Dr.J.J.MagdumTrust's
Dr. J. J. Magdum College of Engineering, Jaysingpur.
An Autonomous Institute

Autonomy Syllabus Scheme of Bachelor of Technology for First Year (Common to All Branches) (Semester I & II) Academic Year 2024-25

JJMCOE

Your Dream, Our Mission

Approved by A.I.C.T.E., New Delhi | Recognized by Govt. of Maharashtra (D.T.E.) | Affiliated to Shivaji University, Kolhapur.
NAAC 'A' Grade Institution & ISO 21001: 2018 Certified
Gat. No. 289 (314/330), Shirol-Wadi Road, (Agarbhag), JAYSINGPUR - 416 101.
Tal. Shirol, Dist. Kolhapur (M.S.) Tel. No. (02322) 221123, Toll Free No. 1800 103 2133
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Dr.J.J.MagdumTrust's
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AUTONOMY SCHEME
JJMCOE R-24

Sr. No.	Heading		Particulars
1	Title of the Course		**First Year of Bachelor of Technology**
2	Eligibility for Admission		**As per the Institute Examination Ordinance**
3	Theory Passing Marks	ESE	**40%**
		CIE+ESE	**40%**
4	Practical Passing Marks	CIE	**40%**
		ESE	**40%**
5	To be implemented from Academic Year		**With effect from Academic Year: 2024-2025**

Dr.M.B.Bhilwade
BoS Chairperson
HOD
F.Y.B.Tech. Dept.
Dr.JJMCOE.

Prof.A.S.Sajane
Dean-Academic

Dr. G. V. Mulgund
PRINCIPAL,
Dr. J.J. Magdum College of
Engineering, Jaysingpur-416101.

Preface

Dr. J. J. Magdum College of Engineering was established by Dr. J. J. Magdum Trust, Jaysingpur in the year 1992 with an objective to promote the cause of higher education. The institute is approved by All India Council of Technical Education (AICTE), New Delhi and Government of Maharashtra, affiliated to Shivaji University, Kolhapur. Notably, the institute has secured Autonomous status from AY 2024-25. The college offers B. Tech program in Mechanical, Civil, Computer Science Engineering, Electronics & Tele-Communication, Information Technology, Artificial Intelligence and Data Science, M. Tech program in Civil Engineering-Construction Management and Master of Computer Application.

The curriculum model is outcome based that focuses on learning by doing. Curriculum is designed to provide multiple learning opportunities for students to acquire and demonstrate competencies for rewarding careers. It ensures multiple choices to a leaner acquiring skill through systematic planning. It has 7 verticals aligned to GR recommendations with strong science and mathematics foundation and program core, sequel of electives, multidisciplinary minor courses, humanities & management courses, and sufficient experiential learning through projects and semester-long industry/research internship along with employable skill-based courses. A learner gets an opportunity to acquire skills through NSDC aligned courses during summer vacations. Additional options of choosing from Honors/Double Minor/Honors with Research are also provided to a learner. The curriculum balances contact hours and total credits of the entire program. The total credits are 172, wherein focus is not only on providing knowledge but also on building skills, attitude and self-learning. Therefore, in the present curriculum, skill-based laboratories, mini-projects, multi-disciplinary projects, and internships are made mandatory across all disciplines of engineering, which will definitely facilitate self-learning of students. The overall credits and approach of curriculum proposed in the scheme and syllabus are in line with AICTE model curriculum. JJMCOE R-24 curriculum will be implemented for First Year of Engineering (All Branches) from the academic year 2024-25.

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Nomenclature

Abbreviation	Title	Code
BSC	Basic Science Courses	BS
ESC	Engineering Science Courses	ES
PCC	Program Core Courses	PC
PEC	Professional Elective Courses	PE
MDM	Multidisciplinary Minor	MD
OE	Open Elective	OE
SC	Skill Courses	SC
LLC	Liberal Learning Courses	--
VSEC	Vocational and Skill Enhancement Course	SE
VEC	Value Education Course	VE
AEC	Ability Enhancement Course	AE
EEMC	Entrepreneurship/Economics/Management Courses	EC
IKS	Indian Knowledge System	IK
RM	Research Methodology	RM
CEP	Community Engagement /Field Project	FP
PRO	Project	PR
OJT	Internship/On Job Training	OJ
CC	Co-curricular Courses	CC
MC	Mandatory Courses	MC
L	Lecture	L
P	Practical	P
T	Tutorial	--
T-I	Test-I	--
T-II	Test-II	--
ISE	In-Semester Evaluation	--
CIE	Continuous Internal Evaluation	--
ESE	End Semester Examination	--

F.Y.B.Tech. Department

Subject Code

Sr. No.	Course Code	Course Title	Course Category
		Basic Science Courses	
01	01FYBSL101	Applied Mathematics-I	BSC
02	01FYBSL102	Engineering Physics	BSC
03	01FYBSL103	Engineering Chemistry	BSC
04	01FYBSL121	Applied Mathematics-II	BSC
05	01FYBSP109	Engineering Physics Lab	BSC
06	01FYBSP110	Engineering Chemistry Lab	BSC
		Engineering Science Courses	
07	01FYESL104	Basic Electrical Engineering	ESC
08	01FYESL105	Basic Electronics Engineering	ESC
09	01FYESL106	Engineering Drawing	ESC
10	01FYESL107	Applied Mechanics	ESC
11	01FYESL108	Fundamentals of Programming Languages	ESC
12	01FYESP111	Basic Electrical Engineering Lab	ESC
13	01FYESP112	Basic Electronics Engineering Lab	ESC
14	01FYESP113	Engineering Drawing Lab	ESC
15	01FYESP114	Applied Mechanics Lab	ESC
16	01FYESP115	Fundamentals of Programming Languages Lab	ESC
		Program Core Course	
17	01FYPCL122	Data Structure and Programming	PCC
18	01FYPCP123	Data Structure and Programming Lab	PCC
		Vocational and Skill Enhancement Courses (VSEC)	
19	01FYSEP117	Design Thinking and Idea Lab	VSEC
20	01FYSEP118	Project Lab	VSEC
		Ability Enhancement Course (AEC)	
21	01FYAEP116	Professional Communication	AEC
		Indian Knowledge System (IKS)	
22	01FYIKP124	Indian Heritage & Democracy	IKS
		Co-curricular - Liberal Learning courses	
23	01FYCCP1XX	Co-Curricular Course* I	CC
24	01FYCCP1XX	Co-Curricular Course* II	CC
		Mandatory courses (Audit Courses)	
25	01FYMCP119	Rural/Social Internship	MC
26	01FYMCP120	Fundamentals of Aptitude -I	MC
27	01FYMCP125	Capstone Project	MC
28	01FYMCP126	Fundamentals of Aptitude -II	MC

***Subject to be selected from Co-curricular bucket**

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F.Y.B.Tech. Department

Indicative List of Co-curricular courses I/II (CC):

Sr. No	Course Code	Course Title
01	01FYCCP127	Dance
02	01FYCCP128	Fundamentals of Photography
03	01FYCCP129	Sport & Physical Fitness
04	01FYCCP130	Self-Défense for Women
05	01FYCCP131	Yoga Education
06	01FYCCP132	Art of Short Film Making / Cinematography
07	01FYCCP133	Fine/applied/visual/Performing arts
08	01FYCCP134	Basics of Fire Safety
09	01FYCCP135	Teaching Assistantship
10	01FYCCP1XX	Any other Course approved by Dean Academics & Principal

Comparison of JJMCOE credit structure with the NEP 2020 GR recommendations:

Dr. J J Magdum College of Engineering											
SEM	BSE	ESC	PCC	PEC	MDM	OE	VSEC	HSSM	ELC	CC	Total
I	8	9	-	-	-	-	1	2	-	2	22
II	8	6	3	-	-	-	1	2	-	2	22
Total	16	15	3	-	-	-	2	4	-	4	44
%	36.36	34.09	6.82	-	-	-	4.55	9.09	-	9.09	100
GR (NEP 2020) Recommended											
Total	18	16	2	-	-	-	4	4	-	4	48
%	37.50	33.33	4.17	-	-	-	8.33	8.33	-	8.33	100

Note:

Students can earn the certificates based on his/her exit from the program as follows:

a. After a one-year (4 credits to be earned) and 8-week summer workshop: Certificate in Engineering.

F.Y.B.Tech. Dept. Dr.JJMCOE

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Teaching and Evaluation Scheme for Academic Year 2024-25
Common to all UG Programs
First Year B. Tech. (Semester – I) NCrF Level: 4.5 w.e.f. 2024-25

Sr. No.	Course Code	Course Title	Course Category	Teaching scheme				Course Credits	Evaluation scheme						
									Theory				Practical		TOTAL
									CIE			ESE	CIE	ESE	
				L	T	P	Contact Hrs/wk		T-I	T-II	ISE				
1	01FYBSL101	Applied Mathematics-I	BSC	3	1	---	4	4	20	20	10	50	---	---	100
2	01FYBSL102/ 01FYBSL103	Engineering Physics / Engineering Chemistry	BSC	3	--	---	3	3	20	20	10	50	---	---	100
3	01FYESL104/ 01FYESL105	Basic Electrical Engineering/ Basic Electronics Engineering	ESC	2	---	---	2	2	20	20	10	50	---	---	100
4	01FYESL106/ 01FYESL107	Computer Aided Engineering Drawing /Applied Mechanics	ESC	2	---	---	2	2	20	20	10	50	---	---	100
5	01FYESL108	Fundamentals of Programming Languages	ESC	2	---	---	2	2	20	20	10	50			100
6	01FYBSP109/ 01FYBSP110	Engineering Physics Lab/ Engineering Chemistry Lab	BSC	---	---	2	2	1	---	---	---	---	50	---	50
7	01FYESP111/ 01FYESP112	Basic Electrical Engineering Lab / Basic Electronics Engineering Lab	ESC	---	---	2	2	1	---	---		---	50	---	50
8	01FYESP113/ 01FYESP114	Computer Aided Engineering Drawing Lab /Applied Mechanics Lab	ESC	---	---	2	2	1	---	---		---	50	---	50
9	01FYESP115	Fundamentals of Programming Languages Lab	ESC	---	---	2	2	1					50	--	50
10	01FYAEP116	Professional Communication	AEC	1	---	2	3	2	---	---		---	50	---	50
11	01FYSEP117 / 01FYSEP118	Design Thinking and Idea Lab / Project Lab	VSEC	--	---	2	2	1	---	---		---	50	---	50
12	01FYCCP131	Co-Curricular Course-I-Yoga Education	CC	--	---	--	--	2	---	---	---	---	50	---	50
25		**Total**		**13**	**01**	**12**	**26**	**22**	**100**	**100**	**50**	**250**	**350**	**0**	**850**
Mandatory Courses (Audit Courses)															
13	01FYMCP120	Fundamentals of Aptitude -I	MC	2	--	--	2	--	--	--	--	--	50	--	--

