

Course Code	Course	Teaching Scheme						Evaluation Scheme					
		L	T	P	TW+SL	Total Hr.	Credits	Scheme	Theory (Marks %)		Practical (Marks %)		
									Max .	Min. % for Passing	Max.	Min. % for Passing	
SH1314	Engineering Physics (BSC)	3	-	-	54	90	3	ISE	20	40	40	---	---
								UT1	15			---	---
								UT2	15			---	---
								ESE	50			40	---
SH1057	Engineering Mathematics-I (BSC)	3	1	-	72	120	4	ISE	20	40	40	---	---
								UT1	15			---	---
								UT2	15			---	---
								ESE	50			40	---
SH1334	Programming for Problem Solving (ESC)	2	-	-	36	60	2	ISE	20	40	40	---	---
								UT1	15			---	---
								UT2	15			---	---
								ESE	50			40	---
SH1335	Universal Human Values and Professional Ethics (CC)	2	-	-	36	60	2	ISE	20	40	40	---	---
								UT1	15			---	---
								UT2	15			---	---
								ESE	50			40	---
SH1338 SH1461 SH148	Indian Politics and Economics/ Vedic Mathematics/ Ancient Indian Astronomy (IKS)	2	-	-	36	60	2	ISE	20	40	40	---	---
								UT1	15			---	---
								UT2	15			---	---
								ESE	50			40	---
SH1516	Engineering Physics Lab (BSC)	-	-	2	06	30	1	ISE	---	---	100	50	
SH1835 SH1586 SH1605 SH147 SH149 SH150	Communication Skills Lab-I/ Japanese Language Lab Level-I/ German Language Lab Level-I/ French Language Lab Level-I/ Spanish Language Lab Level-I/ Mandarin Language Lab Level-I (HSSM-AEC)	-	-	2	06	30	1	ISE	---	---	60	50	
		-	-	2	06	30	1	ISE	---	---	100	50	
								ESE	---	---	40	50	
SH1854	Engineering Practice Lab-I (VSEC)	-	-	2	06	30	1	ISE	---	---	100	50	
SH1895	Engineering Exploration and Design Project (VSEC)	-	-	6	18	90	3	ISE	---	---	80	50	
								ESE	---	---	20		
SH1914	Programming for Problem Solving Lab (ESC)	-	-	4	12	60	2	ISE	---	---	100	50	
Total:		12	01	16	282	630	21						
Total Contact Hours:		29											

ISE-In Semester Evaluation, UT I- Unit Test-1, UT II- Unit Test-2, ESE- End Semester Evaluation,
 TW-Term work, SL- Self learning



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Department of Sciences and Humanities

Class: F.Y. B. Tech

Semester-II

Group: A

Rev- Course structure/F.Y. B. Tech/RIT/01/2026-2027

Course Code	Course	Teaching Scheme						Evaluation Scheme					
		L	T	P	TW+SL	Total Hr.	Credits	Scheme	Theory (Marks %)		Practical (Marks %)		
									Max.	Min. % for Passing	Max.	Min. %for Passing	
SH1037	Engineering Chemistry (BSC)	3	-	-	54	90	3	ISE	20	40	40	---	---
								UT1	15			---	---
								UT2	15			---	---
								ESE	50			40	---
SH1027	Engineering Mathematics-II (BSC)	3	1	-	72	120	4	ISE	20	40	40	---	---
								UT1	15			---	---
								UT2	15			---	---
								ESE	50			40	---
SH1136	Engineering Graphics (ESC)	2	-	2	42	90	3	ISE	20	40	40	---	---
								UT1	15			---	---
								UT2	15			---	---
								ESE	50			40	---
SH1295	Basic Electrical Engineering (ESC)	2	-	-	36	60	2	ISE	20	40	40	---	---
								UT1	15			---	---
								UT2	15			---	---
								ESE	50			40	---
Code course is given to each PCC	Program Core Course (PCC)	2	-	-	36	60	2	ISE	20	40	40	---	---
								UT1	15			---	---
								UT2	15			---	---
								ESE	50			40	---
SH1536	Engineering Chemistry Lab (BSC)	-	-	2	06	30	1	ISE	---	---	100	50	
SH1795	Basic Electrical Engineering Lab (ESC)	-	-	2	06	30	1	ISE	---	---	100	50	
SH1624 SH1665 SH1684 SH192 SH194 SH196	Communication Skills Lab-II/ Japanese Language Lab Level -II/ German Language Lab Level-II/ French Language Lab Level-II/ Spanish Language Lab Level-II/ Mandarin Language Lab Level-II (HSSM-AEC)	-	-	2	06	30	1	ISE	---	---	60	50	
SH1644	Engineering Practice Lab-II (VSEC)	-	-	2	06	30	1	ISE	---	---	100	50	
SH1343 SH1158 SH1081	*Sports and Yoga/ *Cultural Activity/ *National service Scheme (CC)	-	-	2	06	30	1	ISE	--	----	100	50	
Total:		12	1	12	270	570	19						
Total Contact Hours:		25											

ISE-In Semester Evaluation, UT I- Unit Test-1, UT II- Unit Test-2, ESE- End Semester Evaluation, TW-Term work, SL- Self learning, Note: * indicates- Engagement beyond academic duration





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Department of Sciences and Humanities

Class: F.Y. B. Tech

Semester-I

Group: B

Rev- Course structure/F.Y. B. Tech/RIT/01/2026-2027

Course Code	Course	Teaching Scheme						Evaluation Scheme					
		L	T	P	TW+SL	Total Hr.	Credits	Scheme	Theory (Marks %)		Practical (Marks %)		
									Max.	Min. % for Passing	Max.	Min. % for Passing	
SH1037	Engineering Chemistry (BSC)	3	-	-	54	90	3	ISE	20	40	40	---	---
								UT1	15			---	---
								UT2	15			---	---
								ESE	50	40	---	---	
SH1057	Engineering Mathematics-I (BSC)	3	1	-	72	120	4	ISE	20	40	40	---	---
								UT1	15			---	---
								UT2	15			---	---
								ESE	50	40	---	---	
SH1136	Engineering Graphics (ESC)	2	-	2	42	90	3	ISE	20	40	40	---	---
								UT1	15			---	---
								UT2	15			---	---
								ESE	50	40	---	---	
SH1295	Basic Electrical Engineering (ESC)	2	-	-	36	60	2	ISE	20	40	40	---	---
								UT1	15			---	---
								UT2	15			---	---
								ESE	50	40	---	---	
Code course is given to each PCC	Program Core Course (PCC)	2	-	-	36	60	2	ISE	20	40	40	---	---
								UT1	15			---	---
								UT2	15			---	---
								ESE	50	40	---	---	
SH1536	Engineering Chemistry Lab (BSC)	-	-	2	06	30	1	ISE	---	---	100	50	
SH1795	Basic Electrical Engineering Lab (ESC)	-	-	2	06	30	1	ISE	---	---	100	50	
SH1835 SH1586 SH1605 SH147 SH149 SH150	Communication Skills Lab-I/ Japanese Language Lab Level-I/ German Language Lab Level-I/ French Language Lab Level-I/ Spanish Language Lab Level-I/ Mandarin Language Lab Level-I (HSSM-AEC)	-	-	2	06	30	1	ISE	---	---	60	50	
								ESE	---	---	40	50	
SH1854	Engineering Practice Lab-I (VSEC)	-	-	2	06	30	1	ISE	---	---	100	50	
SH1343 SH1158 SH1081	*Sports and Yoga/ *Cultural Activity/ *National service Scheme (CC)	-	-	2	06	30	1	ISE	--	----	100	50	
Total:		12	1	12	270	570	19						
Total Contact Hours:		25											

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Class: F.Y. B. Tech

Semester-II

Group: B

Rev- Course structure/F.Y. B. Tech/RIT/01/2026-2027

Course Code	Course	Teaching Scheme						Evaluation Scheme					
		L	T	P	TW+SL	Total Hr.	Credits	Scheme	Theory (Marks %)		Practical (Marks %)		
									Max.	Min. % for Passing	Max.	Min. % for Passing	
SH1314	Engineering Physics (BSC)	3	-	-	54	90	3	ISE	20	40	40	---	---
								UT1	15			---	---
								UT2	15			---	---
								ESE	50			---	---
SH1027	Engineering Mathematics-II (BSC)	3	1	-	72	120	4	ISE	20	40	40	---	---
								UT1	15			---	---
								UT2	15			---	---
								ESE	50			---	---
SH1334	Programming for Problem Solving (ESC)	2	-	-	36	60	2	ISE	20	40	40	---	---
								UT1	15			---	---
								UT2	15			---	---
								ESE	50			---	---
SH1335	Universal Human Values and Professional Ethics (CC)	2	-	-	36	60	2	ISE	20	40	40	---	---
								UT1	15			---	---
								UT2	15			---	---
								ESE	50			---	---
SH1338 SH1461 SH148	Indian Politics and Economics/ Vedic Mathematics/ Ancient Indian Astronomy (IKS)	2	-	-	36	60	2	ISE	20	40	40	---	---
								UT1	15			---	---
								UT2	15			---	---
								ESE	50			---	---
SH1516	Engineering Physics Lab (BSC)	-	-	2	06	30	1	ISE	---	---	100	50	
SH1624 SH1665 SH1684 SH192 SH194 SH196	Communication Skills Lab-II/ Japanese Language Lab Level-II/ German Language Lab Level-II/ French Language Lab Level-II/ Spanish Language Lab Level-II/ Mandarin Language Lab Level-II (HSSM-AEC)	-	-	2	06	30	1	ISE	---	---	60	50	
								ESE	---	---	40	50	
SH1644	Engineering Practice Lab-II (VSEC)	-	-	2	06	30	1	ISE	---	---	100	50	
SH1895	Engineering Exploration and Design Project (VSEC)	-	-	6	18	90	3	ISE	---	---	80	50	
								ESE	---	---	20		
SH1914	Programming for Problem Solving Lab (ESC)	-	-	4	12	60	2	ISE	---	---	100	50	
Total:		12	01	16	282	630	21						
Total Contact Hours:		29											

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Group A: Electronics and Telecommunication Engineering, Civil Engineering, Mechanical Engineering, Mechatronics Engineering, Robotics and Automation.

Group B: Electrical Engineering, Computer Engineering, Computer Science and Information Technology, Computer Science and Engineering (Artificial Intelligence and Machine Learning)

Abbreviations:

BSC: Basic Science Course

ESC: Engineering Science Course

PCC: Program Core Courses

VSEC: Vocational and Skill Enhancement Courses

HSMC: Humanities, Social Science and Management

AEC: Ability Enhancement Courses

IKS: Indian Knowledge System

CC: Co-curricular Courses

Program Core Course (PCC), offered by Departments:

Sr. No.	Course Code	Course Name	Program for which course is offered
1	SH188	Applied Mechanics	Civil Engineering
2	SH172	Electrical Power Generation Technologies	Electrical Engineering
3	SH190	Basics of Electronics Engineering	Electronics and Telecommunications Engineering
4	SH176	IT for Business	Computer Science & Engineering, Information Technology
5	SH178	Introduction to Cyber Security	Computer Engineering
6	SH180	Generative AI and Prompt Engineering	Computer Science and Engineering (Artificial Intelligence and Machine Learning)
7	SH182	Engineering Mechanics	Mechanical Engineering
8	SH184	Fundamentals of Mechatronics	Mechatronics Engineering
9	SH186	Basics of Robotics & Automation	Robotics and Automation





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Choice Based Languages (HSSM-AEC):

Sr. No.	Course Code	Department	Course Title
1	SH1835	Sciences and Humanities Department	Communication Skills Lab-I
2	SH1624		Communication Skills Lab-II
3	SH1586		Japanese Language Lab Level-I
4	SH1665		Japanese Language Lab Level-II
5	SH1605		German Language Lab Level-I
6	SH1684		German Language Lab Level-II
7	SH147		French Language Lab Level-I
8	SH192		French Language Lab Level-II
9	SH149		Spanish Language Lab Level-I
10	SH194		Spanish Language Lab Level-II
11	SH150		Mandarin Language Lab Level-I
12	SH196		Mandarin Language Lab Level-II





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Department of Sciences and Humanities

Class:- First Year B. Tech.	Semester-I/II	L	T	P	Credits
Course Code : SH1314	Course Name: Engineering Physics	3	--	--	3

Course Description:

This course introduces fundamental principles of oscillations, interference, quantum mechanics, semiconductors, fiber optics, and advanced materials. It covers damped and forced oscillations, thin-film and wedge-shaped interference, and the basics of quantum mechanics. Semiconductor physics is explored with applications in diodes, LEDs, and photodiodes. The working principles of lasers and fiber optics are discussed in the context of communication technology. Students will also study magnetic materials, superconductors, smart materials, and shape memory alloys. The course emphasizes problem-solving skills and real-world applications. By the end, students will develop a strong foundation in physics concepts relevant to engineering and technology.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Illustrate the fundamental principles of oscillations, quantum mechanics, lasers, fiber optics, magnetic, superconducting, and nanomaterials.
2. Construct mathematical equations related to damped and forced oscillations, interference phenomena, quantum mechanics, semiconductor properties, laser principles, and optical fiber propagation.
3. Solve problems based on oscillations, interference patterns, quantum mechanics, semiconductors, fiber optics, magnetic materials, and superconductors.
4. Analyze thin-film interference, quantum behavior in a 1D infinite potential box, and the properties of magnetic, superconducting, and nano materials.

Prerequisite: 12th Physics

Course Content		
Unit No.	Description	Hrs
1.	Oscillations Introduction: Free, forced, and damped oscillation, Damped harmonic motion, differential equation of damped harmonic motion and its solution, overdamped, critically damped and underdamped conditions, attenuation coefficients: logarithmic decrement, relaxation time, quality factor, forced vibration, resonance-sharpness and bandwidth, resonance in LCR circuit (series), Lissajous figures.	06





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2.	Interference Introduction, conditions for getting steady interference pattern, interference by division of amplitude: Path difference condition in thin film interference, wedge shaped interference, Newton's rings (Experimental arrangement, condition for diameter of dark and bright rings, radius of curvature of Plano convex lens using Newton's ring experiment), application of interference: measurement of optical flatness of surface and antireflection coatings.	06
3.	Quantum Mechanics Matter waves and De-Broglie's hypothesis, Heisenberg's uncertainty principle and its application (Nonexistence of electron in nucleus), wave function and its properties, time independent and dependent Schrödinger wave equation, Particle in a box (One dimension), Conceptual discussion: quantum tunneling, Superposition principle, quantum entanglement, quantum computing.	06
4.	Semiconductors Intrinsic and Extrinsic semiconductors (based on energy band model), carrier generation and recombination, Fermi Dirac distribution function (statement), Fermi energy in semiconductor (conceptual), carrier transport: diffusion and drift, Hall effect, PN junction diode, Light Emitting diode, Photo diode. Tunnel diode.	06
5.	Laser and Fiber Optics LASER: Introduction, properties of laser, principle of Laser- absorption and emission of radiation, relation between Einstein's coefficients, population inversion, Ruby Laser, He-Ne Laser, Application of laser. Fiber Optics: Introduction, propagation of light in an optical fiber- Total internal reflection (TIR), Angle of Acceptance, Numerical Aperture, types of fibers, advantages of optical fiber, losses in optical fiber, fiber optics communication.	06
6.	Advanced Materials Magnetic materials: Origin of magnetic moment, magnetization, types of magnetic materials-dia, para, ferro, antiferro, and ferrimagnetic materials, domain theory in ferromagnetic materials, hysteresis, soft and hard magnetic materials. Superconductors: Introduction to superconductivity, properties of superconductors: Critical temperature, Critical magnetic field, Meissner effect, Type I and type II superconductors. Nano Materials: Introduction to nanotechnology, properties of	06





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	nanomaterials-optical, electrical, mechanical, types of nanomaterials: 0D, 1D, 2D, and 3D, synthesis approach-Ball milling, Characterization techniques: Scanning electron microscopy.	
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References -

Text Books:

1. H. K. Malik, A. K. Singh, Engineering Physics, Tata McGraw Hill.
2. Avadhanulu, Kshirsagar, A textbook of Engineering Physics, S. Chand Publications.

