



**FABTECH EDUCATION SOCIETY'S
FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH
(An Autonomous Institute)**

Second Year B. Tech.

Semester - IV (w.e.f. A.Y. 2026-27)

Signals and Systems (26UET22106)

Teaching Scheme:

	No. of Hrs./week	No. of Credits		
Lectures:	3	3	MSE:	30 Marks
Tutorials:	-	-	ICA:	10 Marks
Practical:	-	-	ESE:	60 Marks
Total:	3	3	OE/POE:	-

Evaluation Scheme:

Course Outcomes: At the end of this course, students shall be able to

BL Level

CO 1	Understand different types of signals and systems	BL2
CO 2	Analyze continuous time LTI signals and systems in transform domain	BL4
CO 3	Apply the Sampling Theorem to determine appropriate sampling frequency for different continuous-time signals.	BL3
CO 4	Understand the concept of Fourier Transform and its applications	BL2
CO 5	Apply Laplace Transform to Continuous time LTI systems	BL3

Unit	Course Contents	No. of lectures (Hrs.)
Unit 1	Introduction to signals and systems Introduction to Signals: Definition, Basic Elementary signals - exponential, sine, step, impulse, ramp, rectangular, triangular. Operations on signals. Classification of Signals: Continuous and discrete time signals, even and odd signals, periodic and non-periodic signals, deterministic and non-deterministic signals, energy and power signals. Systems and Classification of systems: System Representation, continuous time and discrete systems, system with and without memory, causal and non-causal system, linear and nonlinear system, time invariant and time variant system, stable system.	10
Unit 2	Time domain analysis of Continuous Time and Discrete Time systems: Linear Time Invariant (LTI) systems: Representation of systems using differential /difference equation, Impulse, step and exponential response, System Stability and Causality. Use of convolution integral and convolution sum for analysis of LTI systems, properties of convolution integral/sum, impulse response of interconnected systems.	7


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Unit 3	Sampling Introduction, Representation of a Continuous- Time Signal by Its Samples, The Sampling Theorem, Reconstruction of a signal from its Samples using different methods (Interpolation, Zero order hold, low pass filter), The Effect of Under-sampling (Aliasing).	5
Unit 4	Fourier analysis for Continuous-Time Signals and Systems Introduction, The Response of LTI Systems to Complex Exponentials, Fourier series, and Representation of Continuous-Time Periodic signals, Convergence of Fourier Series, Representation of A periodic Signals: The Continuous -Time Fourier Transform, Properties of Fourier Transform, Application of Fourier Transform in LTI systems.	9
Unit 5	Laplace Transform and Continuous time LTI systems Need of Laplace Transform, Concept of Region of Convergence, Properties of Laplace Transform, Relation between continuous time Fourier Transform and Laplace Transform, unilateral Laplace Transform, inverse Laplace Transform. Analysis of continuous time LTI systems using Laplace Transform: Causality and stability of systems in s-domain, Total response of a system.	8
Text Books:		
1)	Signals and Systems A.V. Oppenheim and A. S. Wilsky, 2nd edition –Pearson Education	
2)	Signals and Systems Simon Haykin and Barry Van Veen, 2nd edition -Wiley andSons	
Reference Books:		
1)	Signals and Systems by P. Ramesh Babu and R. Anand Natarajan[Scitech]	
2)	Luis F. Chaparro, Signals and Systems Using MATLAB, Academic Press	
3)	V. Krishnaveni and A. Rajeshwari, Signals and Systems, Wiley-India, First Edition 2012	
4)	Michael J Roberts, Fundamentals of Signals and systems, Tata McGraw Hill, special Indian Economy edition, 2009.	
5)	Luis F. Chaparro, Signals and Systems Using MATLAB, Academic Press	
6)	Signals and Systems Laboratory: Virtual Laboratory http://ssl-iitg.vlabs.ac.in/	

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Second Year B. Tech.

Semester - IV (w.e.f. A.Y. 2026-27)

Signal and System Laboratory (26UET22107)

Teaching Scheme:

	No. of Hrs./week	No. of Credits		
Lectures:	-	-	MSE:	-
Tutorials:	-	-	ICA:	25 marks
Practical:	2	1	ESE:	-
Total:	2	1	OE/POE:	25 marks

Evaluation Scheme:

Course Outcomes: At the end of this course, students shall be able to

BL Level

CO 1	Understand the basics operation of MATLAB	BL-2
CO 2	Apply and verify the fundamental properties of systems using MATLAB simulations	BL-3
CO 3	Implement the concept of Fourier series and Fourier transforms.	BL-3
CO 4	Find the stability of system using pole-zero diagram	BL-3

Exp No.

Experiment Details

No. of Ex. Sessions (hrs.)

