



HINDUSTAN
INSTITUTE OF TECHNOLOGY & SCIENCE
(DEEMED TO BE UNIVERSITY)

**B. TECH. ELECTRONICS AND COMMUNICATION
ENGINEERING**

(Duration: 4 Years)

CURRICULUM and SYLLABUS

(Applicable for Students admitted from Academic Year 2022-23)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SCHOOL OF ELECTRICAL SCIENCES

HINDUSTAN INSTITUTE OF TECHNOLOGY AND SCIENCE

HINDUSTAN INSTITUTE OF TECHNOLOGY & SCIENCE

Motto, Vision, Mission and Value Statement

Motto

To Make Every Man a Success and No Man a Failure.

Vision

To be an International Institute of Excellence, providing a conducive environment for education with a strong emphasis on innovation, quality, research and strategic partnership blended with values and commitment to society.

Mission

- To create an ecosystem for learning and world class research.
- To nurture a sense of creativity and innovation.
- To instill highest ethical standards and values with a sense of professionalism.
- To take up activities for the development of Society.
- To develop national and international collaboration and strategic partnership with industry and institutes of excellence.
- To enable graduates to become future leaders and innovators.

Value Statement

Integrity, Innovation, Internationalization

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

VISION AND MISSION

VISION

To be a premier academic centre for quality education to meet the industrial standards and research in diverse areas of Electronics and Communications Engineering with social commitment.

MISSION

- M1:** To impart adequate engineering knowledge to transform students into highly professional engineers as well as good researchers.
- M2:** To develop their interdisciplinary skills as per the need of the industry and society.
- M3:** To inculcate Entrepreneurship and lifelong learning skills among the students with ethics and social commitment.

B. Tech. Electronics and Communication Engineering

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

- PEO 1** : Graduates will be nurtured to become successful professionals suitable for cutting - edge communication technologies to meet the societal needs.
- PEO 2** : Graduates will exhibit creative multidisciplinary skills to cater the needs of digital revolution through industry enhanced training and design projects.
- PEO 3** : Graduates will focus towards sustainable electronic product development with entrepreneurship skills through ethical attitude and effective collaborative learning practices.
- PEO 4** : Graduates will conduct problem-solving investigations on issues and concerns in the emerging areas of electronics and communication engineering.

PROGRAMME OUTCOMES (PO's)

Engineering Graduates will be able to:

- 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, review 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 & 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 & 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 & 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 & 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 SPECIFIC OUTCOMES: (PSO's)

- PSO1** : Able to analyze and design the advanced Communication and Digital Systems.
- PSO2** : Able to analyze, design and validate the systems using hardware and software tools pertaining to VLSI and Signal Processing.
- PSO3** : Able to apply interdisciplinary programming languages to develop, analyze and test the recent automation and autonomous systems.



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B. TECH ELECTRONICS AND COMMUNICATION ENGINEERING CURRICULUM R2022 (in line with NEP 2020)									
SEMESTER – I									
S. NO	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
1	BS	EMA51001	Matrices and Calculus	3	0	2	4	2	5
2	BS	EPH51001	Engineering Physics	3	0	2	4	2	5
3	PC	ECS51001	Programming Fundamentals using C	3	0	2	4	1	5
4	HS	ELS51002	Personality Development and Soft Skills	1	0	2	2	1	3
5	ES	EME51002	Technical Graphics	2	0	2	3	1	4
6	ES	EEC51400	FAB Lab for Electronics Engineers	0	1	2	2	2	3
7	HS	EGE51400 EGE51401 EGE51402 EGE51403	Fine Arts (Drawing) Fine Arts (Singing) Fine Arts (Dance) Fine Arts (Music)	0	0	2	1	0	2
8	PC	EEC51402	Design Thinking for Electronics Engineers	0	1	2	2	1	3
Total				12	2	16	22	10	30
SEMESTER – II									
S. NO	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
1	BS	EMA51002	Analytical Mathematics	3	0	2	4	2	5
2	BS	ECT51001	Engineering Materials	3	0	2	4	2	5
3	PC	EEC51001	Electric Circuits and Machines	3	0	2	4	1	5
4	HS	EGE51001	Universal Human Values	2	0	0	2	1	2
5	HS	ELS51003 ELS51004 ELS51005	Regional Language (Tamil) Regional Language (Hindi) Regional Language (Telugu)	2	0	0	2	1	2
6	ES	EEC51401	Innovation Lab for Electronics Engineers	0	1	2	2	2	3
7	HS	EGE51404 EGE51405	Outreach (NCC) Outreach (NSS)	0	0	2	1	0	2
8	HS	ELS51001	Communication Skills	2	0	2	3	1	4
Total				15	1	12	22	10	28

SEMESTER – III									
S. NO	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
1	BS	EMA51003	Partial and Differential Equations	3	1	0	4	2	4
2	PC	EEC51002	Analog Electronics	2	1	2	4	1	5
3	PC	EEC51003	Digital System Design	2	0	2	3	1	4
4	DE	EEC515**	Department Elective 1	2	0	2	3	0	4
5	NE	*****	Non Department Elective 1	2	0	2	3	0	4
6	EEC	EEC51800	Design Project – 1	0	0	2	1	2	2
7	ES	ECT51002	Environmental Science and Sustainable Development	2	0	0	2	2	2
8	EEC	EEC51801	Internship -1	*	*	*	1	2	-
Total				13	2	10	21	10	25
* Internship to be carried out during summer vacation after 2nd semester and evaluated during 3rd semester									
SEMESTER – IV									
S. NO	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
1	BS	EMA51007	Random Processes	3	1	0	4	2	4
2	PC	EEC51004	Signals and Systems	2	1	2	4	2	5
3	PC	EEC51005	Electromagnetic Fields and Transmission Lines	2	1	0	3	2	3
4	PC	EEC51006	VLSI Design	2	0	2	3	2	4
5	DE	EEC515**	Department Elective 2	2	0	2	3	0	4
6	NE	*****	Non Department Elective 2	2	0	2	3	0	4
7	EEC	EEC51802	Design Project – 2	0	0	2	1	2	2
8	PC	EEC51007	Industry Collaborated Course - Microcontroller for Embedded System Design	2	0	2	3	2	4
Total				15	3	12	24	12	30

SEMESTER – V									
S. NO	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
1	PC	EEC51008	Communication Systems	2	0	2	3	2	4
2	PC	EEC51009	Digital Signal Processing	2	1	2	4	2	5
3	PC	EEC51010	Control Systems	2	1	2	4	2	5
4	DE	EEC515**	Department Elective 3	2	0	2	3	0	4
5	NE	*****	Non Department Elective 3	2	0	2	3	0	4
6	EEC	EEC51803	Design Project – 3	0	0	2	1	2	2
7	ES	EGE51002	Entrepreneurship	1	0	2	2	0	3
8	EEC	EEC51804	Internship -2	*	*	*	1	2	-
Total				11	2	14	21	10	27
* Internship to be carried out during summer vacation after 4 th semester and evaluated during 5 th semester									
SEMESTER – VI									
S. NO	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
1	PC	EEC51011	Antenna and Wave Propagation	2	1	2	4	2	5
2	PC	EEC51012	Automated Test Engineering for Electronics	2	0	2	3	2	4
3	PC	EEC51013	Computer Networks	2	0	2	3	2	4
4	DE	EEC515**	Department Elective 4	2	0	2	3	0	4
5	NE	*****	Non Department Elective 4	2	0	2	3	0	4
6	PC	EEC51014	Case Study / Field Study / Product study	1	1	2	3	2	4
7	EEC	EEC51805	Design Project – 4	0	0	2	1	2	2
8	HS	EGE51406	Skill Development & Career Planning	0	0	2	1	2	2
Total				11	2	16	21	12	29

SEMESTER – VII									
S. NO	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
1	PC	EEC51015	Optical and Microwave Engineering.	2	1	2	4	2	5
2	PC	EEC51016	Machine Learning and Artificial Intelligence	2	0	2	3	2	4
3	PC	EEC51017	Next Generation Wireless Networks	2	1	0	3	2	3
4	DE	EEC515**	Department Elective 5	2	0	2	3	0	4
5	NE	*****	Non Department Elective 5	2	0	2	3	0	4
6	PC	EEC51018	Term Paper on Research Findings	2	0	0	2	2	2
7	ES	EGE51003	Research Review	0	2	0	2	2	2
8	EEC	EEC51806	Project Phase 1	0	0	6	3	2	6
Total				12	4	14	23	12	30
SEMESTER – VIII									
S. NO	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
1	EEC	EEC51807	Project Phase 2	0	0	22	11	4	22
Total				0	0	22	11	4	22

LIST OF DEPARTMENTAL ELECTIVES									
Department Elective 1									
SEM	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
1	DE	EEC51500	IDE Based Programming and its applications	2	0	2	3	0	4
2	DE	EEC51501	Interfacing Techniques for General Purpose Processors	2	0	2	3	0	4
3	DE	EEC51502	Linear and Electronic Switching Circuits	2	0	2	3	0	4
4	DE	EEC51503	Electronic Instrumentation	2	0	2	3	0	4
5	DE	EEC51504	Verilog HDL	2	0	2	3	0	4
6	DE	EEC51505	Electronic Packaging	2	0	2	3	0	4
7	DE	EEC51506	Data Structures and Algorithms using C	2	0	2	3	0	4
8	DE	EEC51507	Circuit Simulation Using Pspice	2	0	2	3	0	4
9	DE	EEC51508	Introduction to Ocean engineering	2	0	2	3	0	4
Department Elective 2									

1	DE	EEC51509	Embedded System Software	2	0	2	3	0	4
2	DE	EEC51510	Robotics and Control	2	0	2	3	0	4
3	DE	EEC51511	Fundamentals of Nanoscience	2	0	2	3	0	4
4	DE	EEC51512	Opto Electronic Devices	2	0	2	3	0	4
5	DE	EEC51513	Digital System Design Using FPGA Board	2	0	2	3	0	4
6	DE	EEC51514	Semiconductor Modelling	2	0	2	3	0	4
7	DE	EEC51515	Object Oriented Programming Languages with C++	2	0	2	3	0	4
8	DE	EEC51516	PCB Design – Idea to Product	2	0	2	3	0	4
9	DE	EEC51517	Ocean Acoustics	2	0	2	3	0	4
Department Elective 3									
1	DE	EEC51518	System Design Using Raspberry Pi Processor	2	0	2	3	0	4
2	DE	EEC51519	Embedded Automotive Systems	2	0	2	3	0	4
3	DE	EEC51520	Neural Networks	2	0	2	3	0	4
4	DE	EEC51521	Virtual and Augmented Reality	2	0	2	3	0	4
5	DE	EEC51522	Analog VLSI	2	0	2	3	0	4
6	DE	EEC51523	ASIC Design	2	0	2	3	0	4
7	DE	EEC51524	Advanced Python Programming	2	0	2	3	0	4
8	DE	EEC51525	Optimization Techniques	2	0	2	3	0	4
9	DE	EEC51526	Nano Electronic Devices and Sensors	2	0	2	3	0	4
Department Elective 4									
1	DE	EEC51527	Wearable Sensors and Devices	2	0	2	3	0	4
2	DE	EEC51528	IOT and its applications	2	0	2	3	0	4
3	DE	EEC51529	Wireless Adhoc Sensor Networks	2	0	2	3	0	4
4	DE	EEC51530	Satellite and RADAR Communication	2	0	2	3	0	4
5	DE	EEC51531	Power Management Integrated Circuits	2	0	2	3	0	4
6	DE	EEC51532	Testing of VLSI Circuits	2	0	2	3	0	4
7	DE	EEC51533	RF Components and System Design	2	0	2	3	0	4
8	DE	EEC51534	Embedded C Programming	2	0	2	3	0	4
9	DE	EEC51535	Underwater Robotics	2	0	2	3	0	4
Department Elective 5									
1	DE	EEC51536	Electronic Standards, Codes and Specifications	2	0	2	3	0	4
2	DE	EEC51537	Security Issues in IOT	2	0	2	3	0	4
3	DE	EEC51538	Smart Antennas	2	0	2	3	0	4
4	DE	EEC51539	High Speed Communication Networks	2	0	2	3	0	4
5	DE	EEC51540	System on Chip Design	2	0	2	3	0	4
6	DE	EEC51541	CAD for VLSI	2	0	2	3	0	4

7	DE	EEC51542	Foundation of Quantum Computing	2	0	2	3	0	4
8	DE	EEC51543	Speech and Image Processing	2	0	2	3	0	4
9	DE	EEC51544	Marine Navigational Systems	2	0	2	3	0	4

LIST OF NON DEPARTMENT ELECTIVES OFFERED BY DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SEM	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
Non Department Elective 1									
1	NE	EEC51700	Fun with Electronics - PBL	2	0	2	3	0	4
2	NE	EEC51701	Matlab Programming for Engineers	2	0	2	3	0	4
3	NE	EEC51702	Exploration of Ocean resources	2	0	2	3	0	4
4	NE	EEC51703	Introduction to Arduino and Its Applications	2	0	2	3	0	4
Non Department Elective 2									
1	NE	EEC51704	Electronics in media Studies	2	0	2	3	0	4
2	NE	EEC51705	IOT Based Health Care Systems	2	0	2	3	0	4
3	NE	EEC51706	Introduction to Bio Inspired Robots	2	0	2	3	0	4
4	NE	EEC51707	Foundation on PCB Design and Testing	2	0	2	3	0	4
Non Department Elective 3									
1	NE	EEC51708	Ocean Sensor Technology	2	0	2	3	0	4
2	NE	EEC51709	Neural Networks and Fuzzy Logic	2	0	2	3	0	4
3	NE	EEC51710	Medical Imaging, Signals and Informatics	2	0	2	3	0	4
4	NE	EEC51711	Smart materials for Electronics applications	2	0	2	3	0	4
Non Department Elective 4									
1	NE	EEC51712	Flexible Electronics	2	0	2	3	0	4
2	NE	EEC51713	Radar Communication	2	0	2	3	0	4
3	NE	EEC51714	Introduction to 5G Technology and IOT	2	0	2	3	0	4

4	NE	EEC51715	Design and fabrication of Underwater Robot - Project based learning	2	0	2	3	0	4
Non Department Elective 5									
1	NE	EEC51716	Music Signal Processing	2	0	2	3	0	4
2	NE	EEC51717	Space Electronics	2	0	2	3	0	4
3	NE	EEC51718	Project Planning and Organization for Engineers	2	0	2	3	0	4
4	NE	EEC51719	AI & ML in Oceanography	2	0	2	3	0	4



DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SCHOOL OF ELECTRICAL SCIENCES
B. Tech ECE – Regulation 2022

