



SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE
(An Autonomous Institution)

Puducherry

B.TECH. ELECTRICAL AND ELECTRONICS ENGINEERING

ACADEMIC REGULATIONS 2023
(R-2023)

CURRICULUM AND SYLLABI
Volume – I



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

To promote proficiency in the field of Electrical and Electronics Engineering by creating a stimulating environment for research, innovation and entrepreneurship

Mission

M1: Quality Education:

To impart high quality technical education with problem solving capabilities by innovative pedagogy in emerging technologies.

M2: Industrial and Societal Needs:

To cater the dynamic needs of the industry and society by strengthening industry-institute interaction.

M3: Research and Innovation:

To nurture the spirit of research attitude by carrying out innovative technologies pragmatically.

M4: Placement and Entrepreneurship:

To inculcate the professionalism in career by advancing synergetic skills to compete in the corporate world.

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.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Professional Knowledge:

To possess strong educational foundation in Electrical and Electronics Engineering to attain successful career with professional responsibility

PEO2: Innovative Skills:

To enrich the skills to design and develop innovative solutions for engineering problems in a multidisciplinary environment

PEO3: Ethics:

To actively embrace leadership qualities for achieving professional goals with ethical values

PEO4: Adaptability:

To enhance intellectual competency along with technical skills by adapting to the current trends through eternal learning.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1: Core Proficiency:

Utilize the engineering core knowledge to identify, formulate, design, and investigate the complex engineering problems of Power Electronics, Electrical Machines and Power Systems.

PSO2: Cutting Edge Technologies:

Explore the new cutting edge technologies in the field of Electric Vehicle, Automation, Artificial Intelligence, Robotics and Renewable Energy to compete in global market

PSO3: Design and Evolution:

Capability to comprehend the technological advancements with the usage of modern design tools for analysing and designing systems to confront the rapid pace of industrial innovations.

STRUCTURE FOR UNDERGRADUATE ENGINEERING PROGRAMME

Sl. No	Course Category	Breakdown of Credits
1	Humanities and Social Sciences including Management courses (HS)	15
2	Basic Science Courses (BS)	20
3	Engineering Science including workshop, drawing, basics of electrical / mechanical / computer etc. (ES)	24
4	Professional Core Courses (PC)	71
5	Professional Electives Courses (PE)	18
6	Open Electives Courses (OE)	09
7	Project Work and Internship (PA)	13
8	Ability Enhancement Courses (AEC*)	-
9	Mandatory Courses (MC*)	-
Total		170

SCHEME OF CREDIT DISTRIBUTION – SUMMARY

Sl. No	AICTE Suggested Course Category	Credits per Semester								Total Credits
		I	II	III	IV	V	VI	VII	VIII	
1	Humanities and Social Science (HS)	3	5	1	1	2	-	-	3	15
2	Basic Sciences(BS)	7	4	5	4	-	-	-	-	20
3	Engineering Sciences (ES)	4	8	4	4	4	-	-	-	24
4	Professional Core (PC)	8	4	13	11	8	15	12	-	71
5	Professional Electives (PE)	-	-	-	3	3	3	3	6	18
6	Open Electives (OE)	-	-	-	-	3	3	3	-	09
7	Project Work (PA)	-	-	-	-	1	1	2	8	12
8	Internship (PA)	-	-	-	-	-	-	1	-	01
9	Ability Enhancement Courses (AEC*)	-	-	-	-	-	-	-	-	-
10	Mandatory courses (MC*)	-	-	-	-	-	-	-	-	-
Total		22	21	23	23	21	22	21	17	170

* AEC and MC are not included for CGPA calculation

HONOURS DEGREE PROGRAMME:

The student is permitted to opt for earning an honours degree in the same discipline of engineering in addition to the degree in his/her own discipline. To earn an honours degree the student is required to earn an additional 18 - 20 credits (over and above the total 170 credits prescribed in the curriculum) starting from fourth semester onwards by completing 5 additional courses offered in respective semesters. A student is eligible to exercise this option if he/she has passed all the courses offered upto third semester in the first attempt itself and has earned a CGPA / GPA* (*for lateral entry) of not less than 8.0. The prescribed courses offered for Honours degree are given in Annexure - IV

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	U23EET101	Electrical Engineering	PC	3	0	0	3	25	75	100
5	U23EET102	Electronics – I	PC	3	0	0	3	25	75	100
Theory cum Practical										
6	U23ENBC01	Communicative English – I	HS	2	0	2	3	50	50	100
Practical										
7	U23ESPC02	Design Thinking and IDEA Lab	ES	0	0	2	1	50	50	100
8	U23EEP101	Electrical Engineering Laboratory	PC	0	0	2	1	50	50	100
9	U23EEP102	Electronics – I Laboratory	PC	0	0	2	1	50	50	100
Ability Enhancement Course										
10	U23EEC1XX	Certification Course – I**	AEC	0	0	4	-	100	-	100
Mandatory Course										
11	U23EEM101	Induction Programme (UHV- I)	MC	2 Weeks			-	-	-	-
							22	425	575	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	U23EET203	Electronics – II	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	50	50	100
Practical										
7	U23ESPC03	Engineering Graphics using AutoCAD	ES	0	0	2	1	50	50	100
8	U23CSPC01	Programming in C Laboratory	ES	0	0	2	1	50	50	100
9	U23EEP203	Electronics – II Laboratory	PC	0	0	2	1	50	50	100
Ability Enhancement Course										
10	U23EEC2XX	Certification Course – II **	AEC	0	0	4	-	100	-	100
Mandatory Course										
11	U23EEM202	Sports Yoga and NSS	MC	0	0	2	-	100	-	100
							21	525	575	1100

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

\$ Open electives are to be selected from the list given in Annexure II

** Certification courses are to be selected from the list given in Annexure III (A)

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

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	U23EET304	Electromagnetic Theory	PC	2	1	0	3	25	75	100
4	U23EET305	Electrical Machines – I	PC	3	0	0	3	25	75	100
5	U23EET306	Electronics – III	PC	3	0	0	3	25	75	100
Theory cum Practical										
6	U23EEB301	Electric Circuit Analysis	PC	2	0	2	3	50	50	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	U23ADPC01	Programming in Python Laboratory	ES	0	0	2	1	50	50	100
10	U23EEP304	Electrical Machines – I Laboratory	PC	0	0	2	1	50	50	100
Ability Enhancement Course										
11	U23EEC3XX	Certification Course – III **	AEC	0	0	4	-	100	-	100
12	U23EES301	Skill Enhancement Course – I*	AEC	0	0	2	-	100	-	100
Mandatory Course										
13	U23EEM303	Climate Change	MC	2	0	0	-	100	-	100
							23	675	625	1300

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	U23CSTC03	Data Structures	ES	3	0	0	3	25	75	100
3	U23EET407	Electrical Machines – II	PC	3	0	0	3	25	75	100
4	U23EET408	Transmission and Distribution	PC	2	1	0	3	25	75	100
5	U23EEE4XX	Professional Elective - I [#]	PE	3	0	0	3	25	75	100
Theory cum Practical										
6	U23EEB402	Control Systems	PC	2	0	2	3	50	50	100
Practical										
7	U23ENPC02	General Proficiency – II	HS	0	0	2	1	50	50	100
8	U23CSPC02	Data Structures Laboratory	ES	0	0	2	1	50	50	100
9	U23EEP405	Electrical Machines - II Laboratory	PC	0	0	2	1	50	50	100
10	U23EEP406	Electronics - III Laboratory	PC	0	0	2	1	50	50	100
Ability Enhancement Course										
11	U23EEC4XX	Certification Course – IV **	AEC	0	0	4	-	100	-	100
12	U23EES402	Skill Enhancement Course – II*	AEC	0	0	2	-	100	-	100
Mandatory Course										
13	U23EEM404	Right to Information and Good Governance	MC	2	0	0	-	100	-	100
							23	675	625	1300

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	U23ITTC03	Programming in Java	ES	3	0	0	3	25	75	100
3	U23EET509	Electrical Measurements and Instrumentation	PC	3	0	0	3	25	75	100
4	U23EET510	Microprocessor and Microcontroller	PC	3	0	0	3	25	75	100
5	U23EEE5XX	Professional Elective - II [#]	PE	3	0	0	3	25	75	100
6	U23XXO5XX	Open Elective - I ^{\$}	OE	3	0	0	3	25	75	100
Practical										
7	U23ITPC03	Programming in Java Laboratory	ES	0	0	2	1	50	50	100
8	U23EEP507	Electrical Measurements and Instrumentation Laboratory	PC	0	0	2	1	50	50	100
9	U23EEP508	Microprocessor and Microcontroller Laboratory	PC	0	0	2	1	50	50	100
Project Work										
10	U23EEW501	Micro Project	PA	0	0	2	1	100	-	100
Ability Enhancement Course										
11	U23EEC5XX	Certification Course – V ^{**}	AEC	0	0	4	-	100	-	100
Mandatory Course										
12	U23EEM505	Essence of Indian Traditional Knowledge	MC	2	0	0	-	100	-	100
							21	600	600	1200

SEMESTER – VI										
Sl. No	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23EET611	Power System Analysis	PC	2	1	0	3	25	75	100
2	U23EET612	Embedded System	PC	3	0	0	3	25	75	100
3	U23EET613	Power Electronics	PC	3	0	0	3	25	75	100
4	U23EEE6XX	Professional Elective - III #	PE	3	0	0	3	25	75	100
5	U23XXO6XX	Open Elective – II \$	OE	3	0	0	3	25	75	100
Theory cum Practical										
6	U23EEB603	Electrical Machine Design	PC	2	0	2	3	50	50	100
Practical										
7	U23EEP609	Power System Analysis Laboratory	PC	0	0	2	1	50	50	100
8	U23EEP610	Embedded System Laboratory	PC	0	0	2	1	50	50	100
9	U23EEP611	Power Electronics Laboratory	PC	0	0	2	1	50	50	100
Project Work										
10	U23EEW602	Mini Project	PA	0	0	2	1	100	-	100
Ability Enhancement Course										
11	U23EEC6XX	Certification Course – VI **	AEC	0	0	4	-	100	-	100
Mandatory Course										
12	U23EEM606	Gender Equality	MC	2	0	0	-	100	-	100
							22	625	575	1200