Reference Books:

1. Halliday, Resnick, Principles of Physics, Wiley India edition.
2. B. K. Pandey, S. Chaturvedi, Engineering Physics, Cengage Learning Publications.
3. A. Beiser, S. Mahajan, S. Rai Choudhari, Concepts of Modern Physics, Tata Mc Graw Hill.





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Class:- First Year B. Tech.	Semester-I/II	L	T	P	Credits
Course Code : SH1516	Course Name: Engineering Physics Lab	--	--	2	1

Course Description:

This course provides practical training in fundamental physics experiments encompassing oscillations, optics, semiconductor physics, and quantum mechanics. Students learn to use advanced measuring tools for experiments covering these theories. Emphasis is on accurate data collection and interpretation to derive meaningful physical quantities. Additionally, students develop effective communication skills through concise lab report writing. This course equips students with essential laboratory skills and analytical abilities crucial for advanced engineering studies.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Perform experiments related to oscillations, optics, semiconductors, quantum mechanics, and magnetic materials.
2. Use the necessary tools and techniques to perform specific experiment.
3. Analyze the collected data to determine relevant physical parameter such as wavelength, band gap energy, Planck's constant, carrier concentration, radius of curvature of Plano convex lens, numerical aperture, particle size, and magnetic properties.
4. Write the lab report on the experiment which conveys experimental findings and interpretation in clear manner.

Prerequisite: Basic practical knowledge upto 12th

Course Content (Any 10 experiments)		
Expt. No.	Description	Hrs
1.	Error Analysis in Physics Laboratory.	02
2.	Determination of resonant frequency in forced oscillator.	02
3.	Determination of radius of curvature of plano convex lens using Newton's rings arrangement.	02
4.	Determination of band gap energy of semiconductor using four probe	02





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	method.	
5.	Determination of wavelength of given laser source using plane diffraction grating.	02
6.	Determination of type, carrier concentration and mobility in given semiconductor using Hall effect.	02
7.	Determination of Planck's Constant.	02
8.	Determination of particle size of lycopodium powder using LASER.	02
9.	Determination of numerical aperture of optical fiber.	02
10.	Determination of retentivity, coercivity, and energy loss in ferromagnetic material using hysteresis curve.	02
11.	Determination of wavelength of different colors of white light using plane diffraction grating.	02
12.	Determination of thickness of small object using air wedge.	02
13.	Determination of resolving power of telescope.	02
14.	Determination velocity of ultrasound in given liquid.	02

References –

Reference Books:

1. M. N. Avadhanulu, A. A. Dani, P.M. Pokley, Experiments in Engineering Physics, S. Chand Publications.
2. Halliday and Resnick, Principles of Physics, Wiley India edition.





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Class:- First Year B. Tech	Semester- I
Course Code: SH1057	Course Name: Engineering Mathematics-I

L	T	P	Credits
3	1	--	4

Course Description:

This course introduces fundamental mathematical concepts essential for solving engineering problems. It covers linear algebra, differential equations, and numerical methods, Complex Variables providing both analytical and computational techniques for mathematical modeling and problem-solving. The course emphasizes conceptual understanding and practical applications across various engineering fields.

Pre-requisite: Higher secondary (10+2) Mathematics

Course Outcomes:

After successful completion of the course, students will be able to,

1. Apply matrices and iterative method to solve linear and simultaneous algebraic equations.
2. Apply the concepts of vector spaces to solve problems in linear algebra.
3. Solve the problems on ordinary differential equations analytically and numerically.
4. Develop the concept of complex variables.

Course Content		
Unit No.	Description	Hrs.
1.	Matrices Rank of Matrix by Echelon form, Linear System of Equations, Eigen Values & Eigen Vectors, Properties of Eigen Values & Eigen Vectors	06
2.	Solution of Simultaneous Algebraic Equations: Gaussian elimination method, Gauss-Jordan method, LU Decomposition, Jacobi's iteration method, Gauss-Seidel iteration method,	06
3.	Vector spaces: Vector Space, Vector Subspace, Independence and dependence of Vectors, Basis of a Vector Space, Dimension.	06
4.	Ordinary Differential Equations of first order & first degree and its applications: Introduction, Types of Differential Equation, Exact, Non-exact, Linear Equations, Bernoulli's Equations, Orthogonal trajectories (Rectangular and	06





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	Polar), Applications to simple electrical circuits	
5.	Numerical Solution of ordinary differential equations: Introduction, Taylor's series method, Euler's method, Modified Euler's method, Runge-Kutta method of fourth order.	06
6.	Complex Variables: Complex functions- Limits, Continuity and Differentiation, Cauchy-Riemann Equations, Analytic Functions, Harmonic Functions	06

Tutorials: (Any 10 tutorials)		
Sr. No.	Title	Hrs
1.	System of Linear Equations	01
2.	Eigen Values & Eigen Vectors	01
3.	Solution of Simultaneous Algebraic Equations: Direct Methods	01
4.	Solution of Simultaneous Algebraic Equations: Iterative Methods	01
5.	Vector Spaces	01
6.	Basis and dimension	01
7.	Ordinary Differential Equations of first order & first degree	01
8.	Application of Differential Equations	01
9.	Numerical Solution of Ordinary Differential Equations- I	01
10.	Numerical Solution of Ordinary Differential Equations- II	01
11.	Complex variables I	01
12.	Complex variables II	01
13.	Self-Paced Online Course (Onramp)	01
14.	Matrices Using MATLAB	01
15.	Solution of Differential Equations using MATLAB	01
Text Books 1. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers		
Reference Books: 1. Lay David C, Linear Algebra and Its Applications, Pearson Education 2. B. V. Raman, Higher Engineering Mathematics, Tata McGraw Hill New Delhi.		





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3. N. P. Bali, A. Saxena, N. Ch. S. N. Iyengar, A Text Book of Engineering Mathematics, Laxmi Publication, New Delhi
4. Peter V. O'Neil, Advanced Engineering Mathematics, Cole publishing House
5. P. N. Wartikar, J. N. Wartikar, A Text book of Applied Mathematics, Vidyarthi Griha Prakashan, Pune





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Class:- First Year B. Tech.	Semester-I/II
Course Code : SH1334	Course Name: Programming for Problem Solving

L	T	P	Credits
2	--	--	2

Course Description:

This is an introductory course of C programming language for problem solving so as to improve the computational and logical thinking of the students. The course focuses on fundamentals of C language including Data types, Operators, I/O statements, control statements, functions array, pointer and structure. This course makes the students familiar with the use of computers for scientific calculations, use of programming language and the logic for writing computer programs for problem solving in engineering, mathematics and statics.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Explain the basic terminology and concepts of c programming language.
2. Design algorithm and draw a flowchart for the given problem.
3. Develop C programs to solve given problems.
4. Analyse the given c program to predict the output.
5. Evaluate the c program to resolve the errors.

Prerequisite: Basic knowledge of Mathematics

Course Content		
Unit No.	Description	Hrs
1.	Introduction to Algorithm and 'C' Language Basics of Algorithm and flowchart: Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/ Pseudo-code with examples. Introduction to 'C' Language: Importance of 'C' Language, Sample 'C' Program, Structure of 'C' Program, Constants, variables and data types. Operators and expressions. Managing input / output operations	04
2.	Control Statements Control statements: Decision making and branching, Decision making and	04





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	looping, Unconditional control statements.	
3.	Functions Basics of function, definition, declaration and calling of function, Function prototype, Method of parameter passing- call by value, Recursion	04
4.	Arrays Array: Basics of Array, Array declaration and initialization, Types of array: One and Two dimensional arrays, Linear Search, Character arrays, String, Passing array to function.	04
5.	Pointer Pointer: Fundamentals, Pointer declaration, Operations on pointer, Pointer to an array, Method of parameter passing- call by reference.	04
6.	Structures Basics of Structure, Structure declaration and initialization, Array of structure variable, Pointer to structure, Methods of passing structure to function, Nested structure.	04

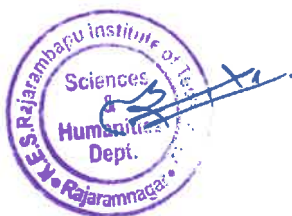
References -

Textbook:

1. K. Balaguruswamy, "Programming in ANSI C", TGMH Publication.
2. A. M Padma Reddy, "C Programming Techniques" Sri Nandi Publication.

Reference Books:

1. Y. Kanitkar, "Let us C", BPB publication.
2. B.W. Kernighan, D. M. Ritchie, "The 'C' Programming Language", Pearson Education.
3. Ashok N. Kamthane, "Programming with ANSI and Turbo C", Pearson Education.





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Class:- First Year B. Tech.	Semester-I/II	L	T	P	Credits
Course Code : SH1914	Course Name: Programming for Problem Solving Lab	--	--	4	2

Course Description:

This is an introductory course of C programming language for problem solving so as to improve the computational and logical thinking of the students. The course focuses on fundamentals of C language including Data types, Operators, I/O statements, control statements, functions array, pointer and structure. This course makes the students familiar with the use of computers for scientific calculations, use of programming language and the logic for writing computer programs for problem solving in engineering, mathematics and statics.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Demonstrate the fundamental concepts of C programming language
2. Draw flowchart based on designed algorithm for writing programs.
3. Develop C programs to solve given problems.
4. Predict the output of C program.
5. Resolve errors in the C program

Prerequisite: Engineering Mathematics and computer fundamentals

Course Content - List of experiments (Any 10)		
Expt. No.	Description	Hrs
1.	Algorithm and Flowchart	04
2.	Basic of C Language	04
3.	Decision making and branching.	04
4.	Decision making and looping	04
5.	Function	04
6.	1-D Array	04
7.	2-D Array	04
8.	String handling	04
9.	Pointer	04



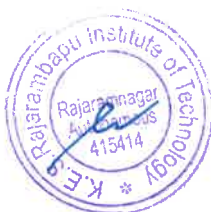
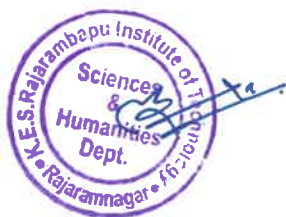


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10.	Structure	04
11.	Nesting of Structure	04
12.	File Management.	04

Reference Books:

1. K. Balaguruswamy, "Programming in ANSI C", TGMH Publication.
2. A. M Padma Reddy, "C Programming Techniques" Sri Nandi Publication.
3. Y. Kanitkar, "Let us C", BPB publication.
4. B.W. Kernighan, D. M. Ritchie, "The 'C' Programming Language", Pearson Education.





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Class:- First Year B. Tech.	Semester- I/II	L	T	P	Credits
Course Code : SH1335	Course Name : Universal Human Values and Professional Ethics	2	--	--	2

Course Description:

The course augments student's initially exposure to human values during the Induction Program. The course takes the student further to explore the self and to harmonize with family in particular and society at large. The course helps student in developing holistic perception of harmony at all levels of existence. The implications of ethical conduct on private, social, and professional life of a person are highlighted here.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Explain the significance of value inputs in education, social, and professional life.
2. Apply the value of harmonious relationship based on trust and respect in their life and profession.
3. Define the role of a human being in ensuring harmony in society and nature.
4. Make use of ethical conduct in formulation of the strategy for ethical life and profession.

Prerequisite: Participation and successful completion of AICTE recommended Induction Program in the college with special emphasis on Universal Human Values.

Course Content		
Unit No.	Description	Hrs
1.	Introduction to Value Education Recapitulation from Universal Human Values discussed during AICTE recommended Student Induction Program at the institute: Aspirations and concerns, Self-Management, Relationships, Participation in society, Natural environment, Understanding Value Education, basic guidelines for value education.	04
2.	Need, Basic Guidelines, Content and Process for Value Education Self-Exploration, Natural acceptance, Continuous happiness and prosperity, Right understanding, relationship and physical facility, Understanding happiness and prosperity, Understanding and living in harmony at various levels.	04
3.	Harmony in the Human Being - Harmony in Myself! Co-existence of the sentient 'I' and the material 'Body', Understanding the	04





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	needs of Self ('I') and 'Body', Understanding the Body as an instrument of 'I', Understanding the characteristics and activities of 'I' and harmony in 'I', Understanding the harmony of I with the Body: programs to ensure Sanyam and Health.	
4.	Harmony in the Family and Society Harmony in the Family – the Basic Unit of Human Interaction, Understanding the meaning of Trust, Difference between intention and competence, Understanding the meaning of Respect, Difference between respect and Differentiation, Understanding the harmony in the society (society being an extension of family, Undivided Society, Universal Order- from family to world family.	04
5.	Harmony in the Nature and Existence Harmony in the Nature, The four orders of nature recyclability and self-regulation in nature, Understanding existence as co-existence of mutually interacting units, Holistic perception of harmony at all levels of existence.	04
6.	Implications of Holistic Understanding of Harmony on Professional Ethics Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Introduction to Code of Conduct (Definition and purpose, Role of professional ethics in technical education and practice) Core Ethical Principles for Engineers (Integrity, Honesty, Accountability, Empathy, Transparency, Fairness, Confidentiality) Conduct in the Workplace (Plagiarism and intellectual dishonesty, Responsibility in research and project work, Ethical behaviour with colleagues, clients, and society, Conflict of interest, Whistleblowing: When and how, Handling professional responsibilities under pressure) Basis for humanistic education, constitution and 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	04

References:

1. A. Nagraj, Jeevan Vidya: Ek Parichaya, Jeevan Vidya Prakashan.
2. T. A. N. Human Values, New Age Intl. Publishers.





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3. R. R. Gaur, A Foundation Course in Human Values and Professional Ethics, Excel Books, ISBN 978-93-87034-47-1.
4. M. Govindrajran, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.
5. B. P. Banerjee, Foundations of Ethics and Management, Excel Books.
6. E. G. Seebauer, Berry, Robert L. Fundamentals of Ethics for Scientists and Engineers, Oxford University Press.





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Class:- First Year B. Tech	Semester- I/II	L	T	P	Credits
Course Code: SH1338	Course Name: Indian Politics and Economics	2	--	--	2

Course Description

This course provides an understanding of Indian governance, economic development, and policy frameworks with a focus on industrial and technological transformation. It examines key economic indicators, sector-specific policies, and global economic trends affecting India. The course is tailored for engineering students to understand how economic policies influence industries, business environments, and technology-driven growth.

Course Outcomes:

After successful completion of the course, students will be able to,

1. Analyze the constitutional and governance structure that influences economic policies in India.
2. Analyze India's economic development, from the License Raj to globalization and digital economy trends.
3. Evaluate key industrial and agricultural policies and their impact on economic and technological growth
4. Examine globalization, trade policies, and India's role in the international technological growth
5. Apply real-world case studies to understand economic policies impact on technology, industries and sustainability.

Prerequisite: Students should have basic knowledge of post independent political, economic issues and developments in India.

