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

DEPARTMENT OF INFORMATION TECHNOLOGY

(Duration: 4 years)

CURRICULUM AND SYLLABUS

Under CBCS

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

B. Tech. Information Technology

DEPARTMENT OF INFORMATION TECHNOLOGY

SCHOOL OF COMPUTING SCIENCES

HINDUSTAN INSTITUTE OF TECHNOLOGY & SCIENCE
VISION AND MISSION

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 INFORMATION TECHNOLOGY
VISION AND MISSION

VISION

To be a globally renowned academic department for quality education and research in the field of Information Technology with ethical values and social commitment.

MISSION

M1: To impart comprehensive technical education to produce highly competent IT professionals and entrepreneurs.

M2: To provide an academic environment for state of the art research with ethical standards.

M3: To conduct knowledge transfer programs to enhance the technical knowledge in the field of Information Technology.

B. Tech. Information Technology

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

The program is expected to enable the students to

PEO I Demonstrate comprehensive knowledge in IT solution development leading to excellence in professional career and/or higher education including research.

PEO II Provide solutions making use of the knowledge gained in Artificial Intelligence, Cloud Computing, Big Data, Cyber Security and Communication.

PEO III Adapt themselves to continuously changing technologies to develop innovative applications with ethical and social commitment.

PROGRAM OUTCOMES (ALIGNED WITH GRADUATE ATTRIBUTES) (PO)

At the end of this program, 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 analyse 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 for complex problems.

PO5 Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6 The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7 Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8 Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9 Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10 Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11 Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12 Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSO)

At the end of this program, graduates will be able to

PSO1: Acquire an ability to use the algorithm's technique and tools for the development of software applications related to Information Technology.

PSO2: Design, develop and test software intensive systems for IT Industry to provide solutions to real world problems.

PSO3: Apply the knowledge in Machine learning and Artificial Intelligence to solve real time problems in Cyber Security and Big Data.

B.TECH – INFORMATION TECHNOLOGY									
(165 CREDIT STRUCTURE)									
SEMESTER – I									
SL. 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	EIT51400	FAB Lab for IT 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	EIT51402	Design Thinking for IT Engineers	0	1	2	2	1	3
Total				**12**	**2**	**16**	**22**	**10**	**30**
SEMESTER – II									
SL. 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	EIT51001	Object Oriented Programming and Data Structures	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	EIT51401	Innovation Lab for IT Engineers	0	1	2	2	2	3
7	HS	EGE51404/ EGE51405	Outreach (NCC) / Outreach(NSS)	0	0	2	1	0	2
8	HS	ELS51001	Communications Skills	2	0	2	3	1	4
Total				**15**	**1**	**12**	**22**	**10**	**28**

SEMESTER – III									
SL. NO	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
1	BS	EMA51***	Partial Differential Equations and Transforms	3	1	0	4	2	4
2	PC	EIT51002	Concepts of Operating Systems	3	0	2	4	1	5
3	PC	EIT51003	Data Communication Networking using Python	2	0	2	3	1	4
4	DE	EIT51***	DE 1	2	0	2	3	0	4
5	NE	********	NE 1	2	0	2	3	0	4
6	EEC	EIT51800	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	EIT51801	Internship -1 (To be carried out in the summer after 2nd semester and evaluated in 3rd semester)	*	*	*	1	2	*
Total				**14**	**1**	**10**	**21**	**10**	**25**

SEMESTER – IV									
SL. NO	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
1	BS	EMA51***	Probability and Statistics	3	1	0	4	2	4
2	PC	EIT51004	Database Technologies	3	0	2	4	2	5
3	PC	EIT51005	Java and Web Programming	2	0	2	3	2	4
4	PC	EIT51006	Design and Analysis of Algorithms	2	1	0	3	2	3
5	DE	EIT51***	DE 2	2	0	2	3	0	4
6	NE	********	NE 2	2	0	2	3	0	4
7	EEC	EIT51802	Design Project – 2	0	0	2	1	2	2
8	PC	EIT51007	Industry Collaborated Course - Introduction to Developer Operations	2	0	2	3	2	4
Total				**16**	**2**	**12**	**24**	**12**	**30**

SEMESTER – V									
SL. NO	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
1	PC	EIT51008	Artificial Intelligence	3	1	0	4	2	4
2	PC	EIT51009	Object Oriented Analysis in Software Engineering	2	0	2	3	2	4
3	PC	EIT51010	Embedded System Programming	3	0	2	4	2	5
4	DE	EIT51***	DE 3	2	0	2	3	0	4
5	NE	********	NE 3	2	0	2	3	0	4
6	EEC	EIT51803	Design Project – 3	0	0	2	1	2	2
7	ES	EGE51002	Entrepreneurship	1	0	2	2	0	3
8	EEC	EIT51804	Internship -2 (to be evaluated in 5th semester. To be carried out in summer after 4th semester))	*	*	*	1	2	*
Total				**13**	**1**	**12**	**21**	**10**	**26**

SEMESTER – VI									
SL. NO	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
1	PC	EIT51011	Industrial Internet of Things	3	1	**0**	4	2	4
2	PC	EIT51012	Networks and Information Security	2	0	2	3	2	4
3	PC	EIT51013	Machine Learning Techniques	2	0	2	3	2	4
4	DE	EIT51***	DE 4	2	0	2	3	0	4
5	NE	********	NE 4	2	0	2	3	0	4
6	PC	EIT51014	Case Study / Field Study / Product study	2	0	2	3	2	4
7	EEC	EIT51805	Design Project – 4	0	0	2	1	2	2
8	HS	EGE51406	Skill Development and Career Planning	0	0	2	1	2	2
Total				**13**	**1**	**14**	**21**	**12**	**28**

SEMESTER – VII									
SL. NO	**COURSE CATEGORY**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
1	PC	EIT51015	Cloud and Fog Computing	3	1	0	4	2	4
2	PC	EIT51016	Cyber Physical Systems	2	0	2	3	2	4
3	PC	EIT51017	Data Analytics	2	0	2	3	2	4
4	DE	EIT51***	DE 5	2	0	2	3	0	4
5	NE	********	NE 5	2	0	2	3	0	4
6	PC	EIT51018	Research Review	2	0	0	2	2	2
7	ES	EGE51003	Research Methodology and IPR	2	0	0	2	2	2
8	EEC	EIT51806	Project Phase 1	0	0	6	3	2	6
Total				**15**	**1**	**14**	**23**	**12**	**30**

SEMESTER – VIII									
SL. NO	**COURSE CATEGORY**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
1	EEC	EIT51807	Project Phase 2	0	0	22	11	4	22
Total				**0**	**0**	**22**	11	**4**	**22**
Total							**165**		

LIST OF DEPARTMENTAL ELECTIVES WITH GROUPING - SEMESTER WISE									
SEM	COURSE CATEGORY	COURSE CODE	NAME OF THE COURSE	L	T	P	C	S	TCH
3	DE	EIT51500	Pentesting Methodologies[1]	2	0	2	3	0	4
3	DE	EIT51501	IT Security Engineering[1]	2	0	2	3	0	4
3	DE	EIT51502	Python Programming[2]	2	0	2	3	0	4
3	DE	EIT51503	Soft Computing[2]	2	0	2	3	0	4
3	DE	EIT51504	Software Engineering[3]	2	0	2	3	0	4
3	DE	EIT51505	Software Conceptual Design[3]	2	0	2	3	0	4
4	DE	EIT51506	Cyber Crime Investigation and Digital Forensics[1]	2	0	2	3	0	4
4	DE	EIT51507	IT Security Operations[1]	2	0	2	3	0	4
4	DE	EIT51508	Decision Modeling[2]	2	0	2	3	0	4
4	DE	EIT51509	Data Warehousing and Data Mining[2]	2	0	2	3	0	4
4	DE	EIT51510	Agile Software Development[3]	2	0	2	3	0	4
4	DE	EIT51511	Software Development with Microservices[3]	2	0	2	3	0	4
5	DE	EIT51512	Ethical Hacking and Cyber Security[1]	2	0	2	3	0	4
5	DE	EIT51513	Identity and Access Management[1]	2	0	2	3	0	4
5	DE	EIT51514	Natural Language Processing[2]	2	0	2	3	0	4
5	DE	EIT51515	Predictive Analytics[2]	2	0	2	3	0	4
5	DE	EIT51516	UI Technologies[3]	2	0	2	3	0	4
5	DE	EIT51517	Software Quality and Testing[3]	2	0	2	3	0	4
6	DE	EIT51518	Web Application Security[1]	2	0	2	3	0	4
6	DE	EIT51519	IT Security Assessment and Testing[1]	2	0	2	3	0	4
6	DE	EIT51520	Deep Learning[2]	2	0	2	3	0	4
6	DE	EIT51521	Data Visualization[2]	2	0	2	3	0	4
6	DE	EIT51522	Web Services and Service Oriented Architecture[3]	2	0	2	3	0	4
6	DE	EIT51523	Secure Coding Practices[3]	2	0	2	3	0	4
7	DE	EIT51524	Mobile Security[1]	2	0	2	3	0	4
7	DE	EIT51525	Applied Cryptography[1]	2	0	2	3	0	4
7	DE	EIT51526	Real Time Analytics[2]	2	0	2	3	0	4
7	DE	EIT51527	Bigdata Analytics[2]	2	0	2	3	0	4
7	DE	EIT51528	Modern Full Stack Development[3]	2	0	2	3	0	4
7	DE	EIT51529	Applied DevOPS and Build and Release Management[3]	2	0	2	3	0	4
[1]Cyber Security [2]Data Analytics and [3]Software modeling Specialized Electives									