SEMESTER – VII										
Sl. No	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23EET714	Industrial Automation and Control	PC	3	0	0	3	25	75	100
2	U23EET715	Renewable Energy Sources	PC	3	0	0	3	25	75	100
3	U23EET716	Electric Vehicles	PC	3	0	0	3	25	75	100
4	U23EEE7XX	Professional Elective – IV [#]	PE	3	0	0	3	25	75	100
5	U23XXO7XX	Open Elective – III ^{\$}	OE	3	0	0	3	25	75	100
Practical										
6	U23EEP712	Industrial Automation and Control Laboratory	PC	0	0	2	1	50	50	100
7	U23EEP713	Renewable Energy Sources Laboratory	PC	0	0	2	1	50	50	100
8	U23EEP714	Electric Vehicles Laboratory	PC	0	0	2	1	50	50	100
Project Work										
9	U23EEW703	Project Phase – I	PA	0	0	4	2	50	50	100
10	U23EEW704	Internship / Inplant Training	PA	0	0	2	1	100	-	100
							21	425	575	1000

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	U23EEE8XX	Professional Elective – V [#]	PE	3	0	0	3	25	75	100
3	U23EEE8XX	Professional Elective – VI [#]	PE	3	0	0	3	25	75	100
Project Work										
4	U23EEW805	Project Phase – II	PA	0	0	16	8	50	100	150
							17	125	325	450

Annexure – I PROFESSIONAL ELECTIVE COURSES

Professional Elective – I (Offered in Semester IV)		
Sl. No.	Course Code	Course Title
1	U23EEDC01	Electrical Safety Engineering
2	U23EEE402	Nano Electronics
3	U23EEE403	Power Plant Engineering
4	U23EEE404	Energy Storage Technology
5	U23EEE405	Digital Logic Design using VHDL
Professional Elective – II (Offered in Semester V)		
Sl. No.	Course Code	Course Title
1	U23EEE506	Utilization of Electrical Energy
2	U23EEE507	Special Electrical Machines
3	U23EEE508	High Voltage Engineering
4	U23EEE509	Automotive Electronics for Electrical Engineering
5	U23ECEC04	VLSI System
Professional Elective – III (Offered in Semester VI)		
Sl. No.	Course Code	Course Title
1	U23EEE611	Finite Element Analysis
2	U23EEE612	SMPS and UPS
3	U23EEE613	Flexible AC Transmission System
4	U23ICEC02	Soft Computing Techniques
5	U23EEE615	Internet of Things for Smart System
Professional Elective – IV (Offered in Semester VII)		
Sl. No.	Course Code	Course Title
1	U23EEE716	Electrical Energy Audit and Conservation
2	U23EEE717	Multilevel Power Converters
3	U23ICEC01	Virtual Instrumentation
4	U23EEE719	Modern Control System
5	U23EEE720	Robotics and Automation
Professional Elective – V (Offered in Semester VIII)		
Sl. No.	Course Code	Course Title
1	U23EEE821	Electric Traction
2	U23EEE822	Advanced Electric Drives and Control
3	U23EEE823	Protection and Switchgear
4	U23EEE824	Digital Signal Processing for Electrical Engineering
5	U23EEE825	AI Techniques in Electrical System
Professional Elective – VI (Offered in Semester VIII)		
Sl. No.	Course Code	Course Title
1	U23EEE826	Industrial Electrical System
2	U23EEE827	Power Electronics for Renewable Energy Systems
3	U23EEE828	Power System Operation and Control
4	U23EEE829	Optimization Techniques
5	U23EEE830	Smart Grid

Annexure – II**OPEN ELECTIVE COURSES**

Sl. No.	Course Code	Course Title	Offering Department	Permitted Department
Open Elective – I / Open Elective – II (Offered in Semester V for CSE, IT, MECH, Mechatronics, AI&DS) (Offered in Semester VI for EEE, ECE, ICE, CIVIL, BME, CCE, FT)				
1.	U23EEDC01	Electrical Safety Engineering	EEE	ECE, ICE, MECH, CIVIL, MCTR, CCE, BME, IT, CSE, FT, AI&DS, CSBS
2.	U23EEOC02	Solar Photovoltaic Fundamental and Applications	EEE	ECE, ICE, MECH, CIVIL, MCTR, CCE, BME, IT, CSE, FT, AI&DS, CSBS
Open Elective – III (Offered in Semester VII)				
1.	U23EEOC03	Electric and Hybrid Vehicles	EEE	ECE, ICE, MECH, MCTR, CCE, BME, AI&DS
2.	U23EEOC04	Energy Conservation and Management	EEE	ECE, ICE, MECH, CIVIL, MCTR, CCE, BME, IT, CSE, AI&DS

Annexure – III**ABILITY ENHANCEMENT COURSES – (A) CERTIFICATION COURSES**

S. No	Course Code	Course Title
1	U23EECX01	Adobe Photoshop
2	U23EECX02	Adobe Animate
3	U23EECX03	Adobe Dreamweaver
4	U23EECX04	Adobe After Effects
5	U23EECX05	Adobe Illustrator
6	U23EECX06	Adobe InDesign
7	U23EECX07	Autodesk AutoCAD -ACU
8	U23EECX08	Autodesk Inventor - ACU
9	U23EECX09	Autodesk Revit - ACU
10	U23EECX10	Autodesk Fusion 360 - ACU
11	U23EECX11	Autodesk 3ds Max - ACU
12	U23EECX12	Autodesk Maya - ACU
13	U23EECX13	Cloud Security Foundations
14	U23EECX14	Cloud Computing Architecture
15	U23EECX15	Cloud Foundation

16	U23EECX16	Cloud Practitioner
17	U23EECX17	Cloud Solution Architect
18	U23EECX18	Data Engineering
19	U23EECX19	Machine Learning Foundation
20	U23EECX20	Robotic Process Automation / Medical Robotics
21	U23EECX21	Advance Programming Using C
22	U23EECX22	Advance Programming Using C ++
23	U23EECX23	C Programming
24	U23EECX24	C++ Programming
25	U23EECX25	CCNP Enterprise: Advanced Routing
26	U23EECX26	CCNP Enterprise: Core Networking
27	U23EECX27	Cisco Certified Network Associate - Level 2
28	U23EECX28	Cisco Certified Network Associate- Level 1
29	U23EECX29	Cisco Certified Network Associate- Level 3
30	U23EECX30	Fundamentals Of Internet of Things
31	U23EECX31	Internet Of Things / Solar and Smart Energy System with IoT
32	U23EECX32	Java Script Programming
33	U23EECX33	NGD Linux Essentials
34	U23EECX34	NGD Linux I
35	U23EECX35	NGD Linux II
36	U23EECX36	Advance Java Programming
37	U23EECX37	Android Programming / Android Medical App Development
38	U23EECX38	Angular JS
39	U23EECX39	Catia
40	U23EECX40	Communication Skills for Business
41	U23EECX41	Coral Draw
42	U23EECX42	Data Science Using R
43	U23EECX43	Digital Marketing
44	U23EECX44	Embedded System Using C
45	U23EECX45	Embedded System with IOT / Arduino
46	U23EECX46	English For IT
47	U23EECX47	Plaxis
48	U23EECX48	Sketch Up
49	U23EECX49	Financial Planning, Banking and Investment Management
50	U23EECX50	Foundation Of Stock Market Investing
51	U23EECX51	Machine Learning / Machine Learning for Medical Diagnosis
52	U23EECX52	IOT Using Python

53	U23EECX53	Creo (Modelling & Simulation)
54	U23EECX54	Soft Skills, Verbal, Aptitude
55	U23EECX55	Software Testing
56	U23EECX56	MX-Road
57	U23EECX57	CLO 3D
58	U23EECX58	Solid works
59	U23EECX59	Staad Pro
60	U23EECX60	Total Station
61	U23EECX61	Hydraulic Automation
62	U23EECX62	Industrial Automation
63	U23EECX63	Pneumatics Automation
64	U23EECX64	Agile Methodologies
65	U23EECX65	Block Chain
66	U23EECX66	Devops
67	U23EECX67	Artificial Intelligence
68	U23EECX68	Cloud Computing
69	U23EECX69	Computational Thinking
70	U23EECX70	Cyber Security
71	U23EECX71	Data Analytics
72	U23EECX72	Databases
73	U23EECX73	Java Programming
74	U23EECX74	Networking
75	U23EECX75	Python Programming
76	U23EECX76	Web Application Development (HTML, CSS, JS)
77	U23EECX77	Network Security
78	U23EECX78	MATLAB
79	U23EECX79	Azure Fundamentals
80	U23EECX80	Azure AI (AI-900)
81	U23EECX81	Azure Data (DP -900)
82	U23EECX82	Microsoft 365 Fundamentals (SS-900)
83	U23EECX83	Microsoft Security, Compliance and Identity (SC-900)
84	U23EECX84	Microsoft Power Platform (PI-900)
85	U23EECX85	Microsoft Dynamics Fundamentals 365 – CRM
86	U23EECX86	Microsoft Excel
87	U23EECX87	Microsoft Excel Expert
88	U23EECX88	Securities Market Foundation
89	U23EECX89	Derivatives Equity

90	U23EECX90	Research Analyst
91	U23EECX91	Portfolio Management Services
92	U23EECX92	Cyber Security
93	U23EECX93	Cloud Security
94	U23EECX94	PMI – Ready
95	U23EECX95	Tally – GST & TDS
96	U23EECX96	Advance Tally
97	U23EECX97	Associate Artist
98	U23EECX98	Certified Unity Programming
99	U23EECX99	VR Development

ABILITY ENHANCEMENT COURSES – (B) SKILL ENHANCEMENT COURSES

Sl. No.	Course Code	Course Title
1	U23EES301	Skill Enhancement Course 1 *
		1) Testing of Electronics Devices and PCB Board Designing
		2) Design of Solar power plant and Installation
		3) Demonstration / Troubleshooting of Electrical and Electronics Equipments
2	U23EES402	Skill Enhancement Course 2 *
		1) Mobile Phone Servicing
		2) Autonomous Robotics
		3) Repair and Maintenance of Power Supply, Inverter and UPS

* Any one course to be selected from the list

Annexure – IV

Honours Programme - Electric Vehicle Technology

COURSE DETAILS											
Sl. No.	Semester	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
					L	T	P		CAM	ESM	Total
Theory											
1	IV	U23EEH401	Advanced Power Train Engineering	PC	3	1	0	4	25	75	100
2	V	U23EEH502	Energy Storage and Management in Electric Vehicles	PC	3	1	0	4	25	75	100
3	VI	U23EEH603	Electrical Drives and Controllers for EV	PC	3	1	0	4	25	75	100
4	VII	U23EEH704	Noise,Vibration and Harshness in Electric Vehicles	PC	3	1	0	4	25	75	100
5	VIII	U23EEH805	Autonomous and Connected Vehicles	PC	3	1	0	4	25	75	100
Total								20	125	375	500
Equivalent NPTEL courses ^{##}											
1	Course Code U23EEHN01		Electric Vehicles and Renewable Energy					3	12 WEEK Course		
2			Electrochemical Energy Storage					3			
3			Design of Photovoltaic Systems					3			
4			Design of Electric Motors					3			
5			Digital Control in Switched Mode Power Converters and FPGA -based Prototyping					3			

^{##} The student shall be given an option to earn 3 credits through one 12 week NPTEL course (Equivalent) instead of any one course listed for honours degree programme and shall be completed before the commencement of eighth semester. The equivalent courses are subject to change based on its availability as per NPTEL course list.