Unit No.	Course Content Description	Hrs.
1.	Foundations of Indian Political and Economic System Introduction to the Indian Constitution & Governance, Economic Philosophy of the Constitution (Socialism, Mixed Economy) Legislature, Executive & Judiciary (Composition, Powers & Role in Economic Policy-Making) Federalism & Economic Planning (NITI Aayog vs. Planning Commission)	06





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2. Economic Growth and Development Pre-1991 Economic Model: Five-Year Plans, State-led Industrialization, 1991 Economic Reforms & Liberalization (LPG), Sectoral Growth & Labor Market Transformations, Digital Economy & Financial Inclusion (UPI, Aadhaar, JAM Trinity), NITI Aayog's role in economic governance, Economic Inequality & Human Capital (Skill Development, Education Policies)	07
3. Industrial Policies, Business Environment & Technology Industrial Policy Resolutions (1956, 1991), Foreign Direct Investment (FDI), Startups & MSMEs, Technology & Industry 4.0 (AI, automation, digital manufacturing), India's Infrastructure & Energy Policies (Smart Cities, Renewable Energy), Climate Change & Sustainable Development (India's Net-Zero goal, Renewable Energy Policies)	06
4. Agriculture & Rural Economy Agriculture's Role in India's Economy, Green Revolution: Success and Challenges, Agricultural Market Reforms & Policies (MSP, APMC Act, Farm Bills, E-NAM), Agri Tech Innovations (AI in Agriculture, Precision Farming, Climate Resilient Crops)	05

References:

Text Books-

1. **D.D. Basu** -Introduction to the Constitution of India – (LexisNexis)
2. **Uma Kapila** - Indian Economy: Performance and Policies (Academic Foundation)
3. **V. K. Puri & S. K. Misra** - Indian Economy (Himalaya Publishing House)

Reference Books:

1. **Jean Drèze & Amartya Sen** - *India: Development and Participation* (Oxford University Press)
2. **Rakesh Mohan** - Growth with Financial Stability (Oxford University Press)
3. **Kaushik Basu** - An Economist in the Real World (MIT Press)
4. **Arvind Panagariya** - India: The Emerging Giant (Oxford University Press)
5. **G. Datt & A. Mahajan** - Indian Economy (S. Chand and Company)
6. **Economic Survey of India (Latest Edition)** - Ministry of Finance, Government of India
7. **Ramesh Singh** - Indian Economy (McGraw Hill Education)
8. **M. Laxmikant** -Governance in India – (McGraw Hill)





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Class:- First Year B. Tech.	Semester-I/II
Course Code: SH1461	Course Name: Vedic Mathematics

L	T	P	Credits
2	--	--	2

Course Description:

This course introduces students to the fascinating world of Vedic Mathematics, an ancient Indian system of mathematical principles and techniques. Originating from the Vedas, the sacred texts of ancient India, Vedic Mathematics offers alternative and often quicker methods for solving mathematical problems compared to conventional approaches.

Throughout the course, students will explore a wide range of topics including basic arithmetic operations, algebra, calculus, and more, all through the lens of Vedic Mathematics. The course aims to develop students' problem-solving skills, mental math abilities, and overall mathematical proficiency.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Apply Vedic sutras to usual multiplication
2. Solve problems on division and divisibility by Vedic sutras
3. Factorise the polynomials of degree two and three using Vedic sutras
4. Employ Vedic Sutras to solve system of linear equations and matrices faster and with ease.

Prerequisite: Basic understanding about Mathematics

Course Content		
Unit No.	Description	Hrs
1.	Multiplication Ekadhikenpurven method, Eknyunenpurven method, Urdhvatiryagbhyam method, Nikhilam method, Anurupyena method, Practical application in compound multiplication	06
2.	Division and Divisibility Division: Nikhilam method, Paravartya method, Anurupyena method Divisibility: Remainder Theorem, Argumental Division, Ekadhikenpurven method, Eknyunenpurven method	06
3.	Factorisation	06





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	Factorisation of Simple Quadratics, Factorisation of Harder Quadratics, Factorisation of Cubics etc., Highest Common Factor	
4.	Simple Equations Simple equations (First Principles), Sunyam Samyasamuccaye method, Merger type of easy simple equations, Complex mergers, Simultaneous Simple Equations, Sunyam Anyat, Sankalana Vyavakalanabhyam, Practical application of linear equations in two variables	06

References -

Textbook:

1. Vedic Mathematics, Motilal Banarsi Das, New Delhi.

Reference Books:

1. Vedic Ganita: Vihangama Drishti-1, Siksha Sanskriti Uthana Nyasa, New Delhi.
2. Vedic Ganita Praneta, Siksha Sanskriti Uthana Nyasa, New Delhi.
3. Vedic Mathematics: Past, Present and Future, Siksha Sanskriti Uthana Nyasa, New Delhi.
4. <https://mathlearners.com>





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Class:- First Year B. Tech.	Semester-I/II	L	T	P	Credits
Course Code : SH148	Course Name: Ancient Indian Astronomy	2	--	--	2

Prerequisite: Basic concepts in Physics

Course Content		
Unit No.	Description	Hrs
1.	Introduction to Ancient Indian Astronomy Astronomical Practices in India: Observational Astronomy: The principal and applications of different instruments (Yantras), Jantar Mantar or Raja Jai Singh Sawai. Some Ancient Indian Astronomers and their work: Āryabhaṭṭa, Varāhamihira, Bhāskara I, Brahmagupta, Bhāskara II.	06
2.	Some concepts in Ancient Indian Astronomy Time Measurement in Ancient Astronomy: Yuga system, Mahayuga & Kalpa system, ayanas, and lunar/solar cycles, Motion of Celestial Bodies: Sun and Moon's motion, planetary positions, and ayanachalana (precession), Zero-precision year and its relation to Earth's axial precession, Mathematical Computations: Katapayadi system for astronomical calculations, Indian nakshatra system, and ecliptic divisions	06
3.	The Indian Calendar System: Elements of the Indian Calendar: Aryabhatic and Siddhantic traditions in astronomical calculations. Solar and Luni-Solar Calendar Systems: Concept of Adhikamāsas (leap month) and periodic corrections, Panchanga System: Five elements of Panchanga (Tithi, Nakshatra, Yoga, Karana, Vara) and their scientific significance. Computational techniques used in Panchanga, comparison with modern timekeeping methods.	06
4.	Applications of Astronomy and Modern Relevance Applications in Yajnya (in ancient times), festivals, agriculture, meteorology, ayurveda, navigation, case study: Jantar Mantar and Ujjain Observatory, Influence of ancient Indian astronomy on ISRO and space exploration.	06

References -

Reference Books:

1. B.V. Subbayappa and K.V. Sarma, Indian Astronomy-A Source Book, Nehru Centre, Mumbai
2. S. N. Sen & K. S. Shukla – History of Astronomy in India, Indian National Science Academy.





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Class:- First Year B. Tech.	Semester-I	L	T	P	Credits
Course Code : SH1835	Course Name: Communication Skills Lab-I	--	--	2	1

Course Description:

This course aims to enhance basic language skills-listening, speaking, reading, and writing to improve students' overall English proficiency. The main goal of this course is to provide an environment in the classroom where students effectively practice language skills while replicating real-life scenarios. Through individual and group activities, engaging exercises, and worksheets students will work on enhancing language skills throughout the course.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Analyse aspects of nature and process of communication in professional contexts.
2. Demonstrate active receptive skills of English language.
3. Apply speaking skills in various situations.
4. Make use of English language with grammatical accuracy in verbal oral and written communication.

Prerequisite: Knowledge of basic grammar and an intermediate-level vocabulary of English language.

Course Content (Any 10 experiment)		
Expt. No.	Description	Hrs
1.	Nature and Process of Communication	02
2.	Vocabulary Building (For competitive exams)	02
3.	Essential Grammar in Use	02
4.	Listening Skills – I (Listen and reproduce [oral])	02
5.	Listening Skills – II (Listen and summarize [written])	02
6.	Listening Skills – III (Listen and answer the questions)	02
7.	Speaking Skills – I (Phonetics)	02
8.	Speaking Skills – II (Conversational English)	02
9.	Reading Skills – I (Read and reproduce [oral])	02





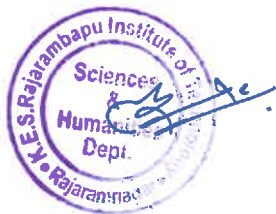
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10.	Reading Skills – II (Read and summarize [written])	02
11.	Writing Skills – Essay writing	02
12.	Student Correspondence	02

References –

Reference Books:

1. D. Sudha Rani, Business Communication and Soft Skills Laboratory Manual, Pearson Education, Mumbai.
2. K. Mohan, Meera Banerji, Developing Communication Skills, Macmillan India Ltd., New Delhi.
3. H. Martin, Advanced English Grammar – A Self Study Reference Book, Prentice –Hall of India Pvt. Ltd., New Delhi.
4. R. J. Dixon, Everyday Dialogues in English, Prentice Hall India Pvt Ltd.
5. N. Lewis, Word Power Made Easy, Goyal Publications.





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Class:- First Year B. Tech.	Semester- II	L	T	P	Credits
Course Code : SH1624	Course Name: Communication Skills - II	--	--	2	1

Course Description:

This course comprises comprehensive areas i.e. speaking, reading, and fundamentals of technical writing. Introduction of the units like Technical Paragraph writing, drafting emails and Letters, Technical Reports, and Information Transfer in the syllabus aims at preparing the basics of the aspirants from the technical field. The course aims to equip students with communication skills suitable for their academic as well as professional purposes.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Identify the need of personal appearance and grooming for professionals.
2. Demonstrate conversational and comprehension skills of English language.
2. Demonstrate writing skills through reports, letters, emails, and notices.
3. Organize the content of technical documents in specific forms.

Prerequisite: Knowledge of basic grammar and intermediate-level vocabulary of English language.

Course Content (Any 10 experiment)		
Expt. No.	Description	Hrs
1.	Professional Appearance and Grooming	02
2.	Speaking Skills (Extempore and Telephone Conversations)	02
3.	Reading Comprehension (For Competitive Exams)	02
4.	Technical Writing (Characteristics, types, language)	02
5.	Technical Paragraph writing	02
6.	Online Communication – e-mails and Teleconferencing	02
7.	Resume and Cover Letter	02
8.	Drafting notices and Note Making	02
9.	Information Transfer (Graphs, charts, and tables)	02





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10.	Report Writing (Formats and Types)	02
11.	Report Writing I (Visit / Event)	02
12.	Report Writing II (Project Report)	02

References -

Text Book:

1. J. Seely, Oxford Guide to Effective Writing and Speaking, OUP.

Reference Books:

1. D. Sudha Rani, Business Communication and Soft Skills Laboratory Manual, Pearson Education, Mumbai.
2. K. Mohan, M. Banerji, Developing Communication Skills, Macmillan India Ltd., New Delhi.
3. M. Raman, S, Sharma, Technical Communication: Principles and Practice, Oxford University Press.





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Class:- First Year B. Tech.	Semester-I	L	T	P	Credits
Course Code: SH1586	Course Name: Japanese Language Lab Level-I	--	--	2	1

Course Description:

This course is designed to introduce students to the everyday language of Japan. Lessons will be organized around natural conversational topics, leading students from fundamental aspects of grammar to readings in simple texts.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Acquire basic Japanese language skills (listening, speaking, writing, and reading).
2. Enable students demonstrate an awareness of the relevance of Japanese language to professions and careers.
3. Make students understand the cultures and civilizations of the country of Japan.
4. Enable the students to function in an environment where Japanese is used exclusively

Prerequisite: A student, who is going to enroll for this course, should have following abilities:

- 1) Knowledge of basic grammar of English Language.
- 2) Communicate moderately using English Language.

Expt. No.	Course Content	Hrs
	Description	
1.	Affirmation & negation in simple present tense.	02
2.	Uses of particles から & まで	02
3.	To express time in Japanese language.	02
4.	Uses of particles へ、で、と、よ	02
5.	Uses of interrogative pronouns なん, いつ, なに	02
6.	Expressions expressing sympathy & agreements.	02
7.	Uses of particle を in case of transitive verb.	02





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8.	Difference between interrogative pronoun なん& なに	02
9.	Expressions used to invite someone to do something.	02
10.	How to say a word or sentence in another language.	02
11.	Different verbs indicating imparting things, information or action.	02
12.	Omission of particles.	02

***Note:** Words written phonetically using the Latin alphabet (*romaji*) will be only used in the initial stage to aid learning pronunciations.





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Class:- First Year B. Tech.	Semester-II	L	T	P	Credits
Course Code : SH1665	Course Name: Japanese Language Lab Level - II	--	--	2	1

Course Description:

This course is designed to introduce students to the everyday language of Japan. Lessons will be organized around natural conversational topics, leading students from fundamental aspects of grammar to readings in simple texts.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Acquire basic Japanese language skills (listening, speaking, writing, and reading).
2. Enable students demonstrate an awareness of the relevance of Japanese language to professions and careers.
3. Make students understand the cultures and civilizations of the country of Japan.
4. Enable the students to function in an environment where Japanese is used exclusively.

Prerequisite: A student, who is going to enroll for this course, should have following abilities:

- 1) Knowledge of basic grammar of English Language.
- 2) Communicate moderately using English Language.

Course Content		
Expt. No.	Description	Hrs
1.	Brief history of Japan & Japanese Language, introduction of 3 scripts. Writing Hiragana alphabets & words from あ to ぜ	02
2.	Writing Hiragana alphabets from た to ぼ Daily expressions & greetings.	02
3.	Writing letters from ま to ん Doubling of consonants Compound letters	02
4.	Katakana alphabets from ア to ぜ Numbers from 1 to 100	02
5.	Katakana alphabets from タ to ン Classroom expressions.	02





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6.	Doubling of consonants & compound letters in Katakana Multiples of 100, 1000, 10,0	02
7.	Use of particles, affirmation, negation.	02
8.	Interrogation in simple present tense.	02
9.	Uses of demonstrative pronouns これ、それ、あれ	02
10.	Substitution for a noun.	02
11.	The こ、そ、あ、ど system of demonstrative.	02
12.	Demonstrative pronouns ここ、そこ、あそこ、どこ & its polite forms.	02

***Note:** Words written phonetically using the Latin alphabet (romaji) will be only used in the initial stage to aid learning pronunciations.

References –

Text Book:

1. Minna No Nihongo I, 3A Corporation, Japan, Goyal publishers.
2. Nihongo shouhou, Publication: JALTAP





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Class:- First Year B. Tech.	Semester-I	L	T	P	Credits
Course Code : SH1605	Course Name: German Language Lab Level-I	--	--	2	1

Course Description:

This course provides an opportunity to enhance acquisition of the fundamental elements of German language. Emphasis is on the progressive development of basic listening, speaking, reading, and writing skills through the use of supplementary learning media and materials.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Make use of familiar everyday expressions and very basic phrases aimed at the satisfaction of needs of a concrete type.
2. Express him /herself and others and can ask and answer questions about personal details such as where he/she lives, people he/she knows and things he/she has.
3. Interact in a simple way provided the other person talks slowly and clearly and is prepared to help.
4. Make use of the basic grammar concepts correctly.
5. Demonstrate reading and writing skills.

Prerequisite: Communicate moderately using English Language.

Course Content		
Expt. No.	Description	Hrs
1.	Introduction of the language, Greetings, to Introduce oneself, speaking about yourself and others.	02
2.	Alphabets and numbers.	02
3.	Listening of Alphabets and numbers, Reading Information about other people and understanding simple information about them, country names and languages.	02
4.	Speaking about Hobbies. Conjugation of strong verbs and revision of regular verbs.	02
5.	Learning articles and genders of nouns, Singular / Plural noun forms.	02

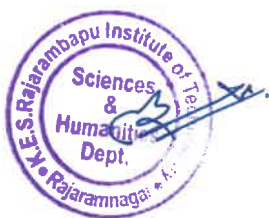




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6.	Learning weekdays, months and Seasons. Speaking about informal appointments. Grammar: yes/no questions, Verb position in normal statements and in questions.	02
7.	Learning Professions, reading small texts and understanding information about working days, hours and profession.	02
8.	Learning to name the famous places, buildings in a city, name the modes of transportation.	02
9.	Learning definite/ indefinite and negative articles in German.	02
10.	To learn to describe the way. Imperative for Pronoun "Sie".	02
11.	To speak about food, understanding food items, where one can buy what, Quantities and packing of the grocery items. Conversation between shopkeeper and customer.	02
12.	Understanding of Grammar: Subject and object of the sentence and introduction of akkusativ case in German. Reading and understanding professions related to food and grocery.	02

Note: This course (after successful completion of 1st course) will prepare the students for Start Deutsch 1 exam (A1 exam by Goethe Institute, Max Mueller Bhavan). The students will find it very easy to pursue for this exam after completion of this course. They just need some exam training to get acquainted with Goethe pattern.