Course Category	BSC	ESC	PCC	PEC	MDM	OE	VSEC	AEC	Entrp/Mgmt	IKS	VEC	RM	CEP/FP	Proj	Int /OJT	CC
Credits	08	09	--	--	--	--	01	02	--	--	--	--	--	--	--	02
Cumulative Sum	08	09	--	--	--	--	01	02	--	--	--	--	--	--	--	02

Progressive Credits: 22

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Teaching and Evaluation Scheme for Academic Year 2024-25

Common to all UG Programs

First Year B. Tech. (Semester – II) NCrF Level: 4.5 w.e.f. 2024-25

Sr. No.	Course Code	Course Title	Course Category	Teaching scheme				Course Credits	Evaluation scheme						
									Theory				Practical		TOTAL
									CIE			ESE	CIE	ESE	
				L	T	P	Contact Hrs/wk		T-I	T-II	ISE				
1	01FYBSL121	Applied Mathematics-II	BSC	3	1	---	4	4	20	20	10	50	---	---	100
2	01FYBSL103/ 01FYBSL102	Engineering Chemistry / Engineering Physics	BSC	3	--	---	3	3	20	20	10	50	---	---	100
3	01FYESL105/ 01FYESL104	Basic Electronics Engineering/ Basic Electrical Engineering	ESC	2	---	---	2	2	20	20	10	50	---	---	100
4	01FYESL107/ 01FYESL106	Applied Mechanics / Computer Aided Engineering Drawing	ESC	2	---	---	2	2	20	20	10	50	---	---	100
5	01FYPCL122	Data Structure and Programming	PCC	2	---	---	2	2	20	20	10	50			100
6	01FYBSP110/ 01FYBSP109	Engineering Chemistry Lab/ Engineering Physics Lab	BSC	---	---	2	2	1	---	---	---	---	50	---	50
7	01FYESP112/ 01FYESP111	Basic Electronics Engineering Lab/ Basic Electrical Engineering Lab	ESC	---	---	2	2	1	---	---		---	50	---	50
8	01FYESP114/ 01FYESP113	Applied Mechanics Lab /Computer Aided Engineering Drawing Lab	ESC	---	---	2	2	1	---	---		---	50	---	50
9	01FYPCP123	Data Structure and Programming Lab	PCC	---	---	2	2	1					50	---	50
10	01FYIKP124	Indian Heritage & Democracy	IKS	1	---	2	3	2	---	---		---	50	---	50
11	01FYSEP118/ 01FYSEP117	Project Lab /Design Thinking and Idea Lab	VSEC	--	---	2	2	1	---	---		---	50	---	50
12	01FYCCP129	Co-Curricular Course-II-Sports & Physical Fitness	CC	--	---	--	--	2	---	---	---	---	50	---	50
		Total		**13**	**01**	**12**	**26**	**22**	**100**	**100**	**50**	**250**	**350**	**0**	**850**
Mandatory Courses (Audit Courses)															
13	01FYP126	Fundamentals of Aptitude -II	MC	2	--	--	2	--	--	--	--	--	50	--	--

Course Category	BSC	ESC	PCC	PEC	MDM	OE	VSEC	AEC	Entrp/Mgmt	IKS	VEC	RM	CEP/FP	Proj	Int /OJT	CC
Last Cum. Sum	08	09	--	--	--	--	01	02	--	--	--	--	--	--	--	02
Credits	08	06	03	--	--	--	01	--	--	02	--	--	--	--	--	02
Cumulative Sum	16	16	03	--	--	--	02	02	--	02	--	--	--	--	--	04

Progressive Total Credits: 22 + 22 = 44

First Year B. Tech Semester – I

Course Code: 01FYBSL101 **Course Title: Applied Mathematics - I**

Teaching Scheme	Credits	Evaluation Scheme		Examination scheme		
		Name of the exam	Marks	Name of the exam	Marks	Duration
Lectures: 03 Hrs./week	3	T-I	20	T-I	20	1.0hour
		T-II	20	T-II	20	1.0hour
		ISE	10	ESE	70	2.5hours
		ESE	50			

Course Objectives

The course objectives are

1. To train the students to solve problems on chapters like partial differentiation, Matrices and its applications to solve simultaneous equations, Algebraic and Transcendental equations complex numbers, expansions of functions, indeterminate forms.
2. To use knowledge of chapters of the course to solve engineering problems

Course Outcomes

At the end of successful completion of course, the students will be able to—

CO1.solve problems on matrices and solution of linear system equations.
CO2.solve problems on Eigen Values & Eigen vectors.
CO3.solve problems on Complex Number.
CO4.solve problems on Numerical Solution of linear simultaneous equations
CO5.solve problems on Expansion of Functions, Indeterminate forms and Partial Differentiation.

Course Contents

Unit I	**Matrices and Solution of Linear System of Equations** Rank of matrix: definition, normal form and echelon form System of linear non-homogeneous equations System of linear homogeneous equations	**06hrs**
Unit II	**Eigen Values and Eigen vectors** Eigen Values and its Properties Eigen vectors and its properties Cayley-Hamilton's theorem (Without proof)	**06hrs**
Unit III	**Complex Numbers** De Moivre's Theorem (Without proof) Roots of complex numbers by using De Moivre's Theorem Expansion of sinnθ and cosnθ in powers of sinθ and /or cosθ. Circular functions of a complex variable - definitions Hyperbolic and Inverse Hyperbolic Functions- definitions.	**06hrs**
Unit IV	**Expansion of Functions and Indeterminate forms** Expansion of Functions by using Taylor's theorem. Expansion in powers of h, Expansion in powers of x, Expansion in powers of (x-a), Indeterminate forms and L' Hospital's rule. Form 0/0, ∞/∞, ∞ − ∞, 0. ∞, Exponential form; 0^0,1^∞,∞^0,0^∞	**06hrs**

Unit V	**Numerical Solutions of Algebraic and Transcendental Equations** Bisection Method, Secant Method, Newton Raphson Method	**06hrs**
Unit VI	**Partial Differentiation** Introduction Differentiation of implicit function Euler's theorem on homogeneous function of two variables Maxima and Minima of functions of two variables	**06hrs**

Text Books:

1. A text book of Applied Mathematics, Vol.I, P. N. Wartikar& J. N. Wartikar Pune Vidyarthi Griha Prakashan, Pune ,7th edition2012
2. Higher Engineering Mathematics Dr. B. S. Grewal Khanna Publishers, Delhi. 42nd edition 2012

Reference Books:

1. A text book of Engineering Mathematics N. P. Bali, Iyengar Laxmi Publications (P) Ltd., New Delhi. 7th edition 2008
2. Advanced Engineering Mathematics Erwin Kreyszig Wiley India Pvt. Ltd 9th edition 2012

Supplementary Reading: Derivative, Integration.

List of Tutorials:

1. Rank of a Matrices
2. Solution of linear homogeneous and non-homogeneous equations
3. Eigen Values
4. Eigen vectors
5. Complex Numbers
6. Expansion of Functions and Indeterminate forms
7. Numerical Solutions of Algebraic and Transcendental Equations
8. Partial Differentiation

First Year B. Tech Semester – I/II

Course Code: 01FYBSL102 **Course Title: Engineering Physics**

Teaching Scheme		Credits	Evaluation Scheme		Examination scheme		
			Name of the exam	Marks	Name of the exam	Marks	Duration
Lectures	3Hrs./ week	3	TI	20			
			TII	20	T-I	20	1.0 hour
			ISE	10	T-II	20	1.0 hour
			ESE	50	ESE	70	2.5 hours

Course Objectives

1. Provide the knowledge of fundamental concepts of physics useful in all Engineering disciplines.
2. To introduce new areas of Physics like LASER, Nanomaterial and their engineering applications

Course Outcomes

At the end of the Course, Student will be able to,

CO1. State & define various terms, laws etc. of Applied Physics. Draws diagrams, gives names to various parts of figure. Writes formulae. (K^1).

CO2. Explain- various terms, concepts, phenomena of Engineering Physics. Explain applications and properties of some emerging fields of Applied Physics like LASER, Nanomaterial etc. Derive different formulae. (K^2).

CO3. Using formula, **solves** problems on: grating, Sabine's formula, crystal Physics and quantum mechanics. Draw diagrams of crystal planes if Miller indices are known. (K^5).

Course Contents

Unit I	**Optics**	**07hrs**

Diffraction: -Concept and types (Fresnel and Fraunhofer diffraction), Diffraction grating construction and theory of plane transmission grating, resolving power of grating, use of grating to determine wavelength of spectral lines.

Polarization: -Basic terms: Polarised & unpolarised light, optic axis of a crystal, principal plane, principal section, isotropic & anisotropic media, double refraction, Huygens 'theory of double refraction, positive and negative crystals.

Unit II	**LASER**	**07hrs**

Absorption, spontaneous emission, stimulated emission, active medium & active centre, conditions of light amplification, population inversion, pumping techniques, Ruby laser, characteristics of laser, Holography (construction and reconstruction of hologram), applications of LASER

Unit III	**Acoustics Of Buildings**	**05hrs**

Conditions for good acoustics, Reverberation, Reverberation time, Sabine's formula for reverberation time (no derivation), Factors affecting architectural acoustics and their remedy.