Department	Mathematics				Programme: B. Tech.						
Semester	First				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	0	4	25	75	100
(Common to ALL Branches Except CSBS)											
Prerequisite	Basic Mathematics										
Course Outcomes	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									K3
	CO5	Gain the knowledge about Vector Calculus and its Applications									K3
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, Chennai, 2 nd Edition, 2016. 2. N. P Bali and Manish Goyal, “A Text Book of Engineering Mathematics”, Lakshmi Publications, New Delhi, 9 th Edition, 2018. 3. S.Narayanan and T.K. Manickavasagam Pillay, “Differential Equations and Its Applications”, Viswanathan Printers & Publishers Pvt Ltd, 2014.											
Reference Books											
1. G. Balaji, “Matrices and Calculus (Engineering Mathematics – I)”, Balaji Publications, 9 th Edition, 2023. 2. A. Singaravelu, “Engineering Mathematics – I”, Meenakshi Agency, Chennai, 23 rd Edition, 2016. 3. Erwin Kreyszig, “Advanced Engineering Mathematics”, Wiley, 10 th Edition, 2019. 4. B.V. Ramana, “Higher Engineering Mathematics”, Tata McGraw Hill, New Delhi, 6 th Edition, 2018. 5. C W. Evans, “Engineering Mathematics - A Programmed Approach”, 3 rd Edition, 2019.											
Web References											
1. http://www.yorku.ca/yaoguo/math1025/slides/chapter/kuttler-linearalgebra-slides-systemsofequation-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/											

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	2	1	1
2	3	2	1	1	-	1	1	-	-	-	-	1	2	1	1
3	3	2	1	1	-	1	1	-	-	-	-	1	2	1	1
4	3	2	1	1	-	1	1	-	-	-	-	1	2	1	1
5	2	2	1	-	-	-	1	-	-	-	-	1	2	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

Department	Physics / Chemistry			Programme: B. Tech.							
Semester	First / Second			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	0	0	3	25	75	100	
(Common to ALL Branches)											
Prerequisite	Physics of 12 th standard or equivalent / Chemistry of 12 th standard or equivalent.										
Course Outcomes	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:8				
Introduction to magnetic materials, Ferromagnetism- Domain theory-Types of energy-Hysteresis-Hard and Soft magnetic materials-ferrites-Dielectric materials-Types of polarization – Langevin-Debye equation-Frequency effects on polarization-Dielectric breakdown- Ferroelectric materials-Superconducting materials and their properties										CO1	
UNIT – II	Quantum Mechanics						Periods:7				
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:7				
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:8				
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:8				
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 and Ag/AgCl. Batteries and fuel cells: Types of batteries- alkaline battery-lead storage battery- nickel-cadmium battery- fuel cell H ₂ -O ₂ fuel cell-applications.										CO5	
UNIT – VI	Corrosion						Periods:7				
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 electro less plating of nickel.										CO6	
Lecture Periods: 45		Tutorial Periods: -			Practical Periods: -			Total Periods: 45			
Text Books											
1. V Rajendran, “Engineering Physics”, TMH, New Delhi, 2 nd Edition, 2017.											
2. S.S Dara, “A text book of Engineering Chemistry”, S.Chand Publications, 15 th Edition, 2021.											
3. C.Jain, Monica Jain, “Engineering Chemistry”, Dhanpat Rai Pub. Co., New Delhi, 17 th Edition, 2015.											

Reference Books

1. G. Balaji, "Matrices and Calculus (Engineering Mathematics – I)", Balaji Publications, 9th Edition, 2023.
2. A. Singaravelu, "Engineering Mathematics – I", Meenakshi Agency, Chennai, 23rd Edition, 2016.
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. 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	2	2
2	3	2	3	2	-	-	-	-	-	-	-	-	2	2	2
3	3	2	3	2	-	-	-	-	-	-	-	-	2	2	2
4	3	1	-	-	-	-	-	-	-	-	-	-	2	2	2
5	3	1	-	-	-	-	-	-	-	-	-	-	2	2	2
6	3	1	-	-	-	-	-	-	-	-	-	-	2	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

Department	Mechanical Engineering				Programme: B. Tech.						
Semester	First / Second				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	0	3	25	75	100
(Common to EEE, ECE, MECH, CIVIL, Mechatronics Branches)											
Prerequisite	Engineering Physics										
Course Outcomes	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 E.R.Johnston Jr., "Vector Mechanics for Engineers", McGraw-Hill Education India Pvt Ltd., 11 th Edition, 2016. 2. J.L. Meriam & L.G. Karidge, "Engineering Volume I and Engineering Mechanics: Dynamics", Wiley, 8 th Edition, 2016. 3. R.C. Hibbeller, "Engineering Mechanics", Prentice hall, 14 th 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, G. Sankarasubramanian, "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, 7 th Edition, 2019. 5. Dr.I.SGujral, "Engineering Mechanical" Lakshmi Publication (P) Ltd., 2 nd Edition, 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 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	1	1	1
2	3	2	2	3	-	-	-	-	-	-	-	1	1	1	1
3	3	2	2	3	-	-	-	-	-	-	-	1	1	1	1
4	3	2	2	3	-	-	-	-	-	-	-	1	1	1	1
5	3	2	2	3	-	-	-	-	-	-	-	1	1	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

Department	Electrical and Electronics Engineering				Programme: B. Tech.							
Semester	First				Course Category: PC		End Semester Exam Type :TE					
Course Code	U23EET101				Periods/Week		Credit	Maximum Marks				
					L	T	P	C	CAM	ESE	TM	
Course Name	ELECTRICAL ENGINEERING				3	0	0	3	25	75	100	
EEE												
Prerequisite	Physics											
Course Outcomes	On completion of the course, the students will be able to									BT Mapping (Highest Level)		
	CO1	Evaluate the current, voltage and power using different laws in DC circuits.									K3	
	CO2	Familiarize different terms, laws and parameters governing the magnetic circuits.									K3	
	CO3	Analyze the different AC circuits and impart the concepts of poly phase system.									K3	
	CO4	Develop the various domestic wiring with the preventive safety measures.									K4	
	CO5	Acquire skills about the factory wiring, estimation and protection methods for industries.									K4	
UNIT – I	DC Circuits						Periods:09					
Concept of Potential difference, current, work, power, energy -Electrical networks and its types – active and passive elements - ideal and practical sources, concept of dependent and independent sources - Ohm's law, Kirchhoff's laws, Current and voltage division rule, Simplification of networks using series , parallel connection - Network solutions using Mesh and Nodal analysis, Star/Delta transformation.										CO1		
UNIT – II	Magnetic Circuits						Periods:09					
Definitions of magnetism – Magnetic effect of electric current – Important terms of magnetic circuits – Comparison of Magnetic and Electric circuits – Electromagnetic induction – Lenz law – Induced EMF – Self and Mutual Induction – Amperes law – Energy stored in magnetic circuits – Magnetic Hysteresis and Eddy current – Magnetic Material and B-H Curve.										CO2		
UNIT – III	AC Circuits						Periods:09					
AC waveform – terms and definitions, form factor, peak factor- R-L, R-C, RLC series and parallel circuits, phasor representation in Polar and Rectangular form, concept of impedance, admittance, active, reactive, apparent and complex power, power factor, 3 phase balanced AC Circuits (Y-Δ and Y-Y), relationship between line and phase values – Power measurement – Two Wattmeter method – AC filters and its types.										CO3		
UNIT – IV	Electrical Safety And Domestic Wiring						Periods:09					
Safety measures in electrical system – Electrical tools and accessories–Wiring Standards –Types of domestic wiring – Staircase, doctor's room, fluorescent lamp, LED lamp and corridor wiring– Residential wiring–Layout of electrical power system and its functions– Insulators, fuses, relays and circuit breakers- Electrical shock and rescue methods – Applications.										CO4		
UNIT – V	Industrial Wiring						Periods:09					
Single line diagram of industrial wiring – Three phase wiring connections – Factory wiring – Godown wiring – panel wiring – Commercial wiring – Indian Electricity rules - Types of Conductors, Cables, sizing and selection- Electrical Estimation and installation –Energy audit - Earthing – Types of earthing – Difference between neutral and earth wire – Introduction to Megger - Introduction to ECAD – Applications.										CO5		
Lecture Periods: 45		Tutorial Periods: -			Practical Periods: -			Total Periods: 45				
Text Books												
1. D. C. Kulshreshtha, “Basic Electrical Engineering”, McGraw Hill, 2 nd Edition, 2019. 2. R. K. Rajput, “Basic Electrical and Electronics Engineering”, University Science Press, 2 nd Edition, 2017. 3. R. Muthusubramaniam, S. Salivahanan and K. A. Mureleedharan, “Basic Electrical Electronics and Computer Engineering”, Tata McGraw Hill, 2018.												
Reference Books												
1. Thaddeus W. Fowler, “Electrical Safety”, Diane Publishing Company, 5 th Edition, 2013. 2. A.Sudhakar and S. P.Shyam Mohan, “Circuits and Networks: Analysis and Synthesis”, Tata McGraw Hill Publishing Company Ltd., New Delhi, 4 th Edition, 2017. 3. B. L. Theraja, A. K. Theraja, “A Textbook of Electrical Technology – Volume - I”, S Chand & Co. Ltd., New Delhi, 23 rd Edition, 2009. 4. Stephen L. Herman, “Electrical Wiring”, Cengage Learning India, 15 th Edition, 2014. 5. S. K. Bhattacharya, S. Chatterji, “Projects in Electrical, Electronics, Instrumentation and Computer Engineering”, S. Chand & Co, 2 nd Edition, 2010.												