LIST OF NON DEPARTMENTAL ELECTIVES OFFERED BY INFORMATION TECHNOLOGY DEPARTMENT WITH GROUPING - SEMESTER WISE									
SEM	**COURSE CATEGORY**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
3	NE	EIT51700	Cyber Security for Beginners	2	0	2	3	0	4
3	NE	EIT51701	Programming for Analytics	2	0	2	3	0	4
4	NE	EIT51702	Cyber Crime Investigation and Digital Laws	2	0	2	3	0	4
4	NE	EIT51703	Fundamentals of Data Analytics	2	0	2	3	0	4
5	NE	EIT51704	Edge Computing	2	0	2	3	0	4
5	NE	EIT51705	Ethical Hacking Techniques	2	0	2	3	0	4
6	NE	EIT51706	Cloud Security	2	0	2	3	0	4
6	NE	EIT51707	Mobile Application Development	2	0	2	3	0	4
7	NE	EIT51708	Cyber Security Techniques and Tools	2	0	2	3	0	4
7	NE	EIT51709	Fundamentals of Machine Learning	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	1. To perform some simple operations on matrices 2. To give a strong foundation on the basic concepts of differentiation and integration. 3. To demonstrate the fundamental understanding of integrals 4. To classify ordinary differential equations. 5. To impart the knowledge of sequences and summation of series.					
Course Outcome	Upon completion of this course, the students will be able to 1. Calculate the inverse of the matrix using Cayley Hamilton theorem and diagonalize the matrix 2. Determine the derivative and higher derivatives of a given function explicitly and integrate the standard functions using suitable differentiation and integration formulae 3. Evaluate surface area and volume using multiple integrals 4. Compute the solution of second order the differential equations 5. 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	PSO1	PSO2	PSO3
CO-1	3	3	1	-	1	-	-	-	-	-	-	1	1	-	-
CO-2	3	3	1	-	1	-	-	-	-	-	-	1	-	-	-
CO-3	3	3	1	2	1	-	-	-	-	-	-	2	-	-	-
CO-4	3	3	2	1	1	-	-	-	-	-	-	2	1	1	-
CO-5	3	3	2	-	1	-	-	-	-	-	-	1	-	1	-

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

MODULE 1: MATRICES	(9L+6P)
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 Suggested Reading: Basics of Matrices **Lab: Eigen values and Eigenvectors, Verification and inverse using Cayley Hamilton**	**CO-1** **BTL-3**

theorem- Diagonalization	
MODULE 2: DIFFERENTIAL AND INTEGRAL CALCULUS	**(9L+6P)**
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. Suggested Reading: Basics of differentiation and integration. **Lab: Taylor's series – Maxima and minima of functions of two variables, Integration using partial fraction**	**CO-2** **BTL-3**
MODULE 3: MULTIPLE INTEGRAL	**(9L+6P)**
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. Suggested Reading: Line Integrals **Lab: Area and Volume of double integration and triple integration.**	**CO-3** **BTL-3**
MODULE 4: ORDINARY DIFFERENTIAL EQUATIONS	**(9L+6P)**
Second order differential equations with constant coefficients – Particular integrals $-e^{ax}$, $cosax$, $\sin ax$, x^m, $e^{ax}cosbx$, $e^{ax}s$, Solutions of homogeneous differentialequations with variable coefficients – Variation of parameters. Suggested Reading: Basics of Differential Equations. **Lab: Solution of Second order differential equations.**	**CO-4** **BTL-3**
MODULE 5: SEQUENCE AND SERIES	**(9L+6P)**
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). Suggested Reading: Basics of sequence and series. **Lab: Test the convergence and divergence.**	**CO-5** **BTL-3**
TEXT BOOKS	
1.	A. Chandrasekaran, G Kavitha (2019), *Matrices and Calculus*, Dhanam Publications, 1st Edition, Chennai.
2.	B.S. Grewal (2017), *Higher Engineering Mathematics*, Khanna Publishers, 43rd Edition, New Delhi.
3.	A. P. Santhakumaran, P. Titus P (2017), *Engineering Mathematics – II*, NiMeric Publications, 2nd Edition, Nagercoil, India.
REFERENCE BOOKS	
1.	D. G. Duffy (2021), *Advanced Engineering Mathematics with MATLAB (Advances in Applied Mathematics)*, Chapman and Hall Publisher, 5th Edition, CRC Press, USA.
2.	M. D. Weir, Joel Hass, Thomas (2016), *Calculus*, Pearson Publication, 12th Edition, India.
3.	Srimantha Pal and S.C. Bhunia (2015), *Engineering Mathematics*, Oxford University Press, 1st Edition, New Delhi, India.
E BOOKS	
1. 2.	https://www.elsevier.com/books/matrix-calculus/bodewig/978-1-4832-3214-0 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/
MOOC	
1. 2.	https://www.coursera.org/learn/introduction-to-calculus 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	3-0-2-2
Version	1.0	Approval Details		LEARNING LEVEL	BTL3

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
15%	15%	10%	5%	5%	Theory 25% Practical 25%

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	1. To evaluate various types of modulus of elasticity and impart knowledge on production and application of ultrasonic wave in SONAR and NDT. 2. To provide a strong foundation on the concepts of crystal physics and thermal conductivity. 3. To illustrate theoretically and experimentally the wave – particle duality. 4. To evaluate the material properties based on energy band gap and magnetic moment. 5. 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 1. Evaluate the elastic properties of materials and apply the properties of ultrasonic waves for industrial applications 2. Evaluate the characteristics of crystal structure and the thermal conductivity of good and bad conductors. 3. Solve the Schrodinger's wave equations and derive energy density based on Planck's hypothesis 4. Apply the fundamental concepts to classify magnetic and semiconducting materials and thereby, illustrate their applications. 5. 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	PS O1	PS O2	PSO 3
CO1	3	3	-	-	-	-	-	-	3	-	-	3	1	-	-
CO2	3	3	-	2	3	-	-	-	3	-	-	3	-	-	-
CO3	3	3	-	-	1	-	-	-	3	-	-	3	1	-	-
CO4	3	3	-	2	-	-	-	-	3	-	-	3	-	-	-
CO5	3	3	-	-	3	-	-	-	3	-	-	3	-	-	-

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

MODULE 1: PROPERTIES OF MATTER AND ULTRASONICS (9L + 6P)	
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. Introduction – Production of ultrasonic waves (Magnetostriction and Piezoelectric methods) – Properties of ultrasonic – Applications in SONAR and NDT. **Practical component:** 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	**CO1 BTL3**
MODULE 2: CRYSTALLOGRAPHY AND THERMAL PHYSICS (9L + 6P)	
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. 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. **Practical component:** Lee's disc experiment – Determination of thermal conductivity of bad conductor	**CO2 BTL3**
MODULE 3: QUANTUM PHYSICS (9L + 6P)	
Black body radiation – Planck's hypothesis – Photoelectric effect – Compton effect – Theory and experimental verification Physical significance of wave function – Schrodinger's wave equation – Time independent and time dependent equations – Particle in a 1D box – Quantum Well (no derivation) **Practical component:** Photoelectric effect – To plot the KE as a function of frequency for different metals.	**CO3 BTL3**
MODULE 4: MAGNETISM AND SEMICONDUCTORS (9L + 6P)	
Magnetic moment – Classification of magnetic materials (Dia, para, ferro, anti-ferro) – Domain theory of ferromagnetism – Hysteresis – Hard and soft magnetic materials – Memory applications. Classification of semiconductors – Direct and in-direct bandgap – Fermi energy level – Intrinsic and extrinsic semiconductors – *n*-type and *p*-type semiconductors (Qualitative) – Hall effect – Determination of Hall voltage (Theory and experiment) – Applications of Hall effect. **Practical component:** Current – Voltage (IV) characteristics of semiconductor diode	**CO4 BTL3**
MODULE 5: MODERN OPTICS (9L + 6P)	
Principles of laser – Stimulated absorption – Spontaneous emission – Stimulated emission – Population inversion – Pumping action – Active medium – Laser characteristics – Nd-YAG laser – CO_2 laser – Dye laser – Laser in Industrial applications. Optical fiber – Principle and propagation of light in optical fibers – Numerical aperture and acceptance angle – Types of optical fibers – Optical fiber as temperature sensors. **Practical component:** Laser – Determination of the wavelength of the laser using grating Laser – Particle size determination using lycopodium powder	**CO5 BTL3**

