	ESE	TM
Course Name	COMMUNICATIVE ENGLISH - I	2	-	2	3	20	80	100

(Common to ALL Branches except CSBS)

Prerequisite	Basics of English Language	
Course Outcome	On completion of the course, the students will be able to	BT Mapping (Highest Level)
CO1	Understand the communication flow in organization and its objectives	K2
CO2	Write the technical contents with grammatically precise sentences	K2
CO3	Articulate with correct pronunciation and overcome vernacular impact in speaking	K3
CO4	Express opinions confidently in formal and informal communicative contexts	K2
CO5	Attend interview with assertiveness	K3

UNIT- I	Workstead Communication	Periods: 10
Communication, Definition, Process, Channels, Barriers, Strategies for Effective Communication, Verbal and Nonverbal Communication - Listening, Types, Barriers, Enhancing Listening Skills - Bibliography: Book, Journal and Internet References		CO1

UNIT- II	Common Errors In Writing And Comprehension Strategies	Periods: 10
Subject Verb Agreement, Misplaced Modifiers, Squinting Modifiers, Dangling Modifier, Fused Sentence, Comma Splice, Sentence Fragment - Reading Comprehension: Technical passage, Strategies: Skimming, Scanning, Intensive and Extensive Reading, Prediction, and Contextual Meaning		CO2

UNIT- III	Phonetics	Periods: 10
Pronunciation Guidelines to consonants and vowels, Sounds Mispronounced, Silent and Non-silent Letters, Intonation, Spelling Rules and Words often misspelled, Mother Tongue Influence (MTI), Various Techniques for Neutralization of Mother Tongue		CO3

UNIT- IV	Communication Practice - I	Periods: 15
List of Exercises **Listening**: Self Introduction videos **Speaking**: Self-Introduction, Extempore, and Role Play **Reading**: Non-Technical Comprehension Passage **Writing:** Common Errors in Writing		CO4

UNIT- V	Interpersonal Communication - I	Periods: 15
List of Exercises **Listening:** Speech Sounds, Interview Videos **Speaking**: Debate, Structured Group Discussion, and Conversation **Reading**: Commonly Confused Words **Writing:** Transcription		CO5

Lecture Periods: 30	Tutorial Periods: -	Practical Periods: 30	Total Periods: 60

Text Books

1. Richa Mishra , RatnaRao, "A textbook of English Language Communication Skills", Macmillan Publishers India Private Ltd., Revised Edition 2021.
2. Rizvi M. Ashraf, "Effective Technical Communication", New Delhi: Tata-McGraw-Hill Publishing Company Limited, 4th Edition, 2010.
3. Balasubramanian T, "English Phonetics for Indian students workbook", 2nd Edition, Trinity Press, 2016.

Reference Books

1. N.P.Sudharshana, C. Savitha," English for Engineers", Cambridge University Press, 2018.
2. Raman, Meenakshi, and Sharma, Sangeetha, "Technical Communication - Principles and Practice", 3rd Edition, Oxford University Press, 2017.
3. Comfort, Jeremy,etal., "Speaking Effectively: Developing Speaking Skills for Business English", Cambridge University Press, Cambridge, Reprint 2011.
4. Wren & Martin, "High School English Grammar and Composition", S Chandh &Co. Ltd, 2015.
5. Boove, Courtland L, "Business Communication Today", Pearson Education, New Delhi, 2002.

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Web References
1. https://lemongrad.com/subject-verb-agreement-rules/
2. https://opentextbc.ca/advancedenglish/chapter/misplaced-and-dangling-modifiers/
3. https://www.hitbullseye.com/Reading-Comprehension-Tricks.php
4. https://www.softwaretestinghelp.com/how-to-crack-the-gd/
5. https://worldscholarshipvault.com/neutralize-mother-tongue-interference/

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1	-	-	-	-	-	-	-	-	3	-	1	-	-	-
2	1	-	-	-	-	-	-	-	-	3	-	1	-	-	-
3	1	-	-	-	-	-	-	-	-	3	-	1	-	-	-
4	1	-	-	-	-	-	-	-	-	3	-	1	-	-	-
5	1	-	-	-	-	-	-	-	1	3	-	1	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Theory						
Assessment	Continuous Assessment Marks (CAM)				End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Attendance		
Marks	5	5	5	5	75	60
	20 (to be weighted for 10 marks)				(to be weighted for 50 marks)	

Practical				
Continuous Assessment Internal Evaluation		End Semester Internal Evaluation		Total Marks
30(to be weighted for 10 marks)		30 marks		
Listening (L)*	10	Listening (L)*	10	40
Speaking(S)	5	Speaking(S)	5	
Reading(R)*	10	Reading(R)*	10	
Writing(W)*	5	Writing(W)*	5	

- **LRW components of Practical can be evaluated through Language Lab Software**

2.A.b.56

Department	EEE/ ECE	Programme : B.Tech.						
Semester	I	Course Category: ES			End Semester Exam Type: LE			
Course Code	U23EEPC01	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY	-	-	2	1	50	50	100

(Common to CSE, IT, MECH, CIVIL, CCE, AI&DS, FT, MCTR, CSBS Branches)

Prerequisite	Basic Knowledge of Science	
Course Outcome	**On completion of the course, the students will be able to**	BT Mapping (Highest Level)
	CO1 Build the different wiring for domestic and commercial applications.	K3
	CO2 Design and analyze the domestic power distribution.	K3
	CO3 Estimate the performance of transformer and motors by conducting load test.	K3
	CO4 Describe characteristics of semiconductor diode and utilize it for different applications	K5
	CO5 Relate the characteristics of various transistor	K2
	CO6 Understand Rectifiers and Regulators	K2

List of Experiments

Section – A Electrical Experiments

Demonstration on Power Sources, Ammeter, Voltmeter, Wattmeter and Energy meter are Pre-requisite for conducting this Electrical Engineering Lab.

1. Electrical safety precautions and study of tools, accessories, electrical joints and electrical symbols.
2. Domestic Wiring Practice
   - Staircase wiring
   - Doctor's room wiring
   - Godown wiring
   - Wiring of Ceiling fan, LED lamps and Iron Box.
3. Design of Domestic power distribution.
4. Measurement of 3-phase power using two wattmeter method
5. Load test on DC shunt motor.
6. Load test on single phase transformer.
7. Load test on single phase Induction Motor.