Web References

1. <https://www.electrical4u.com/>
2. <https://www.allaboutcircuits.com/>
3. <https://nptel.ac.in/courses/108105112/>
4. <https://nptel.ac.in/courses/108108076/>
5. <https://demonstrations.wolfram.com/>

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	3	2	-	-	-	-	-	-	1	3	3	3
2	3	3	3	3	2	-	-	-	-	-	-	1	3	3	3
3	3	3	3	3	2	-	-	-	-	-	-	1	3	3	3
4	3	3	3	2	2	-	-	-	-	-	-	1	3	3	3
5	3	3	3	2	2	-	-	-	-	-	-	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

Department	Electrical and Electronics Engineering				Programme: B. Tech.						
Semester	First				Course Category: PC		End Semester Exam Type :TE				
Course Code	U23EET102				Periods/Week		Credit	Maximum Marks			
					L	T	P	C	CAM	ESE	TM
Course Name	ELECTRONICS – I				3	0	0	3	25	75	100
EEE											
Prerequisite	Mathematics, Physics										
Course Outcomes	On completion of the course, the students will be able to										BT Mapping (Highest Level)
	CO1	Acquire knowledge about semiconductor devices and their characteristics for applications like rectifiers, clippers, clamping and regulator circuits.									K3
	CO2	Gain knowledge of transistor biasing techniques and stability considerations for applications like amplifier and switching circuits.									K3
	CO3	Comprehend the physical structure, types and characteristics of FET.									K2
	CO4	Describe the behavior of special and optoelectronic devices.									K2
	CO5	Apply Boolean Algebra and Karnaugh map for designing combinational logic circuits.									K3
UNIT – I	PN Junction Diodes							Periods: 09			
Semiconductor – PN junction diode: Forward and Reverse bias – Effect of temperature – Static and Dynamic resistance – Equivalent models – Transition and diffusion capacitances – Reverse Recovery time. Diode applications: Rectifiers, Clippers and Clamping. Zener diode: VI Characteristics – Zener as regulator – Introduction to SiC diodes.										CO1	
UNIT – II	Bipolar Junction Transistors							Periods: 09			
BJT: NPN and PNP transistors – Ebers - Moll Model – CB, CE and CC configurations – Transistor characteristics – Biasing – DC and AC load line – Operating point – Stabilization – Bias compensation techniques – Thermal stability and runaway – Amplification – Transistor switching times – Base width modulation – Breakdown voltage – Voltage in open emitter configuration and open base configuration – BJT ratings – Introduction to HBT and SJT.										CO2	
UNIT – III	Field Effect Transistors							Periods: 09			
JFET: Construction – Drain and transfer characteristics – Shockley's equation – Comparison between JFET and BJT – Biasing – MOSFET: Construction, Types and characteristics – FET ratings – Introduction to SiC MOSFET – HFET.										CO3	
UNIT – IV	Special Devices and Optoelectronic Devices							Periods: 09			
Special Devices: Varactor diode – PIN diode – Tunnel diode – Schottky diode – SCR – DIAC – TRIAC and UJT. Optoelectronic Devices: Photo diodes – Photo transistors – PV cells – Opto couplers – LED – LDR – LCD.										CO4	
UNIT – V	Number system and Combinational Circuits							Periods: 09			
Number systems: Binary, Decimal, Octal and Hexa decimal –1s and 2s complement – Binary arithmetic – BCD addition and subtraction – Boolean theorems – Digital logic gates – Universal gates. Combinational Circuits: Design of combination circuits using NAND and NOR gates – POS, SOP simplification – Minterms and Maxterms – Karnaugh map – Don't care conditions – Design of adder and Subtractor – Multiplexers – Demultiplexers – Encoder and Decoders – Parity generator – Code converters and BCD to seven segment display driver.										CO5	
Lecture Periods: 45		Tutorial Periods: -			Practical Periods: -			Total Periods: 45			
Text Books											
1. J.B.Gupta, “Electronic Devices and Circuits”, S.K. Kataria and Sons, 6 th Edition, 2022. 2. Robert L. Boylestad and Louis Nashelsky, “Electronic Devices and Circuit Theory”, Pearson Education, 9 th Edition, 2007. 3. Floyd and Jain, “Digital Fundamentals”, Pearson Education, 11 th Edition, 2015.											

Reference Books

1. Dr. R. S. Sedha, "A Textbook of Applied Electronics", S. Chand Publications, Multicolor Edition, 2019.
2. David A. Bell, "Electronic devices and circuits", Oxford University higher education, 5th Edition, 2008.
3. Thomas L. Floyd, "Electronic Devices", Conventional current version, Pearson Prentice hall, 10th Edition, 2017.
4. Morris. M. Mano and Michael. D. Ciletti, "Digital Design", Pearson Education, 5th Edition, 2013.
5. A. Anand Kumar, "Fundamentals of Digital Circuits", PHI Learning Pvt. Ltd, 4th Edition, 2022.

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1. <https://nptel.ac.in/courses/117107095>
2. <https://nptel.ac.in/courses/108107142>
3. <https://nptel.ac.in/courses/115102014>
4. https://onlinecourses.nptel.ac.in/noc21_ee80/preview
5. <https://nptel.ac.in/courses/106108099>

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	2	3	2	3	-	-	-	-	-	-	-	3	3	3
2	2	2	3	2	3	-	-	-	-	-	-	-	3	3	3
3	2	2	3	2	3	-	-	-	-	-	-	-	3	3	3
4	2	2	3	2	3	-	-	-	-	-	-	-	3	3	3
5	2	2	3	2	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
	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

Department	English				Programme: B. Tech.						
Semester	First				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	0	2	3	50	50	100
(Common to ALL Branches except CSBS)											
Prerequisite	Basics of English Language										
Course Outcomes	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”, Tata-McGraw-Hill Publishing Company Limited, 4 th Edition, 2010. 3. T. Balasubramanian, “English Phonetics for Indian students workbook”, Trinity Press, 2 nd Edition, 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”, Oxford University Press, 3 rd Edition, 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											

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	1	-	-
2	1	-	-	-	-	-	-	-	-	3	-	1	1	-	-
3	1	-	-	-	-	-	-	-	-	3	-	1	1	-	-
4	1	-	-	-	-	-	-	-	-	3	-	1	1	-	-
5	1	-	-	-	-	-	-	-	1	3	-	1	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		40
Listening (L)*	10		Listening (L)*	10	
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

Department	Mechanical Engineering			Programme: B. Tech.						
Semester	First / Second			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			0	0	2	1	50	50	100
(Common to all Branches)										
Prerequisite	Basic Knowledge of Science									
Course Outcomes	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	
List of Experiments:										
<p>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</p> <p>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.</p> <p>Sustainable product design, Ergonomics, Semantics, Entrepreneurship/business ideas, Product Data Specification, Establishing target specifications, Setting the final specifications. Design projects for teams.</p> <ol style="list-style-type: none">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		
Reference Books										
<ol style="list-style-type: none">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.3. Ulrich and Eppinger, "Product Design and Development", McGraw Hill, 3rd Edition, 2004.4. Chris Hackett. Weldon Owen, "The Big Book of Maker Skills: Tools & Techniques for Building Great Tech Projects", 2018.5. Sean Michael Ragan, Weldon Owen, "The Total Inventors Manual (Popular Science): Transform Your Idea into a Top-Selling Product", 2017.6. Paul Horowitz and Winfield Hill, "The Art of Electronics", Cambridge University Press, 3rd Edition.7. Paul Sherz and Simon Monk, "Practical Electronics for Inventors" McGraw Hill, 4th Edition.										

8. Simon Monk and Duncan Amos, "Make Your Own PCBs with EAGLE: From Schematic Designs to Finished Boards", McGraw Hill Education.
9. Simon Monk, "Programming Arduino: Getting Started with Sketches", McGraw Hill, 2nd Edition.
10. Venuvinod, PK., MA. W., "Rapid Prototyping – Laser Based and Other Technologies", Kluwer.
11. 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	2	3
2	3	3	3	2	2	2	-	-	2	-	3	2	2	2	3
3	3	3	3	2	3	2	-	-	2	-	3	2	2	2	3
4	3	3	3	2	3	2	-	-	2	-	3	2	2	2	3
5	3	3	3	2	3	2	-	-	2	-	3	2	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