TEXT BOOKS	
1	Rajendran V. (2017), *Engineering Physics*, Tata McGraw Hill Publications, 3rd Edition, US.
2	Gaur R. K. and Gupta S.L. (2014). Engineering Physics, 8th edition, Dhanpat Rai publications (P) Ltd., New Delhi
3	Mani P. (2016), Engineering Physics, Dhanam Publications, 13th Edition, Chennai.
REFERENCE BOOKS	

1.	Arthur Beiser (2017), *Concepts of Modern Physics*, Tata McGraw Hill Publications, 7th Edition, US.
2.	Halliday, Resnick and Walker (2021), *Fundamental of Physics Extended*, Wiley & Sons, 12th Edition, US.
3	Shaikh I. A, Kulkarni H. R, Mohril, S. F. and Khairnar (2018), *Engineering Physics*, Nirali Prakashan Publishers, 5th 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#.Y0EfilxBzIU
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	**ECSB5101**	**COURSE CATEGORY**	**PC**	**L-T-P-S**	**3-0-2-1**
Version	**1.0**	**Approval Details**		**LEARNING LEVEL**	**BT L-4**

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	End Semester Examination (Theory + Practical)
15%	**15%**	**10%**	**5%**	**5%**	**50%**

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	1. To acquire the basic knowledge in computer hardware, programming languages and Problem-solving techniques. 2. To learn the fundamentals of C programming. 3. To gain knowledge in Functions, arrays and strings in C programming. 4. To understand the pointers, Structures and Union in C programming 5. To gain Knowledge on Embedded Programming and real time applications of C Programming.

Course Outcome	Upon completion of this course, the students will be able to 1. Describe the basics of digital computer and programming languages. 2. Demonstrate problem solving techniques using flowchart, algorithm/pseudo code to solve the given problem. 3. Design and Implement C program using Control Statements and Functions. 4. Design and Implement C program using Pointers and File operations. 5. 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	3	2	-
CO-2	3	3	2	2	3	2	-	-	3	-	-	1	3	3	-
CO-3	3	3	2	2	3	-	3	-	-	2	-	1	3	3	-
CO-4	3	3	2	2	3	-	-	3	-	-	-	1	3	2	-
CO-5	3	3	2	2	3	-	-	-	-	-	-	1	3	-	-

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

MODULE 1: PROGRAMMING LANGUAGES AND PROBLEM-SOLVING TECHNIQUES	**(9L+6P)**
Introduction – Fundamentals of digital computers - Programming languages -Programming Paradigms – Types of Programming Languages – Language Translators – Problem Solving Techniques: Algorithm – Flow Chart - Pseudo code. **PracticalComponent:** Drawing Flowcharts using E- Chart & Writing pseudo code for the following problem 1.Greatest of three numbers 2.Sum of N numbers 3. Computation of nCr	**CO-1** **BTL-1**
MODULE 2: FUNDAMENTALS OF C	**(9L+6P))**
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. **PracticalComponent** 1.Program to illustrate arithmetic and logical operators 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	**CO-2** **BTL-3**
MODULE 3: FUNCTIONS, ARRAYS AND STRINGS	**(9L+6P)**
Functions – Storage Class – Arrays – Strings and standard functions - Pre-processor Statements. **PracticalComponent:** 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	**CO-3** **BTL-4**

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	
MODULE 4: POINTERS, STRUCTURES AND UNION	**(9L+6P)**
Pointers – Dynamic Memory allocation – Structure and Union – Files. **PracticalComponent:** 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	**CO-4** **BTL-3**
MODULE 5: APPLICATIONS OF C	**(9L+6P)**
Structure of embedded C program - Data Types - Operators - Statements - Functions - Keil C Compiler. Game development using c - Analysing the environment - Snake game - Tic-Tac-Toe - flappy bird. **Practical component:** Simple programs using embedded C-Game Development using C	**CO-5** **BTL-2**

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 TITLE		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	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	Upon completion of this course, the students will be able to 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	PSO1	PSO 2	PSO 3
CO1	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO2	-	-	-	-	-	-	-	2	2	3	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	3	-	-	1	-	-
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)

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 **Vocabulary :** 1. Recruitment Brochure : ability, certificate, course, etc., 2. Work, job, training course. 3. Job	**CO-1 BTL-2**

Responsibilities 4. Staff, Employee, member of Staff. 5. Phrases expressing enthusiasm 6. Adjective Forms **Writing :** 1. Report Writing – Staff Training Report 2. A Website entry 3. A short Email and an Email of a job application. **Reading :** Articles on Human Resources **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	
MODULE 2 : GOAL SETTING	**(3L + 6P = 9)**
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. **Vocabulary :** 1. Word related to marketing (Launch, Play, Find out, Learn, Know, etc.,) 2. Revenue outcome 3. Adjective – noun collocations, 3. Last and latest **Writing :** 1. A marketing Report 2. Email giving information – making an enquiry – answering enquiries – correcting information – confirming terms 3 Memo Writing **Reading :** Articles on Marketing **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	**CO-2** **BTL-3**
MODULE 3 : TIME MANAGEMENT	**(3L + 6P = 9)**
Grammar : 1. Prepositions in time phrases 2. Making recommendations 3. Phrases signaling parts of a presentation 4. Can and could **Vocabulary :** 1. Financial Terms 2. Rising finance 3. Noun Phrases connected with starting companies 4. Assets, collateral etc., **Writing :** Formal Letter : 1. A letter of enquiry 2. Proposal Writing **Reading :**Articles on Entrepreneurship **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	**CO-3** **BTL-3**
MODULE 4 : EMOTIONAL INTELLIGENCE	**(3L + 6P = 9)**
Grammar : 1. Referencing 2. Using the Passives to express opinions and ideas. 3. Relative Clauses **Vocabulary :** 1. Collocations describing reasons for meetings, 2. Collocations with meeting 3. Crucial, priceless, etc., **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, **Reading :** Articles on Business abroad **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.	**CO-4** **BTL-3**
MODULE 5 : LEADERSHIP	**(3L + 6P = 9)**
Grammar : 1. Using the Definite Article 2. Expressing Causes 3. Reporting verbs and reported speech 4 Third Conditional(Imaginary) **Vocabulary :** 1. Verb – Noun collocations 2. Issues, impact, etc., 3. Way or method 4. Words and phrases expressing numbers. **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. **Reading :** Articles on Change in Business **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	**CO-5** **BTL-4**
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	1. To apply the AutoCAD commands to generate simple drawings and understand drafting techniques. 2. To apply the acquired knowledge to solve simple problems involving planes and solids. 3. To comprehend the various isometric projections and its developments 4. To draw electrical circuit drawings using software. 5. To generate associated views of PCB circuit drawings using CAD software.				