Unit IV	Crystallography	07hrs
Space Lattice, Basis and Crystal structure, Unit cell, Seven crystal systems & Bravai's lattices, number of atoms per unit cell, atomic radius, relation between density and lattice constant, Miller indices-procedure, features and sketches for different planes, symmetry elements of cubic crystal, Bragg's law for X-ray diffraction, Bragg's X-ray spectrometer.		
Unit V	**Physics of Nano material**	**06hrs**
Nanomaterial, Nano science and Nano technology, production techniques (Top down and bottom up), Ball milling and Colloidal technique for synthesis of Nano particles, Tools-Scanning Tunnelling Microscope and Atomic Force Microscope, properties and applications of nano-materials		
Unit VI	**Quantum Mechanics**	**07hrs**
Wave-particle duality of light, dual nature of matter (De-Broglie's concept of matter waves) Wavelength of matte wave in terms of K.E. and P.D., Properties of matter waves, Compton Effect-Statement, explanation, experimental arrangement to study Compton effect, formula for Compton shift (no derivation).		
Text books: 1) Engineering Physics- M.N.Avadhanulu, P.G.Kshirsagar S.Chand & company 2) Engineering Physics- B.K.Pandey , S.Chaturvedi Dhanpat Rai Publications		
Reference Books: 1) Optics – N.Subrahmanyam Brijlal. S.Chand & Company 2) Engg. Physics- R.K.Gaur, S.L. Gupta Dhanpat Rai Publishers, 2012. 3) Modern Physics- B.L.Theraja S.Chand & Company Ltd., New Delhi		

First Year B. Tech Semester – I/II

Course Code: 01FYBSL103 **Course Title: Engineering Chemistry**

Teaching Scheme		Credits	Evaluation Scheme		Examination scheme		
Lectures	3Hrs./ week	3	Name of the exam	Marks	Name of the exam	Marks	Duration
			TI	20			
			TII	20	T-I	20	1.0 hour
			ISE	10	T-II	20	1.0 hour
			ESE	50	ESE	70	2.5 hours

Course Objectives: -

1. Students will apply their scientific knowledge related to Chemistry.
2. Students will operate modern analytical instruments.
3. To produce graduates with mathematical knowledge, computational skills and the ability to deploy these skills effectively in the solution of problems, principally in the area of engineering.

Course Outcomes:-

At the end of successful completion of course, the students should be able to

CO1.Integrate pure Chemistry principles & fundamentals with engineering applications. (K^3).

CO2.Explains the Chemistry behind the development of engineering materials. (K^2).

CO3.Analytical ability of students for solving simple numerical problems in Engineering Chemistry. (K^4).

Course Content

Unit I	Chemistry of Metallic and Composite Materials	6 hrs

Metallic materials:
Introduction, Alloy- definition and classification, purposes of making alloys. Ferrous alloys: Plain carbon steels (mild, medium and high), stainless steels. Nonferrous alloys: Copper alloy (Brass), Nickel alloy (Nichrome), Aluminium alloy (Duralumin and Alnico).

Composite materials:
Introduction, Composition, properties and uses of Fiber reinforced Plastics (FRP) and glass reinforced plastic (GRP).

Unit II	Instrumental methods of chemical analysis	6 hrs

Introduction, advantages and disadvantages of instrumental methods

Spectrometry: Introduction, Laws of spectrometry (Lamberts and Beer-Lambert's law), Single beam spectrophotometer (schematic, working and applications).

Chromatography: Introduction, types, gas-liquid chromatography (GLC), basic principle, instrumentation and applications.

Unit III	Water	6 hrs

Introduction, impurities in natural water, water quality parameters total solids, acidity, alkalinity, chlorides, and dissolved oxygen (definition, causes, significance), hardness of water types of hardness, units of hardness, ill effects of hard water in steam generation in boilers (scale & sludge formation), numerical on hardness, treatment of hard water (ion exchange and reverse osmosis).

Unit IV	Fuels	6 hrs
Introduction, classification, calorific value, definition, units (calorie, kcal, joules, kilojoules), characteristics of good fuels, comparison between solid, liquid and gaseous fuels, types of calorific value (higher and lower), Bomb calorimeter and Boy's calorimeter. Numerical problems on Bomb and Boy's calorimeter.		
Unit V	**Corrosion**	**6 hrs**
Introduction, causes, classification, atmospheric corrosion (oxidation corrosion), electrochemical corrosion (hydrogen evolution and oxygen absorption mechanism), factors affecting rate of corrosion. Prevention of corrosion by proper design and material selection, cathodic protection, Protective coatings-hot dipping (galvanizing and tinning,), electroplating.		
Unit VI	**Polymer**	**6 hrs**
Polymers and Polymerization. Types of polymerizations (addition and condensation). Plastics, types (thermo softening and thermosetting plastics), properties and applications of polythene, polystyrene, Bakelite, urea formaldehyde plastics, epoxy resin.		

Reference Books: -

1) Engineering Chemistry by Jain and Jain, Dhanpat Rai Publishing Company Ltd., New Delhi.
2) A Textbook of Engineering Chemistry by S. S. Dara and S. S. Umare, S. Chand & Company Ltd., New Delhi.
3) A Textbook of Engineering Chemistry by C. P. Murthy, C. V. Agarwal and A. Naidu, BS Publications, Hyderabad.
4) Chatwal and Anand, Instrumental Methods of Chemical Analysis, Himalaya Publishing House, New Delhi.
5) Engineering Chemistry by Dr. A. K. Pahari and Dr. B. S. Chauhan, Laxmi Publications (P) Ltd, New Delhi.
6) A text Book of Engineering Chemistry by ShashiChawla, DhanpatRai & Co. (Pvt.) Ltd, Delhi.
7) Engineering Chemistry by Wiley India.
8) Engineering Chemistry by Renu Bapna and Renu Gupta, MacMillan Publishers (India) Ltd, Delhi.

First Year B. Tech Semester – I/II

Course Code: 01FYESL104 **Course Title: Basic Electrical Engineering**

Teaching Scheme		Credits	Evaluation Scheme		Examination scheme		
			Name ofthe exam	Marks	Name of the exam	Marks	Duration
Lectures	2Hrs./ week	2	TI	20			
			TII	20	T-I	20	1.0 hour
			ISE	10	T-II	20	1.0 hour
			ESE	50	ESE	70	2.5 hours

Course Objectives

1. To learn basic concepts involved in electrical & magnetic circuits.
2. To understand concepts of elements & parameters in single phase and three phase AC circuits.
3. To understand working and importance of electrical transformer.

Course Outcomes

At the end of the Course, Student will be able to

CO1. Define various laws & concepts of basic electrical engineering (K^1).
CO2. Solve Numerical on mesh, nodal analysis, 1Phase AC, Transformers (K^3).
CO3. Analyze the behavior of resistance, inductance and capacitance with respect to AC supply (K^4).
CO4. Explain the knowledge of Transformer (K^2).

Course Contents

Unit I	**D.C. Circuits**	**08 Hrs**
Concept of E.M.F, Potential Difference, Current, Resistance, Ohm's Law Kirchhoff's laws, mesh and node analysis		
Unit II	**Magnetic Circuits**	**04 Hrs**
Concept of mmf, reluctance, magnetic flux, Magnetic Flux density, Magnetic field strength, BH curve, magnetic leakage, fringing, Comparison of Electric and Magnetic circuit, series magnetic circuits.		
Unit III	**Single Phase A.C. Circuits**	**08 Hrs**
Introduction to A.C. supply, advantages A.C. supply, Faraday's Laws, Lenz's Law, types of emfs, generation of sinusoidal voltage, R.M.S. & Average value, form factor, peak factor, phasor representation of A.C. quantities, impedance, R-L, R-C, R-L-C series circuits, powers, power factor and its improvement by capacitor method.		
Unit IV	**Three Phase A.C. Circuits**	**04 Hrs**
Advantages of 3 phase system, Generation of 3 phase AC supply, balanced 3 Phase load, relation between line and phase quantities for star connected circuit and delta connected circuit.		
Unit V	**Single phase Transformer**	**06 Hrs**
Construction, operating principle, Types, emf equation, Ratios of voltage and current, operation on no load and with load, power losses, efficiency, voltage regulation, applications. Numericals		

Text Book:

1. Basic Electrical Engineering by U.A. Bakshi, Technical Publications, Pune.
2. Electrical Technology by U.A. Bakshi, Technical Publications, Pune.

Reference Books:

1. P.V.Prasad and S.Shivan Raju – Electrical Engineering concepts and Applications – Cengage learning.
2. B.L.Theraja – Electrical Technology vol.1. – S.Chand.
3. B.L.Theraja – Electrical Technology vol.2. – S.Chand.
4. NagrathI.J. and D.P.kothari – Basic Electrical Engineering (2001) – Tata McGraw Hill.
5. Bharati Dwivedi and AnurasgTripathi – Fundamentals of Electrical Engineering – Willey Precise

Supplementary Reading:

1. https://www.schandpublishing.com/books/tech-professional/electrical-engineering-electronics/abc-electrical-engineering/9788121939096/
2. MOOC / NPTEL/YouTube Links: https://nptel.ac.in/courses/108105112

First Year B. Tech Semester – I/II

Course Code: 01FYESL105 **Course Title: Basic Electronics Engineering**

Teaching Scheme		Credits	Evaluation Scheme		Examination scheme		
Lectures	2Hrs./ week	2	Name of the exam	Marks	Name of the exam	Marks	Duration
			TI	20			
			TII	20	T-I	20	1.0 hour
			ISE	10	T-II	20	1.0 hour
			ESE	50	ESE	70	2.5 hours

Course Objectives:-

1. Study of basics of Semiconductor Devices and Applications
2. Study of basics of Number Systems and binary codes
3. Study of basics of Digital circuits and reduction Techniques
4. Study and design of combinational circuits.
5. Study and design of sequential circuits
6. Study of Logic Families.

Course Outcomes: -

At the end of the Course, Student will be able to

CO1. Understand different semiconductor devices and their application (K^2).

CO2. Perform various logical and arithmetic operations on various number systems aswell as conversion of one representation to another. (K^3).

CO3. Apply Boolean algebra for the implementation and minimization of logic functions(K^3).

CO4. Analyze, Design and Implement combinational and sequential logic circuits(K^4).

CO5. Differentiate between logic families TTL and CMOS(K^5).

Course Contents

Unit I	Semiconductor Devices and Applications:	05 hrs

Semiconductor Diode, Half wave, Full wave, Bridge rectifier, CE configuration, CE as an amplifier. Load Line, Operating Point, Leakage Currents, Saturation and Cut off Mode of Operations.

Unit II	Number Systems and Codes:	04 hrs

Decimal number system, Binary number system, Octal number system, Hexadecimal number system

Binary Codes: Binary Coded Decimal, Octal Code, Hexadecimal Code and their conversions.