Section – B Electronics Experiments

1. Study of Electronic components and equipment: Resistor, Capacitor
2. Measurement of AC signal parameter (Peak-Peak, rms period, frequency) using CRO.
3. VI Characteristics of PN junction diode, Zener diode
4. Input and output characteristics of Common Emitter configuration of BJT
5. Characteristics of JFET
6. Measurement of Ripple factor of HWR, FWR
7. Voltage Regulator using Zener Diode

Lecture Periods: -	Tutorial Periods: -	Practical Periods: 30	Total Periods: 30

Reference Books

1. S. Gowri, T. Jeyapoovan Nadar, "Engineering Practices Lab Manual", Vikas Publishing House Private Limited, New Delhi, 5th Edition, 2014.
2. A.Sudhakar and Shyam Mohan.S.P, "Circuits and Networks Analysis and Synthesis", Tata McGraw Hill Publishing Company Ltd., New Delhi, 4th edition, 2017.
3. D.P.Kothari and I.J. Nagrath, "Electric Machines", Tata McGraw Hill, New Delhi, 5th Edition, 2017.
4. Edward Hughes, John Hiley, Keith Brown, Ian McKenzie Smith, Electrical and Electronics Technology, Pearson Education Limited, New Delhi, 12th edition 2016.
5. S.K. Sahdev, "Fundamentals of Electrical Engineering and Electronics", DhanpatRai and Co, 2017.

Web References

1. http://eie.sliet.ac.in/laboratories/basic-electrical-engineering-lab/
2. https://www.electronics-tutorials.ws/accircuits/series-circuit.html
3. https://www.allaboutcircuits.com/textbook/experiments/
4. https://www.electronicshub.org/measurements-of-ac-current/
5. http://www.electronics-tutorials.ws

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COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	3	-	-	1	-	-	3	-	-	1	3	2	-
2	3	2	3	-	-	1	-	-	3	-	-	1	3	2	-
3	3	2	3	-	-	1	-	-	3	-	-	1	3	2	-
4	3	2	3	-	-	1	-	-	3	-	-	1	3	2	-
5	3	2	3	-	-	1	-	-	3	-	-	1	3	2	-

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	Performance in Practical classes			Model Practical Examination	Attendance		
	Conduction of Practical	Record work	viva				
Marks	15	5	5	15	10	50	100

2.A.b.58

Department	Mechanical Engineering				Programme : B.Tech.			
Semester	I				Course Category: ES		End Semester Exam Type: LE	
Course Code	U23ESPC02	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	DESIGN THINKING AND IDEA LAB	-	-	2	1	50	50	100

(Common to ALL Branches)

Prerequisite	Basic Knowledge of Science	
Course Outcome	**On completion of the course, the students will be able to**	BT Mapping (Highest Level)
	CO1 Demonstrate a comprehensive understanding of the tools and inventory associated with the IDEA Lab.	K2
	CO2 Develop proficiency in ideation techniques to generate creative and innovative solutions for various design challenges and problems	K3
	CO3 Acquire practical knowledge of mechanical and electronic fabrication processes, including hands-on experience with machinery, tools, and techniques used in the manufacturing and assembly of physical components.	K3
	CO4 Cultivate the skills necessary for developing innovative and desirable products, including the ability to integrate user needs, market trends, and technological advancements into the design process.	K4
	CO5 Apply iterative design methodologies to refine and improve solutions based on feedback, user testing, and evaluation of functional, aesthetic, and usability aspects	K4

Design process: Traditional design, Design thinking, Existing sample design projects, Study on designs around us, Compositions/structure of a design, Innovative design: Breaking of patterns, Reframe existing design problems, Principles of creativity Empathy: Customer Needs, Insight-leaving from the lives of others/standing on the shoes of others, Observation

Design team-Team formation, Conceptualization: Visual thinking, Drawing/sketching, New concept thinking, Patents and Intellectual Property, Concept Generation Methodologies, Concept Selection, Concept Testing, Opportunity identification Prototyping: Principles of prototyping, Prototyping technologies, Prototype using simple things, Wooden model, Clay model, 3D printing; Experimenting/testing.

Sustainable product design, Ergonomics, Semantics, Entrepreneurship/business ideas, Product Data Specification, Establishing target specifications, Setting the final specifications. Design projects for teams.

List of Lab Activities and Experiments

1. Schematic and PCB layout design of a suitable circuit, fabrication and testing of the circuit.
2. Machining of 3D geometry on soft material such as softwood or modelling wax.
3. 3D scanning of computer mouse geometry surface. 3D printing of scanned geometry using FDM or SLA printer.
4. 2D profile cutting of press fit box/casing in acrylic (3 or 6 mm thickness)/cardboard, MDF (2 mm) board using laser cutter & engraver.
5. 2D profile cutting on plywood /MDF (6-12 mm) for press fit designs.
6. Familiarity and use of welding equipment.
7. Familiarity and use of normal and wood lathe.
8. Embedded programming using Arduino and/or Raspberry Pi.
9. Design and implementation of a capstone project involving embedded hardware, software and machined or 3D printed enclosure.
10. Discussion and implementation of a mini project.
11. Documentation of the mini project (Report and video).

Lecture Periods: -	Tutorial Periods: -	Practical Periods: 30	Total Periods: 30

Text Books

1. Tim Brown, Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation, HarperCollins Publishers Ltd
2. Workshop / Manufacturing Practices (with Lab Manual), Khanna Book Publishing.

2.A.6.59

Reference Books

1. Ulrich and Eppinger, Product Design and Development, 3rd Edition, McGraw Hill, 2004
2. The Big Book of Maker Skills: Tools & Techniques for Building Great Tech Projects. Chris Hackett. Weldon Owen; 2018.
3. The Total Inventors Manual (Popular Science): Transform Your Idea into a Top-Selling Product. Sean Michael Ragan, Weldon Owen; 2017.
4. The Art of Electronics. 3rd edition. Paul Horowitz and Winfield Hill. Cambridge University Press.
5. Practical Electronics for Inventors. 4th edition. Paul Sherz and Simon Monk. McGraw Hill.
6. Make Your Own PCBs with EAGLE: From Schematic Designs to Finished Boards. Simon Monk and Duncan Amos. McGraw Hill Education.
7. Programming Arduino: Getting Started with Sketches. 2nd edition. Simon Monk. McGraw Hill.
8. Venuvinod, PK., MA. W., Rapid Prototyping – Laser Based and Other Technologies, Kluwer
9. Chapman W.A.J, "Workshop Technology", Volume I, II, III, CBS Publishers and Distributors, 5th Edition,2002.

