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

B. TECH. CIVIL ENGINEERING

(Duration: 4 Years)

CURRICULUM and SYLLABUS

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

DEPARTMENT OF CIVIL ENGINEERING

SCHOOL OF BUILDING SCIENCES

HINDUSTAN INSTITUTE OF TECHNOLOGY AND SCIENCE

HINDUSTAN INSTITUTE OF TECHNOLOGY & SCIENCE

Motto, Vision, Mission and Value Statement

Motto

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

Vision

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

Mission

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

VALUE STATEMENT

Integrity, Innovation, Internationalization

DEPARTMENT OF CIVIL ENGINEERING
VISION AND MISSION

VISION

To be a globally competent Premier Academic Centre for quality education and research in the diverse areas of Civil Engineering with social commitment.

MISSION

M1: To inculcate comprehensive principles to produce highly competent and technologically capable professional engineers, academicians and entrepreneurs.

M2: To impart quality education with strong emphasis on social commitment and sustainability, with ethical standards.

M3: To provide a scholastic environment for state-of the-art research.

M4: To conduct Knowledge transfer programs to enhance technical knowledge.

B. Tech. Civil Engineering

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PEO 1 : The graduates will become experts in Planning, Designing and executing any infrastructural Development project.

PEO 2 : The Graduates will be able to learn and adopt new technologies evolving in the field of Civil Engineering.

PEO 3 : The Graduates will become globally competent Civil Engineering Professionals

PROGRAMME OUTCOMES (PO's)

Engineering Graduates will be able to:

PO1: To apply the knowledge of Mathematics, Science and Engineering fundamentals to solve complex Civil Engineering Problems.

PO2: Graduate will attain the ability to identify, formulate, analyze and find suitable solutions for complex Engineering problems using basic principles of Science and Engineering.

PO3: Graduates will be able to design Civil Engineering system Components and Processes considering public health, safety and Environmental issues to meet the needs of the society.

PO4: Graduates will be able to conduct investigations of complex problems in Civil Engineering using Research based knowledge and Research.

PO5: Graduate will exhibit skills to use modern Engineering tools, software and equipment to analyze various problems in Civil Engineering Domain.

PO6: To practice as an efficient Civil Engineer to assess and manage the societal needs

PO7: Graduate will understand the impact of Engineering solutions based on the Sustainable Concepts.

PO8: Graduate will be aware of their Professional and ethical responsibilities to the society.

PO9: Graduate will be able to work individually or as a team member or leader in uniform and multidisciplinary settings.

P10: Graduate will be able to communicate effectively in both verbal and written forms.

PO11: Graduate will have an understanding of Engineering and Management Principles and apply this to one`s own work, as a member and a leader in a team, to manage projects.

PO12 Graduate will develop confidence for self-education and ability for lifelong learning.

PROGRAMME SPECIFIC OUTCOMES: (PSO's)

PSO1 : Apply mathematical and basic science knowledge to analyze, and interpret societal problems pertaining to civil engineering.

PSO2 Exhibit ability to design a system, component or a process in various domains of civil engineering such as structural, environmental and transportation engineering.

CURRICULUM 2022 FOR B. TECH CIVIL ENGINEERING (in line with NEP 2020)										
SEMESTER – I										
S NO	**COURSE CATEGORY**	**COURSE TYPE**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
1	BS	TP	EMA51001	Matrices and Calculus	3	0	2	4	2	3
2	BS	TP	EPH51001	Engineering Physics	3	0	2	4	2	3
3	PC	TP	ECS51001	Programming Fundamentals using C	3	0	2	4	1	3
4	HS	TP	ELS51002	Personality Development & Soft Skills	1	0	2	2	1	1
5	ES	TP	EME51002	Technical Graphics	2	0	2	3	1	2
6	ES	PR	ECE51400	FAB lab for Civil Engineers	0	1	2	2	2	0
7	HS	PR	EGE51400/ EGE51401/ EGE51402/ EGE51403/	Fine Arts (Drawing) / Fine Arts (Singing) / Fine Arts (Dance) / Fine Arts (Music) /	0	0	2	1	0	0
8	PC	PR	ECE51401	Design Thinking for Civil Engineer's	0	1	2	2	1	0
				Total	**12**	**2**	**16**	**22**	**10**	**30**
SEMESTER – II										
S NO	**COURSE CATEGORY**	**COURSE TYPE**		**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
1	BS	TP	EMA51002	Analytical Mathematics	3	0	2	4	2	5
2	BS	TP	ECT51001	Engineering Materials	3	0	2	4	2	5
3	PC	TH	ECE51001	Building Design & Technology	3	0	2	4	0	5
4	HS	TH	EGE51001	Universal Human Values	2	0	0	2	1	2
5	HS	TH	ELS51001	Communications Skills	2	0	2	3	1	4
6	ES	TP	ECE51402	Innovation Lab for Civil Engineers	0	1	2	2	2	3
7	HS	PR	EGE51404/ EGE51405	Outreach (NCC) / Outreach (NSS)	0	0	2	1	0	2
8	HS	PR	ELS51003/ ELS51004/ ELS51005	Regional Language (Tamil)/ Regional Language (Hindi)/ Regional Language (Telugu)	2	0	0	2	1	2
				Total	**15**	**1**	**12**	**22**	**9**	**28**

CURRICULUM 2022 FOR B. TECH CIVIL ENGINEERING (in line with NEP 2020)									
SEMESTER – III									
SL. NO	**COURSE CATEGORY**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
1	BS	EMA51003	Partial Differential Equation	3	1	0	4	2	4
2	PC	ECE51002	Mechanics of Structures	2	1	2	4	1	5
3	PC	ECE51003	Surveying and Planning	2	0	2	3	1	4
4	DE	ECE51***	Department Elective 1	3	0	0	3	0	3
5	NE	***	Non-Department Elective I	3	0	0	3	0	3
6	EEC	ECE51800	Design Project – 1	0	0	2	1	2	2
7	ES		Sustainable Engineering Systems	2	0	0	2	2	2
8	EEC	ECE51801	Internship -1	*	*	*	1	2	*
		Total		**15**	**2**	**6**	**21**	**10**	**23**
SEMESTER – IV									
SL. NO	**COURSE CATEGORY**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
1	BS	EMA51004	Probability & Statistics	3	1	0	4	2	4
2	PC	ECE51004	Geotechnical Engineering	2	1	2	4	2	5
3	PC	ECE51005	Environmental Engineering	2	0	2	3	2	4
4	DE	ECE51***	Department Elective II	3	0	0	3	0	3
5	NE	***	Non-Department Elective II	3	0	0	3	0	3
6	EEC	ECE51802	Design Project – 2	0	0	2	1	2	2
7	PC	ECE51006	Construction Management Industry Collaborated Course	2	0	2	3	2	4
8	ES	ECT51002	Environmental Science and Sustainable Development	3	0	0	3	2	3
		Total		**18**	**2**	**8**	**24**	**12**	**30**