Department	Electrical and Electronics Engineering			Programme: B. Tech.						
Semester	First			Course Category: PC			End Semester Exam Type : LE			
Course Code	U23EEP101			Periods/Week			Credit	Maximum Marks		
				L	T	P	C	CAM	ESE	TM
Course Name	ELECTRICAL ENGINEERING LABORATORY			0	0	2	1	50	50	100
EEE										
Prerequisite	Physics									
Course Outcomes	On completion of the course, the students will be able to									BT Mapping (Highest Level)
	CO1	Acquire knowledge on safety protocols and procedures for working with electricity.								K2
	CO2	Gain hands on experience in using various electrical tools and equipments.								K3
	CO3	Develop skills in designing line diagram and construct wiring for domestic and industrial applications.								K4
	CO4	Use protection circuits for electrical networks and measure insulation resistance using megger.								K3
	CO5	Analyze and troubleshoot the electrical circuits of various domestic appliances.								K4
List of Experiments:										
<div>1. Study of electrical tools, accessories, joints, symbols and safety precautions.</div> <div>2. Study of different types of Fuses, Circuits breakers, AC and DC meters.</div> <div>3. Testing of series and parallel lamp circuits.</div> <div>4. Domestic Wiring Practice<div>a. Staircase wiring</div><div>b. Doctor's room wiring</div><div>c. Bed room wiring</div><div>d. Godown wiring</div><div>e. Ceiling fan, LED Lamps and Iron box.</div></div> <div>5. Design of Domestic power distribution.</div> <div>6. Estimation of material requirement for Residential building/Flat wiring</div> <div>7. Estimation of material requirement for industrial wiring</div> <div>8. Measurement of Insulation resistance using Megger.</div> <div>9. Characteristics of Incandescent lamp and CFL.</div> <div>10. To study and measure the inductance of choke coil.</div> <div>11. Study of Electric shock phenomenon, precautions, preventions and earthing</div> <div>12. Study and Troubleshooting of electrical equipments (Fan, Iron box, Mixer)</div>										
Lecture Periods: -		Tutorial Periods: -		Practical Periods: 30			Total Periods: 30			
Reference Books										
<div>1. B. L. Thereja, A. K. Thereja, "A text book of Electrical Technology- Basic Electrical Engineering – Volume - I", S. Chand & Co. Ltd., 13th Edition, 2020.</div> <div>2. D. P. Kothari and I.J. Nagarath, "Basic Electrical and Electronics Engineering", McGraw Hill Education (India) Private Limited, 3rd Reprint, 2016.</div> <div>3. R. Muthusubramaniam, S. Salivahanan and K. A. Mureleedharan, "Basic Electrical Electronics and Computer Engineering", Tata McGraw Hill, 2018</div> <div>4. Del Toro, "Electrical Engineering Fundamentals", Pearson Education India, New Delhi, 2nd Edition, 2015.</div> <div>5. David Herres, "The Homeowner's DIY Guide to Electrical Wiring", McGraw Hill Professional, 7th Edition, 2015.</div> <div>6. Stephen L. Herman, "Electrical Wiring", Cengage Learning India, 15th Edition, 2014.</div>										
Web References										
<div>1. https://www.electrical4u.com/</div> <div>2. https://www.allaboutcircuits.com/</div> <div>3. https://nptel.ac.in/courses/108105112/</div> <div>4. https://nptel.ac.in/courses/108108076/</div> <div>5. https://demonstrations.wolfram.com/</div>										

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	2	-	-	-	2	-	-	2	3	2	2
2	3	3	3	3	2	-	-	-	2	-	-	2	3	2	2
3	3	3	3	3	2	-	-	-	2	-	-	2	3	2	2
4	3	3	3	3	2	-	-	-	2	-	-	2	3	2	2
5	3	3	3	3	2	-	-	-	2	-	-	2	3	2	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

Department	Electrical and Electronics Engineering			Programme: B. Tech.						
Semester	First			Course Category: PC			End Semester Exam Type : LE			
Course Code	U23EEP102			Periods/Week			Credit	Maximum Marks		
				L	T	P	C	CAM	ESE	TM
Course Name	ELECTRONICS – I LABORATORY			0	0	2	1	50	50	100
EEE										
Prerequisite	Physics									
Course Outcomes	On completion of the course, the students will be able to								BT Mapping (Highest Level)	
	CO1	Analyze the characteristics of diodes, current controlled and voltage controlled power switches.							K4	
	CO2	Design and implement clippers, clampers, rectifiers and regulator circuits using diodes.							K3	
	CO3	Analyze the characteristics of photodiodes, LEDs and able to investigate their behavior under different operating conditions.							K3	
	CO4	Gain knowledge in design and implementation of digital logic circuits in order to validate their functionality.							K3	
	CO5	Develop skills to simplify the hardware requirements of digital circuits for real time applications.							K4	
List of Experiments:										
1. V-I characteristics of PN junction diode. 2. Clipping and clamping circuits. 3. Half wave and full wave rectifier circuits with and without filters. 4. V-I characteristics of zener diode and design of voltage regulator circuits. 5. Input and output characteristics of BJT for CB, CC and CE configurations. 6. Design of biasing circuits for BJT. 7. Transfer and drain characteristics of JFET and MOSFET. 8. V - I characteristics of SCR and TRIAC. 9. V - I characteristics of Photodiode and LED. 10. Study and implementation of logic gates and verification of De Morgan laws using basic gates. 11. Design and verification of adder and Subtractor. 12. Design and verification of Encoder and Decoder. 13. Design of Multiplexer and Demultiplexer using gates and ICs. 14. Design of Parity generator and Checker using gates and ICs. 15. Design of Code Converters: BCD to Binary, Binary to BCD using logic gates. 16. Design of BCD to Seven Segment Display using ICs.										
Lecture Periods: -			Tutorial Periods: -			Practical Periods: 30			Total Periods: 30	
Reference Books										
1. Paul Scherz and Simon Monk, “Practical Electronics for Inventors”, Mc Graw Hill Education, 4 th Edition, 2016. 2. Satya Sai Srikant, Prakash Kumar Chaturvedi, “Basic Electronics Engineering Including Laboratory Manual”, Springer Nature Singapore Pvt Ltd., 2020. 3. J.B.Gupta, “Electronic Devices and Circuits”, S.K. Kataria and Sons, 6 th Edition Reprint, 2022. 4. A. Anand Kumar, “Fundamentals of Digital Circuits”, PHI Learning Pvt. Ltd, 4 th Edition, 2022. 5. L.K.Maheswari, M.M.S. Anand, “Laboratory Manual for Introductory Electronics Experiments”, New Age International (p) Limited, 1980.										
Web References										
1. http://vlabs.iitkgp.ernet.in/be/ 2. https://be-iitkgp.vlabs.ac.in/ 3. https://electricvlab.com/ 4. https://iotdunia.com/basic-electronics-virtual-lab-for-teachers-and-students/										

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	2	3	2	-	-	-	-	-	-	-	3	2	2
2	3	3	2	3	2	-	-	-	-	-	-	-	3	2	2
3	3	3	2	3	2	-	-	-	-	-	-	-	3	2	2
4	3	3	2	3	2	-	-	-	-	-	-	-	3	2	2
5	3	3	2	3	2	-	-	-	-	-	-	-	3	2	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

Department	Electrical and Electronics Engineering	Programme: B. Tech.						
Semester	First	Course Category: AEC			End Semester Exam Type : -			
Course Code	U23EEC1XX	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	CERTIFICATION COURSE - I	0	0	4	-	100	-	100
EEE								
Prerequisite	-							
<p>Students shall choose an International certification course offered by the reputed organizations like Google, Microsoft, IBM, Texas Instruments, Bentley, Autodesk, Eplan and CISCO, etc. The duration of the course is 40-50 hours specified in the curriculum, which will be offered through Centre of Excellence.</p> <p>Pass / Fail will be determined on the basis of participation, attendance, performance and completion of the course. If a candidate Fails, he/she has to repeat the course in the subsequent years. Pass in this course is mandatory for the award of degree.</p>								

Department	Electrical and Electronics Engineering				Programme: B. Tech.						
Semester	First				Course Category: MC		End Semester Exam Type :-				
Course Code	U23EEM101				Periods/Week		Credit	Maximum Marks			
					L	T	P	C	CAM	ESE	TM
Course Name	INDUCTION PROGRAMME (UHV - I)				2 Weeks		Non-Credit	-	-	-	
(Common to ALL Branches)											
Prerequisite	Basic Mathematics										
Course Outcomes	On completion of the course, the students will be able 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.										CO3	
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.											
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. R. Kumar Mohan, "English Grammar for all (Functional and Applied Grammar)", Unicore 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, 2019.
6. E. Balagurusamy, "Programming in ANSI C", McGraw Hill, 8th Edition, 2019.
7. Dr.K.K.Pillay, "Social Life of Tamils", A Joint Publication of TNTB and ESC and RMRL.
8. R.Balakrishnan, "Journey of Civilization", Roja muthiah Research Publishers, 1st Edition 2019.
9. கே. கே. பிள்ளை, "தமிழக வரலாறு - மக்களும் பண்பாடும்", சென்னை: உலகத் தமிழாராய்ச்சி நிறுவனம், 2002.
10. முனைவர் இல.சுந்தரம், "கணினித்தமிழ்", விகடன் பிரசுரம்.
11. கீழடி - வைகை நதிக்கரையில் சங்க கால நகர நாகரிகம், தமிழக தொல்லியல் துறை

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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>

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	-	-	-	-	2	1	-	1	2	-	1	1	-	-
2	1	-	-	-	-	2	1	-	1	3	-	1	1	-	-
3	1	-	-	-	-	2	1	-	1	1	-	1	1	-	-
4	1	-	-	-	-	2	1	-	3	3	-	1	1	-	-
5	1	-	-	-	-	2	1	-	3	1	-	1	1	-	-

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

Department	Mathematics				Programme: B. Tech.						
Semester	Second				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	0	4	25	75	100
(Common to ALL Branches Except CSBS, FT)											
Prerequisite	Basic Mathematics										
Course Outcomes	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, 3 rd Edition, 2011. 2. C. P. Gupta, Shree Ram Singh. M. Kumar, “Engineering Mathematics for semester I & II”, Tata McGraw Hill, New Delhi, 2 nd Edition, 2016. 3. H.K. Dass, “Advanced Engineering Mathematics”, S. Chand, New Delhi, 22 nd Edition, 2019.											
Reference Books											
1. N.P. Bali and Dr. Manish Goyal, “A Textbook of Engineering Mathematics”, University Science Press, India, 8 th Edition, 2016. 2. P. Sivaramakrishna Das and C. Vijayakumari, “Engineering Mathematics”, Pearson India Education services Pvt. Ltd, India, 1 st Edition, 2017. 3. Erwin Kreyszig, “Advanced Engineering Mathematics”, John Wiley & Sons, New Delhi, 10 th Edition, 2019. 4. G. Balaji, “Engineering Mathematics - Transforms and Partial Differential Equations”, G. Balaji Publishers, 18 th Edition, 2022. 5. B.V. Ramana, “Higher Engineering Mathematics”, Tata McGraw Hill, New Delhi, 2017.											