Web References

1. https://onlinecourses.nptel.ac.in/noc23_mg72

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	2	2	2	-	-	2	-	3	2	-	-	-
2	3	3	3	2	2	2	-	-	2	-	3	2	-	-	-
3	3	3	3	2	3	2	-	-	2	-	3	2	-	-	-
4	3	3	3	2	3	2	-	-	2	-	3	2	-	-	-
5	3	3	3	2	3	2	-	-	2	-	3	2	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	Performance in Practical classes			Model Practical Examination	Attendance		
	Conduction of Practical	Record work	viva				
Marks	15	5	5	15	10	50	100

2.A.6.60

Department	Mechanical	Programme : B.Tech.						
Semester	I	Course Category: ES			End Semester Exam Type: LE			
Course Code	U23ESP101	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	ENGINEERING MECHANICS LABORATORY	-	-	2	1	50	50	100

Prerequisite	Basic Knowledge of Science	
Course Outcome	On completion of the course, the students will be able to	BT Mapping (Highest Level)
	CO1 Applies the concept of law of forces, principle of moments and equilibrium of forces	K2
	CO2 Computes the axial forces acting in the truss members and centroid of a lamina.	K3
	CO3 Applies the coefficient of friction and Newton's law of motion.	K2
	CO4 Infers about the concept of moment of inertia of a flywheel.	K2
	CO5 Demonstrates the concept of conservation of energy.	K2

List of Experiments

1. Verification of triangle law & parallelogram law of forces
2. Verification of polygon law of forces
3. Verification of the Principle of Moments using the Bell Crank Lever apparatus
4. Verification of support reactions of a simply supported beam
5. Verification of condition of equilibrium of a system of forces
6. Verification of equilibrium of three-dimensional forces.
7. Verification of axial forces in the members of a truss
8. Verification of centroid of different lamina
9. Determination of coefficient of friction between two surfaces
10. Verification of newton's laws of motion
11. Determination of moment of inertia of a flywheel
12. Verification of motion parameters using conservation of energy.

Lecture Periods: -	Tutorial Periods: -	Practical Periods: 30	Total Periods: 30

Reference Books

1. A.K.Gupta, Mohit Bhoot, Engineering Mechanics laboratory manual, Scientific Publishers, 2015.
2. A.K.Sharma, Engineering mechanics practicals, University Science Press, 2009.
3. U.C.Jindal, Basics of Engineering Mechanics, Galgotia Publications, 2002.
4. S.Rajasekaran, G.Sankarasubramanian, Fundamentals of Engineering Mechanics, Vikas Publishing House Pvt., Ltd., 2012.
5. S.S.Bhavikatti and K.G. Rajashekarappa, Engineering Mechanics, New Age International(p) Ltd, New Delhi, 7th Edition, 2019.

Web References

1. http://nptel.iitm.ac.in/video.php?subjectId=112103108
2. http://www.nptel.iitm.ac.in/courses/Webcourse-contents/IIT-KANPUR / Engineering mechanics / Table of Contents.html
3. https://nptel.ac.in/courses/112/106/112106286/
4. https://www.coursera.org/learn/engineering-mechanics-statics
5. https://nptel.ac.in/courses/122/104/122104014/

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	1	1	-	-	-	-	-	-	1	2	2	1
2	3	2	2	1	1	-	-	-	-	-	-	1	2	2	1
3	3	2	2	1	1	-	-	-	-	-	-	1	2	2	1
4	3	2	2	1	1	-	-	-	-	-	-	1	2	2	1
5	3	2	2	1	1	-	-	-	-	-	-	1	2	2	1

Correlation Level: 1 - Low, 2 - Medium, 3 – High

2.A.6.61

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	Performance in Practical classes			Model Practical Examination	Attendance		
	Conduction of Practical	Record work	viva				
Marks	15	5	5	15	10	50	100

2.A.b.b2

Department		Programme: **B.Tech.**						
Semester	**First**	Course Category: **MC**			End Semester Exam Type: -			
Course Code	**U23MEMC01**	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**INDUCTION PROGRAMME**	-	-	-	Non-Credit	-	-	-
Prerequisite	-							

Course Outcome	The course will enable the student to	BT Mapping (Highest Level)
CO1	Develop holistic attitude and harmony in the individual, family, and Society	**K2**
CO2	Acquire grammar skills and capable to write and speak English confidently	**K2**
CO3	Understand the basic concepts in Mathematics and Programming	**K2**
CO4	Know about the art and culture, language and literature of this vast secular nation	**K2**
CO5	Identify the inherent talent and develop it professionally	**K3**

UNIT- I	**Universal Human Values**	**Periods: 12**

Welcome and Introductions - Getting to know each other, Aspirations and Concerns - Individual Academic and Career, Expectations of Family, Peers, Society, Nation, Fixing one's Goals, Self-Management - Self-confidence, Peer Pressure, Time Management, Anger, Stress Personality Development, Self-improvement, Health - Health issues, Healthy diet, Healthy lifestyle, Hostel life, Relationships - Home sickness, Gratitude towards Parents, Teachers and others Ragging and interaction, Competition and Cooperation, Peer Pressure, Society - Participation in Society, Natural Environment - Participation in Nature, Sum Up - Role of Education, Need for a Holistic Perspective, Self-evaluation and Closure - Sharing and feedback. **CO1**

UNIT- II	**Proficiency in English**	**Periods: 12**

Communication skills - Prognostic test on Grammar - Synonyms, Antonyms, Tenses, Sentence Completion, Idioms and Phrases, One-word Substitution, Homophones, Homonyms, Use of Prepositions, Subject-verb Agreement - Writing - Paragraph writing, Letter writing, Essay writing, Story Development. **CO2**

UNIT- III	**Bridge Course in Mathematics and C Programming**	**Periods: 12**

Mathematics:

Fundamentals of differential and integral calculus: Theory and Practice, Limit of function - Fundamental results on limits - Continuity of a function - Concept of differentiation - Concept of derivative - Slope of a curve -Differentiation Techniques - Derivatives of elementary functions from first principle - Derivatives of inverse functions - Logarithmic differentiation - Method of substitution - Differentiation of parametric functions -Differentiation of implicit functions - Higher order derivatives. Integrals of functions containing linear functions -Method of integration (Decomposition method, method of substitution, integration by parts) - Definite integrals. Simple definite integrals - Properties of Definite integrals - Reduction formulae - Area and volume - Length of curve - surface area of a solid.

C Programming:

Features of C and its basic Structure - Keywords - constants - variables - operators - Data types - Formatted input and output statements - Control and Looping statement - Arrays - Functions - Strings - writing simple C programs. **CO3**

UNIT- IV	**Literary activities**	**Periods: 12**

Team building activities - Quiz - Oral Exercises - Group discussion, Debate, Extempore, Role play, சிறப்பு சொற்பொழிவு - தமிழர் மரபு மற்றும் தமிழர் தொழில்நுட்பம். **CO4**

UNIT- V	**Creative arts**	**Periods: 12**

Introduction to painting and renowned artworks - Documentary and Short films - Music - Vocal, Instrumental - Dance - Classical, Cinematic - Mimicry - Mime. **CO5**

Lecture Periods: 60	**Tutorial Periods: -**	**Practical Periods: -**	**Total Periods: 60**