CURRICULUM 2022 FOR B. TECH CIVIL ENGINEERING (in line with NEP 2020)									
SEMESTER – V									
SL. NO	**COURSE CATEGORY**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
1	PC	ECE51007	Structural Analysis	2	1	2	4	2	5
2	PC	ECE51008	Mechanics of Fluids	2	1	2	4	2	5
3	PC	ECE51009	IOT in Civil Engineering	2	0	2	3	2	4
4	DE	ECE51***	Department Elective III	3	0	0	3	0	3
5	NE	***	Non-Department Elective III	3	0	0	3	0	3
6	EEC	ECE51803	Design Project – 3	0	0	2	1	2	2
7	ES		Entrepreneurship	1	0	2	2	0	3
8	EEC	ECE51804	Internship -2	*	*	*	1	2	*
Total				**13**	**2**	**10**	**21**	**10**	**25**
SEMESTER – VI									
SL. NO	**COURSE CATEGORY**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
1	PC	ECE51010	Design of Concrete Structures	2	1	2	4	2	5
2	PC	ECE51011	Design of Steel Structures	2	0	2	3	2	4
3	PC	ECE51012	Transportation Engineering	2	0	2	3	2	4
4	DE	ECE51***	Department Elective V	3	0	0	3	0	3
5	NE	***	Non-Department Elective V	3	0	0	3	0	3
6	PC	ECE51013	Case Study / Field Study / Product study	2	0	2	3	2	4
7	EEC	ECE51805	Design Project – 4	0	0	2	1	2	2
8	HS		Skill Development and Career Planning	0	0	2	1	2	2
Total				**14**	**1**	**12**	**21**	**12**	**27**

CURRICULUM 2022 FOR B. TECH CIVIL ENGINEERING (in line with NEP 2020)									
SEMESTER – VII									
SL. NO	**COURSE CATEGORY**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
1	PC	ECE51014	Estimation and Quantity Surveying	2	1	2	4	2	5
2	PC	ECE51015	Structural Dynamics and Aseismic Design	2	0	2	3	2	4
3	PC	ECE51016	Foundation Engineering	2	0	2	3	2	4
4	DE	ECE51***	Department Elective V	3	0	0	3	0	3
5	NE	***	Non-Department Elective V	3	0	0	3	0	3
6	PC	ECE51017	Term Paper on Research Findings	2	0	2	3	2	4
7	ES		Research Methodology & IPR	0	0	2	1	2	2
8	EEC	ECE51806	Project Phase 1	0	0	2	1	2	2
Total				**16**	**2**	**10**	**23**	**12**	**28**
SEMESTER – VIII									
SL. NO	**COURSE CATEGORY**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
1	EEC	ECE51807	Project Work Phase - 2	0	0	22	11	4	22
Total				**0**	**0**	**22**	**11**	**4**	**22**
Total Credits for the Program							**165**		

LIST OF DEPARTMENT ELECTIVES OFFERED BY DEPARTMENT OF CIVIL ENGINEERING									
SEM	**COURSE CATEGORY**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
3	DE	ECE51500	Engineering Geology	3	0	0	3	0	3
3	DE	ECE51501	Irrigation Engineering	3	0	0	3	0	3
3	DE	ECE51502	Renewable Energy	3	0	0	3	0	3
3	DE	ECE51503	Housing Planning and Management	3	0	0	3	0	3
3	DE	ECE51504	Standards & Practices for sustainable habitat	3	0	0	3	0	3
4	DE	ECE51505	Applied Hydrology	3	0	0	3	0	3
4	DE	ECE51506	Remote Sensing Techniques and Applications	3	0	0	3	0	3
4	DE	ECE51507	Air Pollution Management	3	0	0	3	0	3
4	DE	ECE51508	Concrete Technology	3	0	0	3	0	3
4	DE	ECE51509	Water Resources Engineering	3	0	0	3	0	3
4	DE	ECE51510	Building Services	3	0	0	3	0	3
5	DE	ECE51511	Environmental Impact Assessment	3	0	0	3	0	3
5	DE	ECE51512	Geo Environmental Engineering	3	0	0	3	0	3
5	DE	ECE51513	Ground Improvement Techniques	3	0	0	3	0	3
5	DE	ECE51514	Earthquake Engineering	3	0	0	3	0	3
5	DE	ECE51515	Wind Engineering	3	0	0	3	0	3
5	DE	ECE51516	Industrial Waste Management	3	0	0	3	0	3
6	DE	ECE51517	Green and Smart Buildings	3	0	0	3	0	3
6	DE	ECE51518	Pre-stressed Concrete	3	0	0	3	0	3

6	DE	ECE51519	Design of Steel Concrete Composite Structures	3	0	0	3	0	3
6	DE	ECE51520	Repair and Rehabilitation of Structures	3	0	0	3	0	3
6	DE	ECE51521	Health and Safety Practices in Construction Industry	3	0	0	3	0	3
6	DE	ECE51522	Pavement Design and Engineering	3	0	0	3	0	3
6	DE	ECE51523	Construction safety Management	3	0	0	3	0	3
7	DE	ECE51524	Traffic Engineering and Management	3	0	0	3	0	3
7	DE	ECE51525	Municipal Solid Waste management	3	0	0	3	0	3
7	DE	ECE51526	Bridge Structures	3	0	0	3	0	3
7	DE	ECE51527	Storage Structures	3	0	0	3	0	3
7	DE	ECE51528	Tall Structures	3	0	0	3	0	3
7	DE	ECE51529	Industrial Structures	3	0	0	3	0	3
7	DE	ECE51530	Prefabricated Structures	3	0	0	3	0	3
7	DE	ECE51531	Basics of Dynamics and Aseismic Design	3	0	0	3	0	3
7	DE	ECE51532	Finite Element Analysis	3	0	0	3	0	3

LIST OF NON-DEPARTMENT ELECTIVES OFFERED BY THE DEPARTMENT OF CIVIL ENGINEERING									
SEM	**COURSE CATEGORY**	**COURSE CODE**	**NAME OF THE COURSE**	**L**	**T**	**P**	**C**	**S**	**TCH**
3	NE	ECE51700	Solid waste Management	3	0	0	3	0	3
4	NE	ECE51701	Air and Noise Pollution Control	3	0	0	3	0	3
5	NE	ECE51702	Sustainable Engineering Practices	3	0	0	3	0	3
5	NE	ECE51703	Environmental Impact Assessment for Engineering Projects	3	0	0	3	0	3
6	NE	ECE51704	Project Safety Management	3	0	0	3	0	3
6	NE	ECE51705	Introduction to Oceanography	3	0	0	3	0	3
7	NE	ECE51706	Intelligent Transportation systems.	3	0	0	3	0	3
7	NE	ECE51707	Introduction to Road Safety and Management.	3	0	0	3	0	3
7	NE	ECE51708	Standards and Practices in Civil Engineering.	3	0	0	3	0	3