Unit III	Logic Gates and Boolean Algebra:	04 hrs

Digital logic gates, Realization using NAND, NOR gates, Boolean Laws and Expression using Logic Gates, Realization of different gates using Universal gates, De-Morgan's Theorem, Duality Theorems.

Unit IV	**Combinational Logic Circuits:**	**04 hrs**
Arithmetic Circuits: Adders/ Subtractor: Half adder, Full adder, Half Subtractor, Full Subtractor **Multiplexer and De-multiplexer:** Multiplexer, Boolean Function implementation using single multiplexerand basic gates, De-multiplexer.		
Unit V	**Sequential Logic Principles:**	**04 hrs**
Latches and Flip flops: Difference between latches and flip flops, RS, JK, Master slave flip flops, Conversion of flip flops		
Unit VI	**Logic Families and Semiconductor Memories:**	**05 hrs**
TTL NAND gate, Specifications, Noise margin, Propagation delay, fan-in, fan-out, Tristate TTL, ECL, CMOS families, Concept of Programmable logic devices like FPGA.		

Text Books

1. Digital Design by "Morris Mano"
2. Digital Logic Design By "Anand Kumar".
3. R. P. Jain, Modern Digital Electronics, Tata McGraw Hill Education, Third Edition 2003.
4. Electronic Devices and Circuits Millman & Halkias Tata McGraw Hill
5. Principles of Electronics V.K. Mehta S Chand & Co Ltd

Reference Books

1. Willim I. Fletcher.'An Engineering Approach to Digital Design'—PHI/ Pearson
2. Norman Balabanian, Bradle Carlson. 'Digital Logic Design Principals,' Wiley Publication
3. Rajkamal 'Digital Systems Principals and Design'—Pearson
4. A.P. Malvino, D.P. Leach 'Digital Principles & Applications' -VIth Edition-Tata Mc Graw Hill, Publication
5. John F. Warkerly, Digital Design Principles and Practices, Pearson Education, Fourth Edition, 2008.

First Year B. Tech- Semester – I/II

Course Code: 01FYESL106 Course Title: Computer Aided Engineering Drawing

Teaching Scheme	Credits	Evaluation Scheme		Examination scheme		
		Name of the exam	Marks	Name of the exam	Marks	Duration
Lectures: 02 Hrs./week	2	T-I	20			
		T-II	20	T-I	20	1.0hour
		ISE	10	T-II	20	1.0hour
		ESE	50	ESE	50	2.5hours

Course Objectives

The course objectives are to cultivate students' ability to conceptualize physical objects and effectively translate them onto paper for communication in engineering contexts. It focuses on enhancing manual drawing skills, honing drawing interpretation abilities, and fostering a practical understanding of object dimensions. Additionally, the course seeks to introduce students to essential drawing and design software tools for a well-rounded skill set.

Course Outcomes

At the end of successful completion of course, the students will be able to--

CO1. Explain the fundamentals of Engineering Graphics and apply the knowledge of Projections, Methods to prepare the drawings for lines (K^2)

CO2. Explain the commands in AutoCAD to draw and modify the lines to prepare the drawings. (K^2)

CO3. Apply the types of Projections, Methods to prepare the drawings for planes (K^3)

CO4. Apply the concept of orthographic projection of an object to draw several 2D views for visualizing the physical state of the object (K^3)

CO5. Apply the basic knowledge of Engineering practices to draw building sections, circuit diagrams, distribution systems of wiring, sections of machine parts (K^3)

Course Contents

Unit I	**Fundamentals of Engineering Drawing** Introduction to drawing instruments and their uses, drawing sheets sizes and their layouts, Types of Lines, BIS conventions and standards, Dimensioning methods, General rules of dimensioning.	**06 hrs.**
Unit II	**Introduction to computer aided Drawing** Computer Screen, Layout of Software, Commands and Creation of Line (Line and modify commands), Coordinate System (UCS), Reference Planes, HP, VP, RPP, LPP Of 2d Environment, Scale,	**06 hrs.**
Unit III	**Projection of planes** Introduction, Projection of plane when plane is Parallel to one and perpendicular to other, Projection of plane when plane is inclined to one plane and perpendicular to other Projections of planes when it is inclined to both reference planes.	**06 hrs.**
Unit IV	**Orthographic Projection** Introduction, Principle of projection, Plane of Projection, Method of Projection, Orthographic Projection First and Third angle method of projection, Hidden features, curved features, circular features. etc. Typical problems by first angle projection method	**06 hrs.**

Unit V	**Multidisciplinary Applications and Practice**	**06 hrs.**
	Basic building drawing- floor plan, cross section of wall, steel structures and trusses using AutoCAD Electric wiring and lighting Diagram- Automatic fire alarm, call bell system, UPS system, basic power distribution system Drawing simple mechanism- gear trains, bicycles, tricycles, two-wheeler cart, four-wheeler cart Electronics engineering drawing- Simple electronic design drawing (Layer Concept)	

Text Books:

1. Bhatt, N. D. and Panchal, V. M., (2016), "Engineering Drawing", Charotar Publication, Anand, India
2. K. Venugopal, K, (2015), "Engineering and Graphics", New Age International, New Delhi
3. Jolhe, D. A., (2015), "Engineering Drawing with introduction to AutoCAD", Tata McGraw Hill, New Delhi
4. Rathnam, K., (2018), "A First Course in Engineering Drawing", Springer Nature Singapore Pte. Ltd., Singapore

Reference Books:

1. Madsen, D. P. and Madsen, D. A., (2016), "Engineering Drawing and design", Delmar Publishers Inc., USA
2. Bhatt, N. D., (2018), "Machine Drawing", Charotor Publishing House, Anand, India
3. Dhawan, R. K., (2000), "A Textbook of Engineering Drawing", S. Chand, New Delhi
4. Luzadder, W. J. and Duff, J. M., (1992), "The Fundamentals of Engineering Drawing: With an Introduction to Interactive Computer Graphics for Design and Production", Peachpit Press, USA
5. Giesecke, F. E., Mitchell, A., Spencer, H. C., Hill, I. L., Loving, R. O., Dygon, J. T., (1990), "Principles of engineering graphics", McMillan Publishing, USA

First Year B. Tech- Semester – I/II

Course Code: 01FYESL107 **Course Title: Applied Mechanics**

Teaching Scheme	Credits	Evaluation Scheme		Examination scheme		
Lectures: 02Hrs./week	2	Name of the exam	Marks	Name of the exam	Marks	Duration
		T-I	20	T-I	20	1.0hour
		T-II	20	T-II	20	1.0hour
		ISE	10	ESE	50	2.5hours
		ESE	50			

Course Objectives

The objective of this course is to make students to learn basics of engineering Mechanics concepts and its application to the real-world problems, solve problems involving Forces, loads and Moments and know their applications in allied subjects.

Course Outcomes

At the end of successful completion of course, the students will be able to--

CO1. Understand basic concept of force System and free body diagram (K^2)
CO2. Apply concept of static equilibrium in two-dimension force system (K^3)
CO3. Locate Centroid and Calculate Moment of Inertia of composite areas (K^2)
CO4. Apply Newton's second law, work energy and impulse momentum principles for particles (K^3)
CO5. Understand the phenomenon of Impact and behavior after impact (K^2)

Course Contents

Unit I	**Force System** Introduction, fundamental concepts and principle, force system, resolution and composition of forces, Varignon's theorem, resultant of co-planner & non co-planner force system, moment of a force & couple	**06hrs**
Unit II	**Equilibrium** Introduction, free body diagram, equilibrium of coplanar forces, equilibrium of two forces, three force principle, equilibrium of concurrent, parallel and general force system, type of load, type of support, type of beam and support reaction.	**06hrs**
Unit III	**Centroid and Moment of Inertia** Introduction-centroid of basic figures, centroid of composite figure, moment of inertia of simple geometrical figure, parallel axis theorem, perpendicular axis theorem, moment of inertia of composite figure.	**06hrs**
Unit IV	**Kinetics of particle** Introduction to Kinematics and Kinetics, equation of motion, work energy principle, impulse momentum principle, D-Alembert's principle	**06hrs**
Unit V	**Impact and Collision of bodies** Impact, Types of Impact, Laws of Conservation of Momentum, Coefficient of Restitution, Numerical on Direct Central Impact.	**06hrs**

Text Book

1. Engineering Mechanics, Ferdinand Singer, 3rd edition, Harper and Row
2. Engineering Mechanics (Statics and Dynamics) by Hibbeler R. C., Pearson Education

Reference Books

1. Engineering Mechanics, S Timoshanko and Young, Tata McGraw Hill Education Pvt. Ltd. New Delhi.
2. Vector Mechanics for Engineers – Statics, Beer and Johnston, Tata McGraw Hill
3. Vector Mechanics for Engineers – Dynamics, Beer and Johnston, Tata McGraw Hill.
4. Engineering Mechanics - Statics and Dynamics, Meriam J. L. and Kraige L.G., John Wiley and Sons

First Year B. Tech- Semester – I

Course Code: 01FYESL108 Course Title: Fundamentals of Programming Languages

Teaching Scheme		Credits	Evaluation Scheme		Examination scheme		
			Name ofthe exam	Marks	Name of the exam	Marks	Duration
Lectures	2Hrs./ week	2	TI	20			
			TII	20	T-I	20	1.0 hour
			ISE	10	T-II	20	1.0 hour
			ESE	50	ESE	70	2.5 hours

Course Objectives: -

1. To introduce basic programming concept
2. To make students familiar with representing solution with algorithm and flowchart.
3. To develop program applying concept in C Language.

Course Outcomes: -

At the end of the Course, Student will be able to

CO1. Explain terminology in C Language (K^2)
CO2. Design algorithm to solve the problem using arrays, functions, pointer (K^6)
CO3. Execute a program for developed algorithm in C Language (K^3)
CO4. Understand the concept of file handling a C program (K^2)

Course Contents

Unit I	Introduction to C Language	04 Hrs

The Form of a C Program, The Basic Data Types, Modifying the Basic Types, Identifies Names, Operators, Variables, Statements - Input and Output Statements, Keywords and Identifiers, Constants, Variables, Data types, Declaration of variables, Storage Class, Assigning Values to variables

Unit II	Control Flow	04 Hrs

Decision Making and Branching: Simple If Statement, If-Else, Else-If, Switch Statement, Goto Statement Decision Making and Looping: While Statement, Do-While, For Statement, Break and Continue

Unit III	Arrays	06 Hrs

Array Declaration, accessing array elements, array initialization. 2D array – Declaration, accessing array elements, initialization.