Course Outcome	Upon completion of this course, the students will be able to 1. Demonstrate the concepts of Engineering graphics and projection of straight lines using CAD software 2. Visualize the objects and to draw by free hand sketching and to draw the projection of solids 3. Visualize solid objects in isometric view and to develop surfaces of simple solids. 4. Develop own electrical circuit drawings using software. 5. 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	PSO-1	PSO -2	PSO 3
CO-1	2	1	-	-	1	-	-	1	1	1	-	2	1	2	-
CO-2	2	1	-	-	2	-	-	1	1	2	-	2	-	2	-
CO-3	2	2	2	-	2	-	-	2	2	2	-	2	-	3	-
CO-4	3	2	2	-	3	-	-	2	2	2	-	2	-	-	-
CO-5	3	1	2	-	-	-	-	1	2	2	-	2	-	2	-

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

MODULE 1: BASICS OF ENGINEERING GRAPHICS	**(6L+6P)**
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. ***Suggested Reading:*** *Solid modelling Software commands*	**CO-1 BTL-2**
MODULE 2: PROJECTION OF SOLIDS AND FREE HAND SKETCHING	**(6L+6P)**
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. ***Suggested Reading:*** *Solids inclined to both the planes. Section of solids.*	**CO-2 BTL-2**
MODULE 3: ISOMETRIC VIEW AND DEVELOPMENT OF SURFACES	**(6L+6P)**
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) ***Suggested Reading:*** Isometric view of solids with multiple sectional planes.	**CO-3 BTL-3**
MODULE 4: ELECTRICAL WIRING DRAWINGS	**(6L+6P)**

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. ***Suggested Reading:*** *Electrical CAD commands, panel layout*	**CO-4 BTL-3**
MODULE 5: PRINTED CIRCUIT BOARD DRAWINGS	**(6L+6P)**
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, 8th 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 IT ENGINEERS			CREDITS	2
COURSE CODE	EIT51400	COURSE CATEGORY	ES	L-T-P-S	0-1-2-2
Version	1.0	Approval Details		LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME					
CIA					ESE
First Periodical Assessment	Second Periodical Assessment	Weekly assignment/ Observation/ lab records and viva- as approved by the DEC	Surprise Test / Quiz, etc. - as approved by the DEC	Attendance	End Semester Examination
15%	15%	10%	5%	5%	50%

Course Description	The course provides the necessary knowledge and skills regarding working construction and interfacing aspects of peripherals. The students will get to know how various peripherals communicate with the central processing unit of the computer system and pattern their respective operations.
Course Objective	1. To inculcate basic knowledge in computer hardware for video monitors. 2. To enable the capability to learn the fundamentals of Motherboards. 3. To apprise knowledge in Hardware Organization of PCs. 4. To demonstrate the working of Input Devices and Output Devices. 5. To acquire knowledge on networking components.
Course Outcome	Upon completion of this course, the students will be able to 1. Describe the basics of computer hardware for video monitors. 2. Explore the Motherboard. 3. Setup and configure the ROM BIOS 4. Perform an exercise to capture the image using a mobile phone camera as a web camera 5. Set up a network of a few systems in a computer lab

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	-	-	-	-	1	-	-	-	3	-	2	-	1	-
CO-2	3	2	2	1	-	-	-	-	2	-	-	1	-	-	-
CO-3	3	3	3	3	2	-	3	2	2	-	-	1	2	2	-
CO-4	3	3	3	3	2	2	2	2	2	-	-	1	2	2	1

CO-5	**2**	**2**	**3**	**3**	**2**	**2**	**3**	**2**	**2**	**-**	**-**	**2**	**2**	**2**	**-**

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

MODULE 1: Video Display	**(3T+6P)**
Working principle of video monitors (CRT, LCD, LED), Video memory, video display card, Raster scan Display, Overview of vector graphic, Concept of reduction and bandwidth of monitors, refreshing of screen, Drawing lines from Dots, Bresenham's line drawing algorithm, Theory of Colour. **Practical Component:** 1. To study the construction and working of CRT, LCD, LED and it's troubleshooting. 2. Determine the video memory size on your PC/Laptop 3. Demonstrate the Bresenham's Line drawing Algorithm. 4. Use understanding of the concept of colour theory to link the components that contribute to the effects of colour.	**CO-1** **BTL-3**
MODULE 2: Hardware Organization of PCs	**(3T+6P)**
Motherboards and their types, details (Form Factor, Chipset), processors and their types (INTEL, AMD) and their compatibility with motherboards, serial and parallel ports, PS/2, USB Ports, Interconnection between units, connectors and cables. **Practical Component:** 1. To Study the components and internal parts, working of hard disk and CDROM, DVD, Flash Drives. 2. Familiarize with the computer system Layout: Mark positions of SMPS, Motherboard, processor, cooling systems, HDD, SSD RAM, Graphics unit and add-on cards. 3. Dissecting the Motherboard: Connectors, Ports & Chipsets 4. Performance Analysis of cooling systems in PCs (Setup a benchmark software-eg: cinebench to perform this), thereby writing the need for efficient cooling systems.	**CO-2** **BTL-3**
MODULE 3: Storage Devices	**(3T+6P)**
Types of Hard Disk Drives- SATA, SCSI, SAS External Hard Disk. Constructional features and working of hard disk drive and Flash Drive, Logical structure of Hard Disk and its organization, boot record. **Practical Component:** 1. Setup and configuration of ROM BIOS 2. Understanding modern memory technology. Make a comparative analysis of each memory technology. 3. Try to partition the hard disk and merge it back. 4. Expand the RAM size using virtualization concept	**CO-3** **BTL-3**
MODULE 4: Input Devices and Output Devices	**(3T+6P)**

Overview of Input Devices and Output Devices Basic principle of touch screen, light pen, digitizers. Drivers for various input devices and their role. principle and working of laser printers (Monochrome and Colour), plotter (Piezoelectric and Thermal), and modems. Software drivers for various output devices and their role. **Practical Component:** 1. To study the operations and components and internal parts of KeyBoard, mouse and their troubleshooting 2. Study of components and internal parts and working of Inkjet printer and Laser printer and various installation of printers. 3. Understand the concept of input devices through keyboard remapping 4. To capture the image using a mobile phone camera as a web camera.	**CO-4** **BTL-3**
MODULE 5: Networking Components	**(3T+6P)**
Types of Computer Networks – Connecting devices like Hub-Switch-Bridge-Router - 7 layers of OSI Model – TCP/IP Model – IP addressing – Subnetting **Practical component:** 1. To study the Network Simulator tool. 2. Create a network simulator object. 3. Study the Tool Command language 4. Connecting two-three node point-to-point network. 5. Using the networking tools like Ping and Traceroute 6. Set up a network of 10 systems using IP addressing and subnetting concepts.	**CO-5** **BTL-3**

TEXTBOOKS	
1	Irv, Englander, Wilson, Wong. (2022). *The architecture of Computer Hardware, System Software , and Netwroking: An Information Technology approach*, Wiley Publication, 6th edition, pp.67-94.
2	Kevin, Wilson. (2018). *Essential Computer Hardware Second Edition: The Illustrated Guide to understanding Computer Hardware(Computer Essentials)*, Elluminet Press, pp.167-186.
REFERENCE BOOKS	
1.	Kevin Wilson. (2022). *Exploring Computer Hardware: The Illustrated Guide to Understanding Computer Hardware, Components, Peripherals & Networks*, Elluminet Press, pp.267-378.
2.	Douglas, Comer. (2017). *Essentials of Computer Hardware*, Chapman and Hall Publishers, pp.57-83.
EBOOK	
1.	https://www.nios.ac.in/media/documents/sec229new/Lesson1.pdf
MOOC	
1.	https://www.udemy.com/share/101upM/
2.	https://www.coursera.org/learn/introduction-to-hardware-and-operating-systems
3.	https://nptel.ac.in/courses/106103068
4.	https://www.udemy.com/share/105iHK/

COURSE TITLE	DESIGN THINKING FOR IT ENGINEERS			CREDITS	2
COURSE CODE	EIT51402	COURSE CATEGORY	PC	L-T-P-S	0-1-2-1
Version	1.0	Approval Details		Learning Level	BTL3

ASSESSMENT SCHEME

CIA					ESE
First Periodical Assessment	Second Periodical Assessment	Weekly assignment/ Observation/ lab records and viva - as approved by the DEC	Surprise Test / Quiz, etc. - as approved by the DEC	Attendance	End Semester Examination
15%	15%	10%	5%	5%	50%

Course Description	This course describes the different ways of design thinking, steps and stages of Design thinking and evaluating the design.
Course Objective	1. To know the steps in design thinking. 2. To learn the stages of design thinking. 3. To get an exposure of design alternatives. 4. To evaluate the design covering function 5. To understand IPR and its importance.
Course Outcome	Upon completion of this course, the students will be able to 1. List down the steps in design thinking. 2. Develop the software by getting awareness of the stages of design thinking. 3. Explore design alternatives through the creation and testing of prototypes. 4. Evaluate the design covering function and other factors in design. 5. Summarize the procedure for obtaining IPR and patents.