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Class:- First Year B. Tech.	Semester-II	L	T	P	Credits
Course Code : SH1684	Course Name : German Language Lab Level - II	--	--	2	1

Course Description:

This course provides an opportunity to enhance acquisition of the fundamental elements of German language. Emphasis is on the progressive development of basic listening, speaking, reading, and writing skills through the use of supplementary learning media and materials.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Make use of familiar everyday expressions and very basic phrases aimed at the satisfaction of needs of a concrete type.
2. Express him /herself and others and can ask and answer questions about personal details such as where he/she lives, people he/she knows and things he/she has.
3. Interact in a simple way provided the other person talks slowly and clearly and is prepared to help.
4. Make use of the basic grammar concepts correctly.
5. Demonstrate reading and writing skills.

Prerequisite: Nil

Course Content		
Expt. No.	Description	Hrs
1.	Understanding and learning of routine activities. To understand the watch timings, giving information about time, Prepositions and Wh questions related to watch timings.	02
2.	Speaking about family and vocabulary related to family. Grammar: Possessiv articles in Nominativ and akkusativ case.	02
3.	Continuation and exercises of possessive articles. Learning of Modalverbs können, wollen, müssen.	02
4.	Learning about punctuality in Germany and how to excuse for delay, telephonic conversation about the appointments.	02
5.	Different free time activities. Things related to activities and listening based on these activities.	02





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6.	Telling birth date and birth year, how to tell years and dates in German. Ordinal numbers, Listening based on ordinal numbers.	02
7.	To plan something together, speaking about birthday, to understand invitation and to write an invitation, to order and to pay in restaurant, to speak about own experiences.	02
8.	Vocabulary related to topic Restaurant. Learning, understanding and speaking about ordering and paying in restaurant. Learning personal pronouns in akkusativ and Preposition für + akkusativ.	02
9.	Simple past tense of the verbs haben and sein. To understand particular information from the texts, to understand about different events and events related information in Radio.	02
10.	Vocabulary related to "Contacts" Information and words related to internship and activities related to internship. To understand particular information from the texts and writing it into the points (comprehension).	02
11.	Learning Prepositions with Dative, Articles in Dative.	02
12.	Learning Possessiv articles with akkusativ. Understanding and learning Vocabulary related to Language learning. Reading of letter and Learning of how to write letter in German (Greetings/salutation).	02

Note: This course (after successful completion of 1st course) will prepare the students for Start Deutsch 1 exam (A1 exam by Goethe Institute, Max Mueller Bhavan). The students will find it very easy to pursue for this exam after completion of this course. They just need some exam training to get acquainted with Goethe pattern.





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Class: - First Year B. Tech.	Semester - I	L	T	P	Credits
Course Code: SH147	Course Name: French Language Lab Level-I	--	--	2	1

Course Description:

The French Language Course is structured into 24 interactive learning hours designed to develop basic communication skills. Proposed structured French language syllabus modeled on French Grande École FLE (Français Langue Étrangère) pedagogy

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Functional independence for living in France
2. Basic academic communication skills
3. Professional interaction readiness
4. Attend interviews and networking events
5. Operational CEFR A1 to early A2 level

Course Content

Unit No	Description	Hrs
1.	Foundations Of Everyday French French sounds & pronunciation-Alphabet, accents, phonetics Greetings & introductions-Bonjour, salut, formal/informal speech Personal information-Nationality, profession, age Numbers, dates, time-Counting, calendar, schedules Asking questions-Où? Pourquoi? Comment? Daily vocabulary-Food, objects, classroom items Articles & gender-Le, la, les, un, une Basic sentence building-Subject + verb + object Ordering food-Café, restaurant vocabulary Transportation French-Metro, taxi, station terms Asking directions-Left/right/near/far Revision & oral assessment-Speaking confidence	04
2.	Survival French For Living In France Housing vocabulary-Apartment types, rent Speaking with landlords-Common rental phrases Rental contracts-Deposit, charges, utilities Banking terminology-Account opening vocabulary Healthcare vocabulary-Pharmacy, symptoms Emergency communication-Police, hospital, emergencies Immigration terminology-Visa, prefecture language CAF/social security-Student support systems Shopping & supermarkets-Payments, billing French administration culture -Formal communication style Public transportation systems -SNCF, metro, passes Practical survival assessment-Real-life simulations	04





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3.	Academic French Classroom vocabulary-Academic terminology Understanding lectures-Key academic phrases Taking notes in French-Symbols and shorthand Academic etiquette-Formal interaction norms Assignment terminology-Reports, deadlines Asking academic questions-Clarification techniques Email writing basics-Formal email structure, Academic presentation skills-Introduction and transitions AI & data vocabulary I-AI, data, cloud terms AI & business vocabulary II-Analytics, ethics, projects Participating in discussions-Debate and agreement phrases Academic practical assessment-Presentation + email	04
4.	Professional & Corporate French Professional introductions-Business self-presentation CV vocabulary-French resume terminology Internship applications-Motivation language Interview communication I-Basic interview questions Interview communication II-Technical interview vocabulary, Workplace communication-Teams, reporting Meeting vocabulary-Agenda, action items, Email etiquette in France-Professional tone Client communication-Polite interaction, French corporate culture-Hierarchy and etiquette Networking language-Conferences and events Corporate communication assessment-Interview + meeting	04
5.	Conversational Practice Informal conversation-Casual speaking French social culture-Greetings and customs, Dining etiquette-Restaurant behavior Networking confidence-Professional socialization	04
6.	-Cultural Integration Workplace culture-Time, punctuality, hierarchy Cultural misunderstandings-Cross-cultural communication. French humor & expressions-Idioms and tone Public confidence speaking-Short spontaneous talks Integrated real life simulation I-Daily life in Paris Integrated real life simulation II-Academic + corporate	04

References

1. Communication Progressive du Français – CLE International
2. French for Professional Communication – Business French Resources





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Class: - First Year B. Tech.	Semester - II
Course Code: SH192	Course Name: French Language Lab Level-II

L	T	P	Credits
-	--	2	1

Course Description:

The French Language Course for Semester II is structured into 24 interactive learning hours designed to strengthen communication skills for academic, professional, and social integration in French-speaking environments. The syllabus advances learners from CEFR A1 to A2 proficiency through practical communication, cultural immersion, and industry-oriented language applications based on French Grande École FLE (Français Langue Étrangère) pedagogy.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Communicate confidently in day-to-day situations in French-speaking countries.
2. Understand and participate in basic academic and workplace conversations.
3. Develop intermediate speaking, listening, reading, and writing skills.
4. Use French for professional interactions, internships, and collaborative activities.
5. Demonstrate operational CEFR A2 level proficiency with practical fluency.

Course Content

Unit No	Description	Hrs
1	MODULE 1 Revision of A1 grammar and sentence structures. Describing routines and habits using present tense. Talking about past events using passé composé. Expressing future plans using futur proche. Giving opinions and preferences. Connecting ideas using conjunctions. Listening comprehension exercises. Guided conversation practice and role play activities. Vocabulary building for education, travel, and daily life. Oral communication assessment and pronunciation improvement.	04
2	MODULE 2 University and campus vocabulary. Library and laboratory communication. Hostel and accommodation discussions. Group discussions and classroom participation. Understanding notices, announcements, and schedules. Writing short academic messages and emails. Asking for clarification and assistance. Participating in seminars and workshops. Academic collaboration vocabulary. Practical communication exercises in student life situations.	04
3	MODULE 3 Professional communication in French organizations. Workplace etiquette and communication style. Telephonic and online communication. Writing professional emails and meeting notes. Internship and project discussion vocabulary. Team	04





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	collaboration and reporting language. Client interaction and formal conversation. Business presentation basics. French workplace culture and professional ethics. Mock interview and professional communication assessment.	
4	MODULE 4 French vocabulary related to technology and innovation. Artificial Intelligence and Data Science terminology. Communication in digital environments. Discussing software, applications, and online platforms. Understanding technical presentations and demonstrations. Industry 4.0 and automation vocabulary. Digital collaboration and remote meeting communication. Reading simple technical documents. Technology-based conversational practice and presentation activity.	04
5	MODULE 5 French culture, traditions, and festivals. Social etiquette and public behavior. Dining and travel communication. Understanding cultural differences and intercultural communication. Expressing emotions, agreement, disagreement, and suggestions. Informal conversation and networking confidence. French media, cinema, and contemporary culture introduction. Group discussions and situational speaking activities.	04
6	MODULE 6 Integrated real-life communication simulations. Travel planning and airport communication. Academic and professional networking conversations. Collaborative project presentation in French. Problem-solving communication in practical situations. Public speaking confidence development. Integrated listening and speaking assessment. Revision and CEFR A2 readiness activities. Final practical evaluation through role play, presentation, and conversation.	04

References

- Communication Progressive du Français – CLE International
- French for Professional Communication – Business French Resources





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Class:- First Year B. Tech	Semester- I
Course Code : SH149	Course Name : Spanish Language Lab Level - I

L	T	P	Credits
-	-	2	1

Course Description:

This course introduces learners to the fundamentals of the Spanish language at A1 level aligned with the DELE A1 framework. It develops basic communicative competence in listening, speaking, reading, and writing through everyday situations and practical activities. The course covers essential grammar, vocabulary, pronunciation, and cultural awareness related to Spain and Latin America. Emphasis is placed on functional communication such as greetings, introductions, shopping, travel, and daily interactions.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Explain fundamental Spanish vocabulary, pronunciation, and grammatical structures used in basic everyday communication.
2. Use basic Spanish language skills to introduce oneself, exchange personal information, and communicate in routine daily situations.
3. Demonstrate listening, speaking, reading, and writing skills to understand and produce simple Spanish sentences and short texts.
4. Analyze and respond appropriately to simple real-life communicative situations by selecting suitable vocabulary and grammatical structures in Spanish.

Prerequisite:

Basic proficiency in English.





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Course Content		
Unit No.	Description	Hrs.
1.	Introduction to Spanish: Spanish alphabet, pronunciation, greetings, basic expressions	02
2.	Personal Identity: Self-introduction, nationality, numbers (0–50), verb ser	02
3.	Basic Grammar: Subject pronouns, articles, gender & number, sentence formation	02
4.	Family and Descriptions: Family vocabulary, adjectives agreement, verb tener	02
5.	Daily Routine: Present tense (-ar verbs), time expressions, daily activities	02
6.	Actions and Preferences: -er/-ir verbs, gustar , likes and dislikes	02
7.	Places and Directions: City vocabulary, verb estar , basic prepositions	02
8.	Food and Ordering: Food vocabulary, restaurant conversations, ordering meals	02
9.	Shopping and Numbers: Numbers (50–100), prices, buying/selling dialogues	02
10.	Asking Questions: Interrogatives (qué, quién, dónde, cuándo, cómo), simple Q&A	02
11.	Travel Basics: Verb ir , transport vocabulary, planning a simple trip	02
12.	Integrated Communication and Cultural Awareness: Integrated practice of listening, speaking, reading, and writing through real-life situations.	02





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Class:- First Year B. Tech	Semester- II	L	T	P	Credits
Course Code : SH194	Course Name : Spanish Language Lab Level-II	-	-	2	1

Course Description:

This course is designed as a continuation of the Spanish Language (A1) course and is aligned with the Common European Framework of Reference for Languages (CEFR A2) and DELE A2 standards. The course enhances learners' communicative competence by enabling them to understand and use frequently occurring expressions related to everyday life. Students develop confidence in speaking, listening, reading, and writing through practical activities, role plays, presentations, and cultural interactions. The course also introduces learners to Hispanic culture, traditions, workplace communication, travel situations, and digital communication.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Explain intermediate Spanish grammar, vocabulary, and sentence structures required for everyday communication.
2. Apply Spanish language skills to communicate in familiar social, academic, travel, and workplace situations.
3. Demonstrate listening, speaking, reading, and writing skills by participating in conversations, understanding authentic texts, and composing short paragraphs and emails.
4. Analyze simple real-life situations and respond appropriately using suitable Spanish expressions while demonstrating awareness of Spanish and Latin American cultures.

Prerequisite:

Successful completion of Spanish Language Lab Level-I or equivalent proficiency.





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Course Content		
Unit No.	Description	Hrs.
1.	Revision of A1 Concepts – Greetings, introductions, numbers, present tense revision, classroom communication	02
2.	Daily Life & Routine – Reflexive verbs, daily schedule, hobbies, leisure activities, frequency expressions	02
3.	Past Experiences – Introduction to <i>Pretérito Perfecto</i> , talking about recent events, travel experiences	02
4.	Health and Lifestyle – Body parts, illnesses, visiting a doctor, giving advice using <i>deber</i>	02
5.	Travel and Tourism – Booking hotels, transportation, asking for information, travel planning	02
6.	Shopping and Services – Banking, post office, online shopping, comparing products, customer conversations	02
7.	Food and Culture – Ordering food, recipes, restaurants, Spanish cuisine, cultural etiquette	02
8.	Workplace Communication – Occupations, office vocabulary, emails, appointments, telephone conversations	02
9.	Future Plans – Near future (<i>ir a + infinitive</i>), making plans, invitations, accepting and declining invitations	02
10.	Digital Communication – Writing messages, emails, social media vocabulary, online meetings and virtual communication	02
11.	Spanish and Latin American Culture – Festivals, traditions, geography, customs, intercultural communication	02
12.	Integrated Communication Project – Role plays, presentations, dialogue practice, listening comprehension, reading and writing activities	02

Reference Books

1. Aula Internacional Plus A2, Difusión Publications, Spain.
2. Nuevo Español en Marcha A2, SGEL Publications.
3. Prisma A2, Edinumen Publications.
4. Gramática Básica del Estudiante de Español, Difusión.
5. Practice Makes Perfect: Complete Spanish Grammar, McGraw-Hill.
6. Easy Spanish Step-by-Step, McGraw-Hill.





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Class: - First Year B. Tech.	Semester - I	L	T	P	Credits
Course Code: SH150	Course Name: Mandarin Language Lab Level-I	--	--	2	1

Course Description:

The course incorporates linguistic and cultural elements relevant to both Mainland China and Taiwan, enabling learners to communicate effectively across academic, professional, and social contexts in China and Taiwan.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Recognize and pronounce basic Mandarin/Chinese sounds, tones and pinyin with reasonable accuracy.
2. Understand and apply basic grammatical structures, including sentence patterns.
3. Read, write and speak commonly used vocabulary and simple phrases relevant to everyday situations.
4. Communicate in basic conversations on topics such as self-introduction, family, food, travel and shopping.
5. Independently use digital tools like OCR dictionaries to find the pronunciation and meaning of unfamiliar Chinese characters.
6. Demonstrate awareness of Chinese culture, traditions, festivals, etiquette and contemporary aspects like economy and technology.

Course Content

Unit No	Description	Hrs
1	Introduction To Mandarin & Script Overview of Mandarin Chinese, Global significance (China & Taiwan focus), Regions where Mandarin is used (Putonghua & Guoyu), Introduction to Chinese script (Hanzi) Difference between spoken Mandarin & written characters, Cultural orientation & basic classroom expressions.	04
2	Pronunciation, Pinyin & Tones Pinyin system: initials & finals, four tones & neutral tone, Tone rules and common tone changes, Pronunciation drills & listening practice, Tone-based speaking exercises Accuracy-building activities	04
3	Basic Grammar & Sentence Structure Basic sentence structure (Subject–Verb–Object), Common verbs & verb usage, Question formation, Measure words (introductory level), Simple affirmative & negative sentences, Grammar-based speaking practice	04
4	Vocabulary Building For Daily Life Greetings & self-introduction, Numbers, dates & time, Family & relationships, Food	04



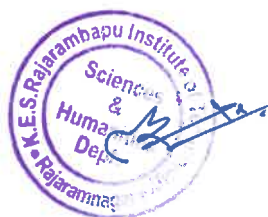


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	& dining vocabulary, Shopping & daily-use expressions, Practical vocabulary-based role plays	
5	Speaking, Listening & Digital Tools Conversational practice, Role plays for daily situations, Audio comprehension exercises Listening for meaning & response, Use of digital tools:, OCR dictionaries, Handwriting input, Translation & pronunciation apps	04
6	Reading, Writing, Culture & Assessment Introduction to stroke order & radicals, Basic character recognition, Reading simple words & phrases, Etiquette, Social scenarios, Review, revision & oral assessment Feedback & learning reflection	04

References

- Customized developed by Mrs. Yashodhara Gadgil, Yin Yang center for Chinese language, Pune
- HSK (Hànyǔ Shuǐpíng Kǎoshì) – Beginner Level Framework, Chinese Language Proficiency Standards, Hanban / Chinese Ministry of Education.
- Mandarin Chinese Teaching Guidelines, National Academy for Educational Research, Taiwan (NAER).