1.	Introduction to MATLAB	2
2.	To write a MATLAB Program to generate continuous and discrete standard signals	2
3.	To write a MATLAB program to perform various operations on signals and sequences such as addition, multiplication, scaling, shifting and folding, computation of energy and average power.	2
4.	Finding even and odd parts of a signal	2
5.	To write a MATLAB Program to verify Properties of system	2
6.	To write a MATLAB Program to perform convolution	2
7.	To write a MATLAB Program to Verify properties of Fourier Transform	2
8.	Finding magnitude and phase spectrum of Fourier transforms.	2
9.	Compute the Unit sample, unit step and sinusoidal response of the given LTI system and verifying its stability	2
10.	Write the program for locating poles and zeros and plotting pole-zero maps in s-plane	2

Text Books:

1	Luis F. Chaparro, Signals and Systems Using MATLAB, Academic Press
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2	Luis F. Chaparro, Signals and Systems Using MATLAB, Academic Press
Reference Books:	
1	Signals and Systems by P. Ramesh Babu and R. Anand Natarajan[Scitech]
2	Signals and Systems Simon Haykin and Barry Van Veen, 2nd edition -Wiley andSons
3	V. Krishnaveni and A. Rajeshwari, Signals and Systems, Wiley-India, First Edition 2012
4	Michael J Roberts, Fundamentals of Signals and systems, Tata McGraw Hill, special Indian Economy edition, 2009.
5	Luis F. Chaparro, Signals and Systems Using MATLAB, Academic Press
6	Signals and Systems Laboratory: Virtual Laboratory http://ssl-iitg.vlabs.ac.in/
In Semester Examination (ISE):	
ISE is of 30 Marks.	
Internal Continuous Assessment (ICA):	
After completion of each chapter assignment is given	
1.Ateendance-5 Marks 2.Presentation viva/Explanation -5 Marks	

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Second Year B. Tech. E&TC Engineering

Semester - IV (w.e.f. A.Y. 2026-27)

Analog Integrated Circuits (26UET22108)

Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	2	2	MSE:	30 Marks
Tutorials:	-	-	ICA:	10 Marks
Practical:	-	-	ESE:	60 Marks
Total:	2	2	OE/POE:	-

Course Outcomes: At the end of this course, students shall be able to		BL Level
CO 1	Classify Differential amplifier and explain fundamentals of Opamp	BL-2:
CO 2	Design and Characterize the operational amplifiers and its modes of operations	BL-3:
CO 3	Elaborate linear applications of Opamp	BL-2:
CO 4	Design Opamp as Non linear circuits and oscillators	BL-3:
CO 5	Design and Elaborate special applications of Opamp	BL-3:

Unit	Course Contents	No. of lectures (hrs.)
Unit 1	Differential Amplifier: Introduction, Classification of Differential Amplifier, DC Analysis, AC Analysis, Constant Current Source or Current Bias, DC Level Shifter, Output Stage, Block Diagram of Operational Amplifier, Ideal Operational Amplifier, Equivalent Circuit of an Ideal Op-Amp.	8
Unit 2	Operational Amplifier: Introduction, Parameters of Op-Amp, Open-Loop Voltage Gain as a Function of Frequency, Negative Feedback in Operational Amplifier, Non-inverting Amplifier (Voltage Series Feedback Amplifier), Inverting Amplifier (Voltage Shunt Feedback Amplifier), Voltage Follower or Unity Gain Buffer	8
Unit 3	Linear Circuits: Introduction, Current-to-Voltage Converter, Voltage-to-Current Converter, Summing, Scaling and Averaging Amplifier, Subtraction Circuit, Integrator, Differentiator,	7
Unit 4	Nonlinear Circuits and waveform Generators: Introduction, Precision Rectifiers, Peak Detector, Logarithmic Amplifier, Sample and Hold Circuit, Comparators, Schmitt Trigger, Sinusoidal Oscillators- Wein, Phase shift, Non Sinusoidal- Astable,	

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	Monostable and Bistable multivibrator	
Unit 5	Special ICs and opamp applications: Phase Lock Loop, Timer (IC 555), voltage regulators (IC 723, 78XX and 79XX), Active Filters – LPF and HPF,	7
Text Books:		
1)	Operational Amplifier: Theory and Experiments by Shrikrishna Yawale and Sangiat Yawale, Springer Nature, 2022	
2)	Linear Integrated Circuits by D. Roy Choudhary and Jain, New Age Publication	
3)	Opamps and Linear Integrated Circuits by Ramakant Gayakwad, Pearson Education, Fourth edition.	
Reference Books:		
1)	Linear Integrated Circuits by B. Visvesvara Rao, Pearson Education	
2)	Operational Amplifier by George Clayton and Steve Winder, Newnes Publication, 5 th Edition	
In Semester Examination (ISE):		
In Semester Examination will be based on Mid Semester Exam for 30 marks and will be declared by Controller of Examination.		
Internal Continuous Assessment (ICA):		
ICA will be based on 5 Unit Assignments.		