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	2	1	1	3	-	-	1	-	2	-	-	1	-	1	-

CO-2	**3**	**2**	**2**	**2**	**3**	**2**	**2**	**2**	**2**	**-**	**-**	**1**	**3**	**2**	**1**
CO-3	**3**	**2**	**3**	**3**	**3**	**2**	**2**	**2**	**3**	**-**	**-**	**1**	**2**	**2**	**1**
CO-4	**2**	**1**	**3**	**2**	**3**	**2**	**2**	**2**	**3**	**-**	**3**	**1**	**3**	**2**	**1**
CO-5	**2**	**-**	**1**	**-**	**-**	**1**	**2**	**-**	**2**	**3**	**-**	**1**	**-**	**-**	**-**

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

MODULE1:INTRODUCTION TO DESIGN THINKING	**(3T+6P)**
Introduction to design thinking; Need of Design in Engineering; The 7 Steps of the Engineering Design thinking Process- Define, Ask, Imagine, Plan, Prototype, Test, Improve. **Project:** An Exercise in the process of design to initiate creative designs Initiating the thinking process for designing a product of daily use.	**CO-1** **BTL-2**
MODULE 2-PROCESSES IN DESIGN THINKING	**(3T+6P)**
Introduction to Design Thinking; Stages of Design Thinking - Empathize, Define, Ideate, Prototype, Test; Design Thinking for Software Development-Clarity of Vision, Scope for Improvement. **Project**: An exercise to develop software that interacts with the user and engages with them in the most effective way possible	**CO-2** **BTL-2**
MODULE 3 – PROTOTYPING	**(3T+6P)**
Need for Prototype in Engineering Design; Types of Prototyping-Rapid (Throwaway) prototyping, Evolutionary prototyping, Incremental prototyping, Extreme prototyping; Steps in prototyping. **Project:** An exercise to build out the details by creating a prototype, or testable model of a derived solution.	**CO-3** **BTL-3**
MODULE 4- QUALITY ASPECTS IN DESIGN	**(3T+6P)**
Design for "X"; covering quality, reliability, safety, Development, assembly, maintenance, logistics, handling; disassembly; recycling; re-engineering etc. **Project:** List out the design methods for IoT based structure	**CO-4** **BTL-2**
MODULE 5 – INTELLECTUAL PROPERTY RIGHTS	**(3T+6P)**
Introduction to IPRs, Basic concepts and need for Intellectual Property - Patents, Copyrights, Geographical Indications; Nature of Intellectual Property, Industrial Property, technological Research, Inventions and Innovations – Important examples of IPR. **Project:** Examine the possibility of value addition for an existing product.	**CO-5** **BTL-2**

TEXTBOOKS

1	Balmer, R. T., Keat, W. D., Wise, G., and Kosky, P. (2020). *Exploring Engineering: An Introduction to Engineering and Design*, Academic Press, 3rd edition, pp.149-198.
2	Dym, C. L., Little, P. and Orwin, E. J. (2019). *Engineering Design - A Project-based Introduction*, Wiley Publication, 4th edition, pp.238-280.

REFERENCE BOOKS	
1	George, E, Dieter, Linda, C, Schmidt. (2017). *Engineering Design*, McGraw Hill publisher, 4th edition, pp.67-93.
2	Kathryn, Christopher. (2019). *Design Thinking in Engineering*, Kendall/Hunt Publishing Co, 1st edition, pp.156-249.
E BOOKS	
1.	https://www.rcsc.gov.bt/wp-content/uploads/2017/07/dt-guide-book-master-copy.pdf
MOOC	
1.	https://nptel.ac.in/courses/110106124
2.	https://archive.nptel.ac.in/courses/110/106/110106124/

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	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	Upon completion of this course, the students will be able to 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	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	-	1	-	-	-	-	-	-	1	1	-	-
CO -2	3	2	1	-	2	-	-	-	-	-	-	1	-	-	-
CO -3	3	2	1	2	1	-	-	-	-	-	-	1	1	-	-
CO -4	3	3	2	1	1	-	-	-	-	-	-	2	1	-	-
CO -5	3	3	2	-	1	-	-	-	-	-	-	2	1	-	-

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 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 parallelopipeds. **Suggested Reading**: Basics of Vectors **Lab: Gradient, Divergence, Curl, Irrotational and Solenoidal vector fields**	**CO-1** **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 semicircular 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), *Analytical Mathematics*, Dhanam Publications, 1st Edition, Chennai.
2.	T. Veerarajan (2016), *Engineering Mathematics-II*, McGraw Hill Education (India), Private Limited, 4th Edition, New Delhi.
3.	Raj Kumar Bansal, Ashok Kumar Goel, Manoj Kumar Sharma (2016), *MATLAB and its Applications in Engineering*, Pearson Publication, 2nd Edition, New Delhi.
4.	D. G. Duffy (2021), *Advanced Engineering Mathematics With MATLAB (Advances in Applied Mathematics)*, Chapman and Hall Publisher, 5th Edition, CRC Press, USA.

REFERENCE BOOKS

1.	P. Sivarama Krishna Das, C. Vijayakumari (2017), *Engineering Mathematics*, 1st Edition, Pearson Publishing, Chennai.
2.	A. P. Santhakumaran, P. Titus P (2017), *Engineering Mathematics – II*, NiMeric Publications, 2nd Edition, Nagercoil, India.
3.	Kreyszig Erwin (2016) *Advanced Engineering Mathematics*, John Wiley and Sons, 10th Edition, New Delhi.
4.	S.S. Sastry (2015), *Engineering Mathematics*, Vol. I & II, PHI Learning Pvt. Ltd, 4th Edition, New Delhi.

E BOOKS

1. 2. 3. 4.	http://ggn.dronacharya.info/APSDept/Downloads/QuestionBank/Mathematics-I/SectionD.pdf. https://people.math.sc.edu/girardi/m7034/book/AshComplexVariablesWithHyperlinks.pdf https://ocw.mit.edu/courses/18-03sc-differential-equations-fall-2011/pages/unit-iii-fourier-series-and-laplace-transform/ 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	1. To make the students understand the basics of crystal structure and phase rule. 2. To provide a knowledge on the theoretical basis of the chemical composition, properties and applications of abrasives, adhesives, lubricants and refractories. 3. To give a strong foundation on the basic concepts of nanomaterials, the general synthetic methods with emphasis on their applications. 4. To provide an exposure on the fundamentals and applications of polymeric materials and composites. 5. To illustrate the applications of energy materials, liquid crystals and conducting polymers with a good exposure on their basic terminologies.
Course Outcome	Upon completion of this course, the students will be able to 1. Propose and justify suitable metals/materials for alloying. 2. Distinguish and select a suitable material as abrasives / adhesives / lubricants / refractories based on its properties and applications. 3. Select an appropriate technique for nanomaterial synthesis and characterization. 4. State and select a suitable polymeric / composite material for industrial applications. 5. 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**	**PO -11**	**PO -12**	**PSO-1**	**PSO-2**	**PSO-3**
CO-1	**3**	**2**	**1**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**-**
CO-2	**3**	**2**	**1**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**
CO-3	**3**	**2**	**1**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**
CO-4	**3**	**2**	**1**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**
CO-5	**3**	**2**	**1**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**

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 – X-ray diffraction and crystal structure. 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. Practical component: Construction of phenol-water phase diagram - Determination of apparent density of porous solids.	**CO-1 BTL-3**
MODULE 2: ABRASIVES, ADHESIVES, LUBRICANTS AND REFRACTORIES	**(9L + 6P)**
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, MoS_2 and Graphite - Refractories – Classification, Properties, Applications. **Practical components**: Preparation of urea-formaldehyde resin - Determination of porosity of a refractory	**CO-2 BTL-3**
MODULE 3: NANOMATERIALS	**(9L + 6P)**
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). **Practical component**: Preparation of ZnO nanoparticles by wet chemical method – Verification of Beer-Lambert's law using silver nanoparticles.	**CO-3 BTL-3**
MODULE 4: POLYMERS AND COMPOSITES	**(9L + 6P)**
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. **Practical components**: Determination of molecular weight / viscosity of polymer using Ostwald Viscometer.	**CO-4 BTL-3**
MODULE 5: MATERIALS FOR ENERGY AND ELECTRONIC APPLICATIONS	**(9L + 6P)**
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	**CO-5 BTL-3**

crystalline behaviour - Applications. Conducting Polymers: Classification, Intrinsic Conducting Polymers, Extrinsic Conducting Polymers, Applications. **Practical component**: Preparation of polyaniline / Polypyrrole.	
TEXT BOOKS	
1.	Jain, P.C., Jain, M. (2018). *Engineering Chemistry*, Dhanpat Raj Publishing Company (P) Ltd, New Delhi, 17th Edition.
2.	Puri, B. R., Sharma, L. R., Pathania, M. S. (2020). *Principles of Physical Chemistry*, Vishal Publishing Co. Jalandhar, 47th Edition.
3.	Rangwala. (2017). *Engineering Materials*, Charotar Publishing House Pvt. Ltd, 43rd Edition.
REFERENCE BOOKS	
1.	Clyne, T. W., Hull, D. (2019). *An introduction to composite materials*, Cambridge University Press, 3rd Edition.
2.	Shah, M. A., Ahmad, T. (2021). *Nano Science & Technology*, Dreamtech Press, 2021 Edition.
3.	Palanna, O. G. (2018). *Engineering Chemistry*, Mc Graw Hill Education (India) Pvt. Ltd, 2nd 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	**OBJECT ORIENTED PROGRAMMING AND DATA STRUCTURES**			**CREDITS**	**4**
COURSE CODE	**EIT51001**	**COURSE CATEGORY**	**PC**	**L-T-P-S**	**3-0-2-1**
Version	**1.0**	**Approval Details**		**Learning Level**	**BTL3**

ASSESSMENT SCHEME

CIA					**ESE**
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**	**End Semester Examination (Theory + Practical)**
15%	**15%**	**10%**	**5%**	**5%**	**50%**

Course Description	This course will provide students with an opportunity to understand the fundamentals of object-oriented programming and to develop solutions for real-time problems using data structure concepts.

