



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

Second Year B. Tech.

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

Subject Name - Mathematical Applications in Electronics (26UET21101)

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

Blooms Level

CO 1	Demonstrate analytic functions by verifying Cauchy-Riemann equations and construct harmonic conjugates using Milne-Thompson method.	3
CO 2	Solve linear differential equations by applying differential operator methods to obtain complementary functions and particular integrals.	3
CO 3	Apply partial differential equation techniques to engineering problems.	3
CO 4	Demonstrate random variable concepts and expectation to compute probabilities and variances.	3
CO 5	Determine binomial, Poisson, and normal distributions to model and analyze real-world data.	3

Unit	Course Contents	No. of lectures (hrs.)
Unit 1	Complex Analysis Functions of Complex variables, complex differentiation, Cauchy-Riemann equations, Harmonic functions, Analytic functions, Construction of analytic functions: Milne Thompson Method, Harmonic conjugates. Cauchy's integral theorem, Cauchy's residue theorem (All theorems without proofs)	7
Unit 2	Linear differential equations with constant coefficients Basic definition, differential operator, complimentary functions, particular integral, Shortcut methods for standard functions like e^{ax} , $\sin(ax+b)$, $\cos(ax+b)$, x^m , $e^{ax}V$ and xV , particular integral by general method (without method of variation of parameters) for other functions, applications to Electronic Engineering problems: LCR Circuit.	7
Unit 3	Partial Differential Equations Formation of Partial differential equations by eliminating arbitrary constants and functions; Equations solvable by direct integration; Linear equations of first order (Lagrange's linear equations); Applications to find solutions method of separation of variables and one dimensional flow equation.	7
Unit 4	Random Variables and Mathematical Expectation Random variables: discrete & continuous, probability mass function, probability density function, mathematical expectation, joint and marginal probability distributions, properties of expectation and variance.	


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Unit 5	Standard Probability Distributions Binomial distribution, Poisson distribution, Normal distribution, Fitting of binomial distributions, Properties of binomial, Poisson, and normal distributions, Relation between binomial and normal distributions, Relation between Poisson and normal distributions,	7
Text Books:		
1)	Higher Engineering Mathematics (42 nd Edition), B. S. Grewal, Khanna Publications, Delhi.	
2)	Advanced Engineering Mathematics, E. Kreyzig's, John Wiley & Sons, INC.	
Reference Books:		
1)	Higher Engineering Mathematics by B. V. Ramana, Tata McGraw-Hill Publications, New Delhi	
2)	A Text Book of Engineering Mathematics by Peter O'Neil, Thomson Asia Pte Ltd., Singapore.	
3)	Advanced Engineering Mathematics by C. R. Wylie & L. C. Barrett, Tata McGraw- Hill Publishing Company Ltd., New Delhi.	
4)	Engineering Mathematics, Srimanta Pal and Subodh C. Bhunia, Oxford University Press India.	
5)	Mathematics for Engineering Applications, Kuldeep S. Rattan and Naathan W. Klingbeil Wiley. (Modeling and Core Engineering Application).	
6)	Engineering Mathematics Through Applications, Kuldeep Singh, PalgraveMacmilan.	
7)	Advanced Engineering Mathematics, H. K. Dass, S. Chand Publications, Delhi.	
8)	A Textbook of Engineering Mathematics, N. P. Bali and Manish Goyal, Laxmi Publications, 2008	
9)	A Textbook of Applied Mathematics, P. N. and J. N. Wartikar, Vol.1, Pune VidyarthiGrihaPrakashan.	
10)	Fundamentals of statistics by S.C. Gupta	

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Second Year B. Tech.

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

Electronic Circuits Design (26UET21102)

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	Understand Bipolar Junction Transistor (BJT) construction, characteristics, biasing methods.	BL-2
CO 2	Apply the operating principles, characteristics, biasing techniques, and amplifier configurations of JFET and MOSFET devices.	BL-3
CO 3	Explain the operation and classification of power amplifiers (Class A, B, AB, C and D).	BL-2
CO 4	Calculate the performance of feedback amplifiers and oscillators in terms of stability, gain, frequency response, and practical applications in electronic systems.	BL-3
CO 5	Describe the working principles and practical uses of transistor voltage regulators, IC voltage regulators, and Switch Mode Power Supplies (SMPS).	BL-2