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Second Year B. Tech. (E&TC)

Semester - IV (w.e.f. A.Y.2026-27)

Analog Integrated Circuits Laboratory (26UET22109)

Teaching Scheme:

	No. of Hrs./week	No. of Credits	Evaluation Scheme:	
Lectures:	-	-	MSE:	-
Tutorials:	-	-	ICA:	25 Marks
Practical:	2	1	ESE:	-
Total:	2	1	OE/POE:	25 Marks

Course Outcomes: At the end of this course, students shall be able to

BL Level

CO 1	Design Linear application of an opamp using components and EDA tools	BL-3:
CO 2	Design Non-Linear application of an opamp using components and EDA tools	BL-3:
CO 3	Design Timer circuits, regulators and filters using ICs	BL-3:

Ex.	Experiment Details	No. of Ex. Sessions (hrs.)
Ex. 1	Design and simulate Inverting and noninverting amplifier for gain=	2
Ex. 2	Design and simulate Adder	2
Ex. 3	Design and simulate ZCD	2
Ex. 4	Design and simulate schmitt trigger for UTP= _____ and LTP= _____	2
Ex. 5	Design and simulate astable multivibrator for frequency of _____ kHz	2
Ex. 6	Design and simulate oscillator for frequency of _____ kHz	2
Ex. 7	Design astable multivibrator using IC 555	2
Ex. 8	Design	2
Ex. 9	Design and simulate traffic light controller using opamp	2
Ex. 10	Design and simulate window detector using opamp	2

Text Books:

- 1) Operational Amplifier: Theory and Experiments by Shrikrishna Yawale and Sangiat Yawale, Springer Nature, 2022
- 2) Linear Integrated Circuits by D. Roy Choudhary and Jain, New Age Publication

Internal Continuous Assessment (ICA):

Students are expected to perform min 8 experiments using any EDA tool and components. Course coordinator can design additional two experiments to enhance the practical skills of students. ICA shall be based on Journal, Performance and additional experiments if any.

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Second Year B. Tech.

Semester- IV (w.e.f. A.Y. 2026-27)

Network Analysis and Synthesis (26UET22110)

Teaching Scheme:

	No. of Hrs./week	No. of Credits		
Lectures:	3	3	MSE:	40 Marks
Tutorials:	-	-	ICA:	-
Practical:	-	-	ESE:	60 Marks
Total:	3	3	OE/POE:	-

Evaluation Scheme:

Course Outcomes: At the end of this course, students shall be able to

Blooms Level

CO 1	Apply fundamental laws and methods to analyze electrical networks	3
CO 2	Simplify complex circuits using network theorems.	4
CO 3	Analyze transient behavior of first and second order circuits.	4
CO 4	Apply Laplace Transform and AC analysis techniques.	3
CO 5	Evaluate two-port networks and network functions.	5

Unit	Course Contents	No. of lectures (hrs.)
Unit 1	Network Theorems Basic nodal and mesh analysis, linearity, superposition and source transformation, Thevenin's, Norton's and maximum power transfer theorem and useful circuit analysis techniques, network topology, Graph Theory, Tree & Co-Tree, Incidence matrix, Cut-set matrix, Tie-set matrix	8
Unit 2	Transient Analysis and Frequency Domain Analysis: Initial and Final Conditions, Natural and Forced Response, RL, RC and RLC Circuits, Time Constant Concept	7
Unit 3	Laplace transform and its circuit applications Laplace transform, initial and final value theorem, circuit analysis in s domain, frequency response.	
Unit 4	Two-Port Networks & Network Functions Z, Y, h, ABCD Parameters, Interconnection of Two-Port Networks, Network Functions, Poles and Zeros, Stability, Frequency Response.	



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Unit 5	Filters & Network Synthesis Basics of filter design.,RL & RC Network Synthesis: Synthesis of one-port networks, transfer function synthesis, Hurwitz Polynomial concept with numerical ,LC Network Synthesis : Foster Canonical form I&II, Cauer forms for reactive networks(1 st and 2 nd Form)	7
Text Books:		
1)	Abijit Chakrabarti – Network Theory (Analysis and Synthesis) – Dhanpat Rai & Co.(P) Ltd Delhi	
2)	Roy Choudary, —Network and SystemsI 1st edition, New Age International,1988	
3)	Hayt, Kemmerley and Durbin, —Engineering Circuit AnalysisI, 8th 2012 Ed., Tata McGraw-Hill	
Reference Books:		
1)	Kuo, F.F., —Network Analysis and SynthesisI, 2nd Ed., Wiley India.2008.	
2)	Boylestead, —Introductory Circuit AnalysisI, 4th edition, Charles & Merrill,1982.	
3)	Er.S.K. Pandey- Fundamentals of Network Analysis and Synthesis-S.Chand & Company Ltd, New Delhi	


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Second Year B. Tech.