Character Arrays and Strings: Declaration and Initialization String Variables, Reading Strings from Terminal, Writing Strings to Screen, Putting Strings Together, Comparison of Two Strings, Introduction to String handling Functions

Unit IV	Pointers	05 Hrs

An introduction to pointers, Pointer notations, call by value and call by pointer, accessing array elements by pointers, Passing array to function, dynamic memory allocation. Pointers to 2D arrays, passing 2D array to a function.

Unit V	Structures	04 Hrs

What is a Structure? Structure Type Declarations, Structure Declarations, Referencing Structure Members, Referencing Whole Structures, Initialization of Structures.

Unit VI	Functions	07 Hrs
User Defined Functions: Need for User-defined Functions, A Multi-Function Program, Elements of User defined Functions, Definition of Functions, Return Values and their Types, Function Calls, Function Declaration, Category of Functions: No Arguments and no Return Values, Arguments but No Return Values, Arguments with Return values, No Arguments but Returns a Value, Functions that Return Multiple Values, Nesting of Functions, Recursion		
Text Books: 1. C the Complete Reference by Herbert Schild (Tata McGraw Hill) 4thEdition. 2. The C Programming Language- Brian W. Kernighan, Dennis Ritchie 2ndEdition.		
Reference Books: 1. Programming in ANSI C by E. Balaguru swamy. (Tata McGraw Hill) 4th Edition. 2. Let Us C By Yashavant P. Kanetkar, 5th Edition. 3. C How to Program 7th Edition, Deitel, Pearson Education India		
Supplementary Reading: 1. https://www.naukri.com/code360/library/how-to-setup-and-program-in-c-in-vs-code 2. https://www.w3resource.com/c-programming-exercises/		

First Year B. Tech Semester – I/II

Course Code: 01FYBSP109 Course Title: Engineering Physics Lab

Teaching Scheme	Credits	Evaluation Scheme
Practical: 02 Hrs./week	01	CIE: 50

Course Objectives: -

1. To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.
2. To learn the usage of electrical and optical systems for various measurements.
3. Apply the analytical techniques, graphical analysis to the experimental data.
4. To develop intellectual communication skills and discuss the basic principles of scientific concepts in group.

Course Outcomes: -

At the end of the Course, Student will be able to

CO1. Make a list of apparatus required for Applied Physics experiments. Use different measuring devices and meters to record the data. (K^3).

CO2. Explains procedure of the experiment **Apply** the appropriate formula to obtain quantitative results. (K^2, K^3).

CO3. Develop basic communication skills through working in groups in performing the laboratory experiments and by interpreting the results, writing the journal. (K^6).

List of Experiments (Any 08 experiments from the following list)

1. Diffraction grating
2. Diffraction at cylindrical obstacle.
3. Specific rotation of sugar using polarimeter.
4. Resolving power of telescope.
5. Energy gap of semiconductor.
6. Photocell characteristics.
7. Divergence of LASER.
8. Symmetry elements of Cubic crystal.
9. Grating element using LASER.
10. Charge to mass ratio (e/m) of an electron.
11. Wavelength of light by using Fresnel's biprism.

Reference Books:

1. Experiments in Engineering Physics – A.A.Dani, P.M.Pokely
2. Engineering Physics- R.K.Gaur, S.L.Gupta

First Year B. Tech Semester – I/II

Course Code: 01FYBSP110 Course Title: Engineering Chemistry Lab

Teaching Scheme	Credits	Evaluation Scheme
Practical: 02 Hrs./week	01	CIE: 50

Course Objectives

1. Discuss basic concepts of Chemistry in Engineering.
2. Develop the ability to understand the effect of various impurities on water quality.
3. Justify the properties of metals, alloys and effect of corrosion on them.

Course Outcomes

At the end of successful completion of course, the students should be able to

CO1. Determine acidity, alkalinity, hardness, chloride content using appropriate methods of titration for given sample of water. (K^2).

CO2. Estimate rate of corroison in acidic and alkaline medium by depreciation of weight (K^4).

CO3. Describe the principals of analytical instruments and properties of some advanced material(K^3).

CO4. Communicate effectively about laboratory work both oraly and writing (K^4).

List of Experiments (Any 08 experiments from the following list)

Minimum 8 experiments should be performed from the following list out of which two experiments should be demonstrative on instrumental methods.

1. Determination of acidity of water.
2. Determination of alkalinity of water.
3. Determination of chloride content of water by Mohr's method.
4. Determination of total hardness of water by EDTA method.
5. Determination of moisture, volatile and ash content in a given coal sample by proximate analysis.
6. Preparation of urea-formaldehyde resin.
7. Preparation of phenol-formaldehyde resin.
8. Determination of percentage of copper in brass.
9. Estimation of zinc in brass solution.
10. Determination of rate of corrosion of aluminium in acidic and basic medium.
11. Demonstration of pH meter.
12. Demonstration of photo-colorimeter / spectrophotometer.
13. Demonstration of paper chromatography.

Reference Books:

1. Engineering Chemistry by Jain and Jain, Dhanpat Rai Publishing Company Ltd., New Delhi.
2. A Textbook of Engineering Chemistry by S. S. Dara and S. S. Umare, S. Chand & Company Ltd., New Delhi.
3. A Textbook of Engineering Chemistry by C. P. Murthy, C. V. Agarwal and A. Naidu, BS Publications, Hyderabad.
4. Chatwal and Anand, Instrumental Methods of Chemical Analysis, Himalaya Publishing House, New Delhi.

First Year B. Tech- Semester – I/II

Course Code: 01FYESP111 Course Title: Basic Electrical Engineering Lab

Teaching Scheme	Credits	Evaluation Scheme
Practical: 02 Hrs./week	01	CIE: 50

Course Objectives

1. To verify the basic network laws.
2. To verify the properties of single phase and three phase A.C. circuit.
3. To analyze working of electrical transformer.
4. To understand electrical safety devices and lamps

Course Outcomes

At the end of the Course, Student will be able to

CO1. Apply the fundamental laws and principles to solve the electrical circuit and network (K^3)

CO2. Demonstrate single phase and three phase A.C. circuit (K^3)

CO3. Demonstrate characteristics of electrical Transformer (K^3).

CO4. Apply the skills to use of electrical safety devices and lamps (K^3).

List of Experiments (Any 08)

1. General Introduction to Electrical Engineering laboratory.
2. Verification of Ohm's Laws.
3. Verification of Kirchhoff' Current Law.
4. Verification of Kirchhoff' Voltage Law.
5. Determination of Power factor in series R-L circuit.
6. Determination of Resistance & Inductance of a coil.
7. Study of Phasor Relationship in R-L-C series circuit.
8. Verification of phase and line parameters in three phase system.
9. Load test on Single Phase Transformer.
10. Demonstration of Fuse and MCB.
11. Study of different types of Protective devices.
12. Study of different types of Earthing.
13. Study of different types of lamps
14. Study of different types of wiring system.

Reference Books:

1. Electrical and Electronics technology by E. Hughey, Pearson.
2. Fundamentals of Electrical Engineering by L.S. Bobrow, Oxford University press.
3. Electrical Engineering Fundamentals by V. Deltoro, Prentice Hall India.

Supplementary Reading:

1. MOOC / NPTEL/YouTube Links: https://nptel.ac.in/courses/108105112

F.Y.B.Tech. Department

First Year B. Tech Semester – I/II

Course Code: 01FYESP112 Course Title: Basic Electronics Engineering Lab

Teaching Scheme	Credits	Evaluation Scheme
Practical: 02 Hrs./week	01	CIE: 50

Course Objectives: -

1. Study of basics of Semiconductor Devices and Applications.
2. Study and verify the truth Table of logic gates.
3. Study and design of combinational circuits.
4. Study and design of sequential circuits.

Course Outcomes: -

At the end of the Course, Student will be able to

CO1. Understand different semiconductor devices and their application. (K^2)
CO2. Construct & verify the truth Table of logic gates. (K^6)
CO3. Analyze Design and Implement combinational logic circuits. (K^4)
CO4. Analyze Design and Implement sequential logic circuits. (K^4)

List of Experiments

1. Plot V-I characteristics P-N junction diode.
2. Construct and study half wave and full wave rectifier.
3. Study of frequency response of single stage CE amplifier.
4. Verify the truth table of logic gates- OR, AND, NOT, NAND, NOR, EX-OR.
5. Study and verify the truth table of full Adder and full subtractor.
6. Design of 4:1 multiplexer.
7. Design of 1:4 de multiplexer.
8. Design of JK Flip Flop.

First Year B. Tech Semester – I/II

Course Code: 01FYESP113 Course Title: Computer Aided Engineering Drawing Lab

Teaching Scheme	Credits	Evaluation Scheme		Examination scheme		
Practical's: 02 Hrs./week	1	Name of the exam	Marks	Name of the exam	Marks	Duration
		T-I	--			
		T-II	--	T-I	--	1.0hour
		ISE	--	T-II	--	1.0hour
		ESE	--	CIE	50	2.5 hours

Course Objectives

The course objectives are to cultivate students' ability to conceptualize physical objects and effectively translate them onto paper for communication in engineering contexts. It focuses on enhancing manual drawing skills, honing drawing interpretation abilities, and fostering a practical understanding of object dimensions. Additionally, the course seeks to introduce students to essential drawing and design software tools for a well-rounded skill set.