Course Objective	1. To comprehend the fundamentals of object oriented programming. 2. To understand the principles of inheritance and polymorphism. 3. To acquire knowledge about the different methods of organizing a large amounts of data. 4. To apply object-oriented programming concepts to implement data structures. 5. To solve problems involving sorting and searching techniques.
Course Outcome	Upon completion of this course, the students will be able to 1. Program the fundamentals of Objects and classes. 2. Develop programs for the concepts of Inheritance and polymorphism using C++. 3. Organize the data in a structured way. 4. Devise novel solution to real time problems using data structures. 5. Apply algorithms and use of sorting and searching techniques.

Prerequisites: Fundamentals of Computer Programming.

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

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

MODULE 1 : FUNDAMENTALS OF OOPS (9L+6P)

Object oriented paradigm-properties-Classes, Objects and Methods- object creation, reference variables, Scope and Accessing members of class -Constructors and destructors -Member Functions and Classes – Friend Function – Dynamic Memory Allocation - Overloading: Function Overloading and Operator Overloading .

PRACTICAL COMPONENT:

Basic Class Implementation using objects-Implementation of Parameterized Constructors and Destructors.-Implementation of friend Functions

Suggested Reading

Procedure oriented Programming Vs Object oriented Programming, Fundamentals of C++.

CO-1
BTL-2

MODULE 2 : INHERITANCE & POLYMORPHISM (9L+6P)

Base Classes and Derived Classes – Protected Members – Overriding – Public, Protected and Private Inheritance-Method Overriding -Virtual functions – This Pointer –Abstract Base Classes and Concrete Classes- Virtual Destructors – Polymorphism and Dynamic Binding.

PRACTICAL COMPONENT:

Implementation Inheritances-Implementation of Virtual Functions

Suggested Reading

Control Structures and type conversions.

CO-2
BTL-2

MODULE 3 :LINEAR DATA STRUCTURES	(9L+6P)
Abstract Data Types (ADTs) – List ADT – array-based implementation – linked list implementation — singly linked lists –Polynomial Manipulation - Stack ADT – Applications- Queue ADT – Applications. **PRACTICAL COMPONENT:** Implementation of singly linked -Implement infix to postfix conversion using stack -Implementation of queue using Array-Implement Tree traversal on the given expression treeDesign process and concepts. **Suggested Reading** Arrays and Representation of Arrays.	**CO-3** **BTL-2**
MODULE 4 : NONLINEAR DATA STRUCTURES	**(9L+6P)**
Trees – Binary Trees – Binary tree representation and traversals – Binary search tree - AVL Trees -A Graph and its representations – Graph Traversals – Breadth-first search –Depth-first search – Topological Sort - Applications of graphs. **PRACTICAL COMPONENT:** Implement Binary search Tree with its primitive operations-Implement Dijkstra's algorithm to find out the shortest path of the given Graph. **Suggested Reading** Threaded Binary Tree, Splay Tree and Heap.	**CO-4** **BTL-3**
MODULE 5 : SORTING AND SEARCHING	**(9L+6P)**
Sorting algorithms: Insertion sort - Quick sort - Merge sort - Searching: Linear search –Binary Search. **PRACTICAL COMPONENT:** Implement the following search operations in C++ (a) Linear Search (b) Binary search using recursion-Implement the following sorting operations using generic data type(template) in C++(a) Insertion Sort (b) Quick Sort (c) Merge Sort (d) Quick Sort. **Suggested Reading** Bubble sort and Heap sort.	**CO-5** **BTL-3**

TEXT BOOKS	
1.	Bjarne, Stroustrup. (2022). *C++ Programming Language*, Pearson Publishers, 4th edition, pp.79-146.
2.	Sachi, Nandan, Mohanty , Pabitra Kumar, Tripathy.(2021). *Data Structure and Algorithms Using C++: A Practical Implementation*, Wiley-Scrivener Publishers, 1st edition, pp.167-193.
REFERENCE BOOKS	
1.	Rajesh K. Shukla. (2017). *Object-Oriented Programming in C++*,Wiley India, pp.186-223.
2.	Schildt. (2017). *C++: The Complete Reference*, McGraw-Hill Education, 4th edition, pp.210-276.
E BOOKS	
1.	http://www.uoitc.edu.iq/images/documents/informatics-institute/Competitive_exam/DataStructures.pdf
2.	https://faculty.ksu.edu.sa/sites/default/files/ObjectOrientedProgramminginC4thEdition.pdf
MOOC	
1.	https://www.coursera.org/learn/cs-fundamentals-1

2.	https://www.edx.org/course/data-structures-algorithms-using-c

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 if 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 are provided as guidelines from AICTE.**
Course Objective	1.To create awareness to students on the themselves and their surroundings (family, society, nature). 2.To create responsibility among students on life in handling problems with sustainable solutions 3.To prepare the students with human relationships and human nature in mind. 4.To Prepare the students on critical ability and sensitive to their commitment.(human values, human relationship and human society). 5. To Apply the learning to their real life
Course Outcome	Upon completion of this course, the students will be able to 1.Demonstrate the necessity of relationship with family, society and nature. Familiarize with the challenges ahead and proposed solutions. 2.Formulate and design human cyber security policies, plans and procedures for organizations. 3.Apply standard security countermeasure tools to sustain human relationships and nature.es. 4.Recognize the necessity of human values and relationship. 5.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	**3L+6L=9**
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 critical appraisal of the current scenario Method to fulfil the above human aspirations: understanding and living in harmony at various levels. **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 **Suggested Readings:** Evolution of cyber security	**CO-1** **BTL-2**
MODULE 2: Understanding Harmony in the Human Being	**(3L+6L=9)**
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. **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	**CO-2** **BTL-2**
MODULE 3: Understanding Harmony in the Family and Society	**(3L+6L=9)**
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 **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	**CO-3** **BTL-3**
MODULE 4: Understanding Harmony in the Nature and Existence	**(3L+6L=9)**

Whole existence as Coexistence - Understanding the harmony in the Nature - Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and selfregulation in nature -Understanding Existence as Co-existence of mutually interacting units in all-pervasive space -Holistic perception of harmony at all levels of existence. **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.	**CO-4** **BTL-2**
MODULE 5: Implications of the above Holistic Understanding of Harmony on Professional Ethics	**(3L+6L=9)**
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 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.	**CO-5** **BTL-2**

TEXT BOOKS

1. P.R Gaur, R Asthana, G.P Bagaria, Human Values and Professional Ethics (2nd 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). *Cyber security for Dummies*, John Wiley & Sons Inc., 2nd Edition, pp.213--432.