Reference Books

1. R.R Gaur, R. Asthana, G.P. Bagaria," A Foundation Course in Human Values and Professional Ethics", Excel Books, New Delhi, 2nd Revised Edition, 2019.
2. Kumar Mohan R, "English Grammar for all (Functional and Applied Grammar)", Unicare Academy, 2022.
3. Seely, John," Oxford A-Z of Grammar and Punctuation, Oxford Publication, 2013.
4. B.V. Ramana," Higher Engineering Mathematics", Tata McGraw – Hill, New Delhi, 6th Edition, 2018.
5. Dr. A. Singaravelu, "Engineering Mathematics - I", Meenakshi publications, Tamil Nadu, 2019.
6. E. Balagurusamy, "PROGRAMMING IN ANSI C", Mc Graw Hill, 8th Edition, 2019.
7. Dr.K.K.Pillay,"Social Life of Tamils", A joint publication of TNTB & ESC and RMRL
8. R.Balakrishnan, "Journey of Civilization",Roja muthiah research publishers, 1st Edition 2019

2.A.6.63

9. தமிழக வரலாறு - மக்களும் பண்பாடும், பிள்ளை, கே. கே. , சென்னை : உலகத் தமிழாராய்ச்சி நிறுவனம் , 2002.
10. கணினித்தமிழ் - முனைவர் இல.சுந்தரம், விகடன் பிரசுரம்.
11. கீழடி - வைகை நதிக்கரையில் சங்க கால நகர நாகரிகம், தமிழக தொல்லியல் துறை

Web References

1. http://www.newsociety.com/Books/S/Slow-isBeautiful
2. https://www.aplustopper.com/formal-letter/
3. https://www.javatpoint.com/c-programming-language-tutorial
4. http://www.math.cum.edu/~wn0g/2ch6a.pdf
5. https://education.nsw.gov.au/teaching-and-learning/curriculum/creative-arts

2.A.6.64

SEMESTER II

2.A.6.65

2.A.6.66

Department	Mathematics	Programme : B.Tech.						
Semester	II	Course Category: BS			End Semester Exam Type: TE			
Course Code	U23MATC02	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	ENGINEERING MATHEMATICS – II	3	1	-	4	25	75	100

(Common to ALL Branches Except CSBS, FT)

Prerequisite	Basic Mathematics	
Course Outcome	On completion of the course, the students will be able to	BT Mapping (Highest Level)
	CO1 Convert a periodic function into series form.	K2
	CO2 Compute Fourier transforms of various functions.	K3
	CO3 Solve Differential Equations using Laplace transforms.	K3
	CO4 Apply inverse Laplace transform of simple functions.	K3
	CO5 Solve difference equations using Z – transforms.	K3

UNIT - I	Fourier Series	Periods:12
Dirichlet's conditions – General Fourier series – Odd and Even functions – Half-Range sine series and cosine series – Change of intervals – Parseval's Identity.		CO1
UNIT - II	**Fourier Transforms**	**Periods:12**
Fourier Transforms and its inverse – Properties of Fourier Transform (without proof) – Fourier sine and cosine Transforms and their properties (excluding proof).		CO2
UNIT - III	**Laplace Transforms**	**Periods:12**
Laplace transforms of elementary functions and Periodic functions – Basic properties (excluding proof) – Laplace transforms of derivatives and integrals – Initial and final value theorems.		CO3
UNIT - IV	**Inverse Laplace Transforms**	**Periods:12**
Definition of inverse Laplace Transforms – Convolution theorem (excluding proof) – Solutions of Linear Ordinary Differential Equations of second order with constant coefficients.		CO4
UNIT - V	**Z – Transforms**	**Periods:12**
Z-transforms – Elementary Properties – Inverse Z-transforms (using partial fraction and Residues) – Solution of difference equations using Z - transform.		CO5

Lecture Periods:45	Tutorial Periods: 15	Practical Periods: -	Total Periods: 60

Text Books

1. T. Veerarajan, "Engineering Mathematics", Tata McGraw Hill, New Delhi, 3rd Edition, 2011.
2. C. P. Gupta, Shree Ram Singh. M. Kumar, "Engineering Mathematics for semester I & II", Tata McGraw Hill, New Delhi, 2nd Edition, 2016.
3. H.K. Dass, "Advanced Engineering Mathematics", S. Chand, New Delhi, 22nd Edition 2019.

Reference Books

1. N.P. Bali and Dr. Manish Goyal, "A TEXTBOOK OF ENGINEERING MATHEMATICS", UNIVERSITY SCIENCE PRESS, India, 8th Edition, 2016.
2. P. Sivaramakrishna Das and C. Vijayakumari, "Engineering Mathematics", Pearson India Education services Pvt. Ltd, India 1st 2017.
3. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons, New Delhi, 10th Edition, 2019.
4. G. Balaji, "Engineering Mathematics - Transforms and Partial Differential Equations", G. Balaji Publishers, 18th Edition, 2022.
5. B.V. Ramana, "Higher Engineering Mathematics", Tata McGraw Hill, New Delhi, 2017.

Web References

1. https://nptel.ac.in/courses/111105121/
2. https://nptel.ac.in/courses/111105035/
3. https://nptel.ac.in/courses/11110711
4. https://swayam.gov.in/nd1_noc20_ma17/preview
5. https://nptel.ac.in/courses/111/103/111103021/

2.A.6.67

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	-	-	1	-	-	-	-	-	1	1	-	-
2	3	2	1	1	-	1	-	-	-	-	-	1	3	-	-
3	3	2	1	1	-	1	-	-	-	-	-	1	3	-	-
4	3	2	1	1	-	1	-	-	-	-	-	1	3	-	-
5	3	2	1	1	-	1	-	-	-	-	-	1	3	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	5	5	5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

2.A.6.68

Department	Computer Science and Engineering			Programme : B.Tech.			
Semester	II	Course Category: ES			End Semester Exam Type: TE		
Course Code	U23CSTC01	Periods/Week			Credit	Maximum Marks	
		L	T	P	C	CAM	ESE	TM
Course Name	PROGRAMMING IN C	3	-	-	3	25	75	100
(Common to ALL Branches)								
Prerequisite	Nil							

Course Outcome	On completion of the course, the students will be able to	BT Mapping (Highest Level)
CO1	Comprehend the basics of Computers.	K2
CO2	Illustrate the concepts of control structures and looping.	K2
CO3	Implement programs using arrays and functions.	K3
CO4	Demonstrate programs using Structure and Pointers.	K3
CO5	Build the programs using Union and File management Operations.	K3

UNIT - I	Introduction	Periods: 09
Generation and Classification of Computers - Block Diagram of a Computer –Categories of Software – Network Structure - Number System – Binary – Decimal – Conversion – Algorithm – Pseudo code – Flow Chart.		CO1

UNIT - II	C Programming Basics	Periods: 09
Introduction to ' C' Programming – Basic structure of a 'C' program – compilation and linking processes – Constants, Variables – Data Types – Expressions using operators in 'C' – Managing Input and Output operations – Decision Making and Branching – Looping statements..		CO2