Semester-IV (w.e.f. A.Y. 2026-27)

MDM-II: Smart Sensors & MEMS Technology (26UET22402)

Teaching Scheme:

	No. of Hrs./week	No. of Credits
Lectures:	3	3
Tutorials:	-	-
Practical:	-	-
Total:	3	3

Evaluation Scheme:

MSE:	30 Marks
ICA:	10 Marks
ESE:	60 Marks
OE/POE:	-

Course Outcomes: At the end of this course, students shall be able to

		BL Level
CO 1	Understand and explain sensor types, characteristics, and smart sensor architecture.	BL-2: Understand ing
CO 2	Analyze the working principles and applications of specific sensors.	BL-3: Apply
CO 3	Analyze smart sensor applications in automotive, industrial (robotic), and consumer systems.	BL-3: Apply
CO 4	Describe the history, evolution, and applications of MEMS and NEMS.	BL-3: Apply
CO 5	Understand and analyze MEMS materials and micro-fabrication techniques.	BL-2: Understand ing

Unit	Course Contents	No. of lectures (hrs.)
Unit 1	Introduction of Smart Sensor Introduction, Sensor Vs Transducer, Nature of Sensors, Sensor Output Characteristics, Sensing Technologies, Digital Output Sensors	8
Unit 2	Specific Sensors Ultrasonic Detectors, Microwave Motion Detectors, Photo Diode, Phototransistor, Thermoelectric Sensors, Optical Temperature Sensors.	7
Unit 3	Smart Applications and Wireless Sensing Automotive Applications, Industrial (Robotic) Applications, Consumer Applications, Wireless Data and Communications, Wireless Sensing Networks, Industrial Wireless Sensing Networks	7
Unit 4	Introduction to MEMS MEMS Overview History, evolution, and Applications, Micro-electro-mechanical systems, Nano-electro-mechanical systems (NEMS), evolution of microsystems.	7
Unit 5	MEMS & Microsystems Study of MEMS Materials Silicon, Polymers, Glass, Metals, Micro-fabrication Techniques: Photolithography, Etching, Deposition, Packaging and Characterization of MEMS Devices	7



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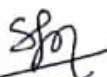
Text Books:

- | | |
|---|---|
| 1 | Smart Sensors and Systems Authors: G. Asada & J. R. Storrs |
| 2 | MEMS and Microsystems: Design and Manufacture Author: Tai-Ran Hsu |
| 3 | Sensors and Transducers Author: D. Patranabis |

Reference Books:

- | | |
|---|---|
| 1 | Microsystem Design Author: Stephen D. Senturia |
| 2 | Foundations of MEMS Author: Chang Liu |
| 3 | Wireless Sensor Networks Author: Ian F. Akyildiz et al. |
| 4 | Optoelectronics and Photonics: Principles and Practices Author: S. O. Kasap |

Sr. No.	Name of Tutorial / Assignment
1)	Explain the concept of a Smart Sensor. Differentiate between a Sensor and a Transducer. Discuss the nature of sensors with suitable examples.
2)	Discuss different sensing technologies and digital output sensors.
3)	Explain the construction, working principle, advantages, and applications of Ultrasonic Detectors
4)	Explain Thermoelectric Sensors and Optical Temperature Sensors with neat diagrams and suitable industrial applications.
5)	Discuss the role of Smart Sensors in Automotive, Industrial (Robotic), and Consumer applications with suitable examples.
6)	Explain Wireless Data Communication in sensing systems. Describe Wireless Sensing Networks
7)	Differentiate between MEMS and NEMS.
8)	Explain various MEMS materials (Silicon, Polymers, Glass, Metals) and justify why Silicon is widely used in MEMS fabrication
9)	Describe micro-fabrication techniques
10)	Describe the working of Photodiode and Phototransistor.


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Second Year B. Tech.

Semester-IV (w.e.f. A.Y. 2026-27)

Financial Management For Engineers (26UOE22502E)

Teaching Scheme:

	No. of Hrs./week	No. of Credits
Lectures:	3	3
Tutorials:	-	-
Practical:	-	-
Total:	3	3

Evaluation Scheme:

MSE:	30 Marks
ICA:	10 Marks
ESE:	60 Marks
OE/POE:	-

Course Outcomes: At the end of this course, students shall be able to

BL

CO 1	Demonstrate comprehensive understanding of financial management principles and their application in engineering contexts.	BL - 2
CO 2	Apply quantitative techniques to evaluate investment opportunities and make capital budgeting decisions	BL - 3
CO 3	Analyze financial statements and interpret financial performance indicators for technical organizations	BL - 4
CO 4	Develop skills in working capital management and financial planning for engineering projects	BL - 3
CO 5	Make informed decisions regarding capital structure and financing alternatives in engineering ventures.	BL - 2

Unit

Course Contents

No. of lecture
(hrs.)