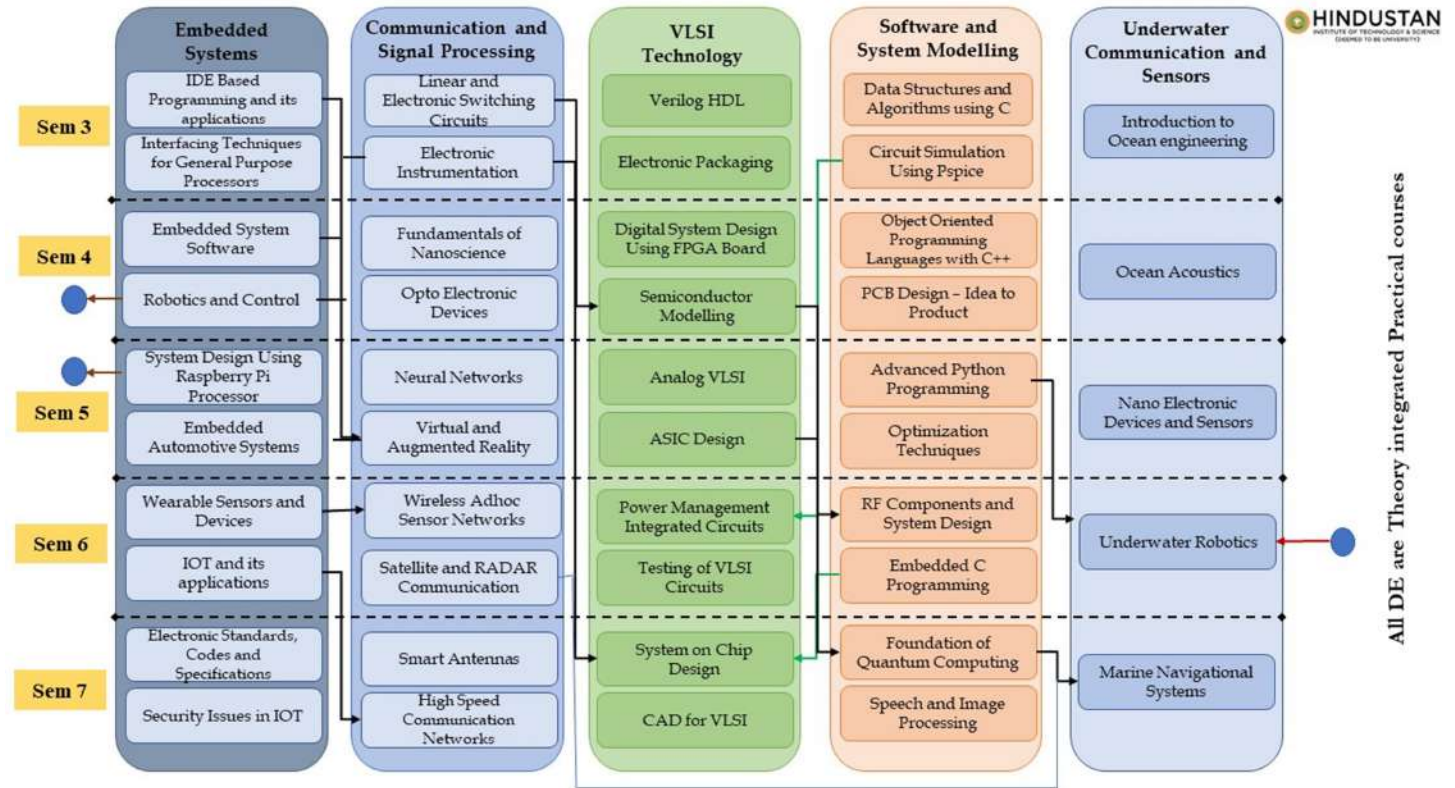
Department Elective Courses: Verticals						
SEMESTER	COURSE CATEGORY	EMBEDDED SYSTEM	COMMUNICATION SYSTEM AND SIGNAL PROCESSING	VLSI TECHNOLOGY	SOFTWARE AND SYSTEM MODELLING	UNDERWATER COMMUNICATION AND SENSORS
3	Department Elective 1	IDE Based Programming and its applications	Linear and Electronic Switching Circuits	Verilog HDL	Data Structures and Algorithms using C	Introduction to Ocean engineering
		Interfacing Techniques for General Purpose Processors	Electronic Instrumentation	Electronic Packaging	Circuit Simulation Using Pspice	
4	Department Elective 2	Embedded System Software	Fundamentals of Nanoscience	Digital System Design Using FPGA Board	Object Oriented Programming Languages with C++	Ocean Acoustics
		Robotics and Control	Opto Electronic Devices	Semiconductor Modelling	PCB Design – Idea to Product	
5	Department Elective 3	System Design Using Raspberry Pi Processor	Neural Networks	Analog VLSI	Advanced Python Programming	Nano Electronic Devices and Sensors
		Embedded Automotive Systems	Virtual and Augmented Reality	ASIC Design	Optimization Techniques	
6	Department Elective 4	Wearable Sensors and Devices	Wireless Adhoc Sensor Networks	Power Management Integrated Circuits	RF Components and System Design	Underwater Robotics
		IOT and its applications	Satellite and RADAR Communication	Testing of VLSI Circuits	Embedded C Programming	
7	Department Elective 5	Electronic Standards, Codes and Specifications	Smart Antennas	System on Chip Design	Foundation of Quantum Computing	Marine Navigational Systems
		Security Issues in IOT	High Speed Communication Networks	CAD for VLSI	Speech and Image Processing	

Registration for Department Elective Courses from verticals:

Department Elective courses will be registered in semester 3, 4, 5, 6 and 7. These courses are arranged in sequential manner and listed in groups called verticals that represents a particular specialization/ diversified group. Students are permitted to choose all departmental elective courses from a particular vertical or from different verticals. Only one departmental elective course can be chosen in the semester horizontally. However, if the students wish to choose courses from different verticals, it must be made sure the requisite prerequisite for the courses is completed.

Departmental Elective Courses: Verticals

COURSE FLOW DIAGRAM





DEPARTMENT ELECTIVE COURSES: VERTICALS									
S.NO	SEM	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
VERTICAL 1: EMBEDDED SYSTEM									
1	3	EEC51500	IDE Based Programming and its applications	2	0	2	3	0	4
2	3	EEC51501	Interfacing Techniques for General Purpose Processors	2	0	2	3	0	4
3	4	EEC51509	Embedded System Software	2	0	2	3	0	4
4	4	EEC51510	Robotics and Control	2	0	2	3	0	4
5	5	EEC51518	System Design Using Raspberry Pi Processor	2	0	2	3	0	4
6	5	EEC51519	Embedded Automotive Systems	2	0	2	3	0	4
7	6	EEC51527	Wearable Sensors and Devices	2	0	2	3	0	4
8	6	EEC51528	IOT and its applications	2	0	2	3	0	4
9	7	EEC51536	Electronic Standards, Codes and Specifications	2	0	2	3	0	4
10	7	EEC51537	Security Issues in IOT	2	0	2	3	0	4
VERTICAL 2: COMMUNICATION SYSTEM AND SIGNAL PROCESSING									
1	3	EEC51502	Linear and Electronic Switching Circuits	2	0	2	3	0	4
2	3	EEC51503	Electronic Instrumentation	2	0	2	3	0	4
3	4	EEC51511	Fundamentals of Nanoscience	2	0	2	3	0	4
4	4	EEC51512	Opto Electronic Devices	2	0	2	3	0	4
5	5	EEC51520	Neural Networks	2	0	2	3	0	4
6	5	EEC51521	Virtual and Augmented Reality	2	0	2	3	0	4
7	6	EEC51529	Wireless Adhoc Sensor Networks	2	0	2	3	0	4
8	6	EEC51530	Satellite and RADAR Communication	2	0	2	3	0	4
9	7	EEC51538	Smart Antennas	2	0	2	3	0	4
10	7	EEC51539	High Speed Communication Networks	2	0	2	3	0	4
VERTICAL 3: VLSI TECHNOLOGY									
1	3	EEC51504	Verilog HDL	2	0	2	3	0	4
2	3	EEC51505	Electronic Packaging	2	0	2	3	0	4
3	4	EEC51513	Digital System Design Using FPGA Board	2	0	2	3	0	4
4	4	EEC51514	Semiconductor Modelling	2	0	2	3	0	4

5	5	EEC51522	Analog VLSI	2	0	2	3	0	4
6	5	EEC51523	ASIC Design	2	0	2	3	0	4
7	6	EEC51531	Power Management Integrated Circuits	2	0	2	3	0	4
8	6	EEC51532	Testing of VLSI Circuits	2	0	2	3	0	4
9	7	EEC51540	System on Chip Design	2	0	2	3	0	4
10	7	EEC51541	CAD for VLSI	2	0	2	3	0	4
VERTICAL 4: SOFTWARE AND SYSTEM MODELLING									
1	3	EEC51506	Data Structures and Algorithms using C	2	0	2	3	0	4
2	3	EEC51507	Circuit Simulation Using Pspice	2	0	2	3	0	4
3	4	EEC51515	Object Oriented Programming Languages with C++	2	0	2	3	0	4
4	4	EEC51516	PCB Design – Idea to Product	2	0	2	3	0	4
5	5	EEC51524	Advanced Python Programming	2	0	2	3	0	4
6	5	EEC51525	Optimization Techniques	2	0	2	3	0	4
7	6	EEC51533	RF Components and System Design	2	0	2	3	0	4
8	6	EEC51534	Embedded C Programming	2	0	2	3	0	4
9	7	EEC51542	Foundation of Quantum Computing	2	0	2	3	0	4
10	7	EEC51543	Speech and Image Processing	2	0	2	3	0	4
VERTICAL 5: UNDERWATER COMMUNICATION AND SENSORS									
1	3	EEC51508	Introduction to Ocean engineering	2	0	2	3	0	4
2	4	EEC51517	Ocean Acoustics	2	0	2	3	0	4
3	5	EEC51526	Nano Electronic Devices and Sensors	2	0	2	3	0	4
4	6	EEC51535	Underwater Robotics	2	0	2	3	0	4
5	7	EEC51544	Marine Navigational Systems	2	0	2	3	0	4

SEMESTER - I

COURSE TITLE	MATRICES AND CALCULUS (Common to ALL B. Tech)								CREDITS	4					
COURSE CODE	EMA51001		COURSE CATEGORY		BS			L-T-P-S	3-0-2-1						
Version	1.0		Approval Details					LEARNING LEVEL	BTL-3						
ASSESSMENT SCHEME															
CIA										ESE					
First Periodical Assessment (Theory)	Second Periodical Assessment (Theory)		Practical Assessments		Observation / Lab records as approved by the Department Examination Committee "DEC"			Attendance	End Semester Examination (Theory)	End Semester Examination (Practical)					
15%	15%		10%		5%			5%	25%	25%					
Course Description	To make the student understand the basic concepts of matrices and calculus using MATLAB														
Course Objective	<ol style="list-style-type: none"> To perform some simple operations on matrices To give a strong foundation on the basic concepts of differentiation and integration. To demonstrate the fundamental understanding of integrals To classify ordinary differential equations. To impart the knowledge of sequences and summation of series. 														
Course Outcome	<p>Upon completion of this course, the students will be able to</p> <ol style="list-style-type: none"> Calculate the inverse of the matrix using Cayley Hamilton theorem and diagonalize the matrix Determine the derivative and higher derivatives of a given function explicitly and integrate the standard functions using suitable differentiation and integration formulae Evaluate surface area and volume using multiple integrals Compute the solution of second order the differential equations Determine the convergence and divergence of the sequence using the appropriate tests. 														
Prerequisites: Knowledge in calculus at high secondary level.															
CO, PO AND PSO MAPPING															
CO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-	3	3	1	-	1	-	-	-	-	-	-	1	1	1	1

1																
CO-2	3	3	1	-	1	-	-	-	-	-	-	1	1	1	-	
CO-3	3	3	1	2	1	-	-	-	-	-	-	2	1	-	-	
CO-4	3	3	2	1	1	-	-	-	-	-	-	2	1	-	-	
CO-5	3	3	2	-	1	-	-	-	-	-	-	1	1	-	1	
1: Weakly related, 2: Moderately related and 3: Strongly related																
MODULE 1: MATRICES													(9L+6P)			
<p>Characteristic equation – Eigen values and Eigenvectors – Properties – Cayley Hamilton theorem (Statement only) – Verification and inverse of the matrix using Cayley Hamilton theorem- Diagonalization of matrices using similarity transformation</p> <p>Suggested Reading: Basics of Matrices</p> <p>Lab: Eigen values and Eigenvectors, Verification and inverse using Cayley Hamilton theorem- Diagonalization</p>													CO-1 BTL-3			
MODULE 2: DIFFERENTIAL AND INTEGRAL CALCULUS													(9L+6P)			
<p>Basic Concepts and Simple Problems in Differentiation and Integration-Partial differentiation – Total differentiation- Taylor’s series – Maxima and minima of functions of two variables. Integration – Methods of integration – Substitution method – Integration by parts – Integration using partial fraction – Bernoulli’s formula.</p> <p>Suggested Reading: Basics of differentiation and integration.</p> <p>Lab: Taylor’s series – Maxima and minima of functions of two variables, Integration using partial fraction</p>													CO-2 BTL-3			
MODULE 3: MULTIPLE INTEGRAL													(9L+6P)			
<p>Double integration – Cartesian and polar co-ordinates – Change of order of integration. Area as a double integral – Triple integration in Cartesian coordinates – Volume as a triple integral - Change of variables between Cartesian and polar coordinates.</p> <p>Suggested Reading: Line Integrals</p> <p>Lab: Area and Volume of double integration and triple integration.</p>													CO-3 BTL-3			
MODULE 4: ORDINARY DIFFERENTIAL EQUATIONS													(9L+6P)			

<p>Second order differential equations with constant coefficients – Particular integrals $-e^{ax}$, $\cos ax$, $\sin ax$, x^m, $e^{ax} \cos bx$, $e^{ax} \sin bx$, Solutions of homogeneous differential equations with variable coefficients – Variation of parameters.</p> <p>Suggested Reading: Basics of Differential Equations.</p> <p>Lab: Solution of Second order differential equations.</p>		<p>CO-4</p> <p>BTL-3</p>
<p>MODULE 5: SEQUENCE AND SERIES</p>		<p>(9L+6P)</p>
<p>Definition of Sequence and series with examples, Convergence, divergence and Oscillation of sequence and series, properties, Tests for convergence of series (Comparison test, Limit Comparison test, Integral test, Ratio test, D' Alembert's test, Alternating Series).</p> <p>Suggested Reading: Basics of sequence and series.</p> <p>Lab: Test the convergence and divergence.</p>		<p>CO-5</p> <p>BTL-3</p>
<p>TEXT BOOKS</p>		
1.	A. Chandrasekaran, G Kavitha (2019), <i>Matrices and Calculus</i> , Dhanam Publications, 1 st Edition, Chennai.	
2.	B.S. Grewal (2017), <i>Higher Engineering Mathematics</i> , Khanna Publishers, 43 rd Edition, New Delhi.	
3.	A. P. Santhakumaran, P. Titus P (2017), <i>Engineering Mathematics – II</i> , NiMetric Publications, 2 nd Edition, Nagercoil, India.	
<p>REFERENCE BOOKS</p>		
1.	D. G. Duffy (2021), <i>Advanced Engineering Mathematics With MATLAB (Advances in Applied Mathematics)</i> , Chapman and Hall Publisher, 5 th Edition, CRC Press, USA.	
2.	M. D. Weir, Joel Hass, Thomas (2016), <i>Calculus</i> , Pearson Publication, 12 th Edition, India.	
3.	Srimantha Pal and S.C. Bhunia (2015), <i>Engineering Mathematics</i> , Oxford University Press, 1 st Edition, New Delhi, India.	
<p>E BOOKS</p>		
1.	https://www.elsevier.com/books/matrix-calculus/bodewig/978-1-4832-3214-0	
2.	https://www.ebooks.com/en-er/book/209983367/matrix-calculus-kronecker-product-and-tensor-product-a-practical-approach-to-linear-algebra-multilinear-algebra-and-tensor-calculus-with-software-implementations-third-edition/yorick-hardy/	
<p>MOOC</p>		
1.	https://www.coursera.org/learn/introduction-to-calculus	
2.	https://nptel.ac.in/courses/111105035	