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	PSO-1	PSO-2
CO-1	3	3	1	-	1	-	-	-	-	-	-	1	2	1
CO-2	3	3	1	-	1	-	-	-	-	-	-	1	1	2
CO-3	3	3	1	2	1	-	-	-	-	-	-	2	2	1
CO-4	3	3	2	1	1	-	-	-	-	-	-	2	1	2
CO-5	3	3	2	-	1	-	-	-	-	-	-	1	2	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 theorem- Diagonalization**	**CO-1** **BTL-3**
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	**CO-2** **BTL-3**

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**	
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 – $e^{ax}, cosax,$ $\sin ax$, $x^m, e^{ax}cosbx$, $e^{ax}sinbx$, Solutions of homogeneous differential equations 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 moduli 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	PSO 1	PSO 2
CO1	3	3	-	-	-	-	-	-	3	-	-	3	1	2
CO2	3	3	-	2	3	-	-	-	3	-	-	3	2	3
CO3	3	3	-	-	1	-	-	-	3	-	-	3	1	2
CO4	3	3	-	2	-	-	-	-	3	-	-	3	1	3
CO5	3	3	-	-	3	-	-	-	3	-	-	3	2	2

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	**CO1 BTL3**

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	
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
COURSECODE	ECSB5101	COURSE CATEGORY	PC	L-T-P-S	3-0-2-1
Version	1.0	Approval Details		LEARNING LEVEL	BTL-4

ASSESSMENT SCHEME

First Periodical Assessment (Theory + Practical)	Second Periodical Assessment (Theory + Practical)	Weekly assignment/ Observation/ lab records and viva - as approved bythe DEC	Surprise Test / Quiz, etc. - as approved by theDEC	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 andProblem-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 CProgramming.
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 solvethe 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.

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. **Practical Component:** 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. **Practical Component:** 1. Program to compute Factorial, Fibonacci series and sum of n numbers using recursion. 2. Program to compute sum and average of N Numbers stored in an array. 3.Program to sort the given n numbers stored in an array. 4.Program to search for the given element 5.Program to do word count 6.Program to insert a substring in count string 7.Program to concatenate and compare the two strings 8.Program using pre-processor statements	**CO-3** **BTL-4**
MODULE 4: POINTERS, STRUCTURES AND UNION	**(9L+6P)**
Pointers – Dynamic Memory allocation – Structure and Union – Files. **Practical Component:** 1. Program to compute sum of integers stored in a 1-D array using pointers and dynamic memoryallocation 2. Program to read and print records of a student/payroll database using structures 3. Program to simulate file copy 3. 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 CCompiler. 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		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	PS O1	PS O2
CO1	-	-	-	-	-	-	-	-	-	3	-	-	1	1
CO2	-	-	-	-	-	-	-	2	2	3	-	-	1	-
CO3	-	-	-	-	-	-	-	-	-	3	-	-	1	1
CO4	-	-	-	-	-	-	2	-	-	3	2	-	-	-
CO5	-	-	-	-	-	-	-	-	2	3	2	3	1	1

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 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	**CO-1 BTL-2**

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 (Aero, Auto, Civil, Bio-Tech, Mechanical)			CREDITS	3
COURSE CODE	EME51001	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 the mechanical design using computer aided design tools and fundamentals of free hand sketching. It prepares the students to learn the basic concepts involved in technical drawing and computer graphics. It also emphasis on the principles of projections and visualization of part drawing.
Course Objective	1. To demonstrate the concepts of Engineering graphics and projection of straight lines using CAD software 2. To visualize the solids in various orientations and to draw its projections 3. To comprehend the concepts of isometric projections 4. To draw the development of solid surfaces and to generate associated views of civil drawings. 5. To visualize and draw views of the object by free hand sketch and to transform 3D models to 2D drawings using CAD tools
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. Apply the acquired knowledge to solve simple problems of regular solids. 3. Create solid objects in isometric view using CAD software 4. Develop the simple solids and to sketch the plan and elevation of the building drawings. 5. Visualize the objects and to draw by free hand sketching.

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

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

MODULE 1: BASICS OF ENGINEERING GRAPHICS (6L + 6P =12)

Relevance of Graphics in Industry - BIS conventions and specifications - drawing sheet sizes - Lettering – Dimensioning - Scales. Drafting methods - Introduction to Computer Aided Drafting –Exposure to Solid Modelling software – Printer and Plotter – 3D printer. Introduction to Orthographic projections - Naming views as per BIS - First angle projection method. Projection of points and projection of Straight lines. ***Suggested Reading:*** *Solid modelling Software commands*	**CO-1 BTL-2**

MODULE 2: PROJECTION OF SOLIDS =12)	**(6L + 6P**
Projections of solids. Solids in simple positions and axis inclined to one plane only. Section of solids. Section planes inclined to Horizontal Plane only. True shape of the section. (Manual and CAD Drawing) ***Suggested Reading:*** *Solids inclined to both the planes. Section of solids with sectional planes inclined to VP.*	**CO-2** **BTL-2**
MODULE 3: ISOMETRIC PROJECTION =12)	**(6L + 6P**
Concepts of isometric projection. Isometric scale, Isometric view of simple solids with sectional planes. (Manual and CAD Drawing) ***Suggested Reading:*** Isometric view of solids with multiple sectional planes.	**CO-3** **BTL-3**
MODULE 4: DEVELOPMENT OF SURFACES AND CIVIL DRAWING =12)	**(6L + 6P**
Development of Surfaces of simple solids with simple sectional planes. Parallel line method and Radial line method only. (Manual and CAD Drawing) Civil Drawing: PLAN and ELEVATION of Simple residential building. (Manual and CAD Drawing) ***Suggested Reading:*** *D*evelopment *of S*phere, *Sectional elevation of building drawing*	**CO-4** **BTL-2**
MODULE 5: FREE HAND SKETCHING =12)	**(6L + 6P**
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:*** *Orthographic views to pictorial views*	**CO-5** **BTL-3**
TEXT BOOKS	
1.	Jeyapoovan, T., Engineering Graphics and Design, Vikas Publishing House Pvt Ltd., New Delhi, 8th Edition, 2022.
2.	P. Kannaiah, K. L. Narayana, K. Venkata Reddy, A Textbook on Engineering Drawing, BS Pub, 2016.
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, 2019.
3.	Kirstie Plantenberg, Engineering Graphics Essentials, SDC Publications., fifth Edition, 2016.
E - Books	
1.	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 CIVIL ENGINEERS			CREDITS	2
COURSE CODE	ECE51400	COURSE CATEGORY	BS	L-T-P-S	0-1-2-2
Version	1.0	Approval Details		LEARNING LEVEL	BTL- 4