UNIT - III	Arrays and Functions	Periods: 09
Arrays – Initialization – Declaration – One dimensional and Two dimensional arrays. String- String operations – String Arrays. Simple programs- sorting- searching – matrix operations- Function – definition of function – Declaration of function – Pass by value – Pass by reference – Recursion		CO3

UNIT - IV	Structure and Pointers	Periods: 09
Structure Introduction – Structure definition – Structure declaration – Structure within a structure –Self Referential Structure. Pointers - Definition – Initialization – Pointers arithmetic – Pointers and arrays -Pointer to Function –Pointer and Structure- Simple programs.		CO4

UNIT - V	Unions and Files	Periods: 09
Union Introduction - Programs Using Structures and Unions – Introduction to File - File Operations - File Input and Output Functions - Random Access to Files - File System Functions - Command Line Arguments- Storage Classes - Pre-Processor Directives- Dynamic Memory Functions.		CO5

Lecture Periods: 45	Tutorial Periods:	Practical Periods: -	Total Periods: 45

Text Books

1. Balagurusamy. E, "Programming in ANSI C", Tata McGraw Hill, 8th Edition, 2019.
2. Yashvant Kanetkar, "Let us C", BPB Publications, 16th Edition, 2017
3. Herbert Schildt," C: The Complete Reference", McGraw Hill, FourthEdition, 2014

Reference Books

1. Vikas B. Agarwal Jyoti P. Mirani, "Computer Fundamentals, Nirali Prakashan Aug-2019,
2. Ashok N Kamthane, "Computer Programming", Pearson education, Second Impression,2012.
3. VikasVerma, "A Workbook on C ", Cengage Learning, Second Edition,2012.
4. P.Visu, R.Srinivasan and S.Koteeswaran, "Fundamentals of Computing and Programming", Fourth Edition, Sri Krishna Publications, 2012.
5. PradipDev, ManasGhoush, "Programming in C", Second Edition, Oxford University Press, 2011.

Web References

1. https://www.programiz.com/c-programming
2. https://www.geeksforgeeks.org/c-language-set-1-introduction/
3. https://www.tutorialspoint.com/cprogramming

2.A.6.69

4. https://www.assignment2do.wordpress.com/.../solution-programming-in-ansi-c
5. https://nptel.ac.in/courses/106/104/106104128/

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	1	-	-	3	-	-	-	-	-	-	-	3	-	3
2	2	1	-	-	3	-	-	-	-	-	-	-	3	-	3
3	3	2	1	1	3	-	-	-	-	-	-	-	3	-	3
4	3	2	1	1	3	-	-	-	-	-	-	-	3	-	3
5	3	2	1	1	3	-	-	-	-	-	-	-	3	-	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	5	5	5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

2.A.b.70

Department	Civil / Mechanical	Programme : B.Tech.						
Semester	II	Course Category: ES			End Semester Exam Type: TE			
Course Code	U23ESTC01	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	BASICS OF CIVIL AND MECHANICAL ENGINEERING	3	-	-	3	25	75	100

(Common to ECE, EEE, ICE, MECH, Civil, Mechatronics Branches)

Prerequisite	Basic Science	
Course Outcome	**On completion of the course, the students will be able to**	BT Mapping (Highest Level)
	CO1 Understand the types of buildings and materials.	K2
	CO2 Summarize on the various components of buildings and surveying concepts	K2
	CO3 Identify the various infrastructure facilities	K2
	CO4 Familiarize the working principles of IC engines and automobile systems	K2
	CO5 Understand about the power generation systems and its components	K2
	CO6 Acquire knowledge about the various machining process.	K2

SECTION A - CIVIL ENGINEERING

UNIT - I	Buildings and Buildings Materials	Periods: 08
Buildings – Definition – Classification according to NBC-plinth area, Floor area, carpet area, floor space index - Development of Smart cities - Green building, Benefits from green building. Building Materials - stone, brick, cement, cement mortar, concrete, steel, Timber - their properties and uses		CO1

UNIT - II	Buildings Components and Surveying	Periods: 08
Various Buildings Components and their functions. Foundation: function and types - Brick masonry, Stone Masonry and its types – Floors, Roofs and its types. Surveying: Objects – Classification – Principles – Measurements of Distances and areas –Leveling		CO2

UNIT - III	Basic Infrastructure	Periods: 07
Roads and Bridges – types, components advantage and disadvantages. Railways - Permanent way and its elements. Sources of Water - Quality of Water- Domestic sewage Treatment – Rain Water harvesting – Dams - site selection for dam construction, types of dams.		CO3

SECTION B – MECHANICAL ENGINEERING

UNIT- IV	Internal and External Combustion Systems	Periods: 08
IC engines – Classification – Working principles – Diesel and Petrol Engines: Two stroke and four stroke engines – merits and demerits. Steam generators (Boilers) – Classification – Constructional features (of only low-pressure boilers) – Boiler mountings and accessories – Merits and demerits – Applications.		CO4

UNIT- V	Power Generation Systems, Refrigeration and Air Conditioning System	Periods: 07
Power plants: Thermal – Nuclear, Hydraulic, Solar, Wind, Geothermal, Wave, Tidal and Ocean Thermal Energy Conversion systems - Functions, Applications - Schemes and layouts (Description only) Refrigeration and Air Conditioning System: Terminology of Refrigeration and Air Conditioning. Principle of vapour compression and absorption system – Layout of typical domestic refrigerator – Window and Split type room Air conditioner.		CO5

UNIT- VI	Manufacturing Process	Periods: 07
Lathe - types, Specifications, Operations of a centre lathe. Casting - Pattern making, Allowances, Green sand and dry sand moulding, casting defects. Welding - Arc and Gas welding process, brazing and soldering (process description only).		CO6

Lecture Periods: 45	Tutorial Periods: -	Practical Periods: -	Total Periods: 45

Text Books

1. Dr. S. Jayakumar, "Basic Civil Engineering", Aagash Nekaa Publications, 2011
2. G Shanmugam, MS Palanichamy, Basic Civil and Mechanical Engineering, McGraw Hill Education, 1st Edition, 2018.
3. Palanikumar, K. Basic Mechanical Engineering, ARS Publications, 2010.

Reference Books

2.A.6.71.