REFERENCE BOOKS

1.	AICTE STUDENT INDUCTION PROGRAM HANDBOOK - **https://fdp-si.aicte-india.org/download/Guidelines/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**
Versio	**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	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	Upon completion of this course, the students will be able to 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	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	PS O3
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 எழுத்ꣳகள்**	
தமிழ் எழுத்துகள் – ஓசைகள் - எண்கள் – வண்ணங்கள் – வடிவங்கள் - ஓர் எழுத்துச் சொற்கள் - பழங்கள் மற்றும் காய்கறிகள் - மலர்கள் - இயற்கை - மாதங்கள் சொற்கள் - சபயர்சொற்கள் - உரிச்சொற்கள் - விசைச்சொற்கள் - காலங்கள் - வாழ்த்துகள். வகுப்பறை செயல்முறைகள் : 1. வார்த்தைகளை வட்டமிடுதல். 2. விடுபட்ட எழுத்துகளை நிரப்புக. 3. வடிவங்களுக்கு வண்ணம் தீட்டுக.	CO-1 BTL-2
அலகு – 2 ககட்டல் மற்றும் உச்சரித்தல்	
உயிரெழுத்துகள், மெய்யெழுத்துகள் மற்றும் உயிர்மெய் எழுத்துகளை உச்சரித்தல் - மாறுகைதகள் வாைத்தல் - எதிர்ச்சொற்கள் - பொருள்தருக - வாக்கியத்தில் அமைத்து எழுதுதல் - ஒரு சொல்லில் விடையளித்தல். வகுப்பறை செயல்முறைகள் : 1. சொற்களைக் ககட்டு உச்சரிக்க செய்தல். 2. கூழுவிவாதம் செய்தல். 3. ககாடிட்ட இடங்களைச் சரியாை சொற்களைக் கூறுதல்.	CO-2 BTL-2
அலகு -3 எழுத்துப் பயிற்சி (6 L) (6L)	
தமிழ் எழுத்துகளை எழுத கற்பித்தல் - உயிர் எழுத்துகள் - மெய் எழுத்துகள் - உயிர்மெய் எழுத்துகள் - ஆய்த எழுத்து - சார்பெழுத்துகள் - ஒற்றெழுத்துகள் - ஒரு சொல் - இரு சொல் எழுதுதல் – ஒருவரி, இருவரி எழுதுதல். வகுப்பறை செயல்முறைகள்: 1. ககாடிட்ட இடங்களை நிரப்புக. 2. சரியாை எழுத்துகளை வட்டமிடுதல். 3. ஒருவரி சொற்களை எழுதுதல்.	CO-3 BTL-3
அலகு - 4 **உரையாடல்கள் கற்பித்தல்** (6 L)	
சிறு உரையாடல்கள் கற்பித்தல் - வாழ்த்துக்கள் - வங்கியில் பணம் செலுத்துதல் - நேர்காணலில் கலந்துகாள்பவரிடம் உரையாடுதல், சபாது இடங்களிலும் உரையாடுதல். வகுப்பறை செயல்முறைகள்: 1. குறு நாடகங்கள் நடித்து உரையாடல்கள் கற்பித்தல். 2. விண்ணப்ப படிவங்கள் பூர்த்தி செய்தல். 3. மின்னல் அட்டைகள் காண்பித்தல்.	CO-4 BTL-2

அலகு	-	5	தமிழ்	வளைக்க	மற்றும்	எழுத	கற்பித்தல்

கடிதங்கள் வொைித்தல் மற்றும் எழுதுதல் – விண்ணப்ப கடிதம், வங்கிகணக்கு படிவங்கள், இரயில் முனன்பதிவு வினண்ணப்ப படிவம் பூரத்திசையத்தல் - கவிசத வாைித்தல் - சையத்திதாள் வொைித்தல். வகபப்பசற சையல் முசறகளள: 1. விண்ணப்ப படிவங்கள் பூரத்திசையத்தலள. 2. கவிசத வாைித்தல் கபாடடிகள் 3. வகுப்பசற கதரவுகள்	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 – 6th TO 9th (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		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	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	Upon completion of this course, the students will be able to 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	PS O3
CO	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO	-	-	-	-	-	-	-	2	2	3	-	-	-	-	-
CO	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO	-	-	-	-	-	-	2	-	-	3	2	-	-	-	-
CO	-	-	-	-	-	-	-	-	2	2	-	2	-	-	-

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

मॉड्यूल 1: **ह दी पत्र और हलहप**	(6 L)
ह5दी स्वर और व्यजन अक्षर - आह्ित स्वर सीखेंं - व्यजन और व्यजन समू5 - अनुस्वर व्यजन - सज्ञा - सवनाम - हियाा (भहवष्य) - सभाहवत ह्वशेषण - काल - ह5दी के त्ररत ह्नयम - अहभवादन - 2 अक्षर शब्द बनाना, 3 अक्षर शब्द - 5र ह्दन शब्दावली - सख्याए - रग - पररवार - वस्त्र - बगीचा - घर - फल और सब्जिया - प्रकृ ह्त **सुझाई गई गह्ितह्िहयाा:** दे शी वक्ताओ द्वारा स्वर और व्यजन का उच्चारण सुनना स्वर और व्यजन के वीह्ियो, 2 अक्षर और 3 अक्षर के शब्द, और प्रह्तह्दन प्रयोगार्् शब्दावली	CO-1 BTL-2
मॉड्यूल 2: सुनने का कौशल	(6 L)
स्वर और व्यजन का उच्चारण सुनना - लघु कर्ाएँ सुनना - साक्षात्कार - भाषण - सामाह्जक मुद्दो पर पॉिकास्ट वाता - ह्नर्ारित पाठो को सुनना: इकाई 1 सभ्यता का र5स्य, इकाई 2 - युवावो से - वातालापो को सुनना - जानकारी सुनना - सम्मेलनो के भाषण **सुझाई गई गह्ितह्िहयाा:** सुनें और चुनें उम्मीदवार पाठ को सुनते 5ैं और तीन ह्वकल्पो के सार् बहुह्वकल्पीय प्रश्न का उत्तर दे ते 5ैं। उम्मीदवार टीवी चैनलो मेंं बातचीत - साक्षात्कार- अहतहर् व्याख्यान, सम्मेलनो और कायशालाओ के दौरान ह्वशेषज्ञो के भाषण सुनते 5ैं	CO-2 BTL-3
मॉड्यूल 3: बोलने का कौशल	(6 L)
औपचारिक सवाद - अनौपचारिक सवाद - ह्लग रूपो के सार् बोलना - सख्या - काल - पररवार, श5र, त्योि5ारो, शौक आहद जैसे सामान्य ह्वषयो पर बोलना - पसद और नापसद व्यक्त करना - ज़रूरतेंं और सपह्त्त - भूह्मका ह्नभाना। **सुझाई गई गह्ितह्िहयाा:** प्रस्तुह्त – कायिकमो का सचालन - भाषण दे ना	CO-3 BTL-3
मॉड्यूल- 4 : **पढ़ने का कौशल**	(6 L)
नमूना पढ़ना - नकल पढ़ना - अक्षरो और शब्दो का स5ी उच्चारण करना - पढ़ने मेंं प्रवा5 - क5ाह्नयाँ पढ़ना- सपादकीय, समाचारपत्र के लेख पढ़ना। **सुझाई गई गह्ितह्िहयाा** फ्लैशकाि का उपयोग - चाट - ह्चत्रो की प5चान करना - शब्दो को पढ़ना	CO-4 BTL-3
मॉड्यूल-5 **लेखन कौशल**	(6 L)

सामान्य पत्राचार - पत्र लेखन: छुट्टी लेने पत्र, बैंक खाता खोलना, पुस्तकें मगवाने के लिए पत्र, शिकायत पत्र - सके त हवकास - ज्ञापन - नोहटस **सुझाई गई गहिहिया:** हनर्ारत पाठ्यपुस्तक के अनुसार अभ्यास पूरा करना	CO-5 BTL-3

पाठ्य पुस्तक	
1.	Sashtri. S.R.(2019). Hindi Shikshak, Dakshina Bharat Hindi Prachar Sabha, Chennai (Pages 137)
सदर्भ 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-सदर्भ	
1.	https://www.hindipod101.com/

COURSE	**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**	**PS**	**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

భాగము 1 : వినడం, చెప్ప డం మరి రాయడం	(6L)
తెలుగు అచ్చు లు & హలులు శబ్ద లు ధ్వ నిచరిత్రంతో పాటు తెలుగు హలుల సంయోగాల పరిచయం సూచించబడిన : కార్య కలాపాలు చర్ లు : 5 గంటలు . అసైనమంటు / జంటషన - 5 గంటలు	**CO-1** **BTL-2**
భాగము 2 : పదర్ పదాలకు, సంఖ్య లకు, మరియు వాటి గుణాల పరిచయం	(6L)
తెలుగు నామవాచకం పరిచయం తెలుగు సర్వ నామం & దాని విషయం సంఖ్య లు దాని పరిచయం & తెలుగు విశేషణాలు పరిచయం సూచించబడిన : కార్య కలాపాలు చర్ లు : 5 గంటలు . అసైనమంటు / జంటషన - 5 గంటలు	**CO-2** **BTL-3**
భాగము 3 : పదాలను విడదీసి వాక్యయ లను రాయడం	(6L)
తెలుగు పూర్వ పదాలు – సంయోగాలు మరి దాని ఉపయోగం సూచించబడిన : కార్య కలాపాలు చర్ లు : 5 గంటలు . అసైనమంటు / జంటషన - 5 గంటలు	**CO-3** **BTL-3**
భాగము 4 : పనులు, సమయం, ియ మరియు ుల వ్య వ్ధుల పరిచయం	(6L)
వివిధ ీయల యొకక ీయ & సమయం / కాల సంయోగాలనిి పరిచయం సూచించబడిన : కార్య కలాపాలు చర్ లు : 5 గంటలు . అసైనమంటు / జంటషన - 5 గంటలు	**CO-4** **BTL-3**
భాగము 5 : తెలుగు చదవడం, రాయడం మరియు పశ్న ంచడం	(6L)
తెలుగులో సర్ళమైన వాయ లను రూపొందంచడం (పాథమిక వాకయ నిా ణ నియామాలు)తెలుగులో తీపతీకూల వాయ లున రూపొందంచడం తెలుగు బోధన అభ్యయ స తీపటీయలో పశన ర్ష వాకాయ లంవాకాయ లను రూపూచించబడిన : కార్య కలాపాలు చర్ లు : 5 గంటలు . అసైనమంటు / జంటషన - 5 గంటలు	**CO-5** **BTL-3**