ASSESSMENT SCHEME

CIA					ESE
First Periodical Assessment	Second Periodical Assessment	Weekly Assignment /Observation/Lab Records & viva	Surprise test / Quiz	Attendance	End Semester Examination
15%	15%	10%	5%	5%	50

Course Description	To provide students with a comprehensive understanding of the product development and fabrication process, the Fab Lab aims to promote 'Do It Yourself' (DIY) concept through various manufacturing/ prototyping methods
Course Objective	1. To understand the basic concepts of plumbing and fabrication. 2. To use the tools for carpentry works. 3. To prepare the reinforcement cage for structural elements. 4. To construct a brick masonry wall. 5. To Familiarize with 3D Printing.
Course Outcome	Students will be able to - 1. Apply various fabrication techniques used in plumbing works. 2. Apply various fabrication techniques used in carpentry works. 3. Apply various fabrication techniques used in brick masonry in the construction field. 4. Apply different fabrication methods utilised in bar bending for building projects. 5. Learn the basics of designing objects with CAD software and ways to turn the digital designs with 3D printing.

Prerequisites: N/A

	CO, PO AND PSO MAPPING														
	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	-	2	-
CO-2	3	2	2	1	-	-	-	-	2	-	-	1	-	2	-
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	-

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: Develop Plumbing line models	**(3L+6P)**
Plumbing- Basic Pipe Connection using valves, couplings and elbows **Practical Component** · Fabricate Plumbing line model from source to distribution end.	**CO-1** **BTL-4**
MODULE 2: Develop Carpentry models	**(3L+6P)**
Carpentry – Sowing, Planning, and making common Joints. **Practical Component** · Fabricate a furniture using any carpentry joints (Chair/Table/any furniture)	**CO-2** **BTL-3**
MODULE 3: Develop Bar Bending Models for structural element	**(3L+6P)**
Bar Bending schedule of horizontal and vertical structural elements as per codal provision. **Practical Component** · Fabricate any one bar bending models for any structural element	**CO-3, CO-4** **BTL-3**
MODULE 4: Construction of masonry wall	**(3L+6P)**
Construction of a Masonry wall without mortar using various bonds. **Practical Component** · Construct a Masonry brick wall using any masonry Bond	**CO-3, CO-4** **BTL-3**
MODULE 5: 3D PRINTING	**(3L+6P)**
Overview of– CAD Models – Prototyping - 3 D Printing **Practical Component** · Generating simple 3D models in CAD and 3D printing	**CO-5** **BTL-3**

TEXTBOOKS	
1	Jeyapoovan T and Saravanapandian M., *Engineering practices lab manual*, 4th Edition, Vikas publishing House, New Delhi, 2015.
2	Ibrahim Zeid., *CAD/CAM Theory and Practice*, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2019.

REFERENCE BOOKS	
1.	P. Dayaratnam and P Sarah, "*Brick and Reinforced Brick Structures"*, 2nd Edition, MedTech Publisher, ISBN: 9386479796, 2017.
2.	M. Gambhir and Neha Jamwal, "*Building Materials Products, Properties and Systems"*, 1st Edition, McGraw Hill Education, ISBN: 007107760X, 2017.

EBOOK	
1.	https://www.nios.ac.in/media/documents/sec229new/Lesson1.pdf

MOOC	
1.	https://ocw.mit.edu/courses/3-003-principles-of-engineering-practice-spring-2010/
2.	http://eerc01-iiith.vlabs.ac.in/
3.	https://www.aaaenggcoll.ac.in/engineering-practices-lab/

COURSE TITLE	DESIGN THINKING FOR CIVIL ENIGINEERS			CREDITS	2
COURSE CODE	ECE51401	COURSE CATEGORY	PC	L-T-P-S	0-1-2-1
Version	1.0	Approval Details		Learning Level	BTL 3

ASSESSMENT SCHEME

CIA					ESE
First Periodical Assessment	Second Periodical Assessment	Weekly Assignment /Observation/Lab Records & viva	Surprise test / Quiz	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 understand the steps in design thinking process. 2. To study the various 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	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. Describe the concept and need 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

MODULE 1: INTRODUCTION TO DESIGN THINKING	**(3L+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. **Suggested Readings: Change by Design by Tim Brown**	**CO-1** **BTL-2**
MODULE 2-PROCESSES IN DESIGN THINKING	**(3L+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 **Suggested Readings:** https://www.interaction-design.org/literature/article/5-stages-in-the-design-thinking-process	**CO-2** **BTL-2**
MODULE 3 – PROTOTYPING	**(3L+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. **Suggested Readings:** https://www.interaction-design.org/literature/article/design-thinking-get-started-with-prototyping	**CO-3** **BTL-3**
MODULE 4- QUALITY ASPECTS IN DESIGN	**(3L+6P)**
Design for "X"; covering quality, reliability, safety, Development, assembly, maintenance, logistics, handling; disassembly; recycling; re-engineering etc.	**CO-4** **BTL-2**

Project: Example: List out the design methods for IoT based structure **Suggested Readings: https://asq.org/blog/2017/09/design-thinking-and-quality/**	
MODULE 5 – INTELLECTUAL PROPERTY RIGHTS	**(3L+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 publicher, 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
CO-1	3	3	2	-	1	-	-	-	-	-	-	1	2	1
CO-2	3	2	1	-	2	-	-	-	-	-	-	1	1	1
CO-3	3	2	1	2	1	-	-	-	-	-	-	1	2	2
CO-4	3	3	2	1	1	-	-	-	-	-	-	2	1	1
CO-5	3	3	2	-	1	-	-	-	-	-	-	2	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 semi-circular contours (excluding poles on boundaries) Suggested Reading: Types of integration **Lab: Evaluation of integrals using Cauchy's Integral formula and Cauchy's residue theorem.**	**CO-3** **BTL-3**
MODULE 4: LAPLACE TRANSFORMS	**(9L+6P)**
Laplace transform – Conditions of existence – Transform of elementary functions – properties – Transforms of derivatives – Initial and final value theorems – Transform of periodic functions. Inverse Laplace transforms using partial fraction and convolution theorem. Solution of linear ODE of second order with constant coefficients. Suggested Reading: Basics of Transform **Lab: Solutions of differential equations using Laplace transform**	**CO-4** **BTL-3**
MODULE 5: FOURIER SERIES	**(9L+6P)**
Dirichlet's Conditions – General Fourier Series – Odd and even functions – Half range sine and cosine series –Harmonic Analysis. Suggested Reading: Basics of series **Lab: Finding Fourier Series**	**CO-5** **BTL-3**