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Class: - First Year B. Tech.	Semester - II	L	T	P	Credits
Course Code: SH196	Course Name: Mandarin Language Lab Level -II	--	--	2	1

Course Description:

This course builds upon the fundamentals acquired in previous learnings and focuses on **expanded vocabulary, practical communication skills, reading and writing of basic characters, and real-life applications** of Mandarin relevant to academic, professional, and social environments in **Mainland China and Taiwan**.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Communicate confidently using expanded sentence structures in routine and professional situations.
2. Understand and apply intermediate-level grammar patterns and sentence connectors.
3. Read and write a limited set of frequently used Chinese characters with correct stroke order.
4. Participate in conversations related to travel, academics, workplace, and daily activities.
5. Comprehend short spoken passages and respond appropriately.
6. Demonstrate deeper awareness of Chinese and Taiwanese culture, etiquette, and social norms.

Course Content

Unit No	Description	Hrs
1	Revision & Functional Communication Revision of Level I grammar and vocabulary, Extended self-introduction, Talking about daily routine, hobbies & interests, Expressing likes/dislikes, Polite requests and responses, Functional classroom and campus communication	04
2	Intermediate Grammar Structures Sentence connectors (because, so, but), Use of aspect particles (introductory), Modal verbs, Comparative sentences, Asking and giving reasons, Sentence expansion exercises	04
3	Vocabulary For Travel & Academics Travel-related vocabulary (transport, directions, accommodation), Academic environment vocabulary (classroom, subjects, exams), Time expressions, Making	04





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	plans & schedules, Practical speaking activities	
4	Reading & Writing Basic Characters Introduction to commonly used characters, Stroke order and structure practice, Radicals (functional introduction), Reading short sentences and signboards, Writing practice using guided worksheets	04
5	Listening, Speaking & Digital Applications Listening to short dialogues and announcements, Role plays (travel, campus, daily life), Pronunciation refinement, Continued use of digital tools: OCR dictionaries, speech recognition, translation and handwriting input	04
6	Culture, Workplace Etiquette & Assessment Chinese & Taiwanese social etiquette, Basic workplace culture, Festivals and traditions, Cross-cultural communication tips, Revision, oral assessment, reading/writing evaluation, learner reflection	04

References

- Customized developed by Mrs. Yashodhara Gadgil, Yin Yang center for Chinese language, Pune
- HSK (Hànyǔ Shuǐpíng Kǎoshì) – Beginner Level Framework, Chinese Language Proficiency Standards, Hanban / Chinese Ministry of Education.
- Mandarin Chinese Teaching Guidelines, National Academy for Educational Research, Taiwan (NAER).





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Class: - First Year B. Tech.	Semester – I/II	L	T	P	Credits
Course Code: SH1895	Course Name: Engineering Exploration and Design Project	-	--	6	3

Course Description:

The Engineering Exploration course is an introduction to engineering concepts with a focus on critical thinking, creativity, teamwork, communication, and working across different engineering disciplines. Students will be introduced to various disciplines as well as engineering design processes through activity-based instructions. The main aim of this workshop is to introduce product development skills at first year of engineering through a semester-long project, providing a design-built-test experience. This course makes students familiar with Engineering Design, Project and Constraints Management, Multi-disciplinary nature of engineering, problem solving, data acquisition analysis, Team Building, Engineering Ethics & Sustainability.

Students are expected to complete the mini project by applying the engineering concepts/principles taught in the course. Students could join (maximum 4 students) together, form a small team, and execute a simple project in multi-disciplinary engineering field under the guidance of course teachers.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Explain the role of an Engineer as a problem solver.
2. Design engineering solutions to complex problems utilizing multi-disciplinary systems approach.
3. Examine a given problem using process of engineering problem analysis.
4. Build simple systems/prototypes using engineering design and development process.
5. Analyze engineering solutions from ethical and sustainability perspectives.
6. Apply basics of engineering project management skills in project development.

Course Content

Unit No	Description	Hrs
1.	Introduction to Engineering and Engineering Study Difference between science and engineering, Problem space of an engineer (needs) various disciplines of engineering, some misconceptions of engineering, Expectation for the 21 st century engineer and Graduate Attributes.	04
2.	Sustainability in Engineering Introduction to sustainability and SDGs, Sustainability leadership matrix, Life cycle assessment, carbon footprint, embodied energy calculation, alternative material selection and justification.	02





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3. Engineering Design	Engineering Design Process, Importance of analysis in engineering design, General analysis procedure, Multidisciplinary facet of design, Material types and material selection, Concept of FOS, Product Architecture. Introduction to Engineering Drawing, Introduction to 3D modeling software, Part modeling & assembly.	08
4. Mechanisms	Mechanisms and Machines, Different types of Mechanisms, Degrees of freedom or mobility of a mechanism, 4-Bar Mechanisms, Slider Crank Mechanism, Power transmission devices – Need, Selection, types and working principle, torque.	04
5. Design of Power Supply, Battery and Motor Selection	Electric circuit design– 5V & 12V DC power supply design, Circuit Diagram emulation and simulation motor sizing, motor selection, mass identification using software, power adapters, types of adapters, power calculations & adapter selection., battery selection.	04
6. Platform based development	Introduction to systems and Platform Based Development, Arduino as a development board, Arduino programming environment, Sensors, actuators and drivers, Interfacing of I/O devices, Pulse Width Modulation, Analog and Digital data,	10
7. Software Application Development	Basics of app development, Google firebase, Interfacing of app with firebase and Arduino/ESP8266/ESP32, Data Acquisition using Sensors interfaced with Arduino/ESP8266/ESP32	06
8. Project Management, ,	Project Management: Importance of Teamwork, Importance of Project Life Cycle, Project Management Tools, Importance of communication and Communication Media, Various Tools used in Electronics Documentation.	02
9. Engineering Ethics	Engineering Ethics: Introduction to ethics, moral values, Significance of Professional Ethics, Code of Conduct for Engineers,	02
10 Course Project	Physical Implementation: Prototyping planning/Prototyping Sprint Reviews	24
	Course Project Review	06





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References

1. C. Starkey, "Basic Engineering Design", Butterworth-Heinemann Publisher 1988.
2. Yousef Haik, Sangarappillai Sivaloganathan, Tamer M. Shahin, "Engineering Design Process", Cengage learning, 2011.
3. Hugh Jack, "Engineering Design, Planning, and Management", Academic press 2013.
4. Rattan, S.S. "Theory of Machines", 3rd Edition, Tata McGraw-Hill, 2009.
5. Khurmi, R.S. "Theory of Machines", 14th Edition, S Chand Publications, 2005.
6. Kenneth Ayala, "The 8051 Microcontroller, Architecture, Programming, and Applications", West publishing Company.
7. Boylsted, "Electronic Devices and Circuits", Person publication, 2013.
8. R. P. Jain, "Modern Digital Electronics" 2/e, TMH publication
9. Jeremy Blum, "Exploring Arduino: Tools and Techniques for Engineering Wizardry 1st Edition, Wiley publication, 2015.
10. Simon Monk, "Programming Arduino Next Steps: Going Further with Sketches", McGraw-Hill / Tab Electronics.
11. Massimo Banzi, "Make: Getting Started with Arduino, 3rd Edition", Shroff Publications, 2014.
12. Stuart Yarnold, "Arduino in Easy Steps", In Easy Steps Publications, 2015.
13. 13. Blum, "Arduino Programming in 24 Hours, Sams Teach Yourself", 1st Edition, Pearson Publications, 2015.





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Class:- First Year B. Tech.	Semester- I/II
Course Code : SH1037	Course Name : Engineering Chemistry

L	T	P	Credits
3	--	--	3

Course Description:

This foundational Engineering Chemistry course provides first-year engineering students with a comprehensive integration of chemical principles and engineering applications across six key modules: Water Treatment, Modern Analytical Methods, Engineering Materials, Nanomaterials, Corrosion Science, and Fuels & Lubricants. The curriculum combines theoretical knowledge with practical case studies, enabling students to tackle real-world engineering challenges while gaining hands-on experience with advanced analytical tools and cutting-edge materials. Students learn to apply chemical concepts to develop innovative solutions in diverse fields including electronics, construction, environmental remediation, and biomedical engineering, with particular emphasis on advanced materials like graphene and quantum dots. Through exposure to industrial problems and sustainable practices, the course equips students with the necessary skills to analyze challenges, evaluate materials, and design effective solutions, ultimately preparing them for future roles in research, industry, and innovation by bridging fundamental chemistry with practical engineering applications.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Analyze the causes and effects of water hardness in industrial and domestic purpose.
2. Apply the principles of instrumental methods to analyze chemical samples.
3. Analyze the properties, synthesis, and applications of conjugated polymers, alloys, and construction materials, and apply this knowledge to design innovative engineering solutions.
4. Compare top-down and bottom-up approaches for nanomaterial synthesis, and propose applications.
5. Investigate the mechanisms of corrosion and recommend appropriate corrosion control methods.
6. Evaluate the calorific value of fuels, and assess the physical properties of lubricants for their suitability in engineering applications.

Prerequisite: Fundamental concepts in Organic, Inorganic, Analytical and Physical Chemistry.





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Course Content		
Unit No.	Description	Hrs
1.	Water Introduction, water quality parameters: dissolved oxygen and hardness. Hardness: Types of hardness, causes of hardness, units, ill effects of hard water in various industries and boilers (scale & sludge). Treatment of for domestic purpose by sedimentation, coagulation and sterilization, treatment of water for industrial purposes reverse osmosis (RO) and ion exchange process.	06
2.	Instrumental Methods Introduction to instrumental methods, basic laws of spectroscopy (Lamberts law and Beers law), principle, construction, working and applications of single beam spectrophotometer, Flame Photometer, Scanning Electron Microscopy (SEM), X-Ray Diffraction (XRD) and pH-metry.	06
3.	Engineering Materials a) High Polymers: Conjugated polymers – synthesis properties and applications of polyacetylene, polyaniline. b) Alloys: Definition, purpose of making an alloy, composition, properties and applications of stainless steel, brass, nichrome, alnico. c) Construction Materials: Introduction to Cement and Plaster of Paris.	06
4.	Nanomaterials Introduction, properties of nanomaterials, synthetic approach for the nanomaterials: Chemical bath deposition (CBD), Chemical vapor deposition (CVD), Sol-Gel, Hydrothermal method, Introduction to Carbon Nanotubes (CNT's), Graphene and Metal-Organic Frameworks (MOFs), Quantum Dots, Applications of nanomaterial's in electronics, biomedical field, water remediation and catalysis.	06
5.	Corrosion Science Introduction, causes, theories and mechanism of corrosion– dry corrosion and wet corrosion (Hydrogen evolution and Oxygen absorption), factors affecting corrosion, corrosion control methods –cathodic protection, surface coatings - methods of application on metals- hot dipping galvanizing, tinning and electroplating.	06
6.	Fuels and Lubricants Fuels: Introduction, Characteristics of good fuels, calorific value and its types, Bomb calorimeter and Boy's gas calorimeter. Lubricants: Functions of lubricants, Types of lubricants, Physical properties of lubricant (definition and significance)-viscosity, viscosity index, flash and fire point, cloud and pour point, Aniline point.	06





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References -

Text Books:

1. B. H. Mahan, University Chemistry.
2. S. S. Dara, A Textbook of Engineering Chemistry, S. Chand Publications, New Delhi.
3. B. S. Godbole, M. H. Pendase, S. S. Joshi, Engineering Chemistry, Nirali Publication.

Reference Books:

1. Jain and Jain, Engineering Chemistry, Dhanpat Rai Publishing Company (P) Ltd, New Delhi.
2. Chatwal and Anand, Instrumental Methods of Chemical Analysis, Himalaya Publishing House, New Delhi.
3. B Sivasankar, Engineering Chemistry, Tata McGraw-Hill Publishing Company Ltd New Delhi.
4. O. G. Palanna, Engineering Chemistry, McGraw-Hill education (India) Publishing Company Ltd. New Delhi.
5. R. V. Gadag, A. N. Shetty, Engineering Chemistry, I. K. International publication house Pvt. Ltd., New Delhi.
6. S. K. Bhasin and Vijay Sharma, Essentials of Engineering Chemistry, Himalaya Publishing House.





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Class:- First Year B. Tech.	Semester-I/II	L	T	P	Credits
Course Code : SH 1536	Course Name: Engineering Chemistry Lab	--	--	2	1

Course Description:

Engineering Chemistry Laboratory experiments related to the six modules in theory course. This course deals with analysis of different samples including water samples having varying hardness, chlorides, alkalinity, acidity, different metal salts solutions, solutions of varying pH, etc. also it deals with synthesis of nanomaterials and polymers.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Examine the materials by using analytical instruments.
2. Identify the quality of water for industrial and domestic purposes.
3. Apply the knowledge of corrosion science for measurement of rate of corrosion.
4. Apply science of polymers and nanomaterials in the synthesis of materials.
5. Inspect the quality of fuel and lubricants.

Prerequisite: Basic chemistry including knowledge of XIIth Std. Chemistry.

Course Content		
Expt. No.	Description (Any 10 experiments)	Hrs
1.	Estimation of total hardness/chloride content of given sample.	02
2.	Estimation of alkalinity of given water sample.	02
3.	Estimation of acidity of given water sample.	02
4.	Determination of corrosion rate of steel in the acid medium by weight loss method.	02
5.	Determination of coefficient of viscosity using Ostwald's viscometer.	02
6.	Synthesis of simple polymer.	02
7.	Estimation of iron by photo-colorimeter/spectrophotometer.	02
8.	Determination of p^H of given sample solutions by water analyzer.	02
9.	Estimation of sodium and potassium in the given sample of water using Flame Photometer.	02





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10.	Synthesis of Nanomaterials.	02
11.	Determination of percentage of zinc from brass.	02
12.	Determination of strength of acid/base conductometrically.	02
13.	Synthesis of Copper nanoparticles.	02
14.	Determination of Saponification number of given lubricating oil.	02
15.	Determination of Aniline number of given lubricating oil.	02

References:

Reference Books-

1. V. K. Ahaluwalliya, S. Dhingra, A. Gulati, College Practical Chemistry, Universities Press.
2. Sudha Rani And S.K. Bashin, Laboratory Manual on Engineering Chemistry, Dhanpat Rai & Co.
3. Chatwal and Anand, Instrumental Methods of Chemical Analysis, Himalaya Publishing House, New Delhi.
4. J. N. Gurtu, Amit Gurtu. Advanced Physical Chemistry experiments.





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Class:- First Year B. Tech	Semester- II	L	T	P	Credits
Course Code : SH1027	Course Name : Engineering Mathematics-II	3	1	--	4

Course Description:

This course introduces fundamental mathematical concepts essential for solving engineering problems. It covers Special Functions, Curve Tracing, Multiple Integrals, and Applications of Multiple Integrals, Partial Differentiation, and its Applications, Complex Integration. This course intends to build the competency in students to apply Mathematical concepts in various Engineering Problems.

Course Outcomes:

After successful completion of the course, students will be able to,

1. Solve problems on improper and multiple integrals
2. Sketch the curve and use it to solve the problems on multiple integral.
3. Prove the results of partial differentiation and apply partial differentiation for problems on Jacobian, maxima and minima
4. Solve various problems on complex integration.