Unit 1	Introduction to Financial Management Overview of finance and financial management, Goals and objectives of financial management, Why Should Engineers learn Business? Business ,Engineer and Society, Financial decision-making: Investment, financing, and dividend decisions, The Skill set of Manager , Role of financial manager in engineering organizations, Financial environment and markets.	8
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Unit 2	The Time Value of Money Concept of time value of money, The compounding Techniques, Future value and present value calculations, Annuities and perpetuities, Compounding and discounting techniques, Applications in engineering projects	8
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Unit 3	Financial Statement Analysis : Understanding financial statements: Balance sheet, income statement, cash flow statement, Book keeping and Accounting Ratio analysis: Liquidity, profitability, efficiency, and leverage ratios, Financial Analysis, Operations Vs Financial Management, Interpretation of financial performance for technical organizations..	8
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Unit 4	Balance Sheet The Purpose of Balance Sheet, Forms and Components , Liabilities , Stakeholders equity , Balance Sheet Vs Income Sheet, Operation and Financial	
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	Stakeholders equity , Balance Sheet Vs Income Sheet, Operation and Financial Management of a company	
Unit 5	Financial Planning and Budgeting Financial planning process, Pro forma financial statements, Break-even analysis, Project budgeting for engineering projects, Cash budgets and forecasting..	7
Text Books:		
1)	Financial Management for Engineers - Dr.Peter Flynn Pearson Custom Publishing	
2)	Financial Management by Dr. R. S. Kulshrestha, Rakesh Kulshrestha SBPD Publication.	
3)	Brigham, E.F., & Ehrhardt, M.C. (2020). Financial Management: Theory & Practice (16th ed.). Cengage Learning.	
Reference Books:		
1)	Pandey, I.M. (2021). Financial Management (12th ed.). Vikas Publishing House..	
2)	Chandra, P. (2019). Financial Management: Theory and Practice (10th ed.). McGraw-Hill Education	
3)	. Ross, S.A., Westerfield, R.W., & Jordan, B.D. (2019). Fundamentals of Corporate Finance (12th ed.). McGraw-Hill Education.	

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S.Y. B.Tech.

Semester - IV (w.e.f. A.Y. 2026-27)

Subject: Mini-Project (26UET22601)

Teaching Scheme:

	No. of Hrs./week	No. of Credits
Lectures:	-	-
Tutorials:	-	-
Practical:	4	2
Total:	4	2

Evaluation Scheme:

MSE:	-
ICA:	50 Marks
ESE:	-
OE/POE:	-

Course Outcomes: At the end of this course, students shall be able to

BL
Level

CO 1	Identify and define a real-world problem in the field of Electronics and Telecommunication Engineering and propose an appropriate solution.	BL-4
CO 2	Plan, design, and execute a mini project using suitable hardware/software tools and engineering practices.	BL-6
CO 3	Develop and test a working prototype by applying concepts of electronics, communication, embedded systems, or IoT.	BL-6
CO 4	Work effectively in a team and apply project management principles including task allocation, scheduling, and resource utilization.	BL-3
CO 5	Prepare technical documentation and communicate project outcomes through reports, presentations, and demonstrations.	BL-3

General Guidelines for Mini project implementation:

- 1 The mini project shall be carried out in a group of 3-4 students.
- 2 The project should address a **real-life, industrial, societal, or academic** problem related to E&TC.
- 3 Students shall perform a **literature survey** and define project objectives before implementation.
- 4 The project may involve **hardware** or a combination of **hardware and software**.
- 5 Use of modern engineering tools such as **Arduino, ESP32, Raspberry Pi, Proteus, MATLAB, Multisim, KiCad, EasyEDA**, etc. is encouraged.
- 6 The team shall prepare a **project proposal**, implementation schedule, and budget.
- 7 Students should maintain a **project diary** documenting progress and activities.
- 8 The project must include **design, implementation, testing, troubleshooting, and validation** stages.
- 9 A **technical report**, presentation, and demonstration of the working model are mandatory.
- 10 The project work should follow professional ethics, safety practices, and proper citation of references.

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(An Autonomous Institute)

Second Year B. Tech.

Semester - IV (w.e.f. A.Y. 2026-27)

Advance Quantitative Ability (26UGS22404)

Teaching Scheme:

	No. of Hrs./week	No. of Credits	Evaluation Scheme:	
Lectures:	1	1	MSE:	-
Tutorials:	-	-	ICA:	50 Marks
Practical:	-	-	ESE:	-
Total:	1	1	OE/POE:	-

Course Outcomes: At the end of this course, students shall be able to

CO 1	Apply concepts of work efficiency, time rates, team work, and pipes & cisterns to solve practical work-based problems.	BL - 2
CO 2	Solve problems involving speed, distance, relative motion, trains, boats & streams, and escalators.	BL - 2
CO 3	Solve commercial mathematics problems involving profit-loss, discounts, partnerships, MRP, and faulty weights.	BL - 2
CO 4	Apply simple and compound interest concepts in financial calculations, population growth, and installment-based applications.	BL - 2
CO 5	Use counting techniques, arrangements, selections, and probability concepts to solve analytical and real-life problems involving dice, cards, balls, and coins.	BL - 2

Unit	Course Contents	No. of Lectures (hrs.)
Unit 1	Time and Work Time and Work, concept of work efficiency, individual vs. team work, alternate days work schedules, Problems based on number of persons, combinations of two or more different types of persons, Useful results, Pipes and Cisterns.	3
Unit 2	Speed, Time and Distance Unit conversion, Average speed, Inter relation, Relative speed, Useful results, Problems on Trains, Problems on Boats and Streams.	3
Unit 3	Profit and Loss Definitions of cost price and selling price, calculation of markup and discount, successive discounts, and problems involving faulty weights, Partnership.	3
Unit 4	Simple Interest and Compound Interest Simple interest and compound interest, finding the difference between them over multiple years, population growth models, and installment schemes.	3
Unit 5	Permutation and Combinations, Probability Fundamental principle of counting, linear and circular arrangements, selection methods, permutations, combinations and distribution problems, Useful results, basic problems of probability based on Dice, Balls, Playing	3