TEXT BOOKS

1.	A. Chandrasekaran, G. Kavitha (2022), *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.	http://ggn.dronacharya.info/APSDept/Downloads/QuestionBank/Mathematics-I/SectionD.pdf.
2.	https://people.math.sc.edu/girardi/m7034/book/AshComplexVariablesWithHyperlinks.pdf
3.	https://ocw.mit.edu/courses/18-03sc-differential-equations-fall-2011/pages/unit-iii-fourier-series-and-laplace-transform/
4.	https://www.pdfdrive.com/calculus-ii-sequences-and-series-e11676778.html
MOOC	
1.	https://www.edx.org/course/introduction-engineering-mathematics-utarlingtonx-engr3-0x

COURSE TITLE	ENGINEERING MATERIALS (Common to ALL B.Tech.)			CREDITS	4
COURSE CODE	ECT51001	COURSE CATEGORY	BS	L-T-P-S	3-0-2-2
Version	1.0	Approval Details		LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment (Theory)	Second Periodical Assessment (Theory)	Practical Assessments	Observation / lab records as approved by the Department Examination Committee "DEC"	Attendance	ESE
15%	15%	10%	5%	5%	Theory 25% Practical 25%

Course Description	To expose the students to the basics of Engineering Materials and their applications**.**
Course Objective	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
CO-1	3	2	1	-	-	-	1	-	-	-	-	1	1	2
CO-2	3	2	1	-	-	-	2	-	-	-	-	2	2	2
CO-3	3	2	1	-	-	-	2	-	-	-	-	2	1	1
CO-4	3	2	1	-	-	-	2	-	-	-	-	2	2	2
CO-5	3	2	1	-	-	-	2	-	-	-	-	2	2	1

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

MODULE 1: CRYSTAL STRUCTURE AND PHASE RULE (9L + 6P)

Basic crystal systems – Types, characteristics, examples – Space lattice, Unit cell – types – 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 crystalline behaviour - Applications. Conducting Polymers: Classification, Intrinsic Conducting Polymers, Extrinsic Conducting Polymers, Applications. Practical component: Preparation of polyaniline / Polypyrrole.	**CO-5** **BTL-3**

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	BUILDING DESIGN & TECHNOLOGY			CREDITS	4
COURSE CODE	ECE51001	COURSE CATEGORY	PC	L-T-P-S	3-0-2-0
Version	-	Approval Details	-	LEARNING LEVEL	BTL-3

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Practical Assessments	Observation / Lab Records	Attendance	ESE (Theory 25% + Practical 25%)
15%	15%	10%	5%	5%	50%

Course Description	This course describes the technical evaluation of building design alternatives, building detailing and selection of materials will be taught with respect to: Practical building physics, building technology, life-cycle-assessment, future low energy concepts along with drafting of structures.
Course Objective	1. To impart knowledge on various components of buildings. 2. To know about the materials used in the construction industry. 3. To familiarize the materials used for acoustics and damp proofing 4. To give exposure to prepare plan and elevation of buildings. 5. To make aware of the approval drawings for buildings.
Course Outcome	Students will be able to 1. Describe the various components of buildings. 2. Describe the materials used in concrete and reinforcement used in the construction industry. 3. Explain damp proofing, thermal insulation and acoustic materials. 4. Develop plan and sectional elevation for simple buildings. 5. Prepare the approval drawing for buildings.

Prerequisites: Physics, Mathematics

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

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

MODULE 1 – BUILDING COMPONENTS	**(9L)**
Introduction to basic structural system- load bearing and framed structures. Building components - substructure and super structure - Foundation, plinth Damp Proof Course, Floor, wall, column, beam- Stair cases	**CO-1 BTL-3**
MODULE 2 – BUILDING MATERIALS	**(9L)**
Cement- Types of cement produced in India, Grades of cement, Fine aggregates cement Mortar-. Preparation of cement mortar, Plastering guidelines requirements of mortar and plaster for various works. Ingredients of plain cement concrete – Water cement ratio, Specification for concrete- Various Concrete - Types of steel reinforcement – MS bars, TMT bars, Torsion steel bars- Stress-Strain behaviour. Standard sizes of reinforcement bars.	**CO-2 BTL-3**
MODULE 3: MODERN CONSTRUCTION MATERIALS	**(9L + 12P)**
Damp proofing materials- Application under various situations- basement floors, swimming pool, terraces, etc. Thermal insulation- materials. Acoustic insulation materials- applications - Floor and wall coverings- Protective and decorative coatings. Self-study- Market study of current developments.	**CO-3 BTL-3**
MODULE 4 - DEVELOPMENT OF PLAN SECTION AND ELEVATION	**(9L + 9P))**
NBC guidelines- Types of lines and their application. Principles of Dimensioning. Conventional signs- Materials in section. Development of plan, section and elevation- Single storey /multi storey building- Industrial building with steel truss.	**CO-4 BTL-3**
MODULE 5: PLANNING AND DRAFTING OF BUILDING COMPONENTS	**(9L + 9P)**
Drafting of single storey /multi storey building- Industrial building with steel truss- Preparation of Approval drawings.	**CO-5 BTL-3**
Self-study Topic: *Impulse and Momentum*	

TEXT BOOKS

1	P.C.Verghese, *"Building Materials* "2nd Edition, Prentice Hall India, ISBN- 9788120328488, 2019
2	D N Ghose, "*Civil Engineering Drawing and design*", 2nd Edition, CBS Publishers, ISBN 9788123918099, 2017.
3	B. C. Punmia, *"Building Construction"* 11th Edition, ISBN – 9788131804285, Laxmi Publications, 2017.

REFERENCE BOOKS

1	Edward Allen, Joseph Iano, "Fundamentals of Building Construction: Materials and Methods", 7th Edition, ISBN: 978-1-119-45025-2, 2019.
2	David Doran, Bob Cather, "Construction Materials Reference Book Hardcover" Routledge publisher, 2013

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 is provided as guidelines from AICTE.
Course Objective	1. To create awareness to students on 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
CO-1	-	-	-	-	3	3	3	3	3	3	3	3	-	-
CO-2	-	-	-	-	3	3	3	3	3	3	3	3	-	-
CO-3	-	-	-	-	-	3	3	3	3	3	3	3	-	-
CO-4	2	-	-	-	-	3	3	3	3	3	3	3	-	-
CO-5	-	-	-	-	-	3	3	3	3	3	3	3	-	-

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

MODULE 1: Introduction (6L)

Need, Basic Guidelines, Content and Process for Value Education Purpose and motivation for the course, recapitulation from Universal Human Values-I Self-Exploration–what is it? - Its content and process; 'Natural Acceptance' and experiential Validation- as the process for self-exploration - Continuous Happiness and Prosperity- A look at basic Human Aspirations Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario - Method to fulfil the above human aspirations: understanding and living in harmony at various levels. **Practical component:**	**CO-1 BTL-2**