COURSE TITLE	ENGINEERING PHYSICS (Common to ALL branches of Engineering)							CREDITS	4						
COURSE CODE	EPH51001	COURSE CATEGORY			BS	L-T-P-S	3-0-2-0								
Version	1.0	Approval Details				LEARNING LEVEL	BTL-3								
ASSESSMENT SCHEME															
First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project/Practical			Surprise Test / Quiz	Attendance	ESE								
15%	15%	10%			5%	5%	50%								
Course Description	This course is based on the developing areas of physics integrating both the theoretical and practical training for engineering students. Application of the concepts to solve engineering problems, to acquire practical thinking and logical reasoning.														
Course Objective	<ol style="list-style-type: none"> To evaluate various types of modulus of elasticity and impart knowledge on production and application of ultrasonic wave in SONAR and NDT. To provide a strong foundation on the concepts of crystal physics and thermal conductivity. To illustrate theoretically and experimentally the wave – particle duality. To evaluate the material properties based on energy band gap and magnetic moment. To make the students understand the production of lasers and propagation of light through an optical fiber.														
Course Outcome	Upon completion of this course, the students will be able to <ol style="list-style-type: none"> Evaluate the elastic properties of materials and apply the properties of ultrasonic waves for industrial applications Evaluate the characteristics of crystal structure and the thermal conductivity of good and bad conductors. Solve the Schrodinger’s wave equations and derive energy density based on Planck’s hypothesis Apply the fundamental concepts to classify magnetic and semiconducting materials and thereby, illustrate their applications. Apply lasers and optical fibers as engineering tools														
Prerequisites: Knowledge in fundamentals of Physics at higher secondary level															
CO, PO AND PSO MAPPING															
CO	PO - 1	PO- 2	PO- 3	PO- 4	PO -5	PO- 6	PO- 7	PO- 8	PO- 9	PO - 10	PO- 11	PO- 12	PSO- 1	PS O-2	PSO-3
CO-1	3	3	-	-	-	-	-	-	3	-	-	3	1	-	-
CO-2	3	3	-	2	3	-	-	-	3	-	-	3	-	-	-
CO-3	3	3	-	-	1	-	-	-	3	-	-	3	1	1	1
CO-4	3	3	-	2	-	-	-	-	3	-	-	3	2	2	1
CO-5	3	3	-	-	3	-	-	-	3	-	-	3	3	-	-

1: Weakly related, 2: Moderately related and 3: Strongly related	
MODULE 1: PROPERTIES OF MATTER AND ULTRASONICS (9L+6P)	
<p>Elasticity – Hooke’s law – Elastic Moduli – Young’s modulus of elasticity – Rigidity modulus - Bulk modulus – Twisting couple on a wire – Torsional pendulum – Determination of rigidity modulus of a wire – Depression of a cantilever – Non-uniform bending – Uniform bending – I shape girder.</p> <p>Introduction – Production of ultrasonic waves (Magnetostriction and Piezoelectric methods) – Properties of ultrasonic – Applications in SONAR and NDT.</p> <p>Practical component:</p> <p>Torsional pendulum – Determination of rigidity modulus of thin wire and moment of inertia of regular objects .Non-uniform bending – Determination of Young’s modulus of wooden beam</p>	CO-1 BTL-3
MODULE 2: CRYSTALLOGRAPHY AND THERMAL PHYSICS (9L + 6P)	
<p>Amorphous and crystalline solids – Unit cell – Lattice parameters – Crystal system and Bravais lattices (Qualitative) – Miller indices – Interplanar spacing for cubic crystal system – Crystal structures SCC, BCC, FCC, HCP (no. of atoms, coordination number, atomic packing fraction calculations) – Bragg’s law – X-ray diffractometer.</p> <p>Thermal conductivity – Experimental determination of thermal conductivities of good and bad conductors – Forbe’s method (Theory and experiment) – Lee’s disc method for bad conductors.</p> <p>Practical component:</p> <p>Lee’s disc experiment – Determination of thermal conductivity of bad conductor</p>	CO-2 BTL-3
MODULE 3: QUANTUM PHYSICS (9L + 6P)	
<p>Black body radiation – Planck’s hypothesis – Photoelectric effect – Compton effect – Theory and experimental verification</p> <p>Physical significance of wave function – Schrodinger's wave equation – Time independent and time dependent equations – Particle in a 1D box – Quantum Well (no derivation)</p> <p>Practical component:</p> <p>Photoelectric effect – To plot the KE as a function of frequency for different metals.</p>	CO-3 BTL-3
MODULE 4: MAGNETISM AND SEMICONDUCTORS (9L + 6P)	
<p>Magnetic moment – Classification of magnetic materials (Dia, para, ferro, anti-ferro) – Domain theory of ferromagnetism – Hysteresis – Hard and soft magnetic materials – Memory applications.</p> <p>Classification of semiconductors – Direct and in-direct bandgap – Fermi energy level – Intrinsic and extrinsic semiconductors – <i>n</i>-type and <i>p</i>-type semiconductors (Qualitative) – Hall effect – Determination of Hall voltage (Theory and experiment) – Applications of Hall effect.</p> <p>Practical component:</p> <p>Current – Voltage (IV) characteristics of semiconductor diode</p>	CO-4 BTL-3
MODULE 5: MODERN OPTICS (9L + 6P)	
<p>Principles of laser – Stimulated absorption – Spontaneous emission – Stimulated emission – Population inversion – Pumping action – Active medium – Laser characteristics – Nd-YAG laser – CO₂ laser – Dye laser – Laser in Industrial applications.</p> <p>Optical fiber – Principle and propagation of light in optical fibers – Numerical aperture and acceptance angle – Types of optical fibers – Optical fiber as temperature sensors.</p> <p>Practical component:</p>	CO-5 BTL-3

Laser – Determination of the wave length of the laser using grating	
Laser – Particle size determination using lycopodium powder	
TEXT BOOKS	
1	Rajendran V. (2017), <i>Engineering Physics</i> , Tata McGraw Hill Publications, 3 rd Edition, US.
2	Gaur R. K. and Gupta S.L. (2014). <i>Engineering Physics</i> , 8 th edition, Dhanpat Rai publications (P) Ltd., New Delhi
3	Mani P. (2016), <i>Engineering Physics</i> , Dhanam Publications, 13 th Edition, Chennai.
REFERENCE BOOKS	
1	Arthur Beiser (2017), <i>Concepts of Modern Physics</i> , Tata McGraw Hill Publications, 7 th Edition, US.
2	Halliday, Resnick and Walker (2021), <i>Fundamental of Physics Extended</i> , Wiley & Sons, 12 th Edition, US.
3	Shaikh I. A, Kulkarni H. R, Mohril, S. F. and Khairnar (2018), <i>Engineering Physics</i> , Nirali Prakashan Publishers, 5 th Edition, Pune.
E BOOKS	
1.	https://industri.fatek.unpatti.ac.id/wp-content/uploads/2019/03/042-Fundamentals-of-Physics-II-Electromagnetism-Optics-and-Quantum-Mechanics-R.-Shankar-Edisi-1-2016.pdf
2.	https://zenodo.org/record/243407#.YOefilxBzIU
3.	https://salmanisaleh.files.wordpress.com/2019/02/physics-for-scientists-7th-ed.pdf
MOOC	
1.	http://nptel.ac.in/courses/115106061
2.	http://nptel.ac.in/courses/117101054/12

COURSE TITLE	PROGRAMMING FUNDAMENTALS USING C				CREDITS	4
COURSE CODE	ECS51001	COURSE CATEGORY	PC		L-T-P-S	3-0-2-0
Version	1.0	Approval Details			LEARNING LEVEL	BTL-4
ASSESSMENT SCHEME						
First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project/Practical	Surprise Test / Quiz	Attendance	ESE (Theory)	ESE (Practical)
15%	15%	10%	5%	5%	25%	25%
Course Description	To introduce computers and programming in C and also explore the power of computational techniques that are currently used by engineers and scientists and to develop programming skills with reasonable complexity.					

Course Objective	<ol style="list-style-type: none"> To acquire the basic knowledge in computer hardware, programming languages and Problem-solving techniques. To learn the fundamentals of C programming. To gain knowledge in Functions, arrays and strings in C programming. To understand the pointers, Structures and Union in C programming To gain Knowledge on Embedded Programming and real time applications of C Programming. 														
Course Outcome	<p>Upon completion of this course, the students will be able to</p> <ol style="list-style-type: none"> Describe the basics of digital computer and programming languages. Demonstrate problem solving techniques using flowchart, algorithm/pseudo code to solve the given problem. Design and Implement C program using Control Statements and Functions. Design and Implement C program using Pointers and File operations. Identify the need for embedded C and C Programming in real-time applications. 														
Prerequisites: Nil															
CO, PO AND PSO MAPPING															
CO	PO -1	PO- 2	PO- 3	PO- 4	PO- 5	PO- 6	PO- 7	PO -8	PO- 9	PO- 10	PO- 11	PO- 12	PSO-1	PSO-2	PSO-3
CO-1	3	3	2	2	3	-	-	2	-	-	2	1	2	2	2
CO-2	3	3	2	2	3	2	-	-	3	-	-	1	2	2	2
CO-3	3	3	2	2	3	-	3	-	-	2	-	1	2	2	2
CO-4	3	3	2	2	3	-	-	3	-	-	-	1	2	1	1
CO-5	3	3	2	2	3	-	-	-	-	-	-	1	2	2	1
1: Weakly related, 2: Moderately related and 3: Strongly related															
MODULE 1: PROGRAMMING LANGUAGES AND PROBLEM-SOLVING TECHNIQUES													(6L+6L=12)		
<p>Introduction – Fundamentals of digital computers - Programming languages -Programming Paradigms – Types of Programming Languages – Language Translators – Problem Solving Techniques: Algorithm – Flow Chart - Pseudo code.</p> <p>Practical Component: Drawing Flowcharts using E- Chart & Writing pseudo code for the following problems 1. Greatest of three numbers 2. Sum of N numbers 3. Computation of nCr</p>													CO-1 BTL-1		
MODULE 2: FUNDAMENTALS OF C													(6L+6L=12)		
<p>Evolution of C -Why C language - Applications of C language - Data Types in C – Operators and Expressions – Input and Output statements in C – Decision Statements – Loop Control Statements.</p> <p>Practical Component 1. Program to illustrate arithmetic and logical operators</p>													CO-2 BTL-3		

<ul style="list-style-type: none"> 2. Program to read and print data of different types 3. Program to calculate area and volume of various geometrical shapes 4. Program to compute biggest of three numbers 5. Program to print multiplication table 6. Program to convert days to years, months and days 7. Program to find sum of the digits of an integer 	
MODULE 3: FUNCTIONS, ARRAYS AND STRINGS	
<p>Functions – Storage Class – Arrays – Strings and standard functions - Pre-processor Statements.</p> <p>Practical Component:</p> <ul style="list-style-type: none"> 1. Program to compute Factorial, Fibonacci series and sum of n numbers using recursion 2. Program to compute sum and average of N Numbers stored in an array 3. Program to sort the given n numbers stored in an array 4. Program to search for the given element in an array 5. Program to do word count 6. Program to insert a substring in a string 7. Program to concatenate and compare two strings 8. Program using pre-processor statements 	<p>CO-3</p> <p>BTL-4</p>
MODULE 4: POINTERS, STRUCTURES AND UNION	
<p>Pointers – Dynamic Memory allocation – Structure and Union – Files.</p> <p>Practical Component:</p> <ul style="list-style-type: none"> 1. Program to compute sum of integers stored in a 1-D array using pointers and dynamic memory allocation 2. Program to read and print records of a student/payroll database using structures 3. Program to simulate file copy 4. Program to illustrate sequential access file 5. Program to illustrate random access file 	<p>CO-4</p> <p>BTL-3</p>
MODULE 5: APPLICATIONS OF C	
<p>Structure of embedded C program - Data Types - Operators - Statements - Functions - Keil C Compiler.</p> <p>Game development using c - Analysing the environment - Snake game - Tic-Tac-Toe - flappy bird.</p> <p>Practical component: Simple programs using embedded C-Game Development using C</p>	<p>CO-5</p> <p>BTL-2</p>
TEXT BOOKS	
1.	Ashok Kamthane, "Computer Programming", Pearson Education, 7th Edition, Inc 2017.
2.	Mark Siegesmund, "Embedded C Programming", first edition, Elsevier publications, 2014.
3.	Robert Marmelstein, "Programming Games in C"
REFERENCE BOOKS	
1.	Jeyapoovan T, "Fundamentals of Computing and Programming in C", Vikas Publishing house, 2015.

2.	Yashavant Kanetkar, "Let us C", 15th edition, BPP publication, 2016.
3.	S.Sathyalakshmi, S.Dinakar, "Computer Programming Practicals – Computer Lab Manual", Dhanam Publication, First Edition, July 2013.
EBOOK	
1.	https://en.wikibooks.org/wiki/C_Programming
MOOC	
1.	https://onlinecourses.nptel.ac.in/noc18-cs10/preview
2.	http://nptel.ac.in/courses/106105085/2
3.	https://www.udemy.com/c-programming-for-beginners/
4.	https://www.coursera.org/specializations/c-programming

COURSE		Personality Development & Soft Skills			CREDITS	2
COURSE CODE		ELS51002	COURSE CATEGORY	HS	L - T - P - S	1 - 0 - 2 - 1
Version	1.0	Approval Details			LEARNING LEVEL	BTL - 4
ASSESSMENT SCHEME						
First Periodical Assessment	Second Periodical Assessment	Weekly assignment/ lab record and viva as approved by the Department Examination Committee "DEC"	Surprise Test / Quiz., as approved by the Department Examination Committee "DEC"	Attendance	End Semester Examination (ESE) Theory + Practical	
15 %	15%	10 %	5 %	5 %	50%	
Course Description		This course teaches the learners LSRW Skills which is needed in today's global workplace together with essential business vocabulary & grammar. It equips them to communicate effectively and at professional and social scenario which in turn makes them confident individuals. This course would help them to appear for Cambridge Certification and add value to their profile and validate their language proficiency.				
Course Objective		<ol style="list-style-type: none"> 1. To acquire self-confidence by which the learner can improve upon their informative listening skills by an enhanced acquisition of the English language. 2. To provide an environment to Speak in English at the formal and informal levels and use it for daily conversation, presentation, group discussion and debate. 3. To equip the students to Read, comprehend and answer questions based on literary, scientific and technological texts. 4. To enhance the writing skills of the students via training in instructions, recommendations, checklists, process-description, letter-writing and report writing. 5. To equip the learners in analysing and applying creative thinking skills and participate in 				

	brainstorming, mind-mapping, audio-visual activities and excel in employability skills.														
Course Outcome	<p>Upon completion of this course, the students will be able to</p> <ol style="list-style-type: none"> 1. Demonstrate the ability to construct the grammatically correct sentences with accuracy and syntax structures. 2. Integrating various components of English Language and determining it through reading and listening. 3. Analyze and transcode data, construct different types of written essays, read complex passages and summarize ideas, create personal profiles in the form of a resume. 4. Organize and articulate ideas, concepts, and perceptions in a comprehensive manner in written business correspondence and speaking in formal and informal situations. 5. Infer details about presentation skills and implementing it in various professional situations. 														
Prerequisites: Plus Two English-Intermediate Level															
CO, PO AND PSO MAPPING															
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PSO3
CO1	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO2	-	-	-	-	-	-	-	2	2	3	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO4	-	-	-	-	-	-	2	-	-	3	2	-	-	-	-
CO5	-	-	-	-	-	-	-	-	2	3	2	3	-	-	-
1: Weakly related, 2: Moderately related and 3: Strongly related															
MODULE 1 : ATTITUDE (3L + 6P = 9)															
<p>Grammar : 1. Countable and uncountable nouns 2. Asking questions 3. Expressing likes 4. Introducing reasons 4. Talking about large and small differences. 5. Expressing Results</p> <p>Vocabulary : 1. Recruitment Brochure : ability, certificate, course, etc., 2. Work, job, training course. 3. Job Responsibilities 4. Staff, Employee, member of Staff. 5. Phrases expressing enthusiasm 6. Adjective Forms</p> <p>Writing : 1. Report Writing – Staff Training Report 2. A Website entry 3. A short Email and an Email of a job application.</p> <p>Reading : Articles on Human Resources</p> <p>Soft Skills And Employability Skills (LAB) : ATTITUDE : The power of positive thinking – Positive self talk – self-esteem and positive attitude who Am I ? Attitude in the workplace – Building a positive attitude – Testing your attitude – Adaptability</p>												CO-1 BTL-2			
MODULE 2 : GOAL SETTING (3L + 6P = 9)															
<p>Grammar: 1. Infinitive or verb + ing, 2. Prepositions in phrases describing trends 3. Formal requests 4. First and Second conditionals. 5. Phrases followed by a Verb + ing.</p> <p>Vocabulary : 1. Word related to marketing (Launch, Play, Find out, Learn, Know, etc.,) 2. Revenue outcome 3. Adjective – noun collocations, 3. Last and latest</p> <p>Writing : 1. A marketing Report 2. Email giving information – making an enquiry – answering enquiries – correcting information – confirming terms 3 Memo Writing</p> <p>Reading : Articles on Marketing</p> <p>Soft Skills And Employability Skills (LAB): GOAL SETTING: What is goal ? - What are SMART goals? - How does SMART goal setting work? - Goals as commitment – Useful Guideline for goal setting – Trying personal and professional goals – Goals at the workplace – Cascading goals – Types of goals</p>												CO-2 BTL-3			
MODULE 3 : TIME MANAGEMENT (3L + 6P = 9)															
<p>Grammar : 1. Prepositions in time phrases 2. Making recommendations 3. Phrases signaling parts of a presentation 4. Can and could</p>												CO-3 BTL-3			