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Text Books:		
1)	Quantitative Aptitude by R. S. Aggarwal, S. Chand Publishing.	
2)	Quantitative Aptitude for Competitive Examinations: Abhijit Guha, McGraw Hill India	
Reference Books:		
1)	Fast Track Objective Arithmetic: Rajesh Verma, Arihant Publications	
2)	Magical Book on Quicker Maths: M. Tyra, BSC Publishing Co. Pvt. Ltd.	
3)	Quantitative Aptitude Quantum CAT: Sarvesh Kumar Verma, Arihant Publications	
4)	Objective Arithmetic: R. S. Aggarwal, S. Chand Publishing	
5)	How to Prepare for Quantitative Aptitude for CAT: Arun Sharma, McGraw Hill India	

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Second Year B. Tech.

Semester- IV (w.e.f. A.Y. 2026-27)

Economics for Engineers (26UET22806)

Teaching Scheme:

	No. of Hrs./week	No. of Credits	Evaluation Scheme:	
Lectures:	1	1	MSE:	-
Tutorials:	-	-	ICA:	25 Marks
Practical:	-	-	ESE:	-
Total:	1	1	OE/POE:	-

Course Outcomes: At the end of this course, students shall be able to

BL Level

CO 1	Understand the fundamental concepts of economics and their relevance to engineering and technology.	BL2
CO 2	Develop awareness of economic factors affecting engineering projects, industries, and society.	BL2
CO 3	Apply basic economic principles in decision-making related to cost, resources, productivity, and efficiency.	BL4
CO 4	Understand personal finance and financial planning, including saving, investment, and budgeting.	BL2
CO 5	Recognize the importance of sustainable economic development and the role of engineers in contributing to economic growth and societal well-being.	BL3

Unit	Course Contents	No. of lectures (Hrs.)
Unit 1	Introduction to Economics (7 Hours) - Basic Economic Concepts - Scarcity, Choice, and Opportunity Cost - Microeconomics and Macroeconomics - Role of Engineers in Economic Development	7
Unit 2	Demand, Supply, and Market (6 Hours) - Demand and Supply Concepts - Market Equilibrium - Consumer Behavior - Market Structures (Overview)	6
Unit 3	Personal Finance and Financial Awareness (6 Hours) - Saving and Investment - Banking System - Digital Payments - Financial Planning for Young Professionals	6

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Unit 4	Economics in Engineering Practice (7 Hours) • Cost Concepts • Cost-Benefit Analysis • Productivity and Efficiency • Sustainable Development and Green Economy	6
Text Books:		
1	<i>Engineering Economics</i> – R. Panneerselvam	
2	<i>Engineering Economics</i> – S. C. Sharma	
3	Engineering Economics, Estimation and Costing by S. K. Bhattacharya	
4	<i>Engineering Economics</i> by S. C. Ahuja and Robert Walsh	
Reference Books:		
1	<i>Engineering Economy</i> – William G. Sullivan et al.	
2	<i>Principles of Economics</i> – N. Gregory Mankiw	
3	Fundamentals of Engineering Economics is a textbook by Chan S. Park	
4	Engineering Economy by Leland Blank and Anthony Tarquin	



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FABTECH EDUCATION SOCIETY'S
FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH
 (An Autonomous Institute)

Second Year B. Tech.

Semester-IV (w.e.f. A.Y. 2026-27)

Economics for Engineers Laboratory (26UET22807)

Teaching Scheme:

	No. of Hrs./week	No. of Credits
Lectures:	-	-
Tutorials:	-	-
Practical:	2	1
Total:	2	1

Evaluation Scheme:

MSE:	-
ICA:	25 Marks
ESE:	-
OE/POE:	-

Course Outcomes: At the end of this course, students shall be able to

		BL Level
CO1	Explain fundamental economic concepts such as scarcity, opportunity cost, demand, supply, and market equilibrium through laboratory activities and case studies.	BL2
CO2	Analyze consumer behavior, market trends, and financial planning using basic economic tools and real-life data.	BL4
CO3	Apply economic principles to evaluate engineering projects using cost-benefit analysis and financial decision-making techniques.	BL3
CO4	Assess sustainable development practices and the role of engineering economics in promoting efficient resource utilization and economic growth.	BL5

Ex.	Experiment (Any Six)	No. of Ex. Sessions (hrs.)
Ex. 1	Understanding Scarcity and Opportunity Cost	2
Ex. 2	Microeconomics vs Macroeconomics Case Analysis	2
Ex. 3	Engineers and Economic Development	2
Ex. 4	Demand Survey and Demand Curve Preparation	2
Ex. 5	Market Equilibrium Simulation	2
Ex. 6	Consumer Behavior Analysis	2
Ex. 7	Personal Budget and Financial Planning	2
Ex. 8	Comparative Study of Banking and Digital Payments	2
Ex. 9	Cost-Benefit Analysis of an Engineering Project	2
Ex. 10	Sustainable Development and Green Economy Assessment	2



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(An Autonomous Institute)**

Second Year B. Tech.