1.	M.P. Poonia, S.C. Sharma and T.R. Banga, Basic Mechanical Engineering, Khanna Publishing House 2018.
2.	S.S.Bhavikatti, Basic Civil engineering, New Age International Ltd. 2018.
3.	V. Rameshbabu, Basic Civil & Mechanical Engineering, VRB Publishers Private Limited, January 2017.
4.	Serope Kalpakjian, Steven Schmid, Manufacturing Engineering and Technology, 7th Edition, Pearson Publication, 2014.
5.	Gopi Satheesh, Basic Civil engineering, Pearson Publications, 3rd Edition, 2015.
Web References	
1.	https://nptel.ac.in/courses/112107291/
2.	https://nptel.ac.in/courses/112/103/112103262/
3.	https://ocw.mit.edu/courses/mechanical-engineering/2-61-internal-combustion-engines-spring-2017/lecture-notes/
4.	https://nptel.ac.in/courses/105102088/
5.	https://nptel.ac.in/courses/105104101/

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	1	1	-	1	-	-	-	-	-	-	1	-	-	-
2	3	1	1	-	1	-	-	-	-	-	-	1	-	-	-
3	3	1	1	-	1	-	-	-	-	-	-	1	-	-	-
4	3	1	-	-	-	-	-	-	-	-	-	1	-	-	-
5	3	1	-	-	-	-	-	-	-	-	-	1	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	5	5	5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

2.A.b.72

Department	Mechanical	Programme : B.Tech.						
Semester	II	Course Category: PC			End Semester Exam Type: TE			
Course Code	U23MET202	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	ENGINEERING METALLURGY	3	-	-	3	25	75	100

Prerequisite	Nil	
Course Outcome	On completion of the course, the students will be able to	BT Mapping (Highest Level)
CO1	Understand the fundamentals of solidification, metal structure, solid solution metals.	K2
CO2	Recognize the phase and equilibrium diagram with reactions.	K2
CO3	Apply the principles of heat-treatment processes.	K3
CO4	Understand the polymers processing methods and its engineering applications.	K3
CO5	Perform mechanical testing and Analyse the failures.	K4

UNIT - I	Solidification and Theory of Alloys	Periods: 09
Mechanism of crystallization, solidification of metals: pure metals and alloys, concept of super cooling, Nucleation: homogenous nucleation and heterogeneous nucleation. Solid solutions: Substitution solid solution-Interstitial solid solution, Hume-Rothery Rule, Lever Rule-Allotropy		CO1

UNIT - II	Phase Diagram and Iron- Carbon Equilibrium Diagram.	Periods: 09
Construction and interpretation of binary phase diagrams – Types – Eutectic, Eutectoid, Peritectic and Peritectoid systems – Iron Carbon equilibrium diagrams – Classification of steel making processes; production of primary and secondary steel- Manufacturing methods of Cast Iron, Alloy cast iron.		CO2

UNIT - III	Heat Treatment of Steels	Periods: 09
Introduction to heat treatment- Classifications, Heat treatment of ferritic steels: constant temperature transformation- Continuous cooling curves-Important of heat treatment of steels- Surface Hardening process: classifications- Martempering and Austempering - Heat treatment of stainless steel: austenite stainless steel and Duplex stainless steel- shot peening- laser peening.		CO3

UNIT - IV	Polymers and Ceramics	Periods: 09
Introduction – Preparation – types - PMMA, PET, PVC- Processing of polymers, Extrusion, Injection molding, Blow molding, Transfer molding, Properties of polymers and Applications, Engineering Ceramics –Properties and applications of Alumina (Al2O3) - Silicon Carbide (SiC) – Silicon Nitride (Si3N4) - Partially Stabilized Zirconia (PSZ) and Sialon.		CO4

UNIT - V	Deformation and Materials Testing	Periods: 09
Union Introduction - Programs Using Structures and Unions – Introduction to File - File Operations - File Input and Output Functions - Random Access to Files - File System Functions - Command Line Arguments- Storage Classes - Pre-Processor Directives- Dynamic Memory Functions.		CO5

Lecture Periods:45	Tutorial Periods:	Practical Periods: -	Total Periods: 45

Text Books

1. S. K.Mandal, Steel Metallurgy: Properties, Specifications and Applications, McGraw-Hill Education,2014.
2. Srinivasan, Engineering Materials and Metallurgy, Tata McGraw-Hill Education,2nd edition,2015
3. A. Lavakumar, Concept of in physical metallurgy, Morgan & clay publication,2017

Reference Books

1. Sidney H. Avner, Introduction to Physical Metallurgy, Tata McGraw-Hill Publishing company Ltd, 2nd Edition 2008.
2. Romesh C. Sharma, Principles of heat treatment of steels, New Age International, 2010.
3. L. Krishna reddy, Principles of Engineering Metallurgy, New Age Publishing Company Ltd, 10th Edition 2011.
4. Kannadi Palankeezhe Balan, Metallurgical Failure Analysis, Elsevier, 2018.
5. William E. Hosford, Physical Metallurgy, Taylor and Francis , 1st Edition 2018

Web References

1. https://nptel.ac.in/courses/113106088/
2. https://nptel.ac.in/courses/113104074/

2.A.6.73

3. https://fractory.com/heat-treatment-methods/
4. http://www.phase-trans.msm.cam.ac.uk/2005/growth.html
5. https://www.vssut.ac.in/lecture_notes/lecture1450443095.pdf

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	-	1	1	-	1	-	1	-	1	1	1	1
2	3	1	2	-	-	-	-	1	-	1	-	1	2	1	1
3	3	1	1	-	-	1	-	-	-	1	-	2	1	1	1
4	3	1	1	1	-	1	1	1	-	1	1	2	1	1	2
5	3	2	1	1	2	1	-	1	2	2	1	2	1	1	2

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	5	5	5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

2.A.b.74

Department	English			Programme : B.Tech.				
Semester	II			Course Category : HS		End Semester Exam Type: TE		
Course Code	U23ENBC02	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	COMMUNICATIVE ENGLISH - II	2	-	2	3	20	80	100

(Common to ALL Branches except CSBS)

Prerequisite	Basics of English Language	
Course Outcome	On completion of the course, the students will be able to	BT Mapping (Highest Level)
CO1	Draft effective written communication in professional environment	K2
CO2	Apply the mechanics of creative writing with precision and clarity	K3
CO3	Acquire language skills professionally to groom the overall personality through sensitizing various etiquettes in real time situation	K2
CO4	Develop language fluency and gain self-confidence	K3
CO5	Express thoughts and ideas with clarity and focus	K2

UNIT- I	Business Correspondence	Periods: 10
Business Writing: Circular, Agenda, Memoranda, Notice, Instruction, Minutes, Email Writing ,Report Writing- Official and Demi Official Letters : Applying for Educational / Car / Home Loans / Joining Report, Leave Letter, Industrial Visit, In plant Training, Letter to the Editor, Calling for a quotation, Placing Order, Letter of Complaints, Letter seeking Clarification, Resume', Job Application Letter, Bio-data, CV		CO1

UNIT- II	Functional Writing Skills	Periods: 10
Four Modes of Writing, Sentence Structure, Art of condensation: Summary Writing and Note Making, Use of phrase and clause in sentence, Principles of paragraph writing, Techniques of Essay Writing, Jumbled Sentence, Paraphrasing		CO2

UNIT- III	Etiquettes	Periods: 10
Etiquette: Meaning, Kinds: Corporate Etiquette, Meeting Etiquette, Telephone Etiquette, Email Etiquette, Social Media Etiquette, Dining Etiquette, Communication Etiquette		CO3

UNIT- IV	Communication Practice - II	Periods: 15
List of Exercises **Listening**: Letter writing tips **Speaking**: Just a Minute, Impromptu Speech, Contemporary Issues **Reading**: Variety of examples for Modes of Writing **Writing:** Different types of letters		CO4

UNIT- V	Interpersonal Communication - II	Periods: 15
List of Exercises **Listening:** Videos on different types of Etiquettes **Speaking**: Team Presentation, Negotiation Skills **Reading**: Phrase and Clause **Writing:** Free writing on any given topic, Paraphrasing Practice		CO5

Lecture Periods: 30	Tutorial Periods: -	Practical Periods: 30	Total Periods: 60

Text Books

1. PC Das, "Letter Writing including Official and Business Letters", New Central Book Agency, 2020.
2. Kumar, Sanjay, Pushpalatha," Communication Skills". Oxford University Press, 2018.
3. Raman, Meenakshi&Sangeetha Sharma," Communication Skills", New Delhi: OUP,2018.