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	
MODULE 2: Understanding Harmony in the Human Being	**(6L)**
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	**(6L)**
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	**(6L)**
Whole existence as Coexistence - Understanding the harmony in the Nature -Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self-regulation in nature - Understanding Existence as Co-existence of mutually interacting units in all-pervasive space -Holistic perception of harmony at all levels of existence. **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	**(6L)**
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	**ELS5100 3**	**COURSE CATEGORY**	**HS**	**L - T – P – S**	**2 – 0 – 0 – 1**
Version	**1.0**	**Approval Details**		**LEARNING LEVEL**	**BTL- 3**

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz etc., as approved by the Department Examination Committee "DEC"	Attendance	End Semester Examination ESE
15%	15%	10%	5%	5%	50%

Course Description	This Tamil course improves Tamil language skills of the students' Tamil letters and Grammar are included. This course provides an opportunity not only to get interest in learning Tamil Language but also, they can learn to converse easily.
Course Objective	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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO2	-	-	-	-	-	-	-	2	2	3	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO4	-	-	-	-	-	-	2	-	-	3	2	-	-	-
CO5	-	-	-	-	-	-	-	-	2	3	2	3	-	-

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

அலகு - 1 தமிழ் எழுத்துக்கள்	**(6 L)**
தமிழ் எழுத்துகள் - ஓசைகள் - எண்கள் - வண்ணங்கள் - வடிவங்கள் - ஓர் எழுத்துச் சொற்கள் - பழங்கள் மற்றும் காய்கறிகள் - மலர்கள் - இயற்கை - மாதங்கள் சொற்கள் - பெயர்சொற்கள் - உரிச்சொற்கள் - வினைச்சொற்கள் - காலங்கள் - வாழ்த்துகள். **வகுப்பறை செயல்முறைகள் : 1. வார்த்தைகளை வட்டமிடுதல்.** **2. விடுபட்ட எழுத்துகளை நிரப்புக. 3. வடிவங்களுக்கு வண்ணம் தீட்டுக.**	CO-1 BTL-2
அலகு - 2 கேட்டல் மற்றும் உச்சரித்தல்	**(6L)**
உயிரெழுத்துகள், மெய்யெழுத்துகள் மற்றும் உயிர்மெய் எழுத்துகளை உச்சரித்தல் - சிறுகதைகள் வாசித்தல் - எதிர்ச்சொற்கள் - பொருள்தருக - வாக்கியத்தில் அமைத்து எழுதுதல் - ஒரு சொல்லில் விடையளித்தல்.	CO-2 BTL-2

வகுப்பறை செயல்முறைகள் : 1. சொற்களைக் கேட்டு உச்சரிக்க செய்தல். 2. குழுவிவாதம் செய்தல். 3. கோடிட்ட இடங்களைச் சரியான சொற்களைக் கூறுதல்.	
அலகு -3 எழுத்துப் பயிற்சி	**(6 L)**
தமிழ் எழுத்துகளை எழுத கற்பித்தல் - உயிர் எழுத்துகள் - மெய் எழுத்துகள் - உயிர்மெய் எழுத்துகள் - ஆயுத எழுத்து - சார்பெழுத்துகள் - ஒற்றெழுத்துகள் - ஒரு சொல் - இருசொல் எழுதுதல் - ஒருவரி, இருவரி எழுதுதல். வகுப்பறை செயல்முறைகள்: 1. கோடிட்ட இடங்களை நிரப்புக. 2. சரியான எழுத்துகளை வட்டமிடுதல். 3. ஒருவரி சொற்களை எழுதுதல்.	CO-3 BTL-3
அலகு - 4 உரையாடல்கள் கற்பித்தல்	**(6L)**
சிறு உரையாடல்கள் கற்பித்தல் - வாழ்த்துக்கள் - வங்கியில் பணம் செலுத்துதல் - சந்தையில் கடைகாரரிடம் உரையாடுதல், பொது இடங்களில் உரையாடுதல். வகுப்பறை செயல்முறைகள்: 1. குறு நாடகங்கள் நடித்து உரையாடல்கள் கற்பித்தல். 2. விண்ணப்ப படிவங்கள் பூர்த்தி செய்தல். 3. மின்னல் அட்டைகள் காண்பித்தல்.	CO-4 BTL-2
அலகு - 5 தமிழ் வாசிக்க மற்றும் எழுத கற்பித்தல்	**(6 L)**
கடிதங்கள் வாசித்தல் மற்றும் எழுதுதல் - விண்ணப்ப கடிதம், வங்கிகணக்கு படிவங்கள், இரயில் முன்பதிவு விண்ணப்ப படிவம் பூர்த்திசெய்தல் - கவிதை வாசித்தல் - செய்திதாள் வாசித்தல். வகுப்பறை செயல் முறைகள்: 1. விண்ணப்ப படிவங்கள் பூர்த்திசெய்தல். 2. கவிதை வாசித்தல் போட்டிகள் 3. வகுப்பறை தேர்வுகள்	CO-5 BTL-3

TEXT BOOK	
1.	Saidhai. P.Sundaramurthy (2018). Learn Tamil Through english. Manimekalai Prasuram. Chennai - 17. Pages 1 to 84
2.	Pulavar Kulanthai (2020). Students Basic Tamil. Manimekalai Prasuram. Chennai -17. Pages1 to 84
REFERENCE BOOKS	
1.	Lena tamil vanan. (2017). Easy Tamil Grammar. Manimekalai Prasuram, Chennai -17, Pages 11 to 21
2.	Tamilnadu Board - NCERT/CBSE-Books Class – 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**	**APROVAL DETAILS**	**35th ACM 6th Aug. 2022**		**BTL LEVEL**	**3**

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Seminar/ Assignments/ Project	Surprise Test / Quiz etc., as approved by the Department Examination Committee "DEC"etc.,	Attendance	End Semester Examination ESE
15%	15%	10%	5%	5%	50%

Course Description	This course has been designed to develop the regional language skills of the students. The course includes Hindi language, literature, vocabulary and grammar. This course teaches students how to communicate accurately, appropriately and fluently in regional language.
Course Objective	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	
CO1	-	-	-	-	-	-	-	-	-	3	-	-	-	-	
CO2	-	-	-	-	-	-	-	2	2	3	-	-	-	-	
CO3	-	-	-	-	-	-	-	-	-	3	-	-	-	-	
CO4	-	-	-	-	-	-	2	-	-	3	2	-	-	-	
CO5	-	-	-	-	-	-	-	-	2	2	-	2	-	-	