Semester- IV (w.e.f. A.Y. 2026-27)

Universal Human Values (26UGS22801)

Teaching Scheme:

	No. of Hrs./week	No. of Credits	Evaluation Scheme:	
Lectures:	1	2	ISE:	-
Tutorials:	-	-	ICA:	50 Marks
Practical:	-	-	ESE:	-
Total:	1	2	OE/POE:	-

Course Outcomes: At the end of this course, students shall be able to

		BL Level
CO 1	Explain the concept of Value Education and analyze the role of self-exploration in achieving continuous happiness and prosperity.	BL2
CO 2	Understand the co-existence of self and body, distinguish their needs, and apply principles of self-regulation and health for harmonious living.	BL2
CO 3	Analyze human values in relationships and demonstrate understanding of harmony in family, society, and the universal human order.	BL4
CO 4	Interpret the interconnectedness and mutual fulfillment among the different orders of nature and develop a holistic perception of harmony in existence.	BL2
CO 5	Apply human values and professional ethics in personal and professional life.	BL3

Unit	Course Contents	No. of lectures (Hors.)
Unit 1	Introduction to Value Education -Understanding Value Education, Self-exploration as the Process for Value Education, Continuous Happiness and Prosperity the Basic Human Aspirations ,Right Understanding, Relationship and Physical Facility , Happiness and Prosperity Current Scenario, Method to Fulfill the Basic Human Aspirations	7
Unit 2	Harmony in the Human Being - Understanding Human being as the Co-existence of the Self and the Body , Distinguishing between the Needs of the Self and the Body , The Body as an Instrument of the Self , Understanding Harmony in the Self ,Harmony of the Self with the Body, Programme to ensure self-regulation and Health	6
Unit 3	Harmony in the Family and Society Harmony in the Family the Basic Unit of Human Interaction , Values in Human-to-Human Relationship , 'Trust' the Foundational Value in Relationship , 'Respect' as the Right Evaluation , Understanding Harmony in the Society , Vision for the Universal Human Order	6
Unit 4	Harmony in the Nature/Existence Understanding Harmony in the Nature, Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature , Realizing Existence as Co-existence at All Levels , The Holistic Perception of Harmony in Existence	

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Unit 5	Implications of the Holistic Understanding a Look at Professional Ethics Natural Acceptance of Human Values - Definitiveness of (Ethical) Human Conduct - A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order - Competence in Professional Ethics - Holistic Technologies, Production Systems and Management Models-Typical Case Studies - Strategies for Transition towards Value-based Life and Profession	7
Text Books:		
1	A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1	
2	The Teacher's Manual Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2	
Reference Books:		
1	Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.	
2	Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.	
3	The Story of Stuff (Book).	
4	The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi	
5	Small is Beautiful - E. F Schumacher	
6	. Slow is Beautiful - Cecile Andrews	


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	FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH (An Autonomous Institute)
	Second Year B. Tech.
	Semester-IV (w.e.f. A.Y. 2026-27)
	Environmental Studies (26UCE22901)

Teaching Scheme:			Evaluation Scheme:	
	No. of Hrs./week	No. of Credits		
Lectures:	1	-	MSE:	-
Tutorials:	-	-	ICA:	50 Marks
Practical:	-	-	ESE:	-
Total:	1	-	OE/POE:	-

Course Outcomes: At the end of this course, students shall be able to			Blooms Levels
CO 1	Apply the water treatment concept and methods.		BL3 (Apply)
CO 2	Prepare basic process designs of water and wastewater treatment plants.		BL6 (Create)
CO 3	Apply the wastewater treatment concept and methods.		BL3 (Apply)
CO 4	Apply the solid waste management concepts.		BL3 (Apply)
CO 5	Explain the sources, types, effects, and control measures of air pollution, and assess the role of atmospheric conditions in the dispersion of air pollutants.		BL4 (Analyze)

Unit	Course Contents	No. of lectures (hrs.)
Unit:1	Introduction Environment and its components, importance of water, role of environmental engineer, sources of water, water demand: Design flow, design period, design population, factors affecting water consumption, variation in demand, and design capacity for water supply components, quality of water: Physical, chemical, biological characteristics, Indian standard for quality of potable water	6
Unit:2	Treatment of Water Conveyance of raw water: Canals and pipelines, hydraulics of conduits, laying and jointing of pipelines, testing of pipe lines, designing of rising main, type of valves, types of pumps, intake structure, types of intake structures, necessity of water treatment processes Types of Treatments: Aeration: Necessity, methods, removal of taste and odour, design of aeration fountain Sedimentation: Suspended Solids, settling velocity, types of sedimentation tanks, surface loading, detention time, inlet and outlet arrangements Coagulation: Necessity, coagulant dosage, choice of coagulants, optimum pH Rapid Mixing: Necessity, gravitational, mechanical, pneumatic devices Slow Mixing and Flocculation: Design of flocculation chamber, mean velocity gradient, design of clari-flocculator, plate settler and tube settler	7