Course Outcomes

At the end of successful completion of course, the students will be able to--

CO1. Explain the fundamentals of Engineering Graphics and apply the knowledge of Projections, Methods to prepare the drawings for lines (K^2)

CO2. Explain the commands in AutoCAD to draw and modify the lines to prepare the drawings (K^2)

CO3. Apply the types of Projections, Methods to prepare the drawings for planes (K^3)

CO4. Apply the concept of orthographic projection of an object to draw several 2D views for visualizing the physical state of the object (K^3)

CO5. Apply the basic knowledge of Engineering practices to draw building sections, circuit diagrams, distribution systems of wiring, sections of machine parts(K^3)

List of Experiments

List of experiments (Applicable for Interaction mode)

1. Introduction to CAD
2. Construction of projection of lines & traces of lines using CAD tool
3. Construction of projection of planes & traces of lines using sketch book and CAD tool
4. Construction of Orthographic projection for simple parts using CAD tools
5. Sheet on Construction of isometric view for simple objects

Text Books:

1. Bhatt, N. D. and Panchal, V. M., (2016), "Engineering Drawing", Charotar Publication, Anand, India
2. K. Venugopal, K, (2015), "Engineering and Graphics", New Age International, New Delhi
3. Jolhe, D. A., (2015), "Engineering Drawing with introduction to AutoCAD", Tata McGraw Hill, New Delhi
4. Rathnam, K., (2018), "A First Course in Engineering Drawing", Springer Nature Singapore Pte. Ltd., Singapore

Reference Books:

1. Madsen, D. P. and Madsen, D. A., (2016), "Engineering Drawing and design", Delmar Publishers Inc., USA
2. Bhatt, N. D., (2018), "Machine Drawing", Charotor Publishing House, Anand, India
3. Dhawan, R. K., (2000), "A Textbook of Engineering Drawing", S. Chand, New Delhi

4. Luzadder, W. J. and Duff, J. M., (1992), "The Fundamentals of Engineering Drawing: With an Introduction to Interactive Computer Graphics for Design and Production", Peachpit Press, USA

Submission:

1. Assignment On AutoCAD Commands (Line and Modify commands)
2. Sheet on Construction of projection of lines & traces of lines using sketch book and CAD tool
3. Sheet on Construction of projection of planes & traces of lines using sketch book and CAD tool
4. Sheet on Construction of Orthographic projection for simple parts using CAD tools
5. Sheet on Construction of Orthographic projection for simple parts using CAD tools

First Year B. Tech Semester – I/II

Course Code: 01FYESP114 **Course Title: Applied Mechanics Lab**

Teaching Scheme	Credits	Evaluation Scheme
Practical: 02 Hrs./week	01	CIE: 50

Course Objectives

1. To impart knowledge of fundamentals of mechanics
2. To provide knowledge of basic concepts and system of forces in static and dynamics
3. To illustrate the principles of mechanics in engineering application

Course Outcomes

At the end of the Course, Student will be able to

CO1. **Explain** the methodology to verify the different laws of forces using different apparatus. (K^2)

CO2. **Apply** graphical method to analyze determinate beams. (K^3)

List of Experiments (Any 08)

Part –A) Experiments

1. Verification of Law of polygon of forces
2. To find Support reaction of Simply Supported Beam
3. Principle of moments using Bell crank lever apparatus
4. Lami's theorem (Jib Crane)

Part-B) Graphic Statics (To be solved on A3 Sheets)

1. To find resultant – 3 Problems
2. To find Support reactions – 3

Part –C) Home Assignments

1. At least ONE assignment on each unit with minimum 04 numerical

Text Books:

1. Engineering Mechanics, Ferdinand Singer, 3rd edition, Harper and Row
2. Engineering Mechanics (Statics and Dynamics) by Hibbeler R. C., Pearson Education

Reference Books:

1. Engineering Mechanics, S Timoshanko and Young, Tata McGraw Hill Education Pvt. Ltd. New Delhi.
2. Vector Mechanics for Engineers – Statics, Beer and Johnston, Tata McGraw Hill
3. Vector Mechanics for Engineers – Dynamics, Beer and Johnston, Tata McGraw Hill.
4. Engineering Mechanics - Statics and Dynamics, Meriam J. L. and Kraige L.G., John Wiley and Sons

First Year B. Tech- Semester – I

Course Code: 01FYESP115 Course Title: Fundamentals of Programming Languages Lab

Teaching Scheme	Credits	Evaluation Scheme
Practical: 02 Hrs./week	01	CIE: 50

Course Objectives

1. To introduce basic programming concept
2. To make students familiar with representing solution with algorithm and flowchart.
3. To develop program by applying concept of C Language.

Course Outcomes

At the end of the Course, Student will be able to

CO1. Explain terminology in C Language (K^2)
CO2. Design algorithm to solve the problem using arrays, functions, pointer (K^6)
CO3. Execute a program for developed algorithm in C Language (K^3)
CO4. Understand the concept of file handling a C program (K^2).

List of Experiments (Any 08)

1. C Program to find addition, subtraction, multiplication, and division of two numbers
2. C Program to find the square and cube of a given number
3. C Program to swap two numbers
4. C Program to check whether a number is even or odd
5. C Program to find the large and small numbers among two numbers
6. C Program to calculate the area of a circle
7. C Program to display factors of a number
8. C Program to generate multiplication table
9. C Program to calculate average using arrays
10. C Program to find the largest element of an array
11. C Program to find the transpose of a matrix
12. With using user-defined function write a program to find the length of a string
13. C Program to Find Length of the String using Pointer.
14. C Program to Copy Contents of one file to another file.

Reference Books:

1. Programming in ANSI C by E. Balaguru swamy. (Tata McGraw Hill) 4th Edition.
2. Let Us C By Yashavant P. Kanetkar, 5 Edition.
3. C How to Program 7th Edition, Deitel, Pearson Education India

Supplementary Reading:

1. https://www.naukri.com/code360/library/how-to-setup-and-program-in-c-in-vs-code
2. https://www.w3resource.com/c-programming-exercises/

First Year B. Tech- Semester – I

Course Code: 01FYAEP116 **Course Title: Professional Communication**

Teaching Scheme	Credits	Evaluation Scheme
Lecture: 01 Hrs./week Practical: 02 Hrs./week	02	CIE: 50

Course Objectives:

The students should be able to:

1. Learn the difference between Verbal and Non- verbal Communication.
2. Improve pronunciation skills.
3. Improve the techniques of good speaking skills.
4. Understand the notion of technical writing.

Course Outcomes:

At the end of the Course, Student will be able to:

CO1. **Understand** the difference between Verbal and Non-Verbal communication. (K^2).
CO2. **Improve** pronunciation ability by using language Lab. (K^3).
CO3. **Learn** to improve good speaking techniques in their surroundings. (K^1).
CO4. **Understand** the concept of technical writing and to know its techniques. (K^2).

Course Contents

Unit I	Fundamentals of Communication	03 hrs

1.1. Basic Concepts of Communication:
- a) Definition, Objectives, Process of communication

1.2. Methods of communication:
- a) Verbal and Non- verbal Administrative Communication (Formal & Informal Communication)

1.3. Barriers to communication:
- a) Mechanical, Physical, psychological, Cultural, Linguistics, Environmental, Noise etc.

Unit II	Basic Grammar & LSRW Skills	03 hrs

2.1. Concepts of Grammar:
- a) Tenses, Developing Vocabulary, confused words, homonyms, homophones etc.

2.2. Developing Listening, Speaking, Reading & Writing Skills:
- a) Concepts of active listening.
- b) Enhancing listening through language lab or open-source platforms.
- c) Conversational activities-one minute speech, storytelling etc.
- d) Techniques to improve reading fluency, Reading & summarization skills.
- e) Seven C's of writing skills

Unit III	Phonetics	02 hrs

3.1. Understanding Phonetics:
- a) Phonetics alphabets.
- b) Transcription practices.
- c) Intonation & word stress

Unit IV	Professional Correspondence	06 hrs

4.1. Structured Communication:
- a) Techniques of spoken language/ Formal speech.
- b) Importance of meetings, Elocution, Extempore etc.

c) Difference in British & American English (format & style)
d) Letter Writing – request/permission etc.), E-mails
e) Planning & preparation of technical events, information broacher and manuals.

Reference Books:

1) Communication Skills Handbook: How to succeed in written and oral communication by Jane Summers, Brette Smith, Wiley India Pvt. Ltd.
2) Business Ethics and Communication by C.S. Tejpal Sheth.
3) Body Language by Allen Pease.
4) Write Right by Syed Abdur Raheem
5) Better English Pronunciation by J.D. O'Connor
6) Speaking Accurately, K.C. Nambiar, Cambridge University Press New Delhi

Lists of Sessions/activities:

1. Language lab sessions
2. LSRW Skills
3. Letter Writing –Simple application letter. E-mails
4. Individual Introduction of the students
5. Problems Facing in English communication
6. Games on vocabulary building
7. Speech/ Elocution
8. Extempore
9. Team Work –Story making,
10. Situational conversation

First Year B. Tech- Semester – I/II

Course Code: 01FYSEP117 **Course Title: Design Thinking and Idea Lab**

Teaching Scheme	Credits	Evaluation Scheme
Practical: 02 Hrs./week	01	CIE: 50

Course Objectives

1. Understand the core principles of design thinking and its role in engineering.
2. Apply the six hats of design thinking to analyze and solve complex problems.
3. Develop creative and user-centered solutions to real-world challenges.
4. Demonstrate effective communication and collaboration in multidisciplinary teams.
5. Evaluate and analysis design concepts and prototypes.
6. Develop a mindset for continuous innovation and improvement.

Course Outcomes

At the end of the Course, Student will be able to

CO1. Identify and define problems from a user's perspective and articulate design criteria.
CO2. Apply empathy and observation to gain insights into user needs and behaviors.
CO3. Generate innovative ideas and solutions through brainstorming and ideation.
CO4. Prototype and test design solutions to refine and improve them
CO5. Present and communicate design ideas effectively using visual aids and storytelling
CO6. Collaborate with peers and industry professionals to address real-world design challenges

List of Experiments

Week 1-2	**Introduction to Design Thinking**

1. Understanding the design thinking process
2. Role of empathy and user-centric design
3. Practical Lab: Empathy mapping and user interviews
4. Assignment 1: Problem identification

Week 3-4	**Ideation**

1. Techniques for idea generation and brainstorming
2. Practical Lab: Brainstorming sessions
3. Assignment 2: Idea generation and selection

Week 5-6	**Prototyping and Testing**

1. Creating prototypes to validate design concepts
2. Practical Lab: Rapid prototyping
3. Assignment 3: Prototyping and user testing

Week 7-8	**Analysis and Evaluation**

1. Applying the six hats of design thinking
2. Practical Lab: Six thinking hats analysis
3. Assignment 4: Six hats analysis of a case study

Week 9-10	**Communication and Collaboration**

1. Visual communication and storytelling
2. Group project and industry collaboration
3. Assignment 5: Design project presentation
4. Assignment 6: Reflection and lessons learned

Indicative List of activities/assignment:

1. An overview of ethical design and critiques in design thinking.
2. Generation of Idea, Development, Evaluation & Application.
3. Problem Identification.
4. Brainstorming sessions to find out solution for identified problems.
5. Prototyping and Modelling challenge.
6. Various Tools and Methodology used for the Prototyping.
7. Creation of Prototype and Innovative solution.
8. Test and Evaluation of Prototype.
9. Report Drafting - Instructions & Practices.
10. Presentation & Exhibition.
11. Industrial Visit or Interaction with Successful Entrepreneurs.