<p>Vocabulary : 1. Financial Terms 2. Rising finance 3. Noun Phrases connected with starting companies 4. Assets, collateral etc.,</p> <p>Writing : Formal Letter : 1. A letter of enquiry 2. Proposal Writing</p> <p>Reading :Articles on Entrepreneurship</p> <p>Soft Skills And Employability Skills (LAB): TIME MANAGEMENT : What is time management? Prioritization – Time stressors – Time stealers – Time management - Eisenhower Matrix– Strategies for effective time management – productivity pyramid – The four Ds of time management</p>		
MODULE 4 : EMOTIONAL INTELLIGENCE		(3L + 6P = 9)
<p>Grammar : 1. Referencing 2. Using the Passives to express opinions and ideas. 3. Relative Clauses</p> <p>Vocabulary : 1. Collocations describing reasons for meetings, 2. Collocations with meeting 3. Crucial, priceless, etc.,</p> <p>Writing : Arranging to travel; an email agreeing to a request and making suggestions – giving instructions – about a business trip – announcing a job opportunity. . 2. A letter informaing about a new service – complaint,</p> <p>Reading : Articles on Business abroad</p> <p>Soft Skills And Employability Skills (LAB): EMOTIONAL INTELLIGENCE : What is Emotional Intelligence ? Enhancing your emotional self-awareness, - Emotional intelligence and change management – unfreezing the old, re-freezing the new – change and stress – emotional intelligence and crisis management.</p>		<p>CO-4 BTL-3</p>
MODULE 5 : LEADERSHIP		(3L + 6P = 9)
<p>Grammar : 1. Using the Definite Article 2. Expressing Causes 3. Reporting verbs and reported speech 4 Third Conditional(Imaginary)</p> <p>Vocabulary : 1. Verb – Noun collocations 2. Issues, impact, etc., 3. Way or method 4. Words and phrases expressing numbers.</p> <p>Writing : Mail arranging a meeting , introducing a company and asking for information – giving suggestions 2. A memo asking for suggestions 3. A proposal for outsourcing.</p> <p>Reading : Articles on Change in Business</p> <p>Soft Skills And Employability Skills (LAB): LEADERSHIP: Qualities of a leader – Leadership and assertiveness – problem –solving and decision-making – Approaches to problem – solving and decision-making – Brainstorming – Cause-and-effect analysis</p>		<p>CO-5 BTL-4</p>
TEXT BOOKS		
1	Brook-Hart, Guy (2019). Cambridge English Business Benchmark, Upper Intermediate. Cambridge University Press. India (Pages 208)	
2.	Pillai, Sabina. Fernandez, Agna. (2018). Soft Skills and Employability Skills. Cambridge University Press. India. (Pages 208)	
REFERENCE BOOKS		
1.	Murphy, Raymond (2019). Intermediate English Grammar. Cambridge University Press. India. (Pages 350)	
2.	Barnes, D., (2020). Exploratory talk for learning in Mercer, N. and Hodgkinson, S. (eds) Exploring Talk in School. London: Sage Publications. (Pages 208)	
3.	Dhanavel. S P (2018). English and Soft Skills. Orient BlackSwan. India. (Pages 136)	
4.	Goldsmith, Marshall & M.S. Rao.(2020) Soft Skills: Enhancing Employability. Dreamtech Press. India (Pages 256)	
E Books		

1	https://www.pdfdrive.com/basic-english-grammar-with-exercises-e12486779.html
2	http://dspace.vnbrims.org:13000/jspui/bitstream/123456789/4733/1/Leadership%20The%20Power%20of%20Emotional%20Intellegence.pdf
MOOC Courses	
1	https://www.edx.org/professional-certificate/ritx-communication-skills
2	https://www.coursera.org/specializations/people-and-soft-skills-for-professional-success

COURSE TITLE		TECHNICAL GRAPHICS (ECE, EEE, CSE, IT and Mechatronics)			CREDITS	3
COURSE CODE	EME51002	COURSE CATEGORY	ES	L-T-P-S	2-0-2-1	
Version	1.0	Approval Details		LEARNING LEVEL	BTL-3	
ASSESSMENT SCHEME						
First Periodical Assessment (Theory + Practical)	Second Periodical Assessment (Theory + Practical)	Weekly assignment/Observation / lab records and viva as approved by the DEC	Surprise Test/ Quiz etc., as approved by the DEC	Attendance	ESE (Theory + Practical)	
15%	15%	10%	5%	5%	50%	
Course Description	This course broadly introduces basic drawings, free hand sketching, electrical circuit drawings and PCB diagrams using computer aided design tools. It prepares the students to learn the basic concepts involved in technical drawing skills and computer graphics. It also emphasis the principles and basic understanding of orthographic and isometric projections.					
Course Objective	<ol style="list-style-type: none"> To apply the AutoCAD commands to generate simple drawings and understand drafting techniques. To apply the acquired knowledge to solve simple problems involving planes and solids. To comprehend the various isometric projections and its developments To draw electrical circuit drawings using software. To generate associated views of PCB circuit drawings using CAD software. 					
Course Outcome	<p>Upon completion of this course, the students will be able to</p> <ol style="list-style-type: none"> Demonstrate the concepts of Engineering graphics and projection of straight lines using CAD software Visualize the objects and to draw by free hand sketching and to draw the projection of solids Visualize solid objects in isometric view and to develop surfaces of simple solids. Develop own electrical circuit drawings using software. Develop printed circuit boards for the chosen circuit using software. 					

Prerequisites: Nil															
CO, PO AND PSO MAPPING															
CO	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PS O-1	PS O-2	PSO-3
CO-1	2	1	-	-	1	-	-	1	1	1	-	2	-	-	-
CO-2	2	1	-	-	2	-	-	1	1	2	-	2	-	1	-
CO-3	2	2	2	-	2	-	-	2	2	2	-	2	-	-	-
CO-4	3	2	2	-	3	-	-	2	2	2	-	2	-	-	-
CO-5	3	1	2	-	-	-	-	1	2	2	-	2	2	2	2
1: Weakly related, 2: Moderately related and 3: Strongly related															
MODULE 1: BASICS OF ENGINEERING GRAPHICS												(6L+6P=12)			
Relevance of Graphics in Industry - BIS conventions and specifications - drawing sheet sizes - Lettering – Dimensioning - Scales. Drafting methods - introduction to Computer Aided Drafting –Exposure to Solid Modelling software – Printer and Plotter – 3D printer. Introduction to Orthographic projections - Naming views as per BIS - First angle projection method. Projection of points and projection of Straight lines. <i>Suggested Reading: Solid modelling Software commands</i>												CO-1 BTL-2			
MODULE 2: PROJECTION OF SOLIDS AND FREE HAND SKETCHING												(6L+6P=12)			
Projections of solids. Solids in simple positions and axis inclined to one plane only. (Manual and CAD Drawing) Visualization concepts and Free Hand sketching: Visualization principles — Representation of Three Dimensional objects — Pictorial Projection methods - Layout of views- Conversion of pictorial views to orthographic view. <i>Suggested Reading: Solids inclined to both the planes. Section of solids.</i>												CO-2 BTL-2			
MODULE 3: ISOMETRIC VIEW AND DEVELOPMENT OF SURFACES												(6L+6P=12)			
Concepts of isometric projection. Isometric scale, Isometric view of simple solids with simple sectional planes. Development of Surfaces of simple solids with simple sectional planes. Parallel line method and Radial line method only. (Manual and CAD Drawing) <i>Suggested Reading: Isometric view of solids with multiple sectional planes.</i>												CO-3 BTL-3			
MODULE 4: ELECTRICAL WIRING DRAWINGS												(6L+6P=12)			
Schematic Wiring: Ladders, Wire Type, Wire Numbers 3-Phase Circuits, Source and Destination Signal Arrows, Multi-Wire 3-Phase Circuits, Point-2-Point Connectors. Schematic Components: Schematic Symbol Annotation, Swap/Update Blocks, Insert a Schematic Component. <i>Suggested Reading: Electrical CAD commands, panel layout</i>												CO-4 BTL-3			

MODULE 5: PRINTED CIRCUIT BOARD DRAWINGS		(6L+6P=12)
PCB Drawings, Standards – Practices, Basics of Printed circuit board drawings: PCB design flow, Placement and routing, steps involved in layout design, art generation methods-Manual and CAD, General design factor for digital and analog circuits, Layout and artwork making for single side boards, Design specification standards. Suggested Reading: Layout and artwork making for double side and Multi-layer boards.		CO-5 BTL-3
TEXT BOOKS		
1.	Jeyapoovan, T., Engineering Graphics and Design, Vikas Publishing House Pvt Ltd., New Delhi, 8 th Edition, 2022.	
2.	Electric CAD manual – Autodesk Inc., 2022.	
REFERENCE BOOKS		
1.	Alf Yarwood, Introduction to AutoCAD – 2D and 3D Design, Newnes Elsevier, 2011	
2.	Bhatt N.D and Panchal V.M, Engineering Drawing: Plane and Solid Geometry, Charotar Publishing House, 2017.	
3.	Kirstie Plantenberg, Engineering Graphics Essentials, SDC Publications., fifth Edition, 2016.	
E BOOKS		
1.	Eagle Manual for PCB Drawings - Autodesk Inc., 2022.	
2.	https://www.amazon.in/Technical-Drawing-Engineering-Graphics-International-ebook/dp/B00IZ0FZHA	
MOOC		
1.	http://nptel.ac.in/courses/112103019/	
2.	https://nptel.ac.in/courses/112102304/	

COURSE TITLE		FAB LAB FOR ELECTRONICS ENGINEERS								CREDITS		2			
COURSE CODE		EEC51400		COURSE CATEGORY		ES		L-T-P-S		0-1-2-2					
Version		1.0		Approval Details				LEARNING LEVEL		BTL-3					
ASSESSMENT SCHEME															
First Periodical Assessment		Second Periodical Assessment		Weekly assignment/Observation / lab records and viva as approved by the Department Examination Committee "DEC"		Surprise Test / Quiz etc., as approved by the Department Examination Committee "DEC"		Attendance		End Semester Examination					
15%		15%		10%		5%		5%		50%					
Course Description		The Fab Lab is intended to help the students to acquire the foundational knowledge necessary to comprehend the fundamentals of diodes, transistor. The course provide a comprehensive idea to the students to design, simulate and develop a simple electronic system prototype in perf-board.													
Course Objective		<ol style="list-style-type: none"> To introduce the concepts of identification and testing of passive and active devices. To interpret the VI characteristic of Diode and Transistor. To have hands on experience in soldering. To have hands on experience in design and prototyping of simple electronic system using perf-board. To summarize the characteristics of electrical machines. 													
Course Outcome		<p>Upon completion of this course, the students will be able to</p> <ol style="list-style-type: none"> Interpret the specification and testing of active and passive devices. Analyse the diode and transistor characteristic using Multisim software. Use soldering machines for assembly of active and passive devices in perf-board and test for the functionality. Design and demonstrate simple electronic system using dotted board. Apply and summarize the basic characteristics of Electrical machines. 													
Prerequisites: N/A															
CO, PO AND PSO MAPPING															
CO	PO - 1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO - 10	PO-11	PO-12	PSO-1	PSO-2	PSO-3
CO-1	1	1	1	1	1	-	-	-	-	-	-	1	1	1	-
CO-2	2	2	2	2	3	-	-	-	--	-	-	1	1	1	1
CO-3	2	2	2	2	1	2	-	-	-	-	-	1	1	1	1
CO-4	2	2	2	2	2	1	1	-	1	-	-	1	1	1	1

CO-5	2	2	2	2	-	1	-	-	1	-	-	1	1	-	2
1: Weakly related, 2: Moderately related and 3: Strongly related															
MODULE 1: IDENTIFICATION OF ELECTRONIC COMPONENTS AND SMD DEVICES (3T+ 6P=9)															
Identification, specifications, testing of R, L, C components, potentiometers, bread boards, PCBs, identification, specifications of active devices, diodes, BJTs, JFETs, LEDs, LCDs. Characteristics of Fluorescent, Tungsten and Carbon filament lamps. Lab: Testing of transistor using Digital Multimeter, ohmmeter														CO-1 BTL-3	
MODULE 2: DIODE AND TRANSISTOR VI CHARACTERISTICS (3T+ 6P=9)															
PN junction diode, depletion layer, Forward & Reverse bias, V - I Characteristic. CB, CE and CC Configurations and their Input and Output Characteristics, JFET and its characteristics. Lab: Analyze the VI characteristics of diode and transistor using MULTISIM software														CO-2 BTL-3	
MODULE 3: SOLDERING PRACTICE AND ELECTRICAL SAFETY PRECAUTIONARY (3T+ 6P=9)															
Soldering stages: Surface Preparation, Component Placement, Apply Heat, Apply Solder and Remove Heat Lab: Soldering exercises through dotted boards using passive and active devices														CO-3 BTL-3	
MODULE 4: ELECTRONIC SYSTEM DESIGN (3T+ 6P=9)															
Lab: Demonstrate a simple electronic system design using basic active and passive devices in dotted board.														CO-4 BTL-3	
MODULE 5: INTRODUCTION TO ELECTRICAL MACHINES (3T+ 6P=9)															
Demonstration of cut-out sections of machines: DC Machine (commutator-brush arrangement) and transformer, Induction Machine (squirrel cage rotor). Lab: Test on single-phase Energy Meter, winding of transformer.														CO-5 BTL-3	
TEXT BOOKS															
1	Satya Sai Srikant, Prakash Kumar Chaturvedi., (2020). <i>Basic Electronics Engineering</i> , Springer Singapore, 1 st edition.														
2	John Cadick, Mary Capelli-Schellpfeffer, Dennis Neitzel, Al Winfield., (2018). <i>Electrical Safety Handbook</i> , McGraw-Hill Education, 4th Edition.														
REFERENCE BOOK															
1	Jens Lienig, Hans Bruemmer., (2017). <i>Fundamentals of Electronic Systems Design</i> , Springer, 1 st edition														