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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/>

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	3	1	1
2	3	2	1	1	-	1	-	-	-	-	-	1	3	1	1
3	3	2	1	1	-	1	-	-	-	-	-	1	3	1	1
4	3	2	1	1	-	1	-	-	-	-	-	1	3	1	1
5	3	2	1	1	-	1	-	-	-	-	-	1	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

Department	Computer Science and Engineering				Programme: B. Tech.							
Semester	First / Second				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	0	0	3	25	75	100	
(Common to ALL Branches)												
Prerequisite	Nil											
Course Outcomes	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. E. Balagurusamy, “Programming in ANSI C”, Tata McGraw Hill, 8 th Edition, 2019. 2. Yashvant Kanetkar, “Let us C”, BPB Publications, 16 th Edition, 2017. 3. Herbert Schildt, “C: The Complete Reference”, McGraw Hill, 4 th Edition, 2014.												
Reference Books												
1. Vikas B. Agarwal, Jyoti P. Mirani, “Computer Fundamentals”, Nirali Prakashan, 2019. 2. Ashok N Kamthane, “Computer Programming”, Pearson education, 2 nd Edition, 2012. 3. Vikas Verma, “A Workbook on C”, Cengage Learning, 2 nd Edition, 2012. 4. P.Visu, R.Srinivasan, S.Koteeswaran, “Fundamentals of Computing and Programming”, Sri Krishna Publications, 4 th Edition, 2012. 5. Pradip Dev, Manas Ghoush, “Programming in C”, Oxford University Press, 2 nd Edition, 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 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	-	-	-	-	-	-	-	1	2	2
2	2	1	-	-	3	-	-	-	-	-	-	-	1	2	2
3	3	2	1	1	3	-	-	-	-	-	-	-	1	2	2
4	3	2	1	1	3	-	-	-	-	-	-	-	1	2	2
5	3	2	1	1	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

Department	Civil / Mechanical			Programme: B. Tech.						
Semester	First / Second			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	0	0	3	25	75	100
(Common to EEE, ECE, ICE, MECH, Civil, Mechatronics Branches)										
Prerequisite	Basic Science									
Course Outcomes	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. G. Shanmugam, M.S. Palanichamy, “Basic Civil and Mechanical Engineering”, McGraw Hill Education, 1 st Edition, 2018. 2. S.C. Sharma, M.P Poonia, “Basic Mechanical Engineering”, Khanna Books Publication, 2019. 3. Dr. S. Jayakumar, “Basic Civil Engineering”, Aagash Nekaa Publications, 2011										

Reference Books

1. Sen Mohan, "Basic Mechanical Engineering", Khanna Books Publication, 2019
2. S.S.Bhavikatti, "Basic Civil Engineering", New Age International Ltd., 2018.
3. V. Rameshbabu, "Basic Civil & Mechanical Engineering", VRB Publishers Private Limited, 2017.
4. Serope Kalpakjian, Steven Schmid, "Manufacturing Engineering and Technology", Pearson Publication, 7th Edition, 2014.
5. Gopi Satheesh, "Basic Civil Engineering", Pearson Publications, 3rd Edition, 2015.

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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	-	1
2	3	1	1	-	1	-	-	-	-	-	-	1	2	-	1
3	3	1	1	-	1	-	-	-	-	-	-	1	2	-	1
4	3	1	-	-	-	-	-	-	-	-	-	1	2	3	1
5	3	1	-	-	-	-	-	-	-	-	-	1	2	3	1
6	3	1	-	-	-	-	-	-	-	-	-	1	2	2	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

Department	Electrical and Electronics Engineering				Programme: B. Tech.						
Semester	Second				Course Category: PC		End Semester Exam Type :TE				
Course Code	U23EET203				Periods/Week		Credit	Maximum Marks			
					L	T	P	C	CAM	ESE	TM
Course Name	ELECTRONICS II				3	0	0	3	25	75	100
EEE											
Prerequisite	Electronics I										
Course Outcomes	On completion of the course, the students will be able to										BT Mapping (Highest Level)
	CO1	Gain knowledge about small signal and large signal amplifier circuits for audio and radio frerquency applications.									K4
	CO2	Comprehend the operation of tuned amplifiers in frequency selective circuits and analyze time base circuits for oscillator applications.									K2
	CO3	Analyze the performance of oscillators and feedaback amplifiers for signal generation and processing.									K4
	CO4	Develop the ability to use flip-flops in counters and shift registers to build complex digital circuits.									K3
	CO5	Apply state reduction techniques to simplify and design synchronous and asynchronous sequential circuits.									K3
UNIT – I	Small Signal And Large Signal Amplifiers							Periods:09			
Small Signal Amplifiers: Transistor hybrid model and H-parameters – Graphical determination of h-parameters – Analysis and comparison of CB, CE and CC amplifier using h-parameter model – CE amplifier with unbiased emitter resistance – Transistor Re model. Large Signal Amplifiers: High frequency transistor model – Class A amplifier – Direct coupled and transformer coupled – Class B amplifier – Push-pull arrangement and complementary symmetry amplifier – Conversion efficiency calculations – Distortion in Power amplifier – Class AB amplifier – Class C amplifier.											CO1
UNIT – II	Multistage Amplifiers And Time Base Circuits							Periods:09			
Multistage Amplifiers: Cascade amplifier – Direct and RC coupled two stage CE amplifiers – Darlington pair – Cascode amplifier. Tuned amplifier: Single tuned – Double tuned – Stagger tuned amplifiers. Time Base Circuits: UJT sweep circuits – Voltage and current saw tooth sweeps – Fixed amplitude sweep – Miller and bootstrap time base. Schmitt trigger and Multi-vibrators circuits using BJT – Multivibrators using negative resistance devices (UJT and Tunnel diodes).											CO2
UNIT – III	Feedback Amplifiers And Oscillators							Periods:09			
Feedback Amplifiers: Feedback concept – Gain with feedback – General characteristics of negative feedback amplifiers – Four basic types of feedback and the effect on gain, input and output resistances. Oscillators: Conditions for sustained oscillations – Barkhausen criterion. Tuned oscillators: Hartley, Colpitt, Armstrong and Crystal Oscillators. RC Oscillators: Phase shift and Wien-bridge. UJT relaxation oscillator – Frequency stability.											CO3
UNIT – IV	Counters And Shift Registers							Periods:09			
Flip flops: SR, D, JK, T and Master Slave – Edge and level triggered. Counters: Design of Synchronous counters – Design Asynchronous counter – UP/Down counter – Decade counter – Modulo - n counter – Ring counter – Johnson counter – BCD counters. Registers: Registers – Shift register – Types – Parallel/serial converter – Bi directional shift registers.											CO4
UNIT – V	Design of Sequential Circuits							Periods:09			
Synchronous sequential circuits: Model Selection – State transition diagram – State synthesis table – Design equations and circuit diagram – State reduction technique. Asynchronous sequential circuits: Design and analysis of asynchronous sequential circuits – State transition diagram, Primitive table, State reduction, state assignment and design equations – Transition stability – Flow stability – race conditions, hazards and errors in digital circuits.											CO5
Lecture Periods: 45		Tutorial Periods: -			Practical Periods: -			Total Periods: 45			
Text Books											
1. J. B. Gupta, “Electronic Devices and Circuits”, S.K. Kataria and Sons, 6 th Edition Reprint 2022. 2. Robert L. Boylestad and Louis Nashelsky, “Electronic Devices and Circuit theory”, Pearson Education, 9 th Edition, 2007. 3. Floyd and Jain, “Digital Fundamentals”, Pearson Education, 11 th Edition, 2015.											

Reference Books

1. Dr. R. S. Sedha, "A textbook of Applied Electronics", S. Chand Publications, Multicolor Edition, 2019.
2. David A. Bell, "Electronic devices and circuits", Oxford University higher education, 5th Edition, 2008.
3. G.S. Tomar, Ashish Bagwari, "Fundamentals of Electronic Devices and Circuits", Springer Nature, 2019.
4. A. Anand Kumar, "Fundamentals of Digital Circuits", PHI Learning Pvt. Ltd, 4th Edition, 2022.
5. Morris. M. Mano and Michael. D. Ciletti, "Digital Design", Pearson Education, 5th Edition, 2013.

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1. <https://www.allaboutcircuits.com/textbook/semiconductors/chpt-4/the-h-parameter-model/>
2. <https://nptel.ac.in/courses/108102097>
3. <https://nptel.ac.in/courses/108106188>
4. <https://nptel.ac.in/courses/108105158>
5. <https://archive.nptel.ac.in/courses/106/105/106105185/>

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	3	-	-	-	-	-	-	-	2	2	2
2	3	3	3	2	3	-	-	-	-	-	-	-	2	2	2
3	3	3	3	2	3	-	-	-	-	-	-	-	2	2	2
4	3	3	3	2	3	-	-	-	-	-	-	-	2	2	2
5	3	3	3	2	3	-	-	-	-	-	-	-	2	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