Reference Books:

1. Design Thinking: Understand-Improve-Apply S. G. Blank 2007
2. Design Thinking for innovation research and Practice Walter Brenner, Falk Uebernickel, Springer 2016
3. Business Design Thinking and Doing: Frameworks, Strategies and Techniques for Sustainable Innovation Angele M. Beausoleil 2022.
4. Design Thinking: Understanding How Designers Think and Work by Nigel Cross
5. Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation" by Tim Brown
6. Design Thinking for Visual Communication" by Ranjan Nayar and Jaidip Subedi
7. The Design of Everyday Things" by Don Norman.
8. "Design Thinking: Creativity and Innovation" by S. Balaram
9. Sprint: How to Solve Big Problems and Test New Ideas in Just Five Days" by Jake Knapp
10. Creative Confidence: Unleashing the Creative Potential Within Us All" by Tom Kelley and David Kelley (with a foreword by Ratan Tata)

Case Studies:

1. Design Thinking in Healthcare: Redesigning a patient's waiting room experience.
2. Design Thinking in Product Development: The evolution of the smartphone.
3. Tata Nano: The People's Car: Explore how Tata Motors aimed to revolutionize the automobile industry by creating an affordable and compact car for the masses, known as the Tata Nano.
4. Aravind Eye Care System: Investigate how Aravind Eye Care System in India used innovative design thinking to provide high-quality, affordable eye care services to a large population, often in remote areas.
5. Project Shakti by Hindustan Unilever: Analyze how Hindustan Unilever's Project Shakti empowered rural women in India by turning them into micro-entrepreneurs, distributing Unilever products in their communities.
6. Aadhaar: India's Unique Identification Program: Explore how the Aadhaar program used biometric data and design thinking to provide millions of Indians with a unique identification system, enhancing access to government services and benefits.
7. Ola Cabs: Transforming Transportation in India: Learn how Ola, an Indian ride-sharing platform, disrupted the traditional taxi industry by applying innovative design thinking to its services and business model.
8. Lifebuoy: Promoting Hygiene in Rural India: Explore how Lifebuoy, a brand under Unilever, used design thinking to develop innovative marketing campaigns and products to promote handwashing and hygiene in rural India.

9. Amul: The White Revolution in India: Analyze how the Amul cooperative transformed the dairy industry in India through a unique business model, design thinking, and innovative marketing strategies
10. Flipkart: E-commerce Success Story: Study how Flipkart, one of India's leading e-commerce platforms, employed design thinking to grow its business and offer a wide range of products and services.
11. ISRO's Mars Orbiter Mission: Learn about how the Indian Space Research Organisation (ISRO) successfully launched the Mars Orbiter Mission (Mangalyaan) on a limited budget, showcasing innovation and design thinking in space exploration.
12. Designing Google's Self-Driving Car: Explore how Google used design thinking to develop autonomous vehicles that redefine transportation.
13. SpaceX: Advancing Space Exploration Through Design Thinking: Analyze SpaceX's approach to space technology and how it has disrupted the aerospace industry.
14. McDonald's: Evolution of Fast-Food Service: Study the design thinking principles applied by McDonald's to enhance their customer experience and streamline operations.
15. Nest: Reinventing Thermostats and Home Automation: Examine how Nest Labs, a subsidiary of Google, reimagined home automation with their smart thermostats and other products.
16. LEGO: Building a Design-Centric Toy Empire: Investigate how LEGO has used design thinking to create a global brand that fosters creativity and learning through play.
17. Starbucks: Brewing Design Innovation in the Coffee Industry: Analyze how Starbucks incorporates design thinking into its store layouts, product offerings, and customer experiences.
18. Amazon: Customer-Centric Design in E-commerce: Discover how Amazon's design thinking philosophy has played a pivotal role in its e-commerce dominance

First Year B. Tech- Semester – I/II

Course Code: 01FYSEP118 **Course Title: Project Lab**

Teaching Scheme	Credits	Evaluation Scheme
Practical: 02 Hrs./week	01	CIE: 50

Course Details

1. Students are divided into groups must select the problem statement which will solve a practical engineering problem.
2. Each group will be assigned a mentor/guide/technical advisor.
3. Guide can approve the problem statements based on feasibility and learning outcomes expected for first year engineering students
4. Guide is to monitor progress of the task during phases of project work. Broadly phases may include- requirements gathering, preparing a solution, technology design for the solution.
5. Weekly monitoring and continuous assessment record are to be maintained by guide.
6. Get the report submitted at the end of semester.

Student is required to prepare a capstone project and file containing documentary proofs of the activities done by him. The evaluation will be done by expert committee constituted by HOD/Departmental capstone project In-charge/ faculty mentor.

First Year B. Tech- Semester – I

Course Code: 01FYMCP119 **Course Title: Rural/Social Internship**

Teaching Scheme	Credits	Evaluation Scheme
Lecture: XX Hrs./week Practical: XX Hrs./week	Mandatory (Audit Course)	CIE: 50

Course Outcomes

At the end of the Course, Student will be able to

CO1. Understand the social, economic and administrative considerations that influence the working environment of industrial organizations. (K^2)

CO2. Demonstrate social and administrative skills. (K^3)

CO3. Recognize the engineer's responsibilities and ethics. (K^2)

Course Details:

As per the approved structure of curriculum, students will be allowed to do internship during first semester of B. Tech. program. During internship students are required to be visit village/ward/small industry/organization etc. For following activities

Indicative list of activities:

1. Prepare and implement plan to create local job opportunities.
2. Prepare and implement plan to improve education quality in village.
3. Developing Sustainable Water Management system.
4. Prepare and improve a plan to improve health parameters of villagers.
5. Developing and implementing of Low-Cost Sanitation facilities
6. Prepare and implement plan to promote Local Tourism through Innovative Approaches.
7. Prepare and implement solution for energy conservation.
8. Prepare and implement plan to Skill village youth and provide employment.
9. Develop localized techniques for Reduction in construction Cost.
10. Prepare and implement plan of sustainable growth of village.
11. Setting of Information imparting club for women leading to contribution in social and economic issues.
12. Developing and managing Efficient garbage disposable system.
13. Contribution to any national level initiative of Government of India. e.g. Digital India/ Skill India/ Swachh Bharat Internship etc.

Every student is required to prepare a file containing documentary proofs of the activities done by him. The evaluation will be done by expert committee constituted by HOD/Departmental Internship In-charge/ faculty mentor.

First Year B. Tech- Semester – I

Course Code: 01FYMCP120 **Course Title: Fundamentals of Aptitude I**

Teaching Scheme	Credits	Evaluation Scheme
Lecture: 02 Hrs./week	Mandatory (Audit Course)	CIE: 50

Course Content		
Unit I	**Learning Basic Aptitude- I**	**05 Hrs**
Module-1: Percentage, Module-2: Average & Its Applications		
Unit II	**Series Completion**	**05 Hrs**
Module-1: Number Series, Module-2: Letter Series, Module-3: Alphanumeric Series		
Unit III	**LSRW**	**05 Hrs**
Module-1. Listening Introduction & Activities, Module- 2. Speaking Introduction & Activities, Module-3. Reading Introduction & Activities, Module-4. Writing Introduction		
Unit IV	**Career Management**	**05 Hrs**
Module-1: SWOT Analysis, Module-2: Goal Setting (Why & How of SMART goals) Module-3: Personality Traits & Self-Assessment, Module-4: Competency Mapping		
Unit V	**Interpersonal Skills**	**05 Hrs**
Module-1: Team Management, Module-2: Attitude Building, Module-3: Time Management		

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First Year B. Tech Semester – II

Course Code: 01FYBSL121 **Course Title: Applied Mathematics - II**

Teaching Scheme	Credits	Evaluation Scheme		Examination scheme		
Lectures: 03Hrs./week	3	Name of the exam	Marks	Name of the exam	Marks	Duration
		T-I	20	T-I	20	1.0hour
		T-II	20	T-II	20	1.0hour
		ISE	10	ESE	70	2.5hours
		ESE	50			

Course Objectives

The course objectives are

1. To train the students to solve problems on chapters like beta and gamma functions, numerical solutions of simultaneous equations, Z-transforms, ordinary differential equation, its application
2. To use knowledge of chapters of the course to solve engineering problems.

Course Outcomes

At the end of successful completion of course, the students will be able to—

CO1. solve problems on ordinary differential equation, its applications.
CO2. solve problems on numerical solutions of ordinary differential equations.
CO3. solve problems on linear system of equations
CO4. solve problems on special functions
CO5. solve problems on Z-transforms

Course Contents

Unit I	**Ordinary Differential Equations of First Order and First Degree**	**06hrs**
	Linear differential equations Reducible to Linear differential equations Exact differential equations Reducible to Exact differential equations	
Unit II	**Applications of Ordinary Differential Equations of First Order and First Degree**	**06hrs**
	Orthogonal trajectories (Cartesian and Polar equations) Applications to Simple Electrical Circuits, Newton's law of cooling	
Unit III	**Numerical Solution of Ordinary Differential Equations of First Order and First Degree**	**06hrs**
	Taylor's series method, Euler's method Modified Euler's method, Runge -Kutta method of fourth order formula.	
Unit IV	**Numerical Solution of linear simultaneous equations**	**06hrs**
	Gauss elimination method Gauss-Jordan method Jacobi's iteration method, Gauss-Seidel iteration method	
Unit V	**Special Functions**	**06hrs**
	Gamma function and its properties Beta function and its properties Error function and its properties	

Unit VI	**Z-Transforms** Introduction, Definition, Region of Convergence Z-Transform of Standard Functions Properties of Z- transform (Linearity, Change of Scale, Shifting Property, Multiplication by k, Division by k.) Inverse Z- Transform-Only by partial fraction method.	**06hrs**

Text Books:

1. A text book of Applied Mathematics, Vol.I, P. N. Wartikar& J. N. Wartikar Pune Vidyarthi Griha Prakashan, Pune ,7th edition2012
2. Higher Engineering Mathematics Dr. B. S. Grewal Khanna Publishers, Delhi. 42nd edition 2012

Reference Books:

1. A text book of Engineering Mathematics N. P. Bali, Iyengar Laxmi Publications (P) Ltd., New Delhi. 7th edition 2008
2. Advanced Engineering Mathematics Erwin Kreyszig Wiley India Pvt. Ltd 9th edition 2012

Supplementary Reading: Derivative, Integration.