TEXT BOOK	
1.	Telugu Akademy. (2018). Sampradaya Telugu Vyakaranalu. Telugu Akademy. Vijayawada, Andhra Pradesh. India.
2.	Raghavendra. A. (2019). Telugu Vyakaranam. Prajasakti Book House. Tadepalli.
REFERENCE BOOKS	
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.
E-References	
1	https://sarkarihelp.com/telugu-grammar-pdf-download/

COURSE TITLE	INNOVATION LAB FOR IT ENGINEERS			CREDITS	2
COURSE CODE	EIT51401	COURSE CATEGORY	ES	L-T-P-S	0-1-2-2
Version	1.0	Approval Details		Learning Level	BTL3

ASSESSMENT SCHEME

CIA					ESE
First Periodical Assessment	Second Periodical Assessment	Weekly assignment/ Observation/ lab records and viva - as approved by the DEC	Surprise Test / Quiz, etc. - as approved by the DEC	Attendance	End Semester Examination
15%	15%	10%	5%	5%	50%

Course Description	Innovation Lab is tasked with coming up with new ideas in the field of various computer science aspects with recent technologies and trends. The course is oriented towards executing the ideas with any iterations required until the proposed model is executed. The students will be motivated to think independently with a systematic and innovative approach.
Course Objective	1. To facilitate the knowledge of independent thinking and creativity. 2. To train the students to handle the current technological aspects. 3. To motivate the students with the idea of solving problems and coming up with a solution.
Course Outcome	Upon completion of this course, the students will be able to 1. Identify the innovative areas in the Cyber Security domain 2. Identify the innovative areas in the Machine Learning domain 3. Identify the innovative areas in the IoT domain 4. Carry out the design process of the solution 5. Implement a project.

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	1	-	-	-	2	1	-	2	-	-	1	-	-	3

CO-2	**3**	**1**	**-**	**-**	**-**	**2**	**1**	**-**	**2**	**-**	**-**	**1**	**-**	**-**	**3**
CO-3	**3**	**1**	**-**	**-**	**-**	**2**	**1**	**-**	**2**	**-**	**-**	**1**	**-**	**-**	**3**
CO-4	**3**	**3**	**3**	**-**	**1**	**1**	**1**	**1**	**3**	**2**	**-**	**1**	**2**	**3**	**-**
CO-5	**3**	**3**	**3**	**2**	**3**	**1**	**1**	**3**	**3**	**3**	**3**	**1**	**2**	**3**	**-**

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

MODULE 1 – CYBER SECURITY FOR INNOVATION	**(3T+6P)**
Information Gathering – Scanning – Gaining Access **Practical Component** 1. Identify the latest tools on Github on each of the above-mentioned topics 2. Experiment with the tools using open-source software like Kali Linux	**CO-1** **BTL-3**
MODULE 2 – MACHINE LEARNING FOR INNOVATION	**(3T+6P)**
Preprocessing – Training & Testing – Data Visualization **Practical Component** 1. Identify the latest tools on Github on each of the above-mentioned topics 2. Experiment with the tools using open-source software like google colab	**CO-2** **BTL-3**
MODULE 3 – IoT FOR INNOVATION	**(3T+6P)**
IoT Architecture and protocols - Devices & sensors - Arduino Uno Architecture - Arduino Setup - Communication Protocols. **Practical Component** 1. Arduino simulator: LED Blink example 2. Arduino + Blynk App IoT 3. Azure IoT with Arduino Uno-board to turn on-off led using a net core console application 4. Connect and work with Azure IoT Hub	**CO-3** **BTL-3**
MODULE 4- PROJECT ANALYSIS AND DESIGNING	**(3T+6P)**
Planning and Requirement Analysis - Designing Architecture - Developing Product - Product Testing and Integration - Documentation - Training and Support - Deployment and Maintenance of Product **Practical Component** 1. Prepare a Gantt chart for project planning 2. Prepare a Mind Map for requirement analysis	**CO-4** **BTL-3**
MODULE 5 – INNOVATIVE APPLICATION DEVELOPMENT	**(3T+6P)**
Agriculture - Healthcare - Transportation - Stock Markets - Education - Finance and Banking Sector - Retail Industry - Business Transactions - Research and Development **Practical Component** 1. Project presentation and documentation on the selected domain	**CO-5** **BTL-3**

TEXTBOOKS	
1.	Roger, Pressman, Bruce, Maxim. (2020). *Software Engineering: A Practitioner's Approach*, McGrawHill Education, 9th edition, pp.178-249.
2.	Joel, Grus. (2019). *Data Science from Scratch: First Principles with Python*, Oreilly Media Inc, 2nd edition, pp.178-245.
REFERENCE BOOKS	
1.	Ian Sommerville. (2017). *Software Engineering* , 10th Edition, Pearson Publishers, pp.328-436.
E LINKS	
1.	https://wokwi.com/arduino/libraries/demo/blink
2.	https://create.arduino.cc/projecthub/pratikdesai/make-your-first-iot-project-f6a748
3.	https://ashiqf.com/2021/02/28/azure-iot-with-arduino-uno-board-to-turn-on-off-led-using-a-net-core-console-application-connected-to-power-apps/
4.	https://wokwi.com/projects/322313026680128082

COURSE TITLE		**Communication Skills**			**CREDITS**	**3**
COURSE CODE		**ELS51001**	**COURSE**	**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	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	Upon completion of this course, the students will be able to 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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	3	-	2	-	1	-
CO2	-	-	-	-	-	-	-	-	-	3	-	2	-	1	-
CO3	-	-	-	-	-	-	-	2	-	3	-	2	-	1	-
CO4	-	-	-	-	-	-	-	2	2	3	2	2	-	1	-
CO5	-	-	-	-	-	-	-	-	-	3	3	2	-	2	-

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

MODULE 1 : English for Employability	**(6L + 6P = 12)**
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. **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 **Writing :** 1. Writing emails – formal and informal – phrases for emails & letters. 2. Writing a covering letter with a resume for a job application. **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. **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. **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.	**CO-1 BTL-2**
MODULE 2 : English for Marketing	**(6L + 6P = 12)**
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 **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. **Writing :** 1. Topic Sentence 2. Paragraph Writing 3. Developing a story with the hints 4. Promotional letter(Email) **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.	**CO-2 BTL-3**

Lab Activities(Speaking) : 1.Role Play – Telephone call to a supplier, 2. Describing Objects **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.	
MODULE 3 : Business Correspondence (6L + 6P = 12)	
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 – 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 **Vocabulary :** 1.Vocabulary for travel 2. Synonyms and Antonyms 3. Employment Vocabulary **Writing :** 1. A letter(Email) of invitation – Accepting the invitation and declining the invitation. **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 **Lab Activities(Speaking) :** Discussion: How to make decisions **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.	**CO-3** **BTL-3**
MODULE 4 : English for Business Relationships (6L + 6P = 12)	
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 **Vocabulary :** 1. Affixes 2. Countable and Uncountable nouns 3. Global Management **Writing :** 1.Memo 2. Notice with agenda 3. Email : Requesting information **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. **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. **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.	**CO-4** **BTL-3**
MODULE 5 : English for Presentation (6L + 6P=12)	
Grammar : 1. Adjectives and adverbs 2. Pronouns and Reference Words 3. Types of Sentences – Simple, Compound and complex Sentences – Identification and transformation. **Vocabulary:** 1. Describing Trends 2. Finance Vocabulary 3. Stocks and Shares 4. Collocation - sets and money **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 **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. **Lab Activities(Speaking) :** 1. Describing figures and trends 2. Discussing qualities needed in candidates for a job vacancy **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.	**CO-5** **BTL-4**

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
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