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

मॉड्यूल 1: **हिंदी पत्र और लिपि** (6 L)	
हिंदी स्वर और व्यंजन अक्षर - आश्रित स्वर सीखें - व्यंजन और व्यंजन समूह - अनुस्वर व्यंजन - संज्ञा - सर्वनाम - क्रिया (भविष्य) - संभावित विशेषण - काल - हिंदी के त्वरित नियम - अभिवादन - 2 अक्षर शब्द बनाना, 3 अक्षर शब्द - हर दिन शब्दावली - संख्याएं - रंग - परिवार - वस्त्र - बगीचा - घर - फल और सब्जियां - प्रकृति **सुझाई गई गतिविधियां:** देशी वक्ताओं द्वारा स्वर और व्यंजन का उच्चारण सुनना स्वर और व्यंजन के वीडियो, 2 अक्षर और 3 अक्षर के शब्द, और प्रतिदिन प्रयोगार्थ शब्दावली	CO-1 BTL-2
मॉड्यूल 2: सुनने का कौशल (6 L)	
स्वर और व्यंजन का उच्चारण सुनना - लघु कथाएँ सुनना - साक्षात्कार - भाषण - सामाजिक मुद्दों पर पॉड वार्ता - निर्धारित पाठों को सुनना: इकाई 1 सभ्यता का रहस्य, इकाई 2 - युवावों से - वार्तालापों को सुनना - जानकारी सुनना - सम्मेलनों के भाषण **सुझाई गई गतिविधियां**: सुनें और चुनें उम्मीदवार पाठ को सुनते हैं और तीन विकल्पों के साथ बहुविकल्पीय प्रश्न का उत्तर देते हैं। उम्मीदवार टीवी चैनलों में बातचीत - साक्षात्कार- अतिथि व्याख्यान, सम्मेलनों और कार्यशालाओं के दौरान विशेषज्ञों के भाषण सुनते हैं	CO-2 BTL-3
मॉड्यूल 3: बोलने का कौशल (6 L)	
औपचारिक संवाद - अनौपचारिक संवाद - लिंग रूपों के साथ बोलना - संख्या - काल - परिवार, शहर, त्योहारों, शौक आदि जैसे सामान्य विषयों पर बोलना - पसंद और नापसंद व्यक्त करना - ज़रूरतें और संपत्ति - भूमिका निभाना। **सुझाई गई गतिविधियां:** प्रस्तुति – कार्यक्रमों का संचालन - भाषण देना	CO-3 BTL-3
मॉड्यूल- 4 : **पढ़ने का कौशल** (6 L)	
नमूना पढ़ना - नकल पढ़ना - अक्षरों और शब्दों का सही उच्चारण करना - पढ़ने में प्रवाह - कहानियाँ पढ़ना- संपादकीय, समाचारपत्र के लेख पढ़ना। **सुझाई गई गतिविधियां** फ्लैशकार्ड का उपयोग - चार्ट - चित्रों की पहचान करना - शब्दों को पढ़ना	CO-4 BTL-3

मॉड्यूल-5 लेखन कौशल (6 L)	
सामान्य पत्राचार - पत्र लेखन: छुट्टी लेने पत्र, बैंक खाता खोलना, पुस्तकें मंगवाने के लिए पत्र, शिकायत पत्र - संकेत विकास - ज्ञापन - नोटिस **सुझाई गई गतिविधियां:** निर्धारित 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)
संदर्भ पुस्तकें	
1.	Prathamatic Patya Pushthak. (2022), Dakshina Bharath Hindi Prachar Sabha, Chennai. (Pages 168)
2.	Madhyama Patya Pushthak. (2022) Dakshina Bharath Hindi prachar Sabha, Chennai (Pages 184)
ई-संदर्भ	
1.	https://www.hindipod101.com/

COURSE TITLE	**REGIONAL LANGUAGE -TELUGU**		**CREDITS**	**2**
COURSE CODE	**ELS51005**	**COURSE CATEGORY**	**HS**	**L - T – P – S** **2 – 0 – 0 – 1**
Version **1.0**	**Approval Details**		**BTL LEVEL**	**3**

ASSESSMENT SCHEME

First Periodical Assessment	**Second Periodical Assessment**	**Seminar/ Assignments / Project**	**Surprise Test / Quiz etc., as approved by the Department Examination Committee "DEC"etc.,**	**Attendance**	**ESE**
15%	**15%**	**10%**	**5%**	**5%**	**50%**

Course Description	This course has been designed to meet students' current and future language and communication needs. It attempts to develop their proficiency in the four language skills and knowledge of grammar and vocabulary. This course teaches students how to communicate accurately, appropriately and fluently in professional and social situations.
Course Objectives	1. This course is aimed to teach the basic Telugu language speaking skills. 2. It will introduce basic skills of the Telugu Language: its alphabets, essential words and simple sentence construction methods. 3. The course intends to facilitate students in acquiring foundational skills of reading, writing and speaking Telugu along with synonyms to expand vocabulary.
Course Outcome	Upon completion of this course, the students will be able to 1. Demonstrate the basic skills of Letters and sounds in Telugu. 2. Develop the basic vocabulary for every day's conversation. 3. Construct simple Telugu sentences with the simple words. 4. Utilize the words that have conjunct character, and can learn functional, everyday conversation**.** 5. Construct Simple sentences for delivering appropriate meaning.

Prerequisites: Plus Two Telugu-Intermediate Level

CO, PO AND PSO MAPPING

CO	**PO 1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
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, చెప్పడం మరియు రాయడం (6L)	
తెలుగు అచ్చులు & హల్లులు శబ్దాలు ధ్వనిచిత్రంతో పాటు తెలుగు హల్లుల సంయోగాల పరిచయం	**CO-1** **BTL-2**

సూచించబడిన : కార్య కలాపాలు చర్చలు : 5 గంటలు . అసైన్‌మెంట్లు / ప్రెజెంటేషన్ - 5 గంటలు	
భాగము 2 : పేర్ల పదాలకు, సంఖ్యలకు, మరియు వాటి గుణాల పరిచయం (6L)	
తెలుగు నామవాచకం పరిచయం తెలుగు సర్వనామం & దాని విషయం సంఖ్యలు దాని పరిచయం & తెలుగు విశేషణాలు పరిచయం సూచించబడిన : కార్య కలాపాలు చర్చలు : 5 గంటలు . అసైన్‌మెంట్లు / ప్రెజెంటేషన్ - 5 గంటలు	**CO-2** **BTL-3**
భాగము 3 : పదాలను విడదీసి వాక్యాలను రాయడం (6L)	
తెలుగు పూర్వ పదాలు – సంయోగాలు మరియు దాని ఉపయోగం సూచించబడిన : కార్య కలాపాలు చర్చలు : 5 గంటలు . అసైన్‌మెంట్లు / ప్రెజెంటేషన్ - 5 గంటలు	**CO-3** **BTL-3**
భాగము 4 : పనులు, సమయం, క్రియ మరియు కాల వ్యవధుల పరిచయం (6L)	
వివిధ క్రియల యొక్క క్రియ & సమయం / కాల సంయోగాలనికి పరిచయం సూచించబడిన : కార్య కలాపాలు చర్చలు : 5 గంటలు . అసైన్‌మెంట్లు / ప్రెజెంటేషన్ - 5 గంటలు	**CO-4** **BTL-3**
భాగము 5 : తెలుగు చదవడం, రాయడం మరియు ప్రశ్నించడం (6L)	
తెలుగులో సరళమైన వాక్యాలను రూపొందించడం (ప్రాథమిక వాక్య నిర్మాణ నియామాలు) తెలుగులో ప్రతీకూల వాక్యాలును రూపొందించడం తెలుగు బోధన అభ్యాస ప్రక్రియలో ప్రశ్నార్థకవాక్యాలువాక్యాలను రూపొందించడం సూచించబడిన : కార్య కలాపాలు చర్చలు : 5 గంటలు . అసైన్‌మెంట్లు / ప్రెజెంటేషన్ - 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	COMMUNICATION SKILLS		CREDITS	3
COURSE CODE	ELS51001	COURSE CATEGORY	HS	L - T – P – S	2 – 0 – 2 – 1
Version	1.0	Approval Details		LEARNING LEVEL	BTL 4