Department	Electrical and Electronics Engineering				Programme: B. Tech.						
Semester	Second				Course Category : HS		End Semester Exam Type: TE				
Course Code	U23HSTC01				Periods / Week		Credit	Maximum Marks			
					L	T	P	C	CAM	ESE	TM
Course Name	UNIVERSAL HUMAN VALUES - II				2	0	0	2	25	75	100
(Common to all Branch)											
Prerequisite	UHV - I										
Course Outcomes	On completion of the course, the students will be able to										BT Mapping (Highest Level)
	CO1	Evaluate the significance of value inputs in formal education and start applying them in their life and profession									K2
	CO2	Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.									K2
	CO3	Analyze the value of harmonious relationship based on trust and respect in their life and profession									K2
	CO4	Examine the role of a human being in ensuring harmony in society and nature.									K2
	CO5	Apply the understanding of ethical conduct to formulate the strategy for ethical life and profession.									K2
UNIT - I	Introduction to Value Education							Periods: 06			
Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education) - Understanding Value Education - Self-exploration as the Process for Value Education - Basic Human Aspirations - Happiness and Prosperity - Current Scenario- Method to Fulfil the Basic Human Aspirations.										CO1	
UNIT - II	Harmony in the Human Being							Periods: 06			
Understanding Human being as the Co-existence of the Self and the Body-Distinguishing between the Needs of the Self and the Body-The Body as an Instrument of the Self-Understanding Harmony in the Self-Harmony of the Self with the Body- Programme to ensure self-regulation and Health.										CO2	
UNIT - III	Harmony in the Family and Society							Periods: 06			
Harmony in the Family - Basic Unit of Human Interaction- 'Trust' - Foundational Value in Relationship - 'Respect' - as the Right Evaluation - Other Feelings, Justice in Human-to-Human Relationship - Understanding Harmony in the Society-Vision for the Universal Human Order.										CO3	
UNIT - IV	Harmony in the Nature / Existence							Periods: 06			
Understanding Harmony in the Nature-Interconnectedness, Self-regulation and Mutual Fulfilment among the Four Orders of Nature - Realizing Existence as Co-existence at All Levels - Holistic Perception of Harmony in Existence.										CO4	
UNIT - V	Implications of the Holistic Understanding - A Look at Professional Ethics							Periods: 06			
Natural Acceptance of Human Values - Definitiveness of (Ethical) Human Conduct - Basis for Humanistic Education, Humanistic Constitution and Universal Human Order-Competence in Professional Ethics-Holistic Technologies, Production Systems and Management Models-Typical Case Studies-Strategies for Transition towards Value - Based Life and Profession										CO5	
Lecture Periods: 30		Tutorial Periods: -			Practical Periods: -			Total Periods: 30			
Text Book											
1. R. R. Gaur, R. Asthana, G. P. Bagaria, "A Foundation Course in Human Values and Professional Ethics", Excel Books, 2 nd Revised Edition, New Delhi, 2019.											
Reference Books											
1. A Nagraj, Jeevan Vidya Prakashan, Amarkantak, "Jeevan Vidya: EkParichaya", 2013.											
2. A.N. Tripathi, "Human Values", New Age International Publishers, New Delhi, 3 rd Edition, 2019.											
3. Annie Leonard, "The Story of Stuff", Free Press, Reprint Edition, 2011.											
4. Mohandas Karam chand Gandhi, "The Story of My Experiments with Truth – Mahatma Gandhi Autobiography", Finger print Publisher, 2009.											
5. E. F Schumacher, "Small is Beautiful", Vintage Publisher, 1993.											
6. Cecile Andrews, "Slow is Beautiful", New Society Publishers, 2006.											
7. J C Kumarappa. "Economy of Permanence". Sarva Seva Sangh Prakashan, 2017.											

8. Pandit Sunderlal, "Bharat Mein Angreji Raj", Prabhat Prakashan Publisher, 2021.
9. Dharampal, "Rediscovering India", Stosius Inc/Advent Books Division Publisher, 1983.
10. Mohandas K. Gandhi, "Hind Swaraj or Indian Home Rule", Gyan Publishing House, 2023.
11. Maulana Abdul Kalam Azad, "India Wins Freedom", Orient Black Swan Publisher, 1st Edition, 1988.
12. Life of Vivekananda, "Romain Rolland (English)", Advaita Ashrama Publisher, India, 4th Edition, 2010.
13. Mahatma Gandhi, "Romain Rolland (English)", Srishti Publishers & Distributors, 2020.

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1. <https://www.uhv.org.in/uhv-ii>
2. <http://www.storyofstuff.com>
3. https://www.youtube.com/channel/UCQxWr5QB_eZUnwxSwxXEkQw
4. https://fdp-si.aicte-india.org/8dayUHV_download.php
5. <https://www.youtube.com/watch?v=8ovkLRYXlJE>

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	3	2	2	-	-	3	1	-	-
2	-	-	-	-	-	2	3	2	2	-	-	3	1	-	-
3	-	-	-	-	-	3	3	2	2	-	-	3	1	-	-
4	-	-	-	-	-	2	3	2	2	-	-	3	1	-	-
5	-	-	-	-	-	2	3	2	2	-	-	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

Department	English			Programme: B. Tech.						
Semester	Second			Course Category : CC			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	0	2	3	50	50	100
(Common to all Branch except CSBS)										
Prerequisite	Basics of English Language , Communicative English - I									
Course Outcomes	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: Phrases and Clauses Writing: Free writing on any given topic, Paraphrasing Practice										CO5
Lecture Periods: 30		Tutorial Periods: -		Practical Periods: 30			Total Periods: 60			
Text Book										
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”, Oxford University Press, 1 st Edition, 2019.										
Reference Books										
1. Sahukar, Nimeran, Bhalla, Prem, “The book of Etiquettes and Manners”, Pustak Mahal Publisher, 1 st Edition, 2009. 2. Gerson Sharon J, Steven M. Gerson, “Technical Writing Process and Product”, Pearson Education Pvt. Ltd. 3 rd Edition, 2009. 3. Grussendorf, Marion, “English for Presentations”. Oxford University Press, 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., 2001.										

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	1	-	-
2	1	-	-	-	-	-	-	-	-	3	-	1	1	-	-
3	1	-	-	-	-	-	-	-	-	3	-	1	1	-	-
4	1	-	-	-	-	-	-	-	-	3	-	1	1	-	-
5	1	-	-	-	-	-	-	-	-	3	-	1	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		40
Listening (L)*	10		Listening (L)*	10	
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

Department	Mechanical				Programme: B. Tech.						
Semester	First / Second				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				0	0	2	1	50	50	100
(Common to all Branches)											
Prerequisite	Nil										
Course Outcomes	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:											
<div>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.</div> <div>2. Drawing a Title Block with necessary text and projection symbol.</div> <div>3. Drawing 2D sketch by applying modify tools like fillet, mirror, array, etc.,</div> <div>4. Drawing front view and top view of simple solids like prism, pyramid, cylinder, cone, etc., and Dimensioning.</div> <div>5. Drawing front view, top view and side view of objects from the given pictorial views (eg. Simple stool, V-block, Mixie Base).</div> <div>6. Drawing a plan of residential building (Two bed rooms, kitchen, hall, etc.)</div> <div>7. Drawing sectional views of prism, pyramid, cylinder, cone, etc,</div> <div>8. Drawing lateral surface development of prism, pyramid, cylinder, cone, etc,</div> <div>9. Drawing isometric projection of simple objects.</div> <div>10. Creating 3D model of simple object and obtaining 2D multi-view drawings.</div>											
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											
<div>1. James D. Bethune, “Engineering Graphics with AutoCAD - A Spectrum book”, Macromedia Press, Pearson, 1st Edition, 2020.</div> <div>2. NS Parthasarathy and Vela Murali, “Engineering Drawing”, Oxford university press, 2015.</div> <div>3. M.B Shah, “Engineering Graphics”, ITL Education Solutions Limited, Pearson Education Publication, 2011.</div> <div>4. N.D. Bhatt and V.M. Panchal, “Engineering Drawing: Plane and Solid Geometry”, Charotar Publishing House, 2017.</div> <div>5. T. Jeyapoovan, “Engineering Drawing and Graphics Using AutoCAD”, Vikas Publishing House Pvt. Ltd., 7th Edition, 2016.</div> <div>6. C M Agrawal, Basant Agrawal, “Engineering Graphics”, McGraw Hill, 2017.</div> <div>7. Dhananjay A. Jolhe, “Engineering Drawing: With An Introduction To CAD”, McGraw Hill, 1st Edition, 2016.</div> <div>8. James Leach, “AutoCAD 2017 Instructor”, SDC Publications, 2016.</div>											
Web References											
<div>1. http://vlabs.iitb.ac.in/vlabs-dev/labs/mit_bootcamp/egraphics_lab/labs/index.php</div> <div>2. http://www.nptelvideos.in/2012/12/computer-aided-design.html</div> <div>3. https://mech.iitm.ac.in/meiitm/course/cad-in-manufacturing/</div> <div>4. https://autocadtutorials.com</div> <div>5. https://dwgmodels.com</div>											

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	1	1	1
2	3	1	-	-	3	-	-	-	3	-	-	3	1	1	1
3	3	1	-	-	3	-	-	-	3	-	-	3	1	1	1
4	3	1	-	-	3	-	-	-	3	-	-	3	1	1	1
5	3	1	-	-	3	-	-	-	3	-	-	3	1	1	1

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

Department	Computer Science and Engineering		Programme: B. Tech.							
Semester	First / Second		Course Category: ES			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		0	0	2	1	50	50	100	
(Common to all Branches)										
Prerequisite	Nil									
Course Outcomes	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:										
<div><div>1. Write a C program to find the Area of the triangle.</div><div>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.</div><div>3. Write a C program to check whether a given character is vowel or not using Switch – Case statement.</div><div>4. Write a C program to print the numbers from 1 to 10 along with their squares.</div><div>5. Demonstrate do—While loop in C to find the sum of ‘n’ numbers.</div><div>6. Find the factorial of a given number using Functions in C.</div><div>7. Write a C program to check whether a given string is palindrome or not?</div><div>8. Write a C program to check whether a value is prime or not?</div><div>9. Develop a C program to swap two numbers using call by value and call by reference.</div><div>10. Construct a C program to find the smallest and largest element in an array.</div><div>11. Implement matrix multiplication using C program.</div><div>12. Write a C program to perform various string handling functions like strlen, strcpy, strcat, strcmp.</div><div>13. Develop a C program to remove all characters in a string except alphabets.</div><div>14. Write a C program to find the sum of an integer array using pointers.</div><div>15. Write a C program to find the Maximum element in an integer array using pointers.</div><div>16. Construct a C program to display Employee details using Structures</div><div>17. Write a C program to display the contents of a file on the monitor screen.</div><div>18. Write a File by getting the input from the keyboard and retrieve the contents of the file using file operation commands.</div><div>19. Write a C program to create two files with a set of values. Merge the two file contents to form a single file</div><div>20. Write a C program to pass the parameter using command line arguments.</div></div>										
Lecture Periods: -		Tutorial Periods: -		Practical Periods: 30			Total Periods: 30			
Reference Books										
<div><div>1. Zed A Shaw, “Learn C the Hard Way: Practical Exercises on the Computational Subjects You Keep Avoiding (Like C)”, Addison Wesley, 2016.</div><div>2. Anita Goel and Ajay Mittal, “Computer Fundamentals and programming in C”, Pearson Education, 1st Edition, 2011.</div><div>3. Maureen Sprankle, Jim Hubbard, “Problem Solving and Programming Concepts”, Pearson, 9th Edition, 2011.</div><div>4. Yashwanth Kanethkar, “Let us C”, BPB Publications, 13th Edition, 2008.</div><div>5. B.W.Kernighan and D.M. Ritchie, “The C Programming Language”, Pearson Education, 2nd Edition, 2006.</div></div>										
Web References										
<div><div>1. https://alison.com/course/introduction-to-c-programming</div><div>2. https://www.geeksforgeeks.org/c-programming-language/</div><div>3. http://cad-lab.github.io/cadlab_data/files/1993_prog_in_c.pdf</div><div>4. https://www.tenouk.com/clabworksheet/clabworksheet.html</div><div>5. https://fresh2refresh.com/c-programming/</div></div>										