Prerequisite: Higher Secondary Mathematics

Course Content:

Unit No.	Description	Hrs.
1.	Special Functions Beta and Gamma Functions, Properties of Beta and Gamma Functions, Differentiation under the Integral Sign	06
2.	Curve Tracing Basic notions, Asymptotic behaviour of curves, Tracing of standard rectangular curves, Tracing of standard polar form curves	06
3.	Multiple Integrals Introduction to double integrals, Evaluation of double integrals (Cartesian and polar forms), Evaluation of double integrals over the given region (Cartesian and polar forms), Change of order of integration	06
4.	Applications of Multiple Integrals Area under the curves using double integrals, mass of lamina, moment of inertia of a plane lamina, volumes of solids by double integral	06





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5.	Partial Differentiation Functions of two and three variables, Partial derivatives of first order and higher order, Partial derivatives of composite functions and Implicit functions, Euler's theorem on homogeneous function, Jacobian, Maxima and Minima of function of two variables.	06
6.	Complex Integration Cauchy's integral theorem, Cauchy's integral formula, Taylor series, Laurent series, Residue theorem, Solution integrals	06

Tutorials: (Any 10 tutorials)		
Sr. No.	Title	Hrs.
1.	Special Functions (Gamma function)	01
2.	Special Functions (Beta function)	01
3.	Tracing of Cartesian Curve	01
4.	Tracing of Polar Curve	01
5.	Multiple integrals-I	01
6.	Multiple integrals-II	01
7.	Applications of Multiple Integrals (Area, Mass)	01
8.	Applications of Multiple Integrals (Moment of Inertia, Volume)	01
9.	Partial Differentiation	01
10.	Applications of Partial Differentiation	01
11.	Complex Integration I	01
12.	Complex Integration II	01
13.	Special Functions Using MATLAB	01
14.	Curve Tracing Using MATLAB	01
15.	Multiple Integral using MATLAB	01





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References:

1. B. S. Grewal, (2018) "Higher Engineering Mathematics", 44th edition, Khanna Publications, New Delhi.
2. H. K. Dass and Er. Rajnish Verma, (2014) "Higher Engineering Mathematics", 3rd Revised edition, S. Chand Publications, New Delhi.

Text Books:

1. Raman B.V., Higher Engineering Mathematics, 6th edition, Tata McGraw Hill New Delhi, 2008.
2. N. P. Bali, Ashok Saxena and N. Ch. S. N. Iyengar, (2004) "A Text Book of Engineering Mathematics", Laxmi Publications, New Delhi, 6th edition.
3. Peter V. O'Neil, (2002) "Advanced Engineering Mathematics", Cole publishing house, 4th edition.
4. P. N. Wartikar and J. N. Wartikar, A Text book of Applied Mathematics, Vol. I, Vol. II, 9th edition, Vidyarthi Griha Prakashan, Pune, 2005.





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Class:- First Year B. Tech	Semester-I/II	L	T	P	Credits
Course Code : SH1136	Course Name: Engineering Graphics	2	--	2	3

Course Description:

A picture speaks a thousand words, and visual communication is often more effective than words alone. Since ancient times, humans have used drawings to convey ideas. With technological progress, the need for a standardized graphical language led to the development of Engineering Drawing. Mastering Engineering Drawing requires understanding its grammar—standard conventions, notations, and methods—along with proficiency in AutoCAD. This course equips students with these essential skills, enabling them to create precise technical drawings. A basic understanding of geometrical theorems and construction procedures is recommended as a prerequisite.

Prerequisite: The knowledge of simple geometrical theorems and constructional procedure.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Draw the projections of line, plane and regular solids with respect to reference planes as per given conditions using AUTOCAD.
2. Generate the sectional view, true shape of the section and development of the solid with the help of AUTOCAD software.
3. Prepare orthographic views of engineering components with AUTOCAD software.

Course Content		
Unit No.	Description	Hrs
1.	Projection of Point and Lines Basic principles of orthographic projection Projections of points, Projection of oblique line by rotation or auxiliary plane method using first angle projection method.	04
2.	Projection of Planes Types of plane, line view of a plane, true shape of a plane, oblique plane. Projection of planes by rotation or auxiliary plane method.	04





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3.	Projection of Solids Define Solid, types of solid, projection of solid in simple position, projections of solids with axes inclined to one of the reference plane and parallel to the other, projections of solid with axes inclined to both the reference planes.	04
4.	Section of Solids Significance of section planes, types; vertical cutting plane, horizontal cutting plane, AVP, AIP; HT, VT; Section of Solids like prism, pyramid, cone, cylinder and true shape of the sections.	04
5.	Development of Solid Surfaces Development of solids like prism, pyramid, cone, cylinder. Industrial applications of development of surfaces, methods of development,	04
6.	Orthographic Projection Introduction, projections methods, types of lines (continues, hidden, center line etc.), types of scales, theory of projections, HRP, FRP, PRP, steps to convert 3D view into 2D view multi view, simple and sectional orthographic drawings, types of hatch lines and their rules. Orthographic projection of objects by first angle projection method. Procedure for preparing scaled drawing, sectional views and hatching of sections.	04

***Note:** Drawings of Theory paper of UT1, UT2 and ESE exam will be conducted on AutoCAD software.

References –

Text Books:

1. D. A Jolhe. Engineering Drawing, Tata-McGraw hill.
2. N. D. Bhatt. Elementary Engineering Drawing, Charotar Publishing House, Anand (India)
3. K. L. Narayana, P. Kannaiah. Text Book on Engineering Drawing, Scitech Publications (India) Pvt. Ltd., Chennai.

Reference Books:

1. W. Luzzader. Fundamentals of Engineering Drawing, Prentice Hall of India, New Delhi.
2. P. S. Gill. Engineering Graphics, S. K. Kataria and sons New Delhi.
3. D.M. Kulkarni, A. P. Rastogi, A. K. Sarkar. Engineering Graphics with AutoCAD, PHI Publication.





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Class:- First Year B. Tech	Semester- I/II	L	T	P	Credits
Course Code : SH1295	Course Name: Basic Electrical Engineering	2	--	--	2

Course Description:

Engineering students of almost all disciplines have to undergo this course as a core subject in the first year. A reasonable understanding on the basics of applied electricity is very important for every engineer. The course can be broadly divided into three major parts, namely: electrical circuits, magnetic circuits and electrical machines. Apart from learning D.C. and A.C. circuit analysis both under steady state and transient conditions, students will learn basic working principles and analysis of transformer, magnetic circuits, D.C. motors and induction motor.

Course Outcomes:

After successful completion of the course, students will be able to,

1. Solve D.C. and A.C. electric circuits.
2. Illustrate the notions of magnetic circuits.
3. Explore suitable capacity of wires, cables, and switchgear for electrical installations.
4. Elaborate transformer and rotating electrical machines.

Prerequisite: Concept of potential difference, current and resistance. Ohm's law. Fundamentals of electromagnetics.

Unit No.	Course Content Description	Hrs
1.	DC Circuits Ohms Law, Equivalent Resistance, Kirchhoff current Law, Kirchhoff voltage laws, Mesh analysis, Nodal analysis. Superposition Theorem.	04
2.	AC Fundamentals Introduction of circuit elements, Generation of Sinusoidal waveform, Basic notions of AC waveform, Analysis of single-phase ac circuits. Power triangle. Introduction of three phase circuits, star and delta configuration.	04
3.	Magnetic Circuits Introduction, concept of magneto-motive force (MMF), Magnet field intensity, reluctance, permeability and relative permeability, B-H characteristics, comparison between electric and magnetic circuits, leakage flux fringing and staking.	04





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4.	Electrical Installations Components of LT Switchgear: Fuse, MCB, ELCB, MCCB, Earthing, Single Line Diagram and Electrical Layout of Residential Wiring, Elementary calculations for energy consumption, Electrical Safety and Safety Measures	04
5.	Transformer Construction and working of transformer, types of transformer, EMF equation and transformation ratio, ideal and practical transformer on no load, losses and efficiency of transformers, Introduction to Three Phase Transformer.	04
6.	Electrical Machines DC machine: construction, working, types and applications. Three phase induction motor: construction, working, slip. Introduction to Single Phase Induction Motor, types & applications	04

References:

Text Books-

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill.
3. Abhijit Chakrabarti, Sudipta Nath, "Basic Electrical Engineering", McGraw Hill Education (India) Pvt. Ltd.

Reference Books:

1. B.L. Theraja, A.K. Theraja, "A Textbook of Electrical Technology" (Volume I, II and III), S. Chand Publications.
2. C. L. Wadhwa, "Basic Electrical Engineering" 4th Ed, New Age International (P) Ltd., Publishers.
3. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India.
4. NPTEL: Electrical Engineering (online) - Basic Electrical Technology Link: nptel.ac.in/courses/108105053/





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Class:- First Year B. Tech.	Semester-I/II
Course Code : SH1795	Course Name: Basic Electrical Engineering Lab

L	T	P	Credits
--	--	2	1

Course Description:

This course is intended to enhance the learning experience of the student in topics wise. In this lab, students are expected to get hands-on experience in using the basic measuring devices used in electrical engineering and in interpreting the results of measurement operations in terms of the concepts introduced in the first electrical circuits course. How the student performs in the lab depends on his/her preparation, participation, and teamwork. Each team member must participate in all aspects of the lab to ensure a thorough understanding of the equipment and concepts. The student, lab teaching assistant, and faculty coordinator all have certain responsibilities for the successful completion of the lab's goals and objectives.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Analyze electrical DC circuits using Ohm's Law and Kirchhoff's laws.
2. Analyze performance of single and three phase AC circuits and interpret the results.
3. Demonstrate operation of different wiring system and LT switchgears
4. Conduct various tests on transformers and basic electrical machines
5. Develop problem-solving skills to troubleshoot and resolve electrical issues

Prerequisite: Fundamental of Physics

Course Content		
Expt. No.	Description	Hrs
1.	Introduction to electrical engineering laboratory equipment's, symbols, and safety rules.	02
2.	Verify Kirchhoff's Voltage Law (KVL) and Kirchhoff's Current Law (KCL) in DC electrical circuits.	02
3.	Analyze the behavior of a single-phase series RLC circuit by measuring voltages, currents, and phase angles.	02
4.	Verify the relationships between line and phase voltages and currents in three-	02





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	phase star (Y) and delta (Δ) connected circuits.	
5.	Plot the B-H curve of a given magnetic material	02
6.	Demonstrate simple, staircase, and go-down electric wiring circuits	02
7.	Demonstration of LT switchgears – (a) Switch fuse Unit (b) Miniature Circuit Breaker (MCB) (c) Moulded case circuit breaker (MCCB) and (d) Earth leakage circuit breaker (ELCB)	02
8.	Perform Open Circuit (OC) and Short Circuit (SC) tests on a single-phase transformer to find the efficiency	02
9.	Perform direction reversal operation of a three-phase induction motor by changing the phase sequence.	02
10.	Self-Learning Activity: Development of Electrical gadget	02

References:

Text Books-

1. L.S. Bobrow, Fundamentals of Electrical Engineering, Oxford University Press,
2. E. Hughes, Electrical and Electronics Technology, Pearson,

Reference Books-

1. V. Deltoro, Electrical Engineering Fundamentals, Prentice Hall India,





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Class:- First Year B. Tech.	Semester- I	L	T	P	Credits
Course Code : SH1854	Course Name: Engineering Practice Lab-I	--	--	2	1

Course Description:

Workshop practice imparts basic knowledge of various tools and their uses in different sections of manufacturing such as Fitting, Tin Smithy, House Wiring, Carpentry etc. It is true that engineers are not going to become carpenters or blacksmiths or skilled workers on the shop floor, but by exposing themselves to all working trades, they get a bird eye view of the basic practical activities associated with all sections of manufacturing. It helps them, when they occupy managerial positions, in understanding the activities and practical difficulties, so that they can take appropriate decisions.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Acquire skills in basic engineering practice.
2. Use hand tools and power tools.
3. Develop sheet metal model for specific application.
4. Illustrate the various operations performed in machine shop.
5. Perform different joining operations
6. Perform pipefittings operations.

Prerequisite: Nil

Course Content		
Expt. No.	Description	Hrs
1.	Demonstration of different carpentry operations useful for making wooden pattern, furniture items etc. with the help of hand tools and power tools	02
2.	To make a Dovetail Joint using Carpentry Tools	02
3.	To make a Butt Joint or T-Joint using Carpentry Tools	02
4.	Demonstration of different Sheet metal operations useful for Sheet metal objects like CPU cabinet, Enclosures of inverter, Tray etc. by performing operations like Cutting, Bending, Folding.	02





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5.	To make small jobs like Electrical meter cover, transformer clamping.	02
6.	Demonstration of different machining operations useful for machining objects like crankshaft, camshaft, axis-symmetric parts etc. by performing centre drilling, facing, plain turning, knurling and chamfering.	02
7.	Demonstration of different joining processes for metal rods, plates and sheet metal.	02
8.	To make Lap joint using metal joining techniques.	02
9.	To make Butt joint or T-joint using metal joining techniques.	02
10.	Demonstration of different piping connections, plumbing techniques in G.I, PVC, UPVC, CPVC fittings.	02
11.	Demonstration of soldering and testing of electronic components.	02
12.	Demonstration of use of electronic control circuits.	02





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Class:- First Year B. Tech.	Semester-II
Course Code: SH1644	Course Name : Engineering Practice Lab-II

L	T	P	Credits
--	--	2	1

Course Description:

To familiarize with the basic manufacturing processes and to study the various tools and equipment used, hands-on training is given in different sections. Essentially student should know the labor involved, machinery or equipment necessary, time required to fabricate and should be able to estimate the cost of the product or job work.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Make wooden job.
2. Make Sheet metal job.
3. Make job by various machining processes.
4. Make job by joining processes.

Prerequisite: Experiential knowledge of Engineering Practice lab – I.

Course Content		
Expt. No.	Description	Hrs
1.	Selection of job and approval from instructor.	02
2.	Preparation of drawing, approval of drawing and material selection.	02
3.	To make a job as per the drawing by using various operations in different sections of workshop.	02
4.	To make a job as per the drawing by using various operations in different sections of workshop.	02
5.	To make a job as per the drawing by using various operations in different sections of workshop.	02
6.	Assessments of job for job no 1.	02
7.	Selection of job and approval from instructor.	02
8.	Preparation of drawing, approval of drawing and material selection.	02





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9.	To make a job as per the drawing by using various operations in different sections of workshop.	02
10.	To make a job as per the drawing by using various operations in different sections of workshop.	02
11.	To make a job as per the drawing by using various operations in different sections of workshop.	02
12.	Assessments of job for job no 2.	02





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Program Core Courses





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Class: First Year B. Tech.	Semester: II	L	T	P	Credits
Civil Engineering					
Course Code : SH188	Course Name: Applied Mechanics	2	-	-	2

Course Description:

Engineering Mechanics focuses on the analysis of static bodies. The course helps the students to understand facts, concepts, principles and techniques of scientific investigation in the field of engineering. It develops thinking, analytical ability and imaginative skill of student. It is an introductory course which supports study of many other advanced courses like analysis and design of various structures.

Course Outcomes:

After successful completion of the course, students will be able to,

1. Calculate resultant force of coplanar force system.
2. Analyze engineering problems applying conditions of equilibrium
3. Determine centroid & moment of inertia of the geometrical plane composite lamina.

Prerequisite: Engineering Mathematics, Engineering Physics

Course Content		
Unit No.	Description	Hrs
1	Fundamentals of Mechanics and force systems: Force and classification of force systems. Resultant of parallel, concurrent and non-concurrent coplanar forces.	04
2	Equilibrium of force system: Free body diagram, conditions of equilibrium, types of loads, types of beams, types of supports and reactions. Analysis of simple and compound beams using conditions of equilibrium	04
3	Friction: Introduction to Laws of friction, Surface friction for bodies on horizontal and inclined planes.	04
4	Analysis of trusses: Analysis of simple truss, Method of joints, Method of sections.	04
5	Centroid: Centroid of plane and composite lamina.	04
6	Moment of Inertia: Moment of Inertia of plane and composite lamina.	04





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References:

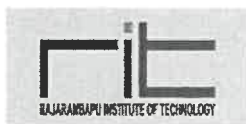
Text Books:

1. Bhavikatti S. S., Rajashekarappa, "Engineering Mechanics", New age International publication (India) Pvt. Ltd. New Delhi,
2. Ramamrutham S., "Engineering Mechanics", Dhanpat Rai Publishing Company Ltd., New Delhi.