ASSESSMENT SCHEME

First Periodical Assessment	Second Periodical Assessment	Weekly assignment/ lab record and viva as approved by the Department Examination Committee "DEC"	Surprise Test / Quiz., as approved by the Department Examination Committee "DEC"	Attendance	End Semester Examination (ESE) Theory + Practical
15 %	15%	10 %	5 %	5 %	50%

Course Description	The course has been designed to improve the communication competency of the students. The course builds on students' English language skills by engaging them in listening, speaking and grammar learning activities (LSRW) that are relevant to authentic contexts. This course trains the students how to communicate accurately, appropriately and fluently in professional and social situations. The course is framed so that the students can appear for Cambridge B1 Preliminary exams and also enable them to get a certification.
Course Objective	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	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
CO1	-	-	-	-	-	-	-	-	-	3	-	2	1	1
CO2	-	-	-	-	-	-	-	-	-	3	-	2	1	2
CO3	-	-	-	-	-	-	-	2	-	3	-	2	-	1
CO4	-	-	-	-	-	-	-	2	2	3	2	2	1	-
CO5	-	-	-	-	-	-	-	-	-	3	3	2	-	1

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	**CO-1 BTL-2**

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.	
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. **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.	**CO-2** **BTL-3**
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	**CO-4** **BTL-3**

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.	
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 300)
2.	Redman, Stuart (2020). English Vocabulary In Use: Pre - Intermediate And Intermediate. Cambridge University Press. India (Pages 264)
3.	Bikram K. Das. et al., (2019) An Introduction to Professional English and Soft Skills with audio CD, Cambridge University Press. India (Pages 272)
4.	John, Dolly., (2018), English for Life and the Workplace Through LSRW&T Skills, Pearson Publications, India (Pages 263)
E BOOKS	
1.	https://www.cambridge.org/gb/files/9116/4138/4615/A1_Student_Book.pdf
2.	https://www.cambridge.org/gb/files/1416/4138/4681/A1_Workbook.pdf
3.	https://www.cambridge.org/gb/files/7216/4138/1999/A2_Student_Book.pdf
4.	https://www.cambridge.org/gb/files/6816/4138/2072/A2_Workbook.pdf
MOOC	
1.	https://www.edx.org/professional-certificate/tsinghuax-english-communication-skills
2.	https://www.britishcouncil.org.tr/en/english/mooc/english-for-the-workplace

COURSE TITLE	INNOVATION LAB FOR CIVIL ENGINEERS			CREDITS	2
COURSE CODE	ECE51402	COURSE CATEGORY	BS	L-T-P-S	0-1-2-2
Version	1.0	Approval Details		LEARNING LEVEL	BTL-4

ASSESSMENT SCHEME

CIA					ESE
First Periodical Assessment	Second Periodical Assessment	Weekly Assignment /Observation/Lab Records & viva	Surprise test / Quiz	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 civil engineering 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	Students will be able to 1. Identify the innovative areas in the Civil Engineering Domain 2. Identify the innovative areas in planning & scheduling of construction projects 3. Identify the innovative areas using IoT in Civil Engineering 4. Carry out the design process of BIM. 5. Create project documentation.

Prerequisites: N/A

CO, PO AND PSO MAPPING

	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: PROBLEM STATEMENT	**(3L+6P)**
Select actual circumstance involving socioeconomic difficulties or business-related issues. Write down the problem statement and brainstorm because it is necessary to solve the challenge in order to explore variables that encourage creativity and innovation.	**CO-1** **BTL-4**
MODULE 2: PLANNING AND SCHEDULING	**(3L+6P)**
List the innovative thrust findings of the project after analysing the problem description. List the project's benefits and drawbacks according to current standards.	**CO-2** **BTL-3**

Identify functional and non-functional requirements by doing a requirement analysis. PERT charts can be used to analyse the project's schedule and resource availability.	
MODULE 3: PROJECT DESGIN	**(3L+6P)**
The problem's implementation domain should be determined. Utilize any design software pertinent to the project's selected domain to create the project.	**CO-3, CO-4 BTL-3**
MODULE 4: TESTING	**(3L+6P)**
Implement the project and make it operational to handle actual situations while utilising a beautiful User Interface Design. Unit and integration testing are used to evaluate the design.	**CO-3, CO-4 BTL-3**
MODULE 5: DOCUMENTATION	**(3L+6P)**
Create project documentation. Provide instructions on how to install the project executable and run the project. Perform system and usability testing. The test cases should be documented. Present the project and turn it into a journal, conference paper, or patent.	**CO-5 BTL-3**

Sample domains for Project

1. Sustainable Materials
2. Automation in Civil Engineering
3. Application of IoT in Civil Engineering
4. BIM
5. Intelligent Transportation System
6. Smart Cities
7. Sustainable waste management

But not limited to the above domains, and can include any innovative development ideas.

TEXTBOOKS

1	Jimmie W. Hinze, *"Construction Planning and Scheduling*", 4th Edition, Pearson, ISBN - 9780132473989 New Delhi, 2017.
2	Ibrahim Zeid, "*CAD/CAM Theory and Practice"*, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2018.

REFERENCE BOOKS

1.	Hamdy A. Taha.,. *"Operations Research: An Introduction",* Prentice Hall, 9th edition, 2019
2.	Creswell,John W. , *"Research design: Qualitative, quantitative, and mixed methods, approaches".* Sage publications, 2018

EBOOK

1.	https://bim360resources.autodesk.com/ebooks

MOOC

1.	https://www.mooclab.club/tags/computer-aided-design-cad/
2.	https://www.mooclab.club/resources/autodesk-fusion-360-integrated-cad-cam-cae.2044/
3.	https://elearn.nptel.ac.in/shop/iit-workshops/completed/concepts-in-measurement-laboratory-experiment-and-modelling-of-atmospheric-pollutants/