COURSE TITLE	DESIGN THINKING FOR ELECTRONICS ENGINEERS						CREDITS	2							
COURSE CODE	EEC51402	COURSE CATEGORY			PC	L-T-P-S	1-0-2-1								
Version	1.0	Approval Details				LEARNING LEVEL	BTL-4								
ASSESSMENT SCHEME															
First Periodical Assessment	Second Periodical Assessment	Weekly assignment/ Observation / lab records and viva as approved by the Department Examination Committee "DEC"			Surprise Test / Quiz etc., as approved by the Department Examination Committee "DEC"	Attendance	End Semester Examination								
15%	15%	10%			5%	5%	50%								
Course Description	Engineering design is the process of devising a system, component, or process to meet desired needs. This purpose of this course is to excite the student on creative design and its significance, to make the student aware of the processes involved in design, to make the student understand the interesting interaction of various segments of humanities, sciences and engineering in the evolution of a design and also to get an exposure as to how to engineer a design.														
Course Objective	<ol style="list-style-type: none"> 1. To facilitate on creative design and its significance 2. To familiarize the processes involved in design 3. To interpret the interaction of humanities, sciences and engineering in the evolution of design 4. To get an exposure to redesign and reuse concepts 														
Course Outcome	<p>Upon completion of this course, the students will be able to</p> <ol style="list-style-type: none"> 1. Apply the appropriate design functionalities in practice as per the design requirement. 2. Classify the product-centered and user-centered aspects of product. 3. Develop a prototype product using hardware/ software tool 4. Investigate the product for redesign or reuse 5. Classify technical, aesthetic and other properties as required as per Design-X constraints. 														
Prerequisites: Nil															
CO, PO AND PSO MAPPING															
CO	PO - 1	PO- 2	PO -3	PO- 4	PO -5	PO-6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO- 2	PSO- 3
CO-1	3	2	1	-	-	-	-	-	1	-	-	-	1	1	-

CO-2	2	2	-	-	-	2	-	-	2	-	-	2	-	1	1
CO-3	3	2	-	-	-	-	-	2	2	2	2	-	-	3	2
CO-4	2	1	-	-	-	3	-	2	2	2	2	-	1	2	-
CO-5	2	2	1	-	-	2	-	2	2	3	2	-	1	2	-
1: Weakly related, 2: Moderately related and 3: Strongly related															
Module 1: Introduction to Engineering and Design objectives (3L+3P=6)															
Introduction to Engineering and project overview. Design and its objectives; Design constraints, Design functions, Design means and Design from; Role of Science, Engineering and Technology in design. How to initiate creative designs? Initiating the thinking process for designing a product of daily use. Need identification; Problem Statement; Market survey-customer requirements; Design attributes and objectives; Ideation; Brainstorming approaches. Project: A simple problem is to be taken up to examine different solutions-Rectifier device- Group Presentation and discussion														CO-1 BTL-3	
Module 2: Electronic System Design Processes (3L+6P=9)															
Design process- Different stages in design and their significance; Defining the design space; Analogies and “thinking outside of the box” Design Communication; Realization of the concept into a configuration, drawing and model. Concept of “Complex is Simple”. Design detailing- Material selection, Design visualization- Solid modelling; Detailed 2D drawings; Tolerance; Use of standard items in design; Energy needs of the design Project: An exercise in the detailed design of any two customer products														CO -2 BTL-3	
Module 3: Development of Prototype product (3L+7P=10)															
Prototyping- prototype assignment and process flow; testing and evaluation of design; Design modifications if required; Freezing the design; Cost analysis. Use of hardware/ software tool to develop an electronic circuit. Project: Develop a simple application oriented electronic circuit														CO-3 BTL-4	
Module 4: Redesign and environment aspects of product development (3L+7P=10)															
Design for “X”; covering quality, reliability, safety, manufacturing, assembly, maintenance, logistics, handling; disassembly; recycling; re-engineering etc.														CO-4 BTL-4	
Module 5: User centred Designs for Electronic System (3L+7P=10)															
Product centered and user centered design. Product centered attributes and user centered attributes. Example: Smart phone. Aesthetics and ergonomics. Value engineering, Concurrent engineering, Reverse engineering in design; Culture based design; Architectural designs; Role of colors in design. Intellectual Property rights – Trade secret; patent; copy-right; trademarks; product liability. Group presentation of any such products covering all aspects that could make or mark it. Project: Examine the possibility of value addition for an existing .														CO-5 BTL-3	
RENCE BOOKS															
1	Dym, C. L., Little, P. and Orwin, E. J., (2013). <i>Engineering Design - A Project based introduction</i> – Wiley Publications, 4 th edition.														
2	Eastman, C. M. (Ed.), (2012). <i>Design for X Concurrent engineering imperatives</i> , Springer Publications, 11 th edition.														
3	Haik, Y. And Shahin, M. T., (2011). <i>Engineering Design Process</i> , Cengage Learning (CL-Engineering), 2 nd edition.														

4	Pahl, G., Beitz, W., Feldhusen, J. and Grote, K. H., (2007) <i>Engineering Design: A Systematic Approach</i> , Springer Publications, 3rd Edition.
5	Voland, G., (2004). <i>Engineering by Design</i> , Pearson India, 2 nd edition.
TEXT BOOK	
1	Balmer, R. T., Keat, W. D., Wise, G., and Kosky, P., (2015). <i>An Introduction to Engineering and Design</i> , Academic Press, 3 rd Edition .
E-BOOKS	
1	https://focusu.com/download-design-thinking/
2	https://i.experiencepoint.com/free-pdf-download-design-thinking-101-ebook
3	https://www.researchgate.net/publication/329310644_Handbook_of_Design_Thinking
MOOC	
1	https://iversity.org/en/courses/design-thinking-2nd-iteration
2	https://www.mooc-list.com/tags/design-thinking

Semester-II

COURSE TITLE	ANALYTICAL MATHEMATICS (Common to ALL B. Tech)					CREDITS	4								
COURSE CODE	EMA51002	COURSE CATEGORY			BS	L-T-P-S	3-0-2-1								
Version	1.0	Approval Details				LEARNING LEVEL	BTL-3								
ASSESSMENT SCHEME															
CIA					ESE										
First Periodical Assessment (Theory)	Second Periodical Assessment (Theory)	Practical Assessments	Observation / Lab records as approved by the Department Examination Committee "DEC"	Attendance	End Semester Examination (Theory)	End Semester Examination (Practical)									
15%	15%	10%	5%	5%	25%	25%									
Course Description	To make the student understand the basic analytical mathematical skills that is imperative for effective understanding of engineering subject using MATLAB.														
Course Objective	<ol style="list-style-type: none"> 1. To implement problem solving skills using vectors 2. To provide an exposure on the concepts of complex variables, conformal mapping and bilinear transformation. 3. To comprehend integrals using Cauchy's integral and residue theorem. 4. To illustrate the applications of Laplace Transforms 5. To make the students understand the concept of Fourier series 														
Course Outcome	<p>Upon completion of this course, the students will be able to</p> <ol style="list-style-type: none"> 1. Verify the standard theorems in Vector Calculus and apply them to evaluate surface area and volume. 2. Construct an analytic function when real and imaginary parts are given. 3. Evaluate finite integrals using Cauchy's theorem. 4. Solve the system of ordinary differential equations using Laplace Transform 5. Expand the Fourier series for the given function. 														
Prerequisites: Knowledge in single-variable calculus.															
CO, PO AND PSO MAPPING															
CO	P O- 1	PO- 2	PO- 3	P O- 4	PO -5	PO -6	P O- 7	PO- 8	PO -9	PO -10	PO- 11	PO- 12	PSO- 1	PS O-2	PS O-3
CO-1	3	3	2	-	1	-	-	-	-	-	-	1	2	-	-
CO-2	3	2	1	-	2	-	-	-	-	-	-	1	1	1	-
CO-3	3	2	1	2	1	-	-	-	-	-	-	1	1	1	-
CO-4	3	3	2	1	1	-	-	-	-	-	-	2	2	2	2
CO-5	3	3	2	-	1	-	-	-	-	-	-	2	2	2	2
1: Weakly related, 2: Moderately related and 3: Strongly related															
MODULE 1: VECTOR CALCULUS												(9L+6P)			
Gradient, Divergence and Curl – Unit normal vector, Directional derivative – angle between														CO-1	

surfaces- Irrotational and Solenoidal vector fields. Green's theorem - Gauss divergence theorem and Stoke's theorem (without proof) – Verification and evaluation of the above theorems - Simple applications to regions such as square, rectangle, triangle, cuboids and rectangular parallelepipeds. Suggested Reading: Basics of Vectors Lab: Gradient, Divergence, Curl, Irrotational and Solenoidal vector fields		BTL-3
MODULE 2: COMPLEX VARIABLES (9L+6P)		
Functions of a complex variable – Analytic function - Cauchy - Riemann equations – Properties of analytic function (Statement Only) – Construction of Analytic functions by Milne – Thomson method – Conformal Mapping – Mapping by functions $w = z + c, w = cz, w = 1/z$, Bilinear transformation. Suggested Reading: Complex Numbers Lab: Verification of Analytic Function		CO-2 BTL-3
MODULE 3: COMPLEX INTEGRATION (9L+6P)		
Statement and Application of Cauchy's Integral theorem and integral formula (without proof)- Evaluation of integrals using the above theorem-Taylor and Laurent series expansions- Singularities-Classification. Residues-Cauchy's residue theorem (without proof)-Contour integration over unit circle and semi-circular contours (excluding poles on boundaries) Suggested Reading: Types of integration Lab: Evaluation of integrals using Cauchy's Integral formula and Cauchy's residue theorem.		CO-3 BTL-3
MODULE 4: LAPLACE TRANSFORMS (9L+6P)		
Laplace transform – Conditions of existence – Transform of elementary functions – properties – Transforms of derivatives – Initial and final value theorems – Transform of periodic functions. Inverse Laplace transforms using partial fraction and convolution theorem. Solution of linear ODE of second order with constant coefficients. Suggested Reading: Basics of Transform Lab: Solutions of differential equations using Laplace transform		CO-4 BTL-3
MODULE 5: FOURIER SERIES (9L+6P)		
Dirichlet's Conditions – General Fourier Series – Odd and even functions – Half range sine and cosine series –Harmonic Analysis. Suggested Reading: Basics of series Lab: Finding Fourier Series		CO-5 BTL-3
TEXT BOOKS		
1.	A. Chandrasekaran, G. Kavitha (2022), <i>Analytical Mathematics</i> , Dhanam Publications, 1 st Edition, Chennai.	
2.	T. Veerarajan (2016), <i>Engineering Mathematics-II</i> , McGraw Hill Education (India), Private Limited, 4 th Edition, New Delhi.	
3.	Raj Kumar Bansal, Ashok Kumar Goel, Manoj Kumar Sharma (2016), <i>MATLAB and its Applications in Engineering</i> , Pearson Publication, 2 nd Edition, New Delhi.	
4.	D. G. Duffy (2021), <i>Advanced Engineering Mathematics With MATLAB (Advances in Applied Mathematics)</i> , Chapman and Hall Publisher, 5 th Edition, CRC Press, USA.	
REFERENCE BOOKS		
1.	P. Sivarama Krishna Das, C. Vijayakumari (2017), <i>Engineering Mathematics</i> , 1 st Edition, Pearson Publishing, Chennai.	
2.	A. P. Santhakumaran, P. Titus P (2017), <i>Engineering Mathematics – II</i> , NiMetric Publications, 2 nd Edition, Nagercoil, India.	

3.	Kreyszig Erwin (2016) <i>Advanced Engineering Mathematics</i> , John Wiley and Sons, 10 th Edition, New Delhi.
4.	S.S. Sastry (2015), <i>Engineering Mathematics</i> , Vol. I & II, PHI Learning Pvt. Ltd, 4 th Edition, New Delhi.
E BOOKS	
1.	http://ggn.dronacharya.info/APSDept/Downloads/QuestionBank/Mathematics-I/SectionD.pdf .
2.	https://people.math.sc.edu/girardi/m7034/book/AshComplexVariablesWithHyperlinks.pdf
3.	https://ocw.mit.edu/courses/18-03sc-differential-equations-fall-2011/pages/unit-iii-fourier-series-and-laplace-transform/
4.	https://www.pdfdrive.com/calculus-ii-sequences-and-series-e11676778.html
MOOC	
1.	https://www.edx.org/course/introduction-engineering-mathematics-utarlingtonx-engr3-0x

COURSE TITLE		ENGINEERING MATERIALS (Common to ALL B.Tech.)				CREDITS		4							
COURSE CODE		ECT51001	COURSE CATEGORY	BS	L-T-P-S		3-0-2-2								
Version		1.0	Approval Details		LEARNING LEVEL		BTL-3								
ASSESSMENT SCHEME															
First Periodical Assessment (Theory)	Second Periodical Assessment (Theory)	Practical Assessments	Observation / lab records as approved by the Department Examination Committee "DEC"		Attendance	ESE									
15%	15%	10%	5%		5%	Theory 25%									
						Practical 25%									
Course Description		To expose the students to the basics of Engineering Materials and their applications.													
Course Objective		<ol style="list-style-type: none"> To make the students understand the basics of crystal structure and phase rule. To provide a knowledge on the theoretical basis of the chemical composition, properties and applications of abrasives, adhesives, lubricants and refractories. To give a strong foundation on the basic concepts of nanomaterials, the general synthetic methods with emphasis on their applications. To provide an exposure on the fundamentals and applications of polymeric materials and composites. To illustrate the applications of energy materials, liquid crystals and conducting polymers with a good exposure on their basic terminologies. 													
Course Outcome		<p>Upon completion of this course, the students will be able to</p> <ol style="list-style-type: none"> Propose and justify suitable metals/materials for alloying. Distinguish and select a suitable material as abrasives / adhesives / lubricants / refractories based on its properties and applications. Select an appropriate technique for nanomaterial synthesis and characterization. State and select a suitable polymeric / composite material for industrial applications. Develop the suitable organic/inorganic materials that can be employed in energy storage / production and electronic devices. 													
Prerequisites: Knowledge in fundamentals of chemistry at higher secondary level.															
CO, PO AND PSO MAPPING															
CO	PO - 1	PO- 2	PO- 3	PO- 4	PO- 5	PO- 6	PO- 7	PO- 8	PO- 9	PO -10	P O- 11	PO- 12	PS O- 1	P S O- 2	PSO-3
CO-1	3	2	1	-	-	-	1	-	-	-	-	1	-	-	-
CO-2	3	2	1	-	-	-	2	-	-	-	-	2	-	-	-
CO-3	3	2	1	-	-	-	2	-	-	-	-	2	1	1	-
CO-4	3	2	1	-	-	-	2	-	-	-	-	2	-	-	-
CO-5	3	2	1	-	-	-	2	-	-	-	-	2	2	-	1
1: Weakly related, 2: Moderately related and 3: Strongly related															
MODULE 1: CRYSTAL STRUCTURE AND PHASE RULE									(9L + 6P)						
Basic crystal systems – Types, characteristics, examples – Space lattice, Unit cell – types –													CO-1		