Reference Books:

1. S. Junnarkar, "Elements of Applied Mechanics", Charotar Publishing House (India) Pvt. Ltd., Anand (Gujarat)
2. Ferdinand. Beer and E. Russell Johnson, "Vector Mechanics for Engineers (Statics and Dynamics)", McGraw Hill Publication, New York.
3. Ferdinand L. Singer, "Engineering Mechanics (Statics and Dynamics)" Publications (India) Pvt. Ltd. Noida.
4. Timoshenko and Young, "Engineering Mechanics (Statics and Dynamics)", McGraw Hill Publication, New York.





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Class:- First Year B. Tech Electrical Engineering	Semester- I	L	T	P	Credits
Course Code : SH172	Course Name: Electrical Power Generation Technologies	2	--	--	2

Course Description:

This course provides an in-depth understanding of India's energy scenario, including conventional and non-conventional energy sources, government policies, and future power demands. It covers power generation technologies such as thermal, nuclear, hydro, solar, and wind, along with their site selection, working principles. The course also explores advanced topics like photovoltaic systems, wind turbine generators. Additionally, it includes alternative energy sources such as biomass, geothermal, ocean energy, fuel cells, and hydrogen energy. Emphasis is placed on sustainable energy solutions and future trends in India's power sector.

Course Outcomes:

After successful completion of the course, students will be able to,

1. Summarize the structure, policies, and future energy demands of Indian power sector.
2. Analyze the working principles of conventional energy sources.
3. Evaluate the operation of Renewable energy sources
4. Explain the fuel cell and other advanced power generation technologies.

Prerequisite: Physics, Chemistry, Science

Unit No.	Course Content Description	Hrs
1	Energy Scenario in India Overview of India's Energy and Power Sector, Conventional and Non-conventional energy sources and generation capacity, Government Initiatives and Policies towards sustainable power system development, Future Energy Demands in India, Principles of Energy Conservation and Energy Audit, Electrical safety.	04
2	Thermal Power Plant Site selection, Main parts and its working, Types of boilers, Ash disposal and dust collection, Draught systems, electrostatic precipitator. Advantages and disadvantages of Thermal power plant, Environmental Impacts	04
3	Nuclear Power Plant Introduction, site selection, Nuclear Fission & Fusion, nuclear reactors and	04





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	working, Advantages and disadvantages of Nuclear Power Plant, Nuclear Waste Disposal, Environmental Impacts	
4	Hydro Power Plant Introduction, Site selection, general arrangements and operation of hydro power plant, Water Hammer and Surge Tank, Types of Turbines, Types of Power Plants, Advantages and Disadvantages of Hydropower Plant, Environmental Impacts	04
5	Solar and Wind Energy System Photovoltaic cell, Module, Array, Equivalent Circuit for a Photovoltaic Cell. I-V and PV characteristics, Impacts of Temperature, Insolation and shading on I-V Curves, Environmental Impacts of solar Energy Types of wind turbine, Power in the Wind, Types of wind turbine Generators, Environmental Impacts of Wind Turbines, Advantages and Disadvantages of wind power plant.	04
6	Other Energy Sources Fuel Cell, Hydrogen Energy, Biomass Energy conversion, Geothermal Energy, Ocean energy, Municipal solid waste to electrical energy conversion, Environmental Impacts	04

References:

Text Books-

1. S.Rao, Dr.B.B.Purulekar, "Energy Technology", Khanna Publications.
2. G. D. Rai, "Non-Conventional Energy Sources", Khanna Publications.
3. V.K.Meheta, Rohit Mehta, "Principles of Power System", S.Chand Publications

Reference Books:

4. B.R.Gupta, "Generation of Electrical Energy", S. Chand Publications.
5. P. K. Nag, "Power Plant Engineering", Tata McGraw Hill Publications

NPTEL: <https://archive.nptel.ac.in/courses/112/107/112107291/>





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Class:- First Year B. Tech. Electronics and Telecommunications Engineering	Semester-II	L	T	P	Credits
Course Code : SH190	Course Name : Basics of Electronics Engineering	2	-	-	2

Course Description:

This course introduces the fundamentals of electronics, including basic electrical quantities, semiconductor physics, and electronic components. Students learn about diodes, number systems, ADC/DAC, and practical devices such as wires, switches, and connectors. The course emphasizes understanding, applying, and using electronic principles in simple circuits and digital applications.

Course Learning Outcomes:

After completion of this course, students will be able to:

1. Explain basic electrical quantities and components used in electronic circuits.
2. Apply number system conversions and binary arithmetic to basic digital problems
3. Describe the working principles, types, and applications of ADCs and DACs.
4. Illustrate basic electronic devices, wires, and connectors.

Prerequisite: Basic knowledge of Physics

Course Content		
Unit No.	Description	Hrs
1.	Introduction to Electronics Introduction to electronics, Overview of basic electrical quantities: Voltage, Current, Power, Energy, Overview of Resistor, Capacitor, inductor, -Types, value calculation, and its uses. AC fundamentals (waveforms, RMS, average value).	04
2.	Semiconductor Physics Conductors, insulators, semiconductors, Atomic structure, Intrinsic & extrinsic semiconductors, p-type & n-type materials, Majority & minority carriers, Drift and diffusion currents, PN junction formation, Depletion region & junction potential.	04
3.	Semiconductor Diodes PN junction diode, V-I characteristics, Forward & reverse bias, Zener diode, LED, Schottky Diode, Varactor Diode, Photodiode, Diode ratings & specifications.	04
4.	Number Systems Number systems: Binary, Octal, Decimal, Hexadecimal, Number system Conversions. Binary arithmetic, 1's Complement, 2's Complement.	04





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5.	ADC and DAC Introduction to Data Conversion: Analog vs. Digital signals, Block diagram of DAS, Basic principle of ADC, types, specifications and applications, Basic principle of DAC, types, specifications and applications	04
6.	Wires and Devices Wires, Connectors, Switches, Relays, Transformers, Heat Sink	04

References –

Text Books:

1. Bernard Grob, Mitchel E. Schultz, Basic Electronics, TMH Publications.
2. Anand Kumar, Fundamentals of Digital Circuits, PHI Publications.

Reference Books:

1. V. K. Mehta, Rohit Mehta, Principles of Electronics, S. Chand and Company.
2. R P Jain, Modern Digital Electronics, TMH Publications.





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Class:- F.Y. B. Tech CSIT	Semester-I
Course Code : SH176	Course Name : IT for Business

L	T	P	Credits
2	--	--	2

Course Description:

The primary objective of this course is to familiarize the students with basic concepts of information technology and their applications to business processes and decision making. Course focuses on the technological changes and trends that are revolutionizing the various knowledge areas under business management. The role and applications of information technology in business have been extensively discussed.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Describe the basics of information technology.
2. Compare various types of information systems.
3. Discuss the environment of a business enterprise which leverages IT for managing its business.
4. Explain E - Commerce Technologies and Emerging Issues.
5. To examine the intensity of ethical issues as an important element influencing the ethical decision-making process.

Prerequisite: Basic Knowledge of Computer

Course Content		
Unit No.	Description	Hrs
1.	Introduction to Information Technology IT: Meaning and Nature, India: The IT Superpower, Reasons behind IT Growth in India, Role of IT in various Sectors, Information Technology Management, Strategies for gaining IT Advantage.	04
2.	Information Systems Defining Information System, components, types, Management Information System, Essentials of effective MIS, Transaction Processing System, Decision Support System, Expert systems, Artificial Neural Systems, Strategic Information System.	04





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3.	Business view of Information Technology Applications Business Enterprise Organization, Core Business Processes, Key Purpose of Using IT in Business, The connected world – Characteristics of Internet ready IT Applications, Enterprise Applications and Bespoke IT Applications, Case Study.	04
4.	Electronic Business and E - Commerce E-Business and E-Commerce, Merits and Demerits E-Commerce, E-Commerce Business Models, Classification of E-Commerce, Value chains in E-Commerce, Functions of E-Commerce, E-Commerce in India, Indian Government's Role.	04
5.	E - Commerce Technologies and Emerging Issues Network and Communication, Infrastructure, Intranet and Internet, Electronic Data Interchange (EDI), Electronic Payment System, Modes of Payment in E-Commerce, Enterprise Resource Planning (ERP), Regulatory issues, Taxation Issues.	04
6.	Business Ethics Ethical Issues in Business, Ethical Decision Making Process. A Framework for Ethical Decision Making in Business - Ethical Issue Intensity, Individual Factors, Organizational Factors, Business Ethics Evaluations and Intentions, Views of Corporate Governance. A Real Life Situation, Emotional Quotient.	04

References -

Text Books:

1. Dhiraj Sharma, "Information Technology for Business", Himalaya Publication House.
2. R. N. Prasad, Seema Acharya, "Fundamentals of Business Analytics", Wiley Publication.

Reference Books:

1. O. C. Ferrell, John Paul Fraedrich, Linda Ferrell, "Business Ethics – Ethical Decision Making and Cases", Indian Adaptation, Biztantra. Dreamtech Press.
2. P. Mohan, "Information Technology for Business", Himalaya Publication House
3. Dhiraj Sharma, "Foundations of IT", Excel Books India.





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Class:- First Year B. Tech Computer Engineering	Semester-I	L	T	P	Credits
Course Code: SH178	Course Name: Introduction to Cyber Security	2			2

Course Description:

To implement efficient algorithms and programs it is necessary to organize or structure the data. Understanding of data structures and their related applications are highly needed to build sustainable program.

Course Learning Outcomes:

1. Explain the basics of data structures and its relevance to real world application.
2. Differentiate between linear and nonlinear data structures.
3. Apply appropriate data structures to solve real-world problems.
4. Analyze the properties and structural differences between various data structures

Prerequisites: Basic knowledge of C Programming, Problem Solving skills

Course Content		
Unit No	Description	Hrs
1.	Introduction to data structure: Basic concepts C languages: Introduction to Structures and Pointers. Importance and applications of data structures, Types of data structures, Algorithms and Asymptotic notations.	04
2.	Stack: Definition & Concepts, Operations on Stacks, Applications of Stack, Polish expressions, Reverse Polish Expression and conversions, Recursion, Tower of Hanoi problem.	04
3.	Queue: Queue and its sequential representation, Simple Queue, Circular Queue, Double Ended Queue, Priority Queue, Applications of Queue.	04
4.	Linked List: Sequential Allocation method Vs linked Allocation method, Dynamic Data structure Vs Static Data structure, Pointers and Linked Allocation, Types of Linked List, Applications of Linked List.	04





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5.	Tree: Definitions and concepts, Terminology, Binary trees, Binary Tree Representations, Binary Tree Traversals, Binary Search Tree, Insertion and Deletion in BST, Applications of Tree.	04
6.	Graph: Definition and concepts, Graph Representation, Graph Terminology, Graph Traversals – Depth First Search and Breadth First Search,	04

References –

Text Books

1. Seymour Lipschutz, Data Structures, McGraw Hill.

References

2. Jean-Paul Tremblay, Paul G. Sorenson, An Introduction to Data Structures with Application, McGraw Hill
3. A.M. Tenenbaum, Data Structures using C & C++ ,Prentice-Hall International.

MOOC Courses:

4. <https://nptel.ac.in/courses/106102064/>
5. <https://nptel.ac.in/courses/106103069/>





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Class:- First Year B. Tech	Semester – I	L	T	P	Credits
AIML					
Course Code : SH180	Course Name : Generative AI and Prompt Engineering	2	--	--	2

Course Description:

This course provides an understanding of Generative AI, its history, evolution, benefits, challenges, and applications. It explores various generative AI models such as GANs, VAEs, and Transformers, along with the fundamentals of prompt engineering, techniques, and frameworks. The course also covers ethical considerations, limitations, and future trends, equipping students with knowledge of AI-generated text, images, code, audio, and video.

Course Learning Outcomes:

After successful completion of the course, students will be able to:

1. Comprehend basic concepts and applications of AI and prompt engineering.
2. Differentiate various Generative AI models such as GANs, VAEs, and Transformers.
3. Identify and categorize different types of prompts and apply prompt priming techniques.
4. Compare and analyze various prompt frameworks to determine their suitability for different AI-driven tasks.
5. Address ethical concerns biases, and limitations associated with Generative AI and prompt engineering.

Prerequisite: Basic knowledge of Artificial Intelligence concepts.

Course Content		
Unit No	Description	Hrs
1.	Introduction to Generative AI History and Evolution, Benefits, Challenges, Applications of Generative AI, Tools for Text, Image Code, Audio and Video generation, Economic Potential of Generative AI.	04
2.	Models For Generative AI Generative AI Models: Generative Adversarial Networks (GANs), Variational Autoencoders (VAEs), Transformers, Attention Mechanism in detail Long Short-Term Memory Networks (LSTMs).	04





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3.	Introduction to Prompt Engineering Introduction to Prompt Engineering, Categories of Prompts, Basic Concepts and Terminology of Prompt Engineering, Importance of Prompt Engineering.	04
4.	Prompt Engineering Techniques and Approaches Prompt Creation, Writing effective prompts, Prompt engineering approaches: Interview pattern, Chain-of Thought, Tree-of Thought, Challenges in generating meaningful and coherent prompts.	04
5.	General Prompt Frameworks Overview of Prompt Frameworks, Examples of Popular Prompt, Frameworks (e.g., TARS, CLEAR), RGC Prompting, Comparative Analysis of Frameworks.	04
6.	Ethical Issues and Limitations Ethical and Bias Issues in Prompts, Cross-Disciplinary Applications of Prompts, Future Trends in Prompt Engineering, Limitations of Generative AI: Issues and concerns, Future and professional Growth of Generative AI	04

References -

Text Books:

1. David Foster, Generative Deep Learning: Teaching Machines to Paint, Write, Compose, and Play, O'Reilly Media
2. Russell Power, The Art of Prompt Engineering: Crafting Effective Prompts for AI, AI Mastery Press.
3. Mariya Yao, Adelyn Zhou, Marlene Jia, Applied Artificial Intelligence: A Handbook for Business Leaders, Topbots Inc.

Reference Books:

1. Altaf Rehmani, Generative AI for Everyone, BlueRose One.
2. Brian Christian, The Alignment Problem: Machine Learning and Human Values, W.W. Norton & Company.
3. Rajiv Shah, Optimizing Chatbots with NLP: Strategies for Effective Prompt Engineering, Apress.





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Class: F.Y. B. Tech Mechanical	Semester: II
Course Code: SH182	Course Name: Engineering Mechanics

L	T	P	Credits
2	--	--	2

Course Description:

This course in Engineering Mechanics covers foundational principles and applications essential for understanding the behavior of mechanical systems under various forces and conditions. It begins with an exploration of Scalars, Vectors, and Force Systems, progressing to the analysis of equilibrium in 2D and 3D Force Systems and the calculation of reactions in beams with different supports. Friction phenomena, including laws, coefficients, and applications in mechanical systems like clutches and brakes, are also studied. Students learn methods for analyzing trusses and frames, calculating centroids, and moments of inertia for both basic and composite shapes. The course concludes with an examination of rigid body kinematics and dynamics, encompassing Newton's Laws, energy principles.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Analyze force systems and equilibrium conditions in mechanical structures.
2. Determine reactions in beams, trusses, and frames using free-body diagrams.
3. Evaluate frictional effects in mechanical systems like brakes, clutches, and screw jacks.
4. Calculate centroids and moments of inertia for simple and composite geometries.
5. Apply kinematic and dynamic principles to particle and rigid body motion.

Prerequisite: Engineering Mathematics, Engineering Physics.