Reference Books

1. Sahukar, Nimeran , Bhalla, Prem,, "The book of Etiquettes and Manners".PustakMahal Publisher, New Delhi; 1st Edition 2009.
2. Gerson Sharon J, Steven M. Gerson, "Technical Writing Process and Product", Pearson Education Pvt. Ltd. 3rd Edition, 2009.
3. Grussendorf, Marion, "English for Presentations". Oxford University Press, Oxford, 2007.
4. Seely John, "The Oxford Guide to Writing and Speaking", Oxford University Press, 2006.
5. R.C. Sharma, Krishna Mohan, "Business Correspondence and Report Writing", Tata McGraw Hill &Co.Ltd., New Delhi, 2001

2.A.6.75

Web References
1. https://www.indeed.com/career-advice/finding-a-job/how-to-write-an-application-letter
2. https://owlcation.com/humanities/Four-Types-of-Writing
3. https://targetstudy.com/languages/english/paragraph-writing.html
4. https://www.businessnewsdaily.com/8262-email-etiquette-tips.html
5. https://www.youtube.com/watch?v=UOceysteljo

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1	-	-	-	-	-	-	-	-	3	-	1	-	-	-
2	1	-	-	-	-	-	-	-	-	3	-	1	-	-	-
3	1	-	-	-	-	-	-	-	-	3	-	1	-	-	-
4	1	-	-	-	-	-	-	-	-	3	-	1	-	-	-
5	1	-	-	-	-	-	-	-	-	3	-	1	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Theory						
Assessment	Continuous Assessment Marks (CAM)				End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Attendance		
Marks	5	5	5	5	75	60
	20(to be weighted for 10 marks)				(to be weighted for 50 marks)	

Practical				
Continuous Assessment Internal Evaluation		End Semester Internal Evaluation		Total Marks
30(to be weighted for 10 marks)		30 marks		
Listening (L)*	10	Listening (L)*	10	40
Speaking(S)	5	Speaking(S)	5	
Reading(R)*	10	Reading(R)*	10	
Writing(W)*	5	Writing(W)*	5	

- **LRW components of Practical can be evaluated through Language Lab Software**

2.A.6.76

Department	Mechanical	Programme : B.Tech.						
Semester	II	Course Category : ES				End Semester Exam Type: LE		
Course Code	U23ESPC03	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	ENGINEERING GRAPHICS USING AUTOCAD LABORATORY	-	-	2	1	50	50	100

(Common to all Branches)

Prerequisite	Nil	
Course Outcome	On completion of the course, the students will be able to	BT Mapping (Highest Level)
	CO1 Familiarize with the fundamentals and standards of engineering graphics.	K3
	CO2 Perform drawing of basic geometrical constructions and multiple views of objects.	K2
	CO3 Visualize the isometric and perspective sections of simple solids.	K3
	CO4 Connect side view associate on front view.	K4
	CO5 Correlate sectional views and lateral surface developments of various solids.	K4

List of Experiments

1. Study of capabilities of software for Drafting and Modeling – Coordinate systems (absolute, relative, polar, etc.) – Creation of simple figures like polygon and general multi-line figures.
2. Drawing a Title Block with necessary text and projection symbol.
3. Drawing 2D sketch by applying modify tools like fillet, mirror, array, etc.,
4. Drawing front view and top view of simple solids like prism, pyramid, cylinder, cone, etc., and Dimensioning.
5. Drawing front view, top view and side view of objects from the given pictorial views (eg. Simple stool, V-block, Mixie Base).
6. Drawing a plan of residential building (Two bed rooms, kitchen, hall, etc.)
7. Drawing sectional views of prism, pyramid, cylinder, cone, etc,
8. Drawing lateral surface development of prism, pyramid, cylinder, cone, etc,
9. Drawing isometric projection of simple objects.
10. Creating 3D model of simple object and obtaining 2D multi-view drawings.
11. Note: Plotting of drawings must be made for each exercise and attached to the records written by Students.

Lecture Periods: -	Tutorial Periods: -	Practical Periods: 30	Total Periods: 30

Reference Books

1. James D. Bethune, Engineering Graphics with AutoCAD A Spectrum book 1st Edition, Macromedia Press, Pearson, 2020.
2. NS Parthasarathy and Vela Murali, Engineering Drawing, Oxford university press, 2015.
3. M.B Shah, Engineering Graphics, ITL Education Solutions Limited, Pearson Education Publication, 2011.
4. Bhatt N.D and Panchal V.M, Engineering Drawing: Plane and Solid Geometry, Charotar Publishing House, 2017.
5. Jeyapoovan T, Engineering Drawing and Graphics Using AutoCAD, Vikas Publishing House Pvt Ltd., 7th Edition, New Delhi, 2016.
6. C M Agrawal, Basant Agrawal, Engineering Graphics, McGraw Hill, 2012.
7. Dhananjay A. Jolhe, Engineering Drawing: With An Introduction To CAD McGraw Hill, 2016.
8. James Leach, AutoCAD 2017 Instructor, SDC Publications, 2016.