<p>X-ray diffraction and crystal structure.</p> <p>Phase rule: Basic terminology - Derivation of Gibbs Phase rule- Phase diagrams: One component system (water), Two component system — Reduced phase rule: Simple Eutectic system, examples, Phase diagram: Ag-Pb system, Pb-Sn system – Applications of phase rule.</p> <p>Practical component: Construction of phenol-water phase diagram - Determination of apparent density of porous solids.</p>		BTL-3
MODULE 2: ABRASIVES, ADHESIVES, LUBRICANTS AND REFRACTORIES (9L + 6P)		
<p>Abrasives – Classification, Properties, Uses – Adhesives – Development of Adhesive strength, Physical and Chemical factors influencing adhesive action, Classification of Adhesives – Epoxy Resin (Preparation, Properties and Applications) – Lubricants – Mechanism of Lubrication, Classification and Properties, Semi Solid Lubricants, Solid Lubricants, MoS₂ and Graphite - Refractories – Classification, Properties, Applications.</p> <p>Practical components: Preparation of urea-formaldehyde resin - Determination of porosity of a refractory</p>		CO-2 BTL-3
MODULE 3: NANOMATERIALS (9L + 6P)		
<p>Introduction – Scope of nanomaterials - Types of nanomaterials - Synthesis of Nanomaterials - Bottom-up and Top-down approaches – Methods of preparation – Laser ablation, Sol-gel process, Gas-phase condensation, Chemical Vapour Deposition. Properties – Optical, Electrical, Magnetic, Chemical properties (introduction only). Characterization – UV-Visible spectroscopy, FE-SEM and TEM (Principle and Applications only).</p> <p>Practical component: Preparation of ZnO nanoparticles by wet chemical method – Verification of Beer-Lambert’s law using silver nanoparticles.</p>		CO-3 BTL-3
MODULE 4: POLYMERS AND COMPOSITES (9L + 6P)		
<p>Introduction – Basic definitions – Classification of polymers – Structure and property relationship of polymers – Plastics – Synthesis, properties and applications of polycarbonates and phenol-formaldehyde - Biodegradable Polymers, examples and applications. Composites - Introduction - Definition – Constituents – Classification - Fiber-reinforced Composites –Types and Applications.</p> <p>Practical components: Determination of molecular weight / viscosity of polymer using Ostwald Viscometer.</p>		CO-4 BTL-3
MODULE 5: MATERIALS FOR ENERGY AND ELECTRONIC APPLICATIONS (9L + 6P)		
<p>Energy storage materials – Metal-hydride batteries, Li-batteries - Materials for solar cells: Semi-conductors - Materials for hydrogen technology - production (electrolysis), storage (hydrides), fuel cells. Liquid Crystals - Introduction –Characteristics – Optical properties- Classification – Chemical constitution and liquid crystalline behaviour - Applications. Conducting Polymers: Classification, Intrinsic Conducting Polymers, Extrinsic Conducting Polymers, Applications.</p> <p>Practical component: Preparation of polyaniline / Polypyrrole.</p>		CO-5 BTL-3
TEXT BOOKS		
1.	Jain, P.C., Jain, M. (2018). <i>Engineering Chemistry</i> , Dhanpat Raj Publishing Company (P) Ltd, New Delhi, 17 th Edition.	
2.	Puri, B. R., Sharma, L. R., Pathania, M. S. (2020). <i>Principles of Physical Chemistry</i> , Vishal Publishing Co. Jalandhar, 47 th Edition.	
3.	Rangwala. (2017). <i>Engineering Materials</i> , Charotar Publishing House Pvt. Ltd, 43 rd Edition.	
REFERENCE BOOKS		

1.	Clyne, T. W., Hull, D. (2019). <i>An introduction to composite materials</i> , Cambridge University Press, 3 rd Edition.
2.	<u>Shah</u> , M. A., <u>Ahmad</u> , T. (2021). <i>Nano Science & Technology</i> , Dreamtech Press, 2021 Edition.
3.	Palanna, O. G. (2018). <i>Engineering Chemistry</i> , Mc Graw Hill Education (India) Pvt. Ltd, 2 nd Edition.
E BOOKS	
1.	http://www.erforum.net/2016/01/engineering-chemistry-by-jain-and-jain-pdf-free-ebook.html
2.	https://abmpk.files.wordpress.com/2014/02/book_maretial-science-callister.pdf
MOOC	
1.	https://www.edx.org/course/materials-science-engineering-misisx-mse1x
2.	https://www.mooc-list.com/tags/materials-science

COURSE TITLE	ELECTRIC CIRCUITS AND MACHINES							CREDITS					4			
COURSE CODE	EEC51001		COURSE CATEGORY			PC		L-T-P-S					3-0-2-1			
Version	1.0		Approval Details					LEARNING LEVEL					BTL-3			
ASSESSMENT SCHEME																
First Periodical Assessment (Theory)	Second Periodical Assessment (Theory)			Practical Assessments			Observation / lab records as approved by the Department Examination Committee "DEC"		Attendance		End Semester Examination (Theory)			End Semester Examination (Practical)		
15%	15%			10%			5%		5%		25%			25%		
Course Description	The students shall develop an intuitive understanding of the circuit analysis, basic concepts of electrical machines and basics of electronics and be able to apply them in practical situation.															
Course Objective	<ol style="list-style-type: none"> To analyze analysing any given electrical network. To synthesize the electrical network from a given impedance/admittance function. To interpret the basics of Electrical machines for specific types of applications. 															
Course Outcome	<p>Upon completion of this course, the students will be able to</p> <ol style="list-style-type: none"> Apply the knowledge of basic circuit law and simplify the circuit. Apply Network theorems to simplify the electric circuits. Construct and interpret two port networks and its parameters. Choose the DC machines and transformer for specific application. Classify and compare different types of AC machines. 															
Prerequisites:																
CO, PO AND PSO MAPPING																
CO	PO - 1	PO- 2	PO- 3	PO -4	PO -5	PO -6	PO -7	PO -8	PO -9	PO -10	PO -11	PO -12	PSO -1	PSO -2	PSO- 3	
CO-1	3	2	1	1	2	1	-	-	1	-	-	1	2	3	1	
CO-2	3	3	1	1	2	1	-	-	1	-	-	1	2	2	1	
CO-3	3	3	3	1	2	1	-	-	1	-	-	1	1	2	1	
CO-4	3	3	3	-	2	1	-	-	1	-	-	1	1	2	2	
CO-5	3	3	3	1	1	1	-	-	1	-	-	1	2	3	2	
1: Weakly related, 2: Moderately related and 3: Strongly related																

MODULE I: BASIC CIRCUITS ANALYSIS		(9L+ 6P=15)
<p>Ohm's Law – Kirchhoff's laws – DC and AC Circuits – Resistors in series and parallel circuits – Mesh current and node voltage method of analysis for D.C and A.C. circuits – Phasor Diagram – Power, Power Factor and Energy</p> <p>Suggested Readings:</p> <p>three phase system, basic safety measures at home and industry</p> <p>Lab Experiments</p> <ol style="list-style-type: none"> 1. Verification of Kirchhoff's Laws 2. Verification of Mesh current and node voltage method 		<p>CO-1</p> <p>BTL-3</p>
MODULE II: NETWORK REDUCTION AND NETWORK THEOREMS		(9L+ 6P=15)
<p>Network reduction: voltage and current division, source transformation – star delta conversion. Thevenin's and Norton & Theorem – Superposition Theorem – Maximum power transfer theorem – Reciprocity Theorem.</p> <p>Suggested Readings:</p> <p>Application of network theorem in real time</p> <p>Lab Experiments</p> <ol style="list-style-type: none"> 1. Verification of Thevenin's and Norton & Theorem 2. Verification of Superposition theorem and Maximum power transfer theorem 		<p>CO-2</p> <p>BTL-3</p>
MODULE III: TWO PORT NETWORKS		(9L+ 6P=15)
<p>Two Port Networks, terminal pairs, relationship of two port variables, impedance parameters, admittance parameters, transmission parameters and hybrid parameters, interconnections of two port networks.</p> <p>Suggested Readings:</p> <p>Find the various driving point & transfer functions of two port network</p> <p>Lab Experiments</p> <ol style="list-style-type: none"> 1. To calculate and verify 'Z' parameters of two-port network 2. To calculate and verify 'H' parameters of two-port network 		<p>CO-3</p> <p>BTL-3</p>
MODULE IV: DC MACHINES AND TRANSFORMER		(9L+ 6P=15)
<p>DC Machines: Principle of Operation, Classification, EMF and Torque Equations, Speed Control Methods and Applications</p> <p>Single Phase Transformers: Principle of Operation of a Single Phase Transformer, EMF Equation, Phasor Diagram, Equivalent Circuit of a 1-ph Transformer, Regulation & Efficiency of a Transformer (Qualitative)</p> <p>Suggested Readings:</p> <p>Special DC machine – BLDC motor, Three phase transformer and its applications</p> <p>Lab Experiments</p> <ol style="list-style-type: none"> 1. Load test on DC series and shunt motor . 2. Load and No load test on single phase transformer 		<p>CO-4</p> <p>BTL-3</p>
MODULE V: AC MACHINES		(9L+ 6P=15)

<p>Three Phase Induction Motor: Principle of Rotating Magnetic Field, Principle of Operation of 3-ph Induction Motor, Torque – Speed Characteristics of 3-ph Induction Motor, Applications of 3-ph Induction Motor.</p> <p>Single phase Induction: Principle of Operation, Types of single phase induction motor and application</p> <p>Suggested Readings:</p> <p>Alternators, Synchronous Motors application of IM in various industry</p> <p>Lab Experiments</p> <p>Load and No load test on single phase and three phase Induction motor</p>		<p>CO-5</p> <p>BTL-3</p>
TEXT BOOKS		
1	Hughes revised by Mckenzie Smith with John Hilcy and Keith Brown., (2016). <i>Electrical and Electronics Technology</i> , Pearson, 12th Edition.	
2	V.K.Metha & Rohit Metha., (2018). <i>Principle of Electrical Machines</i> , S.Chand and Company Ltd, Revised edition.	
3	Sudhakar A and Shyam Mohan SP., (2019). <i>Circuits and Network Analysis and Synthesis</i> , Tata McGraw Hill, 5 th edition.	
REFERENCE BOOKS		
1	Chakrabati A., (2015). <i>Circuits Theory (Analysis and synthesis)</i> , Dhanpath Rai & Co publications, 7 th revised edition.	
2	V.N Mittle. (2017). <i>Basic Electrical Engineering</i> Tata McGraw Hill, 2nd edition.	
3	A. Chakroborty, S. Nath and C.K. Chanda., (2019). <i>Basic Electrical Engineering</i> , McGraw Hill Education Pvt. Ltd., 4th Edition.	
E BOOKS		
1	https://archive.nptel.ac.in/courses/108/102/108102042/	
2	https://archive.nptel.ac.in/courses/108/105/108105159/	
3	http://nptel.ac.in/courses/108106072/	
MOOC		
1	https://nptel.ac.in/courses/108102042	
2	https://www.edx.org/course/circuits-and-electronics-1-basic-circuit-analysis-2	

COURSE TITLE		UNIVERSAL HUMAN VALUES						CREDITS		2					
COURSE CODE		EGE51001		COURSE CATEGORY		HS		L-T-P-S		2-0-0-1					
Version		1.0		Approval Details		LEARNING LEVEL		BTL-3							
ASSESSMENT SCHEME															
First Periodical Assessment		Second Periodical Assessment		Seminar/ Assignments/ Project		Surprise Test / Quiz		Attendance		ESE					
15%		15%		10%		5%		5%		50%					
Course Description		This course is mandatory as per the AICTE for the UG students to motivate the students for focusing on the human values. The main aim is to focus on the sustainability of happiness with harmony and natural acceptance in the career. Lecture cum power points is provided as guidelines from AICTE.													
Course Objective		<ol style="list-style-type: none"> To create awareness to students on themselves and their surroundings (family, society, nature). To create responsibility among students on life in handling problems with sustainable solutions To prepare the students with human relationships and human nature in mind. To Prepare the students on critical ability and sensitive to their commitment. (Human values, human relationship and human society). To Apply the learning to their real life. 													
Course Outcome		<p>Upon completion of this course, the students will be able to</p> <ol style="list-style-type: none"> Demonstrate the necessity of relationship with family, society and nature. Familiarize with the challenges ahead and proposed solutions. Formulate and design human cyber security policies, plans and procedures for organizations. Apply standard security countermeasure tools to sustain human relationships and nature.es. Recognize the necessity of human values and relationship. Demonstrate the learning in their real life. 													
Prerequisites: Nil															
CO, PO AND PSO MAPPING															
CO	PO -1	PO -2	PO -3	PO- 4	PO- 5	PO -6	PO-7	PO- 8	PO -9	PO -10	PO -11	PO- 12	PSO- 1	PSO -2	PSO- 3
CO-1	-	-	-	-	3	3	3	3	3	3	3	3	-	-	-
CO-2	-	-	-	-	3	3	3	3	3	3	3	3	-	-	-
CO-3	-	-	-	-	-	3	3	3	3	3	3	3	-	-	-
CO-4	2	-	-	-	-	3	3	3	3	3	3	3	-	-	-
CO-5	-	-	-	-	-	3	3	3	3	3	3	3	-	-	-
1: Weakly related, 2: Moderately related and 3: Strongly related															
MODULE 1: Introduction (6L)															
Need, Basic Guidelines, Content and Process for Value Education Purpose and motivation for the course, recapitulation from Universal Human Values-I Self-Exploration– what is it? - Its content and process; ‘Natural Acceptance’ and experiential Validation- as the process for self-exploration - Continuous Happiness and Prosperity- A look at basic Human Aspirations Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority Understanding Happiness and Prosperity correctly- A											CO-1 BTL-2				

<p>critical appraisal of the current scenario - Method to fulfil the above human aspirations: understanding and living in harmony at various levels.</p> <p>Practical component: Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking</p> <p>Suggested Readings: Evolution of cyber security</p>	
MODULE 2: Understanding Harmony in the Human Being (6L)	
<p>Harmony in Myself! Understanding human being as a co-existence of the sentient 'I' and the material 'Body' Understanding the needs of Self ('I') and 'Body' - happiness and physical facility Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer) Understanding the characteristics and activities of 'I' and harmony in 'I' - Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail -Programs to ensure Sanyam and Health.</p> <p>Practical component: Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease</p>	CO-2 BTL-2
MODULE 3: Understanding Harmony in the Family and Society (6L)	
<p>Harmony in Human-Human Relationship- Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship - Understanding the meaning of Trust; Difference between intention and competence Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals</p> <p>Practical component: Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives</p>	CO-3 BTL-3
MODULE 4: Understanding Harmony in the Nature and Existence (6L)	
<p>Whole existence as Coexistence - Understanding the harmony in the Nature -Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self-regulation in nature - Understanding Existence as Co-existence of mutually interacting units in all-pervasive space -Holistic perception of harmony at all levels of existence.</p> <p>Practical component: Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.</p>	CO-4 BTL-2
MODULE 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics (6L)	
<p>Natural acceptance of human values, Definitiveness of Ethical Human Conduct Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order -Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems. -Case studies of typical holistic technologies, management models and production systems-Strategy for</p>	CO-5 BTL-2

transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers b. At the level of society: as mutually enriching institutions and organizations. Sum up.	
Practical component: Include practice exercises and case studies to discuss the conduct as an engineer or scientist etc.	
TEXT BOOKS	
1. P.R Gaur, R Asthana, G.P Bagaria, Human Values and Professional Ethics (2 nd revised edition) Excel Books, New Delhi, 2019	
2. A Nagaraj, Jeevan Vidya: Ek Parichaya, Jeevan Vidya Prakashan, Amarkantak, 1999.	
3. A. N Tripathi, Human Values, New Age Intl. Publishers, New Delhi, 2004.	
Lawrence, C. (2016). <i>Cyber security for Dummies</i> , John Wiley & Sons Inc., 2 nd Edition, pp.213--432.	
REFERENCE BOOKS	
1.	AICTE STUDENT INDUCTION PROGRAM HANDBOOK- https://fdp-si.aicte-india.org/download/G012%20SIP%20Hand%20Book%20v2.pdf
E BOOKS	
1.	https://fdp-si.aicte-india.org/download.php#1

COURSE TITLE		REGIONAL LANGUAGE – BASIC TAMIL			CREDITS	2
COURSE CODE	ELS51003	COURSE CATEGORY	HS	L - T - P - S	2 - 0 - 0 - 1	
Version	1.0	Approval Details			LEARNING LEVEL	BTL- 3
ASSESSMENT SCHEME						
First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments / Project	Surprise Test / Quiz etc., as approved by the Department Examination Committee "DEC"	Attendance	End Semester Examination ESE	
15%	15%	10%	5%	5%	50%	
Course Description	This Tamil course improves Tamil language skills of the students' Tamil letters and Grammar are included. This course provides an opportunity not only to get interest in learning Tamil Language but also, they can learn to converse easily.					
Course Objective	<ol style="list-style-type: none"> 1. By studying this course, students will be able to write and speak Tamil easily in any situation, daily life and daily conversations. 2. Develops language and interest in learning in students. 3. Facilitates students to create opportunities for themselves in the society. 4. Students also learn Tamil literature by developing interest in language department. 5. This lesson plan helps the students to learn about the culture by learning the Tamil language. 					
Course Outcome	<p>Upon completion of this course, the students will be able to</p> <ol style="list-style-type: none"> 1. Demonstrate the Letters and basic words of Tamil Language which are in daily use 2. Develops the listening skills of Tamil language 3. Utilize the letters and common words of the language for communication 4. Develop the conversational skills 5. Demonstrate the skill of reading and writing 					
Prerequisites: Plus Two -Intermediate Level						
CO, PO AND PSO MAPPING						

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO3
CO1	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO2	-	-	-	-	-	-	-	2	2	3	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO4	-	-	-	-	-	-	2	-	-	3	2	-	-	-	-
CO5	-	-	-	-	-	-	-	-	2	3	2	3	-	-	-

1: Weakly related, 2: Moderately related and 3: Strongly related

அலகு - 1 தமிழ் எழுத்துக்கள்

(6 L)

தமிழ் எழுத்துக்கள் - ஓசைகள் - எண்கள் - வண்ணங்கள் - வடிவங்கள் - ஓர் எழுத்துச் சொற்கள் - பழங்கள் மற்றும் காய்கறிகள் - மலர்கள் - இயற்கை - மாதங்கள் சொற்கள் - பெயர்சொற்கள் - உரிச்சொற்கள் - வினைச்சொற்கள் - காலங்கள் - வாழ்த்துகள்.