List of Tutorials:

1. Exact differential equation
2. Linear differential Equations
3. Reducible to Linear differential Equations
4. Applications of Ordinary Differential Equations of First Order and First Degree
5. Numerical Solution of Ordinary Differential Equations of First Order and First Degree
6. Numerical Solution of linear simultaneous equations
7. Special Functions
8. Z-Transforms

First Year B. Tech Semester – II

Course Code: 01FYPCL122 Course Title: Data Structure and Programming

Teaching Scheme		Credits	Evaluation Scheme		Examination scheme		
Lectures	2Hrs./ week	2	Name of the exam	Marks	Name of the exam	Marks	Duration
			TI	20			
			TII	20	T-I	20	1.0 hour
			ISE	10	T-II	20	1.0 hour
			ESE	50	ESE	70	2.5 hours

Course Objectives

1. To understand the fundamentals of Data Structures.
2. To master the concepts and operations of Linked Structures.
3. To comprehend the functionality and applications of Stacks and Queues.
4. To acquire proficiency in Searching and Sorting Algorithms.
5. To develop a comprehensive understanding of Trees and Non-Linear Data Structures.

Course Outcomes

At the end of the Course, Student will be able to,

CO1. Describe basic terminology of Data Structures (K^2)
CO2. Apply data structures to solve given problem (K^3)
CO3. Design algorithms to carry out different operations on data structures (K^6)
CO4. Evaluate performance of different data structures (K^5)

Course Contents

Unit I	**Introduction to Data Structures**	**04 Hrs**
ADT- Defining the ADT, Types of Data Structures, Arrays- Need for array, Array ADT, Implementing array, 2-D arrays, Analysis of Algorithms: Complexity Analysis of Algorithms, Big-O Notation		
Unit II	**Lists**	**04 Hrs**
Linked Structures- Singly Linked List & Operations with algorithms, Application- Polynomials, Doubly Linked Lists, Circular Linked List		
Unit III	**Stacks and Queues**	**05 Hrs**
Stacks ADT, Stack Implementation using linked list and array, applications of stack. Queues – operations ADT, implementations, applications, Circular queue, Priority queues.		
Unit IV	**Searching and Sorting Algorithms**	**05 Hrs**
Search Algorithms- Linear Search Algorithm, Binary Search Algorithm, Sort Algorithms- Selection Sort, Insertion Sort, Bubble Sort, Merge Sort, Quick Sort		
Unit V	**Trees**	**05 Hrs**
Binary Trees- Tree Structure, Properties, Implementation, Tree Traversals, Binary Search Trees- Operations and Algorithms (searching, insertion, deletion, min, max)		
Unit VI	**Non-Linear Data Structures**	**05 Hrs**
Heap – operations: reheapup, reheapdown, heap sort, insert and delete nodes. Hashing – hashing methods, hash collision, hash collision resolution methods.		

Text Books:

1) Data Structures: A Pseudocode Approach with C, Richard F. Gilberg & Behrouz A. Forouzan 2nd Edition.
2) Data Structures and Algorithms Using Python, Rance D. Necaise willey Publications.
3) Data Structures and Algorithms in Python, Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser wiley Publications.

Reference Books:

1) Data Structures and Algorithm Analysis in C, 2 Edition, by Weiss, Pearson Education India.
2) Data Structures and Algorithms Made Easy: Data Structures and Algorithmic Puzzles, by Narasimha Karumanchi, Careermonk Publications 5th Edition.
3) Data Structures using C – ISRD Group, TMH publication.

Supplementary Reading:

1) https://donsheehy.github.io/datastructures/fullbook.pdf

First Year B. Tech- Semester – II

Course Code: 01FYPCP123 **Course Title: Data Structure and Programming Lab**

Teaching Scheme	Credits	Evaluation Scheme
Practical: 02 Hrs./week	01	CIE: 50

Course Objectives

1. To comprehend the functionality and applications of Stacks and Queues.
2. To acquire proficiency in Searching and Sorting Algorithms.
3. To develop a comprehensive understanding of Trees and Non-Linear Data Structures.

Course Outcomes

At the end of the Course, Student will be able to

CO1. Identify time complexity of any program (K^2)

CO2. Design and **Implement** algorithms based on stack and queue (K^6 K^3)

CO3. Apply different data structures to solve real life problem (K^3).

List of Experiments (Any 08)

1. To Find Time Complexity of a Programs.
2. Implementation of multi-dimensional arrays and problems related to them like matrix multiplication.
3. Problem on implementation of the various operations on singly Linked List, like create, display, delete.
4. Program to create doubly linked list, and search for a particular key.
5. Inserting, deleting elements in linked list at various position.
6. Implement the various types of insertions and deletions possible in Circular Linked List.
7. Implementation of stack using array/ Linked list.
8. Implementation of circular queue using array/Linked list.
9. Implement Sorting algorithm (recursive/Non recursive)
10. Implement Searching algorithm.
11. Implementation of different tree traversal algorithms.
12. Inserting new elements, deleting existing elements, and updating elements in tree.
13. Insertion and deletion of elements in heap.

Reference Books:

1. Data Structures and Algorithm Analysis in C, 2nd Edition, by Weiss, Pearson Education India.
2. Data Structures and Algorithms Made Easy: Data Structures and Algorithmic Puzzles, by Narasimha Karumanchi, Careermonk Publications 5th Edition.
3. Data Structures using C – ISRD Group, TMH publication.

Supplementary Reading:

1. https://donsheehy.github.io/datastructures/fullbook.pdf

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First Year B. Tech- Semester – II

Course Code: 01FYIKP124 Course Title: Indian Heritage & Democracy

Teaching Scheme	Credits	Evaluation Scheme
Lecture: 01 Hr./week Practical: 02 Hrs./week	02	CIE: 50

Course Outcomes

At the end of the Course, Student will be able to

CO1. Identify the core concepts of Indian knowledge systems and harmony of life.
CO2. Describe the role of language and culture in knowledge transmission.
CO3. Determine the influence of Indian knowledge on modern democracy.
CO4. Implement the indigenous science and technology.

Course Content

Unit I	**Introduction to IKS**	**02 Hrs**

a)Introduction, significance, scope
b) Why IKS is introduced in Curriculum?

Unit II	**Cultural Richness & Diversity**	**04 Hrs**

a) Cultural diversity & heritage of India.
b) Indian languages, literature, education etc.
c) Sculptures in Kolhapur district.(Mahalaxmi & Kopeshwar temple,)

Unit III	**Harmony of Life, Ayurveda & Health**	**03 Hrs**

a) Supporting balanced living & health
b) Traditional Indian Medicines & its principles.
c) Aspiration & purpose of individual human life.

Unit IV	**Indian Democracy & Governance**	**03 Hrs**

a) Historical background
b) Constitutional framework
c) Electoral system

Unit V	**Science & Technology in IKS**	**02Hrs**

a)Traditional Knowledge of Science & Technology.
b) Evolution of Technology.

Sr.No.	Practical Contents	Hrs
1	Exploring IKS through mini projects /assignments	All practical sessions

First Year B. Tech- Semester – II

Reference Books :

1) "An Introduction to Indian Philosophy" by Satischandra Chatterjee and Dhirendra Mohan Datta.
2) "Science and Civilization in India" D.S.Kothari and Irfan Habib.
3) "Introduction to Indian Knowledge System-concepts and applications"B. Mahadevan,Vinayak Rajat
Bhat.
4) "Traditional Knowledge System in India" – Amit Jha.
5) "Indian Science and Technology in the Eighteenth Century" Dharampal.
6) "India's Glorious Tradition – Suresh Soni
7)Indian Knowledge System:Vol I &II Kapil Kapoor and A.K. Singh

Web Material:

1) Introduction to Indian Knowledge Systems" NPTEL Online Course
2) "Indian Philosophy and its Relevance Today" YouTube lecture Series.
3) "Ancient Indian Engineering"- National Geographic Documentary

F.Y.B.Tech. Department

First Year B. Tech- Semester – II

Course Code: 01FYMCP126 **Course Title: Fundamentals of Aptitude II**

Teaching Scheme	Credits	Evaluation Scheme
Lecture: 02 Hrs./week	Mandatory (Audit Course)	CIE: 50

Course Content

Unit I	**Learning Basic Aptitude II**	**06 Hrs**
Ratio & Proportion, Mixture & Allegation, HCF & LCM		
Unit II	**Logical Reasoning**	**06 Hrs**
Blood Relations, Seating Arrangement, Pattern Completion		
Unit III	**Functional English**	**06 Hrs**
Spotting Errors, Sentence Correction/ Sentence Improvement, Sentence completion Sentence Formation/ Ordering of words, One word Substitution, Para jumbles		
Unit IV	**Attitude Building**	**06 Hrs**
Focus & Discipline, ASK Model- Corporate Expectations, Change Management (Changing & Developing habits)		

First Year B. Tech- Semester – I/II

Course Code: 01FYCCP1XX **Course Title: Co-Curricular Course-I/II**

Teaching Scheme	Credits	Evaluation Scheme
Lecture: XX Hrs./week Practical: XX Hrs./week	02	CIE: 50

Course Details:

1. Liberal Learning Through Students Clubs and particular areas is a Two-credit course run for First Year B. Tech.
2. Students are required to go through the list of liberal learning courses and rank their preferences through google form provided by department at the beginning of semester.
3. They will be allocated one area from the list. Experts from particular areas (club) conduct sessions once a week for each area on campus through activities, discussions, presentations, and lecture methods and evaluation out of 50 per area is done for each area throughout the semester.
4. Evaluation pattern may differ according to the nature of each area (Club).
5. Although there is no pre-defined syllabus, there is an outline which experts normally develop and follow for the sessions.
6. However, students may approach the faculty to cover certain topics of their interest in that area during sessions based on students' interest and experts'.
7. List of liberal learning courses will get display at the beginning of semester.