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	Filtration: Theory of filtration, filter materials, types of filters, components, working and cleaning of filters Disinfection: Theory of disinfection, factors affecting, efficiency of disinfection, types of disinfectants, break point chlorination, bleaching powder estimation Water softening methods: Lime-soda, ion exchange method, demineralization	
Unit:3	System of Water Supply Continuous and intermittent system, type of distribution systems, layouts, methods of supply: gravity, pumping and combination, hydraulic analysis of distribution system	6
Unit:4	Treatment of Waste Water Sources of wastewater flows, components of wastewater flows, wastewater constituents, characteristic of municipal waste water, necessity of treatment of waste water, sewerage systems, concept of sewage, sullage, storm water, introduction of preliminary treatment, primary treatment, secondary treatment, introduction to tertiary or advanced treatment fundamentals of anaerobic treatment, sewage and industrial waste of common origin, types Treatment of Solid Waste Types, sources, characteristics, ill-effects of improper solid waste management, collection, processing techniques, methods of treatment of solid waste-composting, incineration, pyrolysis and sanitary land filling, biodegradable, non-degradable segregation of solid waste, concept of hazardous waste management, e-waste disposal	7
Unit:5	Air Pollution Definition, sources of air pollution, types air pollutants, atmospheric stability, mixing heights, plume types and meteorological parameters, effects of air pollution, control measures of air pollution	4
Text Books:		
1)	Rao and Rao, "Air Pollution ", Tata McGraw Hill Publications, New Delhi, 1990	
2)	Garg S. K., "Water Supply Engineering", Khanna Publishers, New Delhi	
3)	Birdi J. S. and Birdi G. S., "Water Supply & Sanitary Engineering", Dhanpat Rai Pub. Company, 8th edition, New Delhi	
Reference Books:		
1)	Peavy and Rowe, "Environmental Engineering", McGraw Hill Publications	
2)	Stern, "Environmental Engineering", Vol. I to IV, McGraw Hill Publications	
3)	Sharma and Kaur, "Environmental Chemistry", Goyal Publisher	
4)	Government Of India Publication, "Water Supply and Treatment Manual"	
5)	Fair and Geyr, "Environmental Engineering", McGraw Hill Publications	
In Semester Examination (MSE): MSE shall be based upon student's performance in three tests conducted and evaluated at institute level		



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**FABTECH EDUCATION SOCIETY'S
FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH
(An Autonomous Institute)**

Second Year B. Tech.

Semester - IV (w.e.f. A.Y. 2026-27)

Technical Aptitude - II (26UET22902)

Teaching Scheme:

	No. of Hrs./week	No. of Credits
Lectures:	-	-
Tutorials:	-	-
Practical:	2	-
Total:	2	-

Evaluation Scheme:

ISE:	-
ICA:	50 Marks
ESE:	-
OE/POE:	-

Course Outcomes: At the end of this course, students shall be able to

BL Level

CO 1	Understand semiconductor devices and semiconductor physics	BL-2
CO 2	Analyze Digital Logic Circuit Design	BL-3
CO 3	Analyze differential amplifiers and operational amplifier-based circuits	BL-3
CO 4	Apply network theorems and circuit analysis techniques	BL-3
CO 5	Analyze LTI systems and signal processing concepts	BL-3

Unit	Course Contents	No. of lectures (hrs.)
Unit 1	Electronic Devices P-N junction, Zener diode, BJT, MOS capacitor, MOSFET, LED, photo diode and solar cell. Energy bands in intrinsic and extrinsic semiconductors, equilibrium carrier concentration, direct and indirect band-gap semiconductors.	5
Unit 2	Digital Circuits Number System(Binary,Octal,Decimal,Hexadecimal), code converters, Combinatorial circuits: Boolean algebra, minimization of functions using Boolean identities and Karnaugh map, logic gates and their static CMOS implementations, arithmetic circuits, multiplexers, decoders.	5
Unit 3	Analog Circuits BJT and MOSFET Amplifiers: Biasing, AC coupling, small signal analysis, frequency response, differential amplifiers. Op-amp Circuits: Amplifiers, summers, differentiators, integrators, active filters, Schmitt triggers and oscillators.	5
Unit 4	Networks and Circuits Node and mesh analysis, superposition, Thevenin's theorem, Norton's theorem. Maximum power transfer. Time and frequency domain analysis of linear circuits: RL, RC and RLC circuits, solution of network equations using Laplace transform. Linear 2-port network parameters.	5

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Unit 5	Signals and Systems LTI systems: definition and properties, causality, stability, impulse response, convolution, poles and zeroes, frequency response	5
Text Books:		
1	Networks and Circuits: "Network Analysis" by M. E. Van Valkenburg	
2	Networks and Systems Author: D. Roy Choudhury	
3	Solid State Electronic Devices Author: Ben G. Streetman and Sanjay Kumar Banerjee	
Reference Books:		
1	Signals and Systems by Alan V. Oppenheim, Alan S. Willsky, and S. Hamid Nawab (Pearson)	
2	Network Analysis and Synthesis by M.E. Van Valkenburg (PHI Learning).	
3	Digital Design by M. Morris Mano and Michael D. Ciletti (Pearson)	



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