வகுப்பறை செயல்முறைகள் : 1. வார்த்தைகளை வட்டமிடுதல். 2. விடுபட்ட எழுத்துகளை நிரப்புக. 3. வடிவங்களுக்கு வண்ணம் தீட்டுக.

CO-1
BTL-2

அலகு - 2 கேட்டல் மற்றும் உச்சரித்தல்

(6L)

உயிரெழுத்துகள், மெய்யெழுத்துகள் மற்றும் உயிர்மெய் எழுத்துகளை உச்சரித்தல் - சிறுகதைகள் வாசித்தல் - எதிர்ச்சொற்கள் - பொருள்தருக - வாக்கியத்தில் அமைத்து எழுதுதல் - ஒரு சொல்லில் விடையளித்தல்.

வகுப்பறை செயல்முறைகள் : 1. சொற்களைக் கேட்டு உச்சரிக்க செய்தல்.

2. குழுவிவாதம் செய்தல். 3. கோடிட்ட இடங்களைச் சரியான சொற்களைக் கூறுதல்.

CO-2
BTL-2

அலகு -3 எழுத்துப் பயிற்சி

(6 L)

தமிழ் எழுத்துகளை எழுத கற்பித்தல் - உயிர் எழுத்துகள் - மெய் எழுத்துகள் - உயிர்மெய் எழுத்துகள் - ஆயுத எழுத்து - சார்பெழுத்துகள் - ஒற்றெழுத்துகள் - ஒரு சொல் - இருசொல் எழுதுதல் - ஒருவரி, இருவரி எழுதுதல்.

வகுப்பறை செயல்முறைகள்: 1. கோடிட்ட இடங்களை நிரப்புக. 2. சரியான எழுத்துகளை வட்டமிடுதல். 3. ஒருவரி சொற்களை எழுதுதல்.

CO-3
BTL-3

அலகு - 4 உரையாடல்கள் கற்பித்தல்

(6L)

சிறு உரையாடல்கள் கற்பித்தல் - வாழ்த்துக்கள் - வங்கியில் பணம் செலுத்துதல் - சந்தையில் கடைகாரரிடம் உரையாடுதல், பொது இடங்களில் உரையாடுதல்.

வகுப்பறை செயல்முறைகள்: 1. குறு நாடகங்கள் நடித்து உரையாடல்கள் கற்பித்தல்.

2. விண்ணப்ப படிவங்கள் பூர்த்தி செய்தல். 3. மின்னல் அட்டைகள்

CO-4
BTL-2

காண்பித்தல்.		
அலகு - 5 தமிழ் வாசிக்க மற்றும் எழுத கற்பித்தல்		(6 L)
கடிதங்கள் வாசித்தல் மற்றும் எழுதுதல் - விண்ணப்ப கடிதம், வங்கிகணக்கு படிவங்கள், இரயில் முன்பதிவு விண்ணப்ப படிவம் பூர்த்திசெய்தல் - கவிதை வாசித்தல் - செய்திதாள் வாசித்தல். வகுப்பறை செயல் முறைகள்: 1. விண்ணப்ப படிவங்கள் பூர்த்திசெய்தல். 2. கவிதை வாசித்தல் போட்டிகள் 3. வகுப்பறை தேர்வுகள்		CO-5 BTL-3
TEXT BOOK		
1.	Saidhai. P.Sundaramurthy (2018). Learn Tamil Through english. Manimekalai Prasuram. Chennai - 17. Pages 1 to 84	
2.	Pulavar Kulanthai (2020). Students Basic Tamil. Manimekalai Prasuram. Chennai -17. Pages1 to 84	
REFERENCE BOOKS		
1.	Lena tamil vanan. (2017). Easy Tamil Grammar. Manimekalai Prasuram, Chennai -17, Pages 11 to 21	
2.	Tamilnadu Board - NCERT/CBSE-Books Class – 6 th TO 9 th (2021-2022)	
E-REFERENCES		
1	https://cbsetamil.com/cbse-tamil-book/ , https://tamil.examsdaily.in/tnpsc-tamil-ilakkanam-material-pdf-download	

COURSE TITLE	REGIONAL LANGUAGE -HINDI				CREDITS	2
COURSE CODE	ELS51004	COURSE CATEGORY	HS	L - T - P - S	2 - 0 - 0 - 1	
VERSION	1.0	APPROVAL DETAILS	35 th ACM 6 th Aug. 2022		BTL LEVEL	3
ASSESSMENT SCHEME						
First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz etc., as approved by the Department Examination Committee "DEC" etc.,		Attendance	End Semester Examination ESE
15%	15%	10%	5%		5%	50%
Course Description	This course has been designed to develop the regional language skills of the students. The course includes Hindi language, literature, vocabulary and grammar. This course teaches students how to communicate accurately, appropriately and fluently in regional language.					
Course Objective	<ol style="list-style-type: none"> 1. To provide an environment to Speak and write in Hindi at the formal and informal levels and use it for daily conversation, presentation, group discussion and debate. 2. To equip the students to Read, comprehend and answer questions based on literary texts. 3. To help student to become sensitive to the requirements of the society and respond to it in a constructive way. 4. To provide an environment to students to read and appreciate the literature. 					
Course Outcome	<p>Upon completion of this course, the students will be able to</p> <ol style="list-style-type: none"> 1. Demonstrate the ability to write the grammatically correct sentences with accuracy. 2. Integrating various components of Hindi Language and determining it through reading and listening. 3. Organize and articulate ideas, concepts, and perceptions in a comprehensive manner in written correspondence, and speaking in formal and informal situations. 4. Infer details from after listening and reading and implement it in various professional 					

situations.															
5. Develop writing and speaking skills.															
Prerequisites: Plus Two -Intermediate Level															
CO, PO AND PSO MAPPING															
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO -9	PO 10	PO 11	PO 12	PS O1	PS O2	PSO3
CO1	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO2	-	-	-	-	-	-	-	2	2	3	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO4	-	-	-	-	-	-	2	-	-	3	2	-	-	-	-
CO5	-	-	-	-	-	-	-	-	2	2	-	2	-	-	-
1: Weakly related, 2: Moderately related and 3: Strongly related															
मॉड्यूल 1: हिंदी पत्र और लर्पि (6 L)															
हिंदी स्वर और व्यंजन अक्षर - आश्रित स्वर सीखें - व्यंजन और व्यंजन समूह - अनुस्वर व्यंजन - संज्ञा - सर्वनाम - क्रिया (भविष्य) - संभावित विशेषण - काल - हिंदी के त्वरित नियम - अभिवादन - 2 अक्षर शब्द बनाना, 3 अक्षर शब्द - हर दिन शब्दावली - संख्याएं - रंग - परिवार - वस्त्र - बगीचा - घर - फल और सब्जियां - प्रकृति														CO-1 BTL-2	
सुझाई गई गतिविधियां: देशी वक्ताओं द्वारा स्वर और व्यंजन का उच्चारण सुनना स्वर और व्यंजन के वीडियो, 2 अक्षर और 3 अक्षर के शब्द, और प्रतिदिन प्रयोगार्थ शब्दावली															
मॉड्यूल 2: सुनने का कौशल (6 L)															
स्वर और व्यंजन का उच्चारण सुनना - लघु कथाएँ सुनना - साक्षात्कार - भाषण - सामाजिक मुद्दों पर पॉड वार्ता - निर्धारित पाठों को सुनना: इकाई 1 सभ्यता का रहस्य, इकाई 2 - युवाओं से - वार्तालापों को सुनना - जानकारी सुनना - सम्मेलनों के भाषण														CO-2 BTL-3	
सुझाई गई गतिविधियां: सुनें और चुनें उम्मीदवार पाठ को सुनते हैं और तीन विकल्पों के साथ बहुविकल्पीय प्रश्न का उत्तर देते हैं। उम्मीदवार टीवी चैनलों में बातचीत - साक्षात्कार- अतिथि व्याख्यान, सम्मेलनों और कार्यशालाओं के दौरान विशेषज्ञों के भाषण सुनते हैं															
मॉड्यूल 3: बोलने का कौशल (6 L)															
औपचारिक संवाद - अनौपचारिक संवाद - लिंग रूपों के साथ बोलना - संख्या - काल - परिवार, शहर, त्योहारों, शौक आदि जैसे सामान्य विषयों पर बोलना - पसंद और नापसंद व्यक्त करना - ज़रूरतें और संपत्ति - भूमिका निभाना।														CO-3 BTL-3	
सुझाई गई गतिविधियां: प्रस्तुति - कार्यक्रमों का संचालन - भाषण देना															
मॉड्यूल- 4 : पढ़ने का कौशल (6 L)															
नमूना पढ़ना - नकल पढ़ना - अक्षरों और शब्दों का सही उच्चारण करना - पढ़ने में प्रवाह - कहानियाँ पढ़ना- संपादकीय, समाचारपत्र के लेख पढ़ना।														CO-4 BTL-3	
सुझाई गई गतिविधियां फ्लैशकार्ड का उपयोग - चार्ट - चित्रों की पहचान करना - शब्दों को पढ़ना															
मॉड्यूल-5 लेखन कौशल (6 L)															
सामान्य पत्राचार - पत्र लेखन: छुट्टी लेने पत्र, बैंक खाता खोलना, पुस्तकें मंगवाने के लिए पत्र, शिकायत														CO-5 BTL-3	

<p>पत्र - संकेत विकास - ज्ञापन - नोटिस</p> <p>सुझाई गई गतविधियां:</p> <p>निर्धारित पाठ्यपुस्तक के अनुसार अभ्यास पूरा करना</p>	
पाठ्य पुस्तक	
1.	Sashtri. S.R.(2019). Hindi Shikshak, Dakshina Bharat Hindi Prachar Sabha, Chennai (Pages 137)
संदर्भ पुस्तकें	
1.	Prathamatic Patya Pushthak. (2022), Dakshina Bharath Hindi Prachar Sabha, Chennai. (Pages 168)
2.	Madhyama Patya Pushthak. (2022) Dakshina Bharath Hindi prachar Sabha, Chennai (Pages 184)
ई-संदर्भ	
1.	https://www.hindipod101.com/

COURSE TITLE		REGIONAL LANGUAGE -TELUGU				CREDITS			2						
COURSE CODE		ELS51005		COURSE CATEGORY		HS	L - T - P - S		2 - 0 - 0 - 1						
Version	1.0	Approval Details				BTL LEVEL			3						
ASSESSMENT SCHEME															
First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments / Project	Surprise Test / Quiz etc., as approved by the Department Examination Committee "DEC" etc.,				Attendance	ESE							
15%	15%	10%	5%				5%	50%							
Course Description	This course has been designed to meet students' current and future language and communication needs. It attempts to develop their proficiency in the four language skills and knowledge of grammar and vocabulary. This course teaches students how to communicate accurately, appropriately and fluently in professional and social situations.														
Course Objectives	1.This course is aimed to teach the basic Telugu language speaking skills. 2.It will introduce basic skills of the Telugu Language: its alphabets, essential words and simple sentence construction methods. 3.The course intends to facilitate students in acquiring foundational skills of reading, writing and speaking Telugu along with synonyms to expand vocabulary.														
Course Outcome	Upon completion of this course, the students will be able to 1.Demonstrate the basic skills of Letters and sounds in Telugu. 2.Develop the basic vocabulary for every day's conversation. 3.Construct simple Telugu sentences with the simple words. 4.Utilize the words that have conjunct character, and can learn functional, everyday conversation. 5.Construct Simple sentences for delivering appropriate meaning.														
Prerequisites: Plus Two Telugu-Intermediate Level															
CO, PO AND PSO MAPPING															
CO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO2	-	-	-	-	-	-	-	2	2	3	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO4	-	-	-	-	-	-	2	-	-	3	2	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	3	-	2	-	-	-
1: Weakly related, 2: Moderately related and 3: Strongly related															
భగము 1 : వినడం, చివ్పడం మరియు రాయడం															
(6L)															

<p>తెలుగు అచ్చులు & హల్లులు శబ్దాలు ధ్వనిచిత్రంతో వటు తెలుగు హల్లుల సంయోగల పరిచయం సూచించబడిన : కర్య కలపలు చర్చలు : 5 గంటలు . అస్త్రాన్మంట్లు / వరజెంటేషన్ - 5 గంటలు</p>	<p>CO-1 BTL-2</p>
<p>భగము 2 : వరల పదలకు, సంఖ్యలకు, మరయు వటి గుణల పరిచయం (6L)</p>	
<p>తెలుగు నమవచకం పరిచయం తెలుగు సరవనమం & దనీ విషయం సంఖ్యలు దనీ పరిచయం & తెలుగు విశేషణలు పరిచయం సూచించబడిన : కర్య కలపలు చర్చలు : 5 గంటలు . అస్త్రాన్మంట్లు / వరజెంటేషన్ - 5 గంటలు</p>	<p>CO-2 BTL-3</p>
<p>భగము 3 : పదలను విడదీసి వక్యాలను రయడం (6L)</p>	
<p>తెలుగు పూర్వ పదలు - సంయోగలు మరయు దనీ ఉపయోగం సూచించబడిన : కర్య కలపలు చర్చలు : 5 గంటలు . అస్త్రాన్మంట్లు / వరజెంటేషన్ - 5 గంటలు</p>	<p>CO-3 BTL-3</p>
<p>భగము 4 : పనులు, సమయం, కరయ మరయు కల వయవధుల పరిచయం (6L)</p>	
<p>వివిధ కరయల యొకక కరయ & సమయం / కల సంయోగలనీకి పరిచయం సూచించబడిన : కర్య కలపలు చర్చలు : 5 గంటలు . అస్త్రాన్మంట్లు / వరజెంటేషన్ - 5 గంటలు</p>	<p>CO-4 BTL-3</p>
<p>భగము 5 : తెలుగు చదవడం, రయడం మరయు వరశనీంచడం (6L)</p>	
<p>తెలుగులే సరళమైన వక్యాలను రూపొందించడం (వరధమిక వక్య నీరమాణ నీయమలు) తెలుగులే వరతీకాల వక్యాలను రూపొందించడం తెలుగు బేధన అభయన వరకరయలే వరశనరధకవక్యాలను వక్యాలను రూపొందించడం సూచించబడిన : కర్య కలపలు చర్చలు : 5 గంటలు . అస్త్రాన్మంట్లు / వరజెంటేషన్ - 5 గంటలు</p>	<p>CO-5 BTL-3</p>
<p>TEXT BOOK</p>	
1.	Telugu Akademy. (2018). Sampradaya Telugu Vyakaranalu. Telugu Akademy. Vijayawada, Andhra Pradesh. India.
2.	Raghavendra. A. (2019). Telugu Vyakaranam. Prajasakti Book House. Tadepalli.
<p>REFERENCE BOOKS</p>	
1.	Ramarao, Chekuri. (2019). A Reference Grammar of Modern Telugu. Emesco Books. Hyderabad
2.	Vemuri, V. Rao. (2020). Learn Telugu with Its Grammar, Eco Foundation, Vijayawada.
<p>E-References</p>	
1	https://sarkarihelp.com/telugu-grammar-pdf-download/