Course Content		
Unit No.	Description	Hrs
1.	Basics of Mechanics: Scalars, Vectors, and Force Systems, Types of Forces and Resolution of Forces, Resultant of Concurrent Force Systems, Resultant of Non-Concurrent Force Systems, Resultant of Parallel Force Systems, Moment of a Force and its Applications, Varignon's Theorem on Moments, Couples and Equivalent Force-Couple Systems, Applications of Force Systems in Engineering.	04
2.	Equilibrium of Force Systems: Free Body Diagram (FBD) and its Importance, Conditions of Equilibrium in 2D and 3D Force Systems, Types of Loads (Point Load, UDL, UVL), Types of	04





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	Beams. Types of Supports, Calculation of Reactions in Simply Supported Beams, Calculation of Reactions in Compound Beams, Equilibrium of Rigid Bodies, Virtual Work Principle and its Applications.	
3.	Friction and Its Applications: Laws of Friction and Coefficient of Friction, Static and Dynamic Friction, Friction on Horizontal and Inclined Planes, Rolling Friction, Belt-Pulley Systems and Friction, Wedge Friction, Brake Mechanisms and Friction Forces, Clutches and Their Working Principle, Screw Jack – Principle and Efficiency, Friction in Vehicles.	04
4.	Analysis of Trusses and Frames: Basic Concepts, Assumptions in Truss Analysis, Method of Joints for Simple Trusses, Method of Sections for Trusses, Zero-Force Members in Trusses, Compound Trusses and their Analysis, Introduction to Frames and their Types, Equilibrium Analysis of Frames.	04
5.	Centroid and Moment of Inertia: Concept of Centroid and Center of Gravity, Centroid of Basic Geometric Figures (Triangle, Rectangle, Circle), Centroid of Composite Figures, Introduction to Moment of Inertia, Moment of Inertia of Simple Plane Figures, Moment of Inertia of Composite Figures, Parallel Axis Theorem, Perpendicular Axis Theorem, Product of Inertia.	04
6.	Kinematics and Dynamics of Rigid Bodies: Basics of Kinematics – Types of Motion, Rectilinear and Curvilinear Motion of Particles, Kinematics of Rigid Bodies in Plane Motion, Newton's Laws of Motion, D'Alembert's Principle, Work-Energy Theorem for Rigid Bodies, Impulse-Momentum Principle for Linear Motion, Impulse-Momentum Principle for Angular Motion, energy formulations, Lagrange's equation.	04

References:

Text Books:

3. Bhavikatti S. S., Rajashekarappa, "Engineering Mechanics", New age International publication (India) Pvt. Ltd. New Delhi.
4. Ramamrutham S., "Engineering Mechanics", Dhanpat Rai Publishing Company Ltd., New Delhi.

Reference Books:

5. S. Junnarkar, "Elements of Applied Mechanics", Charotar Publishing House (India) Pvt. Ltd., Anand (Gujarat)
6. Ferdinand. Beer and E. Russell Johnson, "Vector Mechanics for Engineers (Statics and





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- "Dynamics)", McGraw Hill Publication, New York.
7. Ferdinand L. Singer, "Engineering Mechanics (Statics and Dynamics)" Publications (India) Pvt. Ltd. Noida.
 8. Timoshenko and Young, "Engineering Mechanics (Statics and Dynamics)", McGraw Hill Publication, New York.





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Class: - F. B. Tech.	Semester- II	L	T	P	Credits
Mechatronics Engineering					
Course Code: SH184	Course Name: Fundamentals of Mechatronics	2	--	--	2

Course Description:

This course aims at providing fundamental understanding about the basic elements of a mechatronics system, interfacing, and its practical applications.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Identify various elements of mechatronics system.
2. Demonstrate of sensor, actuator, controller, control algorithm for different applications.
3. Differentiate between PLC, Microprocessor, microcontroller.

Prerequisite: The students should have basic knowledge of numbering system, Boolean algebra.

Course Content		
Unit No	Description	Hrs
1.	Introduction: Introduction to Mechatronics, Key elements of Mechatronics, Block diagram of mechatronics system, Control systems and Modes of control, Difference between traditional and concurrent design process.	02
2.	Sensors and transducers: Transducers- classification, Development in Transducer technology Sensors - Introduction, Need of Sensors, Classification, Working and Application of- Potentiometer Sensors, Strain Gauge Elements. Capacitive Elements, Eddy Current, Proximity Sensors, Inductive Proximity Sensors, Light Sensors, Pressure Sensors, Pneumatic Sensors, Pyro electrical Sensors, Piezoelectric Sensors, Shaft Encoders.	06
3.	Drives and Actuators: Introduction and Classification of Actuators. Need and Scope. Hydraulic Actuation Systems-Linear, Single and Double Acting system, Pneumatic Actuation systems- gear Motors and Vane Motors. Electrical Actuation Systems — solenoid type Devices, Stepper Motors, and Servo Motor.	04





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4.	Controllers: PLC- Introduction, definitions, PLC block diagram, Difference between Relay panel and PLC, Selection of PLC, Introduction to Ladder logic programming. Microcontroller and Microprocessor- Introduction, Comparison of Microcontroller and Microprocessor, Architecture — Pin configuration of 8051 Microcontroller,	04
5.	Signal Conditioning: Operational amplifier circuits, filtering circuits, Analog, and Digital signal conversion.	04
6.	Advanced applications in mechatronics: Mechatronics in automated manufacturing, Artificial intelligence in mechatronics, Case studies of mechatronics systems.	04

References -

Text Books:

1. D. Shetty & R. A. Kolk, Mechatronics System Design, PWS Publishing Company (Thomson Learning Inc.).
2. W. Bolton, Mechatronics: A Multidisciplinary Approach, Pearson Education.
3. R.K. Rajput, A Textbook of Mechatronics, S. Chand & Company Private Limited.
4. W. Bolton, Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering, Prentice Hall.

Reference Books:

1. David Alciatore, Introduction to Mechatronics and Measurement Systems.





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Class: - First Year B. Tech Robotics and Automation	Semester-II	L	T	P	Credits
Course Code : SH186	Course Name : Basics of Robotics & Automation	2	--	--	2

Course Description:

This course provides an in-depth understanding of the fundamental concepts and applications of robotics and automation. It provides an introduction to robotics, its history and development, various types of end effectors, grippers, kinematic and dynamics of robotics, robot drive systems, sensors and actuators and fundamentals of robot programming and applications. This course also introduces the need for automation, its types and various applications of automation technology in industries.

Course Learning Outcomes:

After successful completion of the course, students will be able to,

1. Explain importance of automation .
2. Discuss fundamentals of robot mechanism.
3. Explain working principle of sensors and actuators.
4. Illustrate microprocessors and microcontrollers for system automation.
5. Discuss different robot programming methods.

Prerequisite: Basic Knowledge of Physics, Mathematics

Course Content		
Unit No.	Description	Hrs
1.	Introduction to Robots: Definition, historical background, laws of robotics, types of robots, various generations of robots, robot anatomy, workspace and work volume, Applications of Robotics	04
2.	Introduction to Robot Mechanisms: Robot Mechanisms: Kinematic link, types of links, structure, machine, kinematic pair, types of pairs, degrees of freedom, drives and types of drives.	04
3.	Sensors, Microcontrollers and Microprocessors Various types of sensors, microcontrollers, microprocessors and Programmable Logic Controller	04





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4.	Robot End Effectors and Drive Systems: Types of end effectors, grippers, sensor end effector and tool end effectors	04
5.	Introduction to Automation: Mechanization and Automation, History of Automation, Reasons for automation, Merits and limitations, Types of Automation: Fixed, Flexible and Programmable.	04
6.	Robot Programming: Introduction to programming, types of programming-online programming, offline programming Lead-through Programming, Walk-through Programming, Use of Teach pendants - Capabilities and limitations, robot programming languages.	04

References:

Text Books:

1. Mittal R K & Nagrath, "Robotics and Control", 2nd Edition, McGraw Hill Publication TMH.
2. S. K. Saha, "Introduction to Robotics", 2nd Edition, TMH, 2014.
3. Grover, M.P. Weiss, M. Nagel, R.N. & Odrey, N.G., Ashish Dutta, "Industrial Robotics, Technology, Programming & Applications", Tata McGraw Hill Education Pvt. Ltd. New Delhi.

Reference Books:

4. John J Craig, "Introduction to Robotics", Pearson Edu. 2005.
5. Fu K.S, "Robotics", McGraw Hill, 2004.
6. Niku SB, "Introduction to Robotics – Analysis, Control, Applications", 3rd Edition, John Wiley & Sons Ltd., 2020.

NPTEL Course on Robotics:

7. https://onlinecourses.nptel.ac.in/noc19_me74/preview
8. https://onlinecourses.nptel.ac.in/noc20_de11/preview





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Class:- First Year B. Tech	Semester- I/II	L	T	P	Credits
Course Code : SH1343	Course Name: Sports and Yoga	--	--	2	1

Course Description:

This course aims to enrich the holistic development of first-year engineering students by fostering an appreciation for Sports and Yoga. Along with Yoga practices, the syllabus of this Program includes allied topics like Anatomy and Physiology, Sports Psychology, Sports Ethics, Diet and Nutrition. Lectures and practical sessions will be conducted in the practical mode.

Course Outcomes:

After successful completion of the course, students will be able to,

1. Make the students understand the importance of sound health and fitness principles as they relate to better health.
2. Expose the students to a variety of physical and yogic activities aimed at stimulating their continued injury about yoga, physical education, health and fitness.
3. Create a safe, progressive, methodical and efficient activity based plan to enhance improvement and minimize risk of injury.
4. Develop among students an appreciation of physical activity as a lifetime pursuit and a means to a better health.

Prerequisite: No prior experience in Sports and Yoga is required, but student has to be physically and mentally fit.

Expt. No.	Course Content	Hrs.
	Description	
1.	Sports Introduction, why is Sports important for student	02
2.	Different types of Sports & Workout Explanation.	02
3.	Conditioning Exercises -Warming Up General and Specific Exercises. & Cooling Down.	02
4.	Indoor Games Practical, teaching, demonstration, training, technical training. Table Tennis, Badminton	02
5.	Outdoor Games Practical, teaching, demonstration training, technical training. Volleyball, Football	02





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6.	Required Physical Fitness Tests: Strength Test, Speed Test, Agility Test, Flexibility Test, etc.	02
7.	Yoga Introduction, Yoga History, why is yoga important for student.	02
8.	Nature of Yoga Shastra. Different types of Yoga and Explanation of Ashtanga yoga	02
9.	Surya Namaskar	02
10.	Pranayama-Anulom Vilom, Bhramari, Suryabhedan	02
11.	Purification in Yogasna-Kapalbhati, Tratak.	02
12.	Yoga Nidra- Relaxation Technique	02

References:

1. Amit Arjun Budhe, (2015) Career aspects and Management in Physical Education, Sports Publication, NewDelhi
2. Bucher, C.A. (n.d.) Foundation of physical education. St. Louis: The C.V. Mosby Co. Deshpande, S. H. (2014). Physical Education in Ancient India. Amravati: Degree College of Physical education.
3. D.M Jyoti, Yoga and Physical Activities (2015) lulu.com3101, Hills borough, NC27609, United States
4. Gharote, M. L. & Ganguly, H. (1988). Teaching methods for yogic practices. Lonawala: Kaivalyadhama.
5. Mohan, V. M. (1969). Principles of physical education. Delhi: Metropolitan Book Dep. Nixon, E. E. & Cozen, F.W. (1969). An introduction to physical education. Philadelphia: W.B. Saunders Co





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Course Code: SH1158	Course Name: Cultural Activities	--	--	2	1
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Course Description:

This course aims to enrich the holistic development of first-year engineering students by fostering an appreciation for cultural activities. The focus is on encouraging students to engage in various forms of cultural activities, both Classical Music and Tabala. Indian Classical music is one of the oldest forms of art. Indian Classical Music can be divided into its two base elements which are Raga and Tala. The raga mainly forms the musical structure of the song while the tala measures the time. Classical music for studying has been shown to have a positive impact on memory and cognitive function. The research study found that listening to music, especially classical music, can activate regions of the brain associated with attention and visualization. The course includes basic practical aspects of classical music.

Taal plays a crucial role in Indian Music. The importance of Taal is indisputable in Hindustani classical music. The Pakhavaj and Tabla are prominent percussion instruments that accompany various forms of vocal and instrumental music and Dance. The experiment of Tabla in fusion music is remarkable and thus Tabla has gained an important place in the percussion world. The tabla is a complete solo instrument with a wide range of rich repertoire. The course includes basic practical aspects of Tabla Music.

Course Outcomes:

After successful completion of the course, students will be able to,

1. Analyze the basic knowledge of Indian classical music.
2. Illustrate the fundamental aspects of Tabla musical instrument.
3. Demonstrate the rhythm system applied in classical music.
4. Demonstrate the performance of Tabla musical instrument.
5. Apply different types of Taal, Matra Kandh, Saam, Khali, Thhali & Aavatanan.

Prerequisite: No prior experience in cultural activities is required, although an open mind and willingness to explore new creative fields are encouraged.

Expt. No.	Course Content	Hrs.
	Description	
1.	Discussion and practice on fundamentals of classical music - Sangeet, Naad, Swar, Saptak, Alankar, Raag, Wadi, Sanwadi, etc.	02
2.	Discussion and practice on fundamentals of classical music - Aanuwadi, Aansh Swar, Nyas Swar, Pakad, Gansamay, Purwang, Uttarang etc.	02





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3.	Discussion and practice on Taal study, Taal, Laay, (Vavalvit, Madya, Dhrut) Matra Kandh.	02
4.	Saam, Khali, Thhali, Aavatanan, Classical Music Notation System.	02
5.	Discussion and practice on Raga - Bhoop Raga – Chota Khyal with Aalap, Taan.	02
6.	Discussion and practice on fundamentals of performing through Tabla musical instrument - Taal, Theka, Peshkar, Kayda.	02
7.	Discussion and practice on fundamentals of performing through Tabla musical instruments- Rela, Rau ladi, Dumdar and Bedam Tehai.	02
8.	Practice on Teentaal, Ektaal with Peshkar, Tukda.	02
9.	Practice on Chakkardar, Gat with Padhant and Hastkriya.	02
10.	Practice on Taal Notation and Pulaskar Taal notation system	02

References:

Text Books-

1. Aneesh Pradhan, Chasing the Raag Dream: A Look into the World of Hindustani Classical Music, Harper India Publications.
2. Amit Chaudhuri, Finding The Raga: An Improvisation on Indian Music, Penguin Random House India Pvt. Ltd. Publications.
3. V. S. Mishra, Art and Science of Playing Tabla, Publications Division of Ministry of Information & Broadcasting.

Reference Books-

4. S. Nagarkar, Raga Sangeet: Understanding Hindustani Classical Vocal Music, Book Baby Publications.
5. L. Chew, S. Spiegel berg, and D. De Reiter, The Daily Book of Classical Music, Walter Foster Publications.
6. D. Courtney, Learning the Tabla, Mel Bay Publications.





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Class:- First Year B. Tech	Semester- I/II	L	T	P	Credits
Course Code : SH1081	Course Name: National Service Scheme (NSS)	--	--	2	1

Course Description:

The National Service Scheme (NSS) is a voluntary program under the Ministry of Youth Affairs & Sports, Government of India, aimed at developing students' personality through community service. The course is designed to foster a sense of social responsibility, leadership, and community engagement among youth.

Course Outcomes:

After successful completion of the course, students will be able to,

1. Identify the community in which they work and their relation
2. Identify the needs and problems of the community and involve them in problem-solving
3. Develop capacity to meet emergencies and natural disasters
4. Practice national integration and social harmony and
5. Utilize their knowledge in finding practical solutions to individual and community problems

Prerequisite: No prior experience in NSS is required, but students have to be physically and mentally fit.

Expt. No.	Course Content	Hrs.
	Description	
1	Personality development through NSS	02
2	Tree Plantation	02
3	Celebration of National Days (As per NSS list)	02
4	Internal Cleanliness Drive.	12
5	Blood donation Camp	04
6	Participation in disaster management training	02

References:

1. National Service Scheme Manual, Government of India.
2. Training Programme on National Programme scheme, TISS.
3. Orientation Courses for N.S.S. Programme officers, TISS.
4. Case material as Training Aid for field workers, *Gurmeet Hans.*
5. Social service opportunities in Hospitals, *Kapil K. Krishan, TISS*