Web References

1. http://vlabs.iitb.ac.in/vlabs-dev/labs/mit_bootcamp/egraphics_lab/labs/index.php
2. http://www.nptelvideos.in/2012/12/computer-aided-design.html
3. https://mech.iitm.ac.in/meiitm/course/cad-in-manufacturing/
4. https://autocadtutorials.com
5. https://dwgmodels.com

2.A.6.77

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	1	-	-	3	-	-	-	3	-	-	2	3	3	3
2	3	1	-	-	3	-	-	-	3	-	-	3	3	3	3
3	3	1	-	-	3	-	-	-	3	-	-	3	3	3	3
4	3	1	-	-	3	-	-	-	3	-	-	2	3	3	3
5	3	1	-	-	3	-	-	-	3	-	-	3	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	Performance in practical classes			Model Practical Examination	Attendance		
	Conduction of practical	Record work	viva				
Marks	15	5	5	15	10	50	100

2.A.b.78

Department	Mechanical Engineering	Programme: B.Tech.						
Semester	II	Course Category: CC			End Semester Exam Type: LE			
Course Code	U23CSPC01	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	PROGRAMMING IN C LABORATORY	-	-	2	1	50	50	100

(Common to All Branches)

Prerequisite	Nil	
Course Outcome	On completion of the course, the students will be able to	BT Mapping (Highest Level)
	CO1 Implement logical formulations to solve simple problems leading to specific applications.	K3
	CO2 Execute C programs for simple applications making use of basic constructs, arrays and strings.	K3
	CO3 Experiment C programs involving functions, recursion, pointers, and structures.	K3
	CO4 Demonstrate applications using sequential and random access file processing.	K3
	CO5 Build solutions for online coding challenges.	K3

List of Experiments

1. Write a C program to find the Area of the triangle.
2. Develop a C program to read a three digit number and produce output like
   1 hundreds
   7 tens
   2 units
   For an input of 172.
3. Write a C program to check whether a given character is vowel or not using Switch – Case statement.
4. Write a C program to Print the numbers from 1 to 10 along with their squares.
5. Demonstrate do—While loop in C to find the sum of 'n' numbers.
6. Find the factorial of a given number using Functions in C.
7. Write a C program to check whether a given string is palindrome or not?
8. Write a C program to check whether a value is prime or not?
9. Develop a C program to swap two numbers using call by value and call by reference.
10. Construct a C program to find the smallest and largest element in an array.
11. Implement matrix multiplication using C program.
12. Write a C program to perform various string handling functions like strlen, strcpy, strcat, strcmp.
13. Develop a C program to remove all characters in a string except alphabets.
14. Write a C program to find the sum of an integer array using pointers.
15. Write a C program to find the Maximum element in an integer array using pointers.
16. Construct a C program to display Employee details using Structures
17. Write a C program to display the contents of a file on the monitor screen.
18. Write a File by getting the input from the keyboard and retrieve the contents of the file using file operation commands.
19. Write a C program to create two files with a set of values. Merge the two file contents to form a single file
20. Write a C program to pass the parameter using command line arguments.

Lecture Periods: -	Tutorial Periods: -	Practical Periods: 30	Total Periods: 30

Reference Books

1. Zed A Shaw," Learn C the Hard Way: Practical Exercises on the Computational Subjects You Keep Avoiding (Like C)", Addison Wesley,2016.
2. Anita Goel and Ajay Mittal," Computer Fundamentals and programming in C", Pearson Education, First edition, 2011.
3. Maureen Sprankle, Jim Hubbard," Problem Solving and Programming Concepts," Pearson,9th Edition, 2011.
4. Yashwanth Kanethkar, "Let us C", BPB Publications,13th Edition,2008.
5. B.W.Kernighan and D.M. Ritchie, "The C Programming Language", Pearson Education, 2nd Edition, 2006.

Web References

1. https://alison.com/course/introduction-to-c-programming
2. https://www.geeksforgeeks.org/c-programming-language/
3. http://cad-lab.github.io/cadlab_data/files/1993_prog_in_c.pdf
4. https://www.tenouk.com/clabworksheet/clabworksheet.html
5. https://fresh2refresh.com/c-programming/

2.A.6.79

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	1	-	-	3	-	-	-	-	-	-	-	3	-	3
2	2	1	-	-	3	-	-	-	-	-	-	-	3	-	3
3	3	2	1	1	3	-	-	-	-	-	-	-	3	-	3
4	3	2	1	1	3	-	-	-	-	-	-	-	3	-	3
5	3	2	1	1	3	-	-	-	-	-	-	-	3	-	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	Performance in practical classes			Model Practical Examination	Attendance		
	Conduction of practical	Record work	viva				
Marks	15	5	5	15	10	50	100

2.A.6.80

Department	Mechanical	Programme : B.Tech.						
Semester	II	Course Categor: CC				End Semester Exam Type: LE		
Course Code	U23MEP201	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	MANUFACTURING AND METALLURGY LABORATORY	-	-	2	1	50	50	100

Prerequisite	Nil	
Course Outcome	On completion of the course, the students will be able to	BT Mapping (Highest Level)
CO1	Be conversant with the basic manufacturing processes.	K3
CO2	Identify and apply suitable tools and instruments for machining, assembly and fitting	K3
CO3	Use different moulding tools, patterns and prepare sand moulds	K3
CO4	Select suitable welding for the given material and perform various operations.	K3
CO5	Evaluate the effect of heat treatment on properties of steel and measure the hardness	K3

List of Experiments

Lathe

1. Study of Lathe machines and its operations
2. Plain Turning and Facing
3. Step Turning
4. Taper turning
5. Thread cutting
6. Drilling and boring

Foundry

7. Preparation of a sand mold using solid pattern

Welding

8. Preparation of butt joints and lap joints by using manual metal arc welding

Metallurgy Laboratory

9. Study of metallurgical microscope and sample preparation.
10. Preparation and study of the microstructure of copper and its alloys
11. Preparation and study of microstructure of aluminum and its alloys
12. Jominy End Quenching Test

Lecture Periods: -	Tutorial Periods: -	Practical Periods: 30	Total Periods: 30

Reference Books

1. Hajra Choudhury S.K., Hajra Choudhury A.K., Nirjhar Roy, "Elements of Workshop Technology - Vol. I", 14th Edition, Media Promoters & Publishers Private Limited, Mumbai, 2008.
2. Hajra Choudhury S.K., Nirjhar Roy, "Elements of Workshop Technology-Volume-2", 15th Edition, Media Promoters & Publishers Pvt Ltd, Mumbai, 2010.
3. R.C. Sharma, Principles of Heat Treatment of Steel 1 Edition, New Age International Publishers,2018.
4. Vijendra Singh, heat treatment of metals. Standard Publishers,2020.
5. K. Rajput, Manufacturing Processes, Lakshmi Publications,2020.

Web References

1. http://www.nptelvideos.in/2012/12/manufacturing-processes-ii.html
2. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=3804
3. https://www.tpctraining.com/collections/machine-shop-practices-training
4. https://www.rubig.com/en/heat-treatment/rubig-heat-treatment/
5. https://nptel.ac.in/courses/112/107/112107219/

2.A.6.81

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	-	1	-	-	-	-	2	1	-	-	2	2	3
2	2	1	-	1	-	-	-	-	1	1	-	-	2	1	2
3	2	1	-	1	-	-	-	-	1	1	-	-	2	2	1
4	2	1	-	1	-	-	-	-	1	1	-	-	1	2	2
5	2	1	-	1	-	-	-	-	1	1	-	-	2	2	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	Performance in practical classes			Model Practical Examination	Attendance		
	Conduction of practical	Record work	viva				
Marks	15	5	5	15	10	50	100

2.A.b.82.