COURSE TITLE	INNOVATION LAB FOR ELECTRONICS ENGINEERS											CREDITS	2		
COURSE CODE	EEC51401		COURSE CATEGORY				PC		L-T-P-S			0-1-2-2			
Version	1.0		Approval Details				LEARNING LEVEL			BTL-4					
ASSESSMENT SCHEME															
First Periodical Assessment	Second Periodical Assessment		Weekly assignment/Observation / lab records and viva as approved by the Department Examination Committee "DEC"				Surprise Test / Quiz etc., as approved by the Department Examination Committee "DEC"			Attendance		End Semester Examination			
15%	15%		10%				5%			5%		50%			
Course Description	This course will enable students to design and fabricate printed circuit boards (PCB) for prototyping simple electronics system using PADS professional software and PCB machine. Printed circuit boards are electronic circuit boards made specifically for attaching electronic components to a nonconductive board and forming conductive connections between them.														
Course Objective	The course should enable the students to <ol style="list-style-type: none"> Understand the evolution of PCB, types and classes of PCB Practice the various steps involved in PADS professional software Understand the steps involved in PCB fabrication Fabrication of single-sided PCB for simple electronic system 														
Course Outcome	Upon completion of this course, the students will be able to <ol style="list-style-type: none"> Interpret the necessity and evolution of PCB, types and classes of PCB Illustrate the steps involved in schematic, layout, fabrication and assembly process of PCB design and evaluate the design of full wave rectifier and clipper Demonstrate the fabrication and assembly process of PCB design Design (schematic and layout) and test the PCB fabrication for simple electronic circuit 														
Prerequisites:															
CO, PO AND PSO MAPPING															
CO	PO -1	PO- 2	PO -3	PO-4	PO-5	PO-6	PO-7	PO- 8	PO-9	PO - 10	PO- 11	PO-12	PSO- 1	PSO -2	PSO- 3
CO-1	1	1	1	1	1	1	-	-	1	-	-	1	1	1	1
CO-2	2	2	2	2	3	1	-	-	1	-	-	1	1	1	1

CO-3	2	2	2	2	3	1	-	-	1	-	-	1	1	1	2
CO-4	2	2	2	2	3	2	-	-	1	-	-	1	1	1	2
1: Weakly related, 2: Moderately related and 3: Strongly related															
MODULE 1: INTRODUCTION TO PCB (4T+ 6P=10)															
Definition and Need/Relevance of PCB, Background and History of PCB, Types of PCB, Classes of PCB Design, Terminology in PCB Design														CO-1	
Practical component:														BTL-3	
<ul style="list-style-type: none"> Practice LED_Flasher.prj example from PADS Pro Tools VX 2.x. 															
MODULE 2: PADS Pro DESIGN PROCESS (4T + 7P=11)															
Capture the schematic, Generate a netlist, Construct the board outline, Set up the design rules and constraints, Place the components, Route the board, Verify the design, Generate the CAM documents.														CO-2	
Practical component:														BTL-4	
<ul style="list-style-type: none"> Develop the schematic of the following circuit: Full Wave rectifier, Clipper 															
MODULE 3: PCB FABRICATION & ASSEMBLY (4T+8P=12)															
Process involved in fabrication of PCB. PCB Fabrication techniques-single, double sided and multilayer.														CO-3	
Practical component:														BTL-4	
<ul style="list-style-type: none"> Practice Hello_world PCB design prototype Develop the schematic of the following circuit: Astable/Monostable multivibrator using IC555 															
MODULE 4: DESIGN PROTOTYPING (3T+9P=12)															
Practical component:														CO-4	
<ul style="list-style-type: none"> Case Study: Design and prototyping of single-sided PCB, mount the components and assemble in a cabinet for the simple electronic system 														BTL-4	
TEXT BOOK															
1	Simon Monk., (2017). <i>Make Your Own PCBs with EAGLE: From Schematic Designs to Finished Boards (Electronics)</i> , McGraw Hill TAB , 2nd edition.														
REFERENCE BOOK															
1	Eric Bogatin., (2022). <i>Bogatin's Practical Guide to Prototype Breadboard and PCB Design</i> , Artech House, 1 st edition.														

COURSE TITLE		COMMUNICATION SKILLS						CREDITS		3					
COURSE CODE		ELS51001		COURSE CATEGORY		HS		L - T - P - S		2 - 0 - 2 - 1					
Version	1.0	Approval Details								LEARNING LEVEL		BTL 4			
ASSESSMENT SCHEME															
First Periodical Assessment	Second Periodical Assessment	Weekly assignment/ lab record and viva as approved by the Department Examination Committee "DEC"		Surprise Test / Quiz., as approved by the Department Examination Committee "DEC"		Attendance		End Semester Examination (ESE) Theory + Practical							
15 %	15%	10 %		5 %		5 %		50%							
Course Description	The course has been designed to improve the communication competency of the students. The course builds on students' English language skills by engaging them in listening, speaking and grammar learning activities (LSRW) that are relevant to authentic contexts. This course trains the students how to communicate accurately, appropriately and fluently in professional and social situations. The course is framed so that the students can appear for Cambridge B1 Preliminary exams and also enable them to get a certification.														
Course Objective	<ol style="list-style-type: none"> 1. To acquire self-confidence by which the learner can improve upon their informative listening skills by an enhanced acquisition of the English language. 2. To provide an environment to Speak in English at the formal and informal levels and use it for daily conversation, presentation, group discussion and debate. 3. To equip the students to Read, comprehend and answer questions based on literary, scientific and technological texts. 4. To enhance the writing skills of the students via training in instructions, recommendations, checklists, process-description, letter-writing and report writing. 5. To equip the learners in analyzing and applying creative thinking skills and participate in brainstorming, mind-mapping, audiovisual activities and excel in employability skills. 														
Course Outcome	<p>Upon completion of this course, the students will be able to</p> <ol style="list-style-type: none"> 1. Acquire the accuracy through the knowledge of Syntax. 2. Demonstrate the skill of using the vocabulary and use it in sentences appropriately. 3. Infer texts and improvise its usage. 4. Illustrate language acquisition skills through formal correspondence. 5. Analyse and transcode the data and interpret it in text format. 														
Prerequisites: Plus Two English-Intermediate Level															
CO AND PO MAPPING															
CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PSO3
CO1	-	-	-	-	-	-	-	-	-	3	-	2	1	1	1
CO2	-	-	-	-	-	-	-	-	-	3	-	2	1	1	1
CO3	-	-	-	-	-	-	-	2	-	3	-	2	1	1	1
CO4	-	-	-	-	-	-	-	2	2	3	2	2	1	1	1

CO5	-	-	-	-	-	-	-	-	-	3	3	2	1	1	1
1: Weakly related, 2: Moderately related and 3: Strongly related															
MODULE 1 : English for Employability (6L + 6P = 12)															
<p>Grammar : 1. Parts of Speech – Identification and Transformation 2. Kinds of Sentences – Identification and Transformation 3. Sentence Pattern – Framing Sentences 4. Tenses – Rules & its usage – Present simple and present continuous; time expressions; state verbs – Past simple ; regular and irregular verbs and spelling of past simple forms ; past continuous.</p> <p>Vocabulary : 1. Job titles and describing jobs ; names of company departments 2. Computer terms; email and website terms. 3. Headings for CVs Describing application Procedures</p> <p>Writing : 1. Writing emails – formal and informal – phrases for emails & letters. 2. Writing a covering letter with a resume for a job application.</p> <p>Reading : Reading about Job and Company : 1. Changing places : job swapping at work. 2. The power of word of mouse : an article on the power of online customer options 3. Haier : an article about the history of a Chinese Company. 4. What kind of company Culture would suit you ? reading answering a quiz.</p> <p>Lab Activities(Speaking) : 1. Self Introduction. 2. Describing jobs ; asking other people about their jobs. 3. Asking about the history of a company ; past simple questions 4. Asking questions about companies and jobs.</p> <p>Lab Activities(Listening) : 1. Being a PA 2. Growing Pains : an interview with a business consultant about company’s Growth. 3. Describing changes in a company : a Conversation on the phone.</p>													CO-1 BTL-2		
MODULE 2 : English for Marketing (6L + 6P = 12)															
<p>Grammar: 1. Concord - Understanding Subject Verb agreement – Identifying the error and Correcting 2. Active and Passive Voice – Identifying the voices and Transforming Active to passive and passive to active 3. Modal Verbs – Using to express modalities – in active and passive voices 4. Words to Describe causes and effects. 5. Prepositions</p> <p>Vocabulary : 1. Vocabulary to describe objects; component parts, shapes, dimensions, materials Describing problems with equipment 2. Verbs to Describe process 3. Vocabulary to talk about advertising and marketing, Language to describe cause and effect.</p> <p>Writing : 1. Topic Sentence 2. Paragraph Writing 3. Developing a story with the hints 4. Promotional letter(Email)</p> <p>Reading : Product Description and Advertisement : 1. Problems with equipment : emails and headings on a form. 2. Waratah : an article on an Australian clothing company. , Short Texts : Notices, Notes and messages 3. Selling your product abroad; an article , Workplace signs and notices 4. Descriptions of advertising media, Singapore airlines; an article on the branding of an airline.</p> <p>Lab Activities(Speaking) : 1. Role Play – Telephone call to a supplier, 2. Describing Objects</p> <p>Lab Activities(Listening) : 1. Describing dimensions of products : Conversations with colleagues and suppliers. – The Gizmo game : listening to the uses of a gadget. 2. Channel No.5 : an interview about a production process 3. Telephone conversations : information about orders and deliveries. 4. Descriptions of how a product is advertised.</p>													CO-2 BTL-3		
MODULE 3 : Business Correspondence (6L + 6P = 12)															
<p>Grammar : 1. Tenses – Present continuous for future arrangements; will and going to future forms 2. Using discourse markers ; Sentence starters - Contrast & similarity words, 3. Degrees of Comparison – Framing sentences with appropriate adjectives and adverts –</p>													CO-3 BTL-3		

<p>transformation from one degree to another degree. 4. Infinitives and gerunds – using infinitives and gerunds in sentences as different elements. 5. Conditionals – Three types of conditionals</p> <p>Vocabulary : 1.Vocabulary for travel 2. Synonyms and Antonyms 3. Employment Vocabulary</p> <p>Writing : 1. A letter(Email) of invitation – Accepting the invitation and declining the invitation.</p> <p>Reading : Transport, Working Holidays and Conferences : Travel Arrangements : notices and short messages : Eurostar : an article on train travel. 2. Netflix : an article about a company's holiday policy; thinking outside the box: an article on offsite meetings 3. Short Texts : Feedback on conferences</p> <p>Lab Activities(Speaking) : Discussion: How to make decisions</p> <p>Lab Activities(Listening) : 1. Making and changing appointments : Voicemail messages and phone conversations ; Future intentions and predictions : Short Extracts. 2. A travel Anecdote 3. Half Holidays: a conversations between two employees. 4. Discussing possible venues for a conference : a conversation between colleagues; a welcome speech at a conference.</p>	
MODULE 4 : English for Business Relationships (6L + 6P = 12)	
<p>Grammar : 1. Writing Instructions and Recommendations – Transforming instruction to recommendation and recommendation to instruction 2. Expressions of quantity – semi-negative words 3. Present Perfect : time expressions : present perfect versus Past simple. 4. Reported Speech – Direct and Indirect Speeches – Identification and Transformation</p> <p>Vocabulary : 1. Affixes 2. Countable and Uncountable nouns 3. Global Management</p> <p>Writing : 1.Memo 2. Notice with agenda 3. Email : Requesting information</p> <p>Reading : Corporate gift-giving, New places, New people, Team Building and Thinking globally : 1. Career Advice : letters to an advice column 2. Promotional gifts : an article 3. Descriptions of team building events; Kaizen : an article 4. Global HR management : an Article.</p> <p>Lab Activities(Speaking): Role Play : 1. Interviewing someone about a job change 2. Discussion : Planning a team building event 3. Promoting a city : giving a speech.</p> <p>Lab Activities(Listening) : 1. An interview with someone who has changed career 2. An interview about corporate gift giving 3. Creating good teams : a Presentation 4. Working an international Team : short Extracts.</p>	<p>CO-4 BTL-3</p>
MODULE 5 : English for Presentation (6L + 6P=12)	
<p>Grammar : 1. Adjectives and adverbs 2. Pronouns and Reference Words 3. Types of Sentences – Simple, Compound and complex Sentences – Identification and transformation.</p> <p>Vocabulary: 1. Describing Trends 2. Finance Vocabulary 3. Stocks and Shares 4. Collocation - sets and money</p> <p>Writing: 1. Transcoding – Converting an image (Linegraph, piechart, bar chart, flowchart tree diagram etc.,) into a paragraph – Converting a paragraph into an image(Linegraph, piechart, bar chart, flowchart tree diagram etc.,) 2. Summary writing</p> <p>Reading : Describing Statistics, Company finances, investments and starting up : 1. Interpreting bar charts 2. Café Coffee day: an article on the growth of the Indian coffee shop. 3. Shares and the stock exchange: a web page; short articles from the financial news; men and women investments: an article 4. Teenage entrepreneurs : reading and comparing two articles; Kalido: an article on funding.</p>	<p>CO-5 BTL-4</p>

<p>Lab Activities(Speaking) : 1. Describing figures and trends 2. Discussing qualities needed in candidates for a job vacancy</p> <p>Lab Activities (Listening) : 1. Listening to statistical information : short extracts 2. An interview with the employee of a company that helps failing business 3. An interview with someone who works in investor relations. 4. Radio interview : marketing director of a business support service.</p>	
TEXT BOOK	
1	Whitby, Norman (2019). Cambridge English Business Benchmark, Pre-intermediate and Intermediate. Cambridge University Press. India (Pages 208)
REFERENCE BOOKS	
1.	Murphy, Raymond (2021). Essential English Grammar, Cambridge University Press. India (Pages 300)
2.	Redman, Stuart (2020). English Vocabulary In Use: Pre - Intermediate And Intermediate. Cambridge University Press. India (Pages 264)
3.	Bikram K. Das. et al., (2019) An Introduction to Professional English and Soft Skills with audio CD, Cambridge University Press. India (Pages 272)
4.	John, Dolly., (2018), English for Life and the Workplace Through LSRW&T Skills, Pearson Publications, India (Pages 263)
E BOOKS	
1.	https://www.cambridge.org/gb/files/9116/4138/4615/A1_Student_Book.pdf
2.	https://www.cambridge.org/gb/files/1416/4138/4681/A1_Workbook.pdf
3.	https://www.cambridge.org/gb/files/7216/4138/1999/A2_Student_Book.pdf
4.	https://www.cambridge.org/gb/files/6816/4138/2072/A2_Workbook.pdf
MOOC	
1.	https://www.edx.org/professional-certificate/tsinghuax-english-communication-skills
2.	https://www.britishcouncil.org/tr/en/english/mooc/english-for-the-workplace