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	-	-	-	-	-	-	-	1	-	1
2	2	1	-	-	3	-	-	-	-	-	-	-	1	-	1
3	3	2	1	1	3	-	-	-	-	-	-	-	1	-	1
4	3	2	1	1	3	-	-	-	-	-	-	-	1	-	1
5	3	2	1	1	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
	Performance in practical classes			Model Practical Examination	Attendance		
	Conduction of practical	Record work	viva				
Marks	15	5	5	15	10	50	100

Department	Electrical and Electronics Engineering			Programme: B. Tech.						
Semester	Second			Course Category: PC		End Semester Exam Type : LE				
Course Code	U23EEP203			Periods/Week		Credit	Maximum Marks			
				L	T	P	C	CAM	ESE	TM
Course Name	ELECTRONICS II LABORATORY			0	0	2	1	50	50	100
EEE										
Prerequisite	Electronics I Laboratory									
Course Outcomes	On completion of the course, the students will be able to									BT Mapping (Highest Level)
	CO1	Analyze frequency response of the transistor amplifiers and the concept of bandwidth.								K4
	CO2	Design and implement multivibrator circuits for PWM and clock generation.								K3
	CO3	Implement oscillator circuits for signal generation and sweep circuits for testing electronic components.								K3
	CO4	Develop proficiency in utilizing flip flops for effective design and implementation of sequential logic circuits for various digital applications.								K4
	CO5	Acquire the skills to construct shift registers for efficient storage and shifting of datas in digital circuits.								K4
List of Experiments:										
1. Design and analysis of frequency response characteristics of common emitter BJT amplifier. 2. Implementation of two stage RC coupled CE amplifier. 3. Design and implementation of Schmitt trigger. 4. Design and implementation of Astable Multivibrator. 5. Design and implementation of Monostable Multivibrator. 6. Implementation of a Sweep Circuit. 7. Design and implementation of RC phase shift oscillator. 8. Design and implementation of Wien bridge oscillator. 9. Implementation of SR, D, JK and T flip-flops using universal gates. 10. Design and implementation of 4-bit shift registers in SISO, SIPO, PISO and PIPO modes using ICs. 11. Design and implementation of synchronous Counters using ICs. 12. Design and implementation of Asynchronous Counters using ICs. 13. Implementation of Ring and Johnson counters using ICs.										
Lecture Periods: -			Tutorial Periods: -			Practical Periods: 30		Total Periods: 30		
Reference Books										
1. Paul Scherz and Simon Monk, “Practical Electronics for Inventors”, Mc Graw Hill Education, 4 th Edition, 2016. 2. Satya Sai Srikant, Prakash Kumar Chaturvedi, “Basic Electronics Engineering Including Laboratory Manual”, Springer Nature Singapore Pvt. Ltd., 2020. 3. L. K. Maheswari, M.M.S. Anand, “Laboratory Manual for Introductory Electronics Experiments”, New Age international (p) Limited, 1980.										
Web References										
1. http://vlabs.iitkgp.ernet.in/be/ 2. https://be-iitkgp.vlabs.ac.in/ 3. https://electricvlab.com/ 4. https://www.circuitlab.com/editor/#?id=7pq5wm&from=homepage										

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	2	3	2	-	-	-	-	-	-	-	2	2	2
2	3	3	2	3	2	-	-	-	-	-	-	-	2	2	2
3	3	3	2	3	2	-	-	-	-	-	-	-	2	2	2
4	3	3	2	3	2	-	-	-	-	-	-	-	2	2	2
5	3	3	2	3	2	-	-	-	-	-	-	-	2	2	2

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



(Pr. Jamung)

B.Tech. Electrical and Electronics Engineering

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

Department	Electrical and Electronics Engineering	Programme: B. Tech.						
Semester	First	Course Category: AEC			End Semester Exam Type : -			
Course Code	U23EEC2XX	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	CERTIFICATION COURSE - II	0	0	4	-	100	-	100
EEE								
Prerequisite	-							
<p>Students shall choose an International certification course offered by the reputed organizations like Google, Microsoft, IBM, Texas Instruments, Bentley, Autodesk, Eplan and CISCO, etc. The duration of the course is 40-50 hours specified in the curriculum, which will be offered through Centre of Excellence.</p> <p>Pass / Fail will be determined on the basis of participation, attendance, performance and completion of the course. If a candidate Fails, he/she has to repeat the course in the subsequent years. Pass in this course is mandatory for the award of degree.</p>								

Department	Electrical and Electronics Engineering				Programme: B. Tech.							
Semester	Second				Course Category: MC			End Semester Exam Type: -				
Course Code	U23EEM202				Periods / Week		Credit	Maximum Marks				
					L	T	P	C	CAM	ESE	TM	
Course Name	SPORTS YOGA AND NSS				0	0	2	Non-Credit	100	-	100	
Prerequisite	-											
Course Outcomes	On completion of the course, the students will be able to										BT Mapping (Highest Level)	
	CO1	Practice Physical activities and Hatha Yoga focusing on yoga for strength, flexibility and relaxation.										K2
	CO2	Understand basic skills associated with yoga and physical activities including strength and flexibility, balance and coordination.										K2
	CO3	Develop understanding of psychological problems associated with age and lifestyle.										K2
	CO4	Recognize the importance of national service in community development.										K2
	CO5	Convert existing skills into socially relevant life skills.										K2
UNIT - I	Introduction to Physical Education							Periods: 06				
Definition, Aims and Objectives of Physical Education - Changing trends in Physical Education Physical Fitness, Wellness and Lifestyle: Importance of Physical Fitness and Wellness - Components of Physical fitness - Components of Health related fitness - Components of wellness - Preventing Health Threats through Lifestyle Change - Concept of Positive Lifestyle.											CO1	
UNIT - II	Yoga and Lifestyle							Periods: 06				
Importance of Yoga - Elements of Yoga - Introduction - Asanas, Pranayama, Meditation and Yogic Kriyas - Yoga for concentration and related Asanas (Sukhasana, Tadasana, Padmasana and Shashankasana) - Relaxation Techniques for improving concentration - Yog-nidra. Asanas as preventive measures – Hypertension – Obesity - Back Pain-Diabetes - Asthema.											CO2	
UNIT - III	Training and Planning in Sports							Periods: 06				
Training - Warming up and limbering down-Skill, Technique and Style - Objectives of Planning – Tournament - Knock-Out, League/Round Robin and Combination. Psychology and Sports: Important of Psychology in Physical Education and Sports - Differentiate Between Growth and Development - Adolescent problems and their Management - Emotion: Concept, Type and Controlling of emotions - Concepts and Types of Aggressions in Sports - Psychological benefits of exercise - Anxiety and Fear and its effects on Sports Performance - Motivation, its type and techniques - Understanding Stress and Coping strategies.											CO3	
UNIT - IV	Introduction to National Service Scheme							Periods: 06				
Orientation of NSS volunteers: History, motto, symbol, awards, structure and activities of NSS - Days of National and International Importance - Sensitizing about the thrust areas and awareness activities - Importance of tree plantation and voluntary blood donation - The role of SHGs and NGOs in community development – CSR - Life skills and youth development-extension activities in HEIs - various clubs and schemes like RRC, ELC, YRC, UBA, SBA, etc.,											CO4	
UNIT - V	Community Issues and the Use of Technology							Periods: 06				
Common Problems of rural India - Technology development and its suitability – Sustainability - Value addition to agricultural products - Service learning and youth volunteering – Shramdaan - Campus cleaning - Field visit to nearby communities - village survey - Initiatives to clean and green environment - preservation of water bodies in adopted villages.											CO5	
Lecture Periods: -			Tutorial Periods: -			Practical Periods: 30			Total Periods: 30			
Reference Books												
1. Brar Ajmer Singh, Gill Jagtar Singh, Bains Jagdish, “Modern Textbook of Physical Education Health and Sports- I”, Kalyani Publishers, 6 th Edition, 2014. 2. B.K.S. Iyengar, “Light on Yoga: The Definitive Guide to Yoga Practice”, Thorsons Publishers, Thorsons Classics Edition, 2015. 3. Joseph, Siby K, Mahodaya, “Bharat Essays on Conflict Resolution”, Institute of Gandhian Studies Publishers, 2007. 4. Barman Prateeti, Goswami, “Document on Peace Education”, Triveni Akansha Publishing House, New Delhi, 2009. 5. Prof R.B.S. Verma, “Field Work Practicum in Social Work-Emerging Concerns”, Rapid Publisher, Lucknow, 2020. 6. Sibereisen, K, Richard M, “Lerner Approaches to Positive Youth Development”, Sage Publications, New Delhi, 2007. 7. Hoshiar Singh, “Administration of Rural Development in India”, Sterling Publisher, 2009.												
Web References												
1. http://www.thebetterindia.com/140/national-service-scheme-nss 2. http://en.wikipedia.org/wiki/national-service-scheme 19= http://nss.nic.in/admininstruct 3. http://nss.nic.in 4. http://socialworknss.org/about.html 5. http://vou.sagepub.com												

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	3	-	-	2	1	-	-
2	-	-	-	-	-	-	-	2	3	-	-	2	1	-	-
3	-	-	-	-	-	-	-	2	3	-	-	2	1	-	-
4	-	-	-	-	-	-	-	2	3	-	-	2	1	-	-
5	-	-	-	-	-	-	-	2	3	-	-	2	1	-	-

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

Evaluation methods

Assessment	Continuous Assessment Marks (CAM)			Total Marks
	Attendance	MCQ Test	Presentation / Activity / Assignment	
Marks	10	30	60	100