Unit	Course Contents	No. of lectures (hrs.)
Unit 1	Bipolar Junction Transistor. BJT: construction, working, characteristics, Transistor as switch, Transistor configurations, current gain equation, stability factor. BJT Biasing and basic amplifier configurations: Need for biasing BJT, Transistor biasing methods, Transistor as amplifier, Analysis of Single Stage Amplifier, RC coupled Amplifiers, Effects of bypass and coupling capacitors, Frequency response of CE amplifier.	8
Unit 2	Junction Field Effect Transistor and MOSFET. JFET: JFET and its characteristics, Pinch off voltage, Drain saturation current, JFET amplifiers-CS, CD, CG. Biasing the FET. MOSFET: Overview of DMOSFET, EMOSFET, n-MOSFET, p-MOSFET MOSFET as an Amplifier and Switch, Biasing in MOSFET, Small signal operation and models, CMOS Devices, Comparison of FET with MOSFET and BJT w.r.t. to device and Circuit parameter.	8
Unit 3	Power amplifiers. Introduction, classification of power amplifiers -A, B, AB, C and D, transformer coupled class A amplifier, Class B push pull and complementary symmetry amplifier, calculation of efficiency of (transformer coupled class A amplifier, Class B push pull), calculation of power output, power dissipation.	8

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Unit 4	Feedback amplifiers & Oscillators. Feedback Amplifiers: Principle of Negative feedback in electronic circuits, Voltage series, Voltage shunt, Current series, Current shunt types of Negative feedback, Typical transistor circuit effects of Negative feedback on Input and Output impedance, Voltage and Current gains. Oscillators: Principle of Positive feedback, Concept of Stability in electronics circuits, Barkhausen criteria for oscillation, Resonant frequency calculation of (General form of LC oscillator, FET RC Phase Shift oscillator, Wein bridge oscillator, Hartley and Colpitts oscillators).	8
Unit 5	Voltage Regulator & Switched Mode Power Supply (SMPS) Transistor application: Discrete transistor voltage Regulation, series voltage regulator, shunt voltage regulator. IC Voltage Regulators: Three terminal voltage regulator, Variable voltage regulator. Introduction to Switch Mode Power supply (SMPS), Block diagram of SMPS, Types of SMPS.	7
Text Books:		
1)	A. Neamen – Semiconductor Physics and Devices, IRWIN, Times Mirror Higher Education Group, Chicago, 1997.	
2)	Brijesh Iyer, S. L. Nalbalwar, R. Dudhe – Electronics Devices & Circuits, Synergy Knowledgeware, Mumbai, 2017.	
3)	V.K. Mehta, Rohit Mehta – Principles of Electronics, S. Chand and Company.	
4)	Robert L. Boylestad, Louis Nashelsky – Electronic Devices and Circuit Theory.	
Reference Books:		
1)	E.S. Yang – Microelectronic Devices, McGraw Hill, Singapore, 1988.	
2)	B.G. Streetman – Solid State Electronic Devices, Prentice Hall of India, New Delhi, 1995.	
3)	J. Millman and A. Grabel – Microelectronics, McGraw Hill International, 1987.	
4)	A.S. Sedra and K.C. Smith – Microelectronic Circuits, Saunders College Publishing, 1991.	
5)	R.T. Howe and C.G. Sodini – Microelectronics: An Integrated Approach, Prentice Hall International, 1997.	



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Second Year B. Tech.

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

Electronic Circuits Design Laboratory (26UET21103)

Teaching Scheme:

Evaluation 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

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

BL

CO 1	Analyze the characteristics and applications of semiconductor devices such as P-N junction diode, Zener diode, BJT, and FET through experimental verification.	BL-3
CO 2	Evaluate the performance of rectifier circuits, transistor configurations, and voltage regulator circuits using input-output characteristics and h-parameter analysis.	BL-3
CO 3	Investigate the frequency response and amplification behavior of BJT and FET amplifiers under different configurations and operating conditions.	BL-3

Ex.	Experiment Details	No. of Ex.Session (hrs.)
1.	P-N junction diode characteristics.	2
2.	Zener diode characteristics and Zener as voltage regulator	2
3.	Half -wave rectifier with and without filter.	2
4.	Full - wave rectifier with and without filter.	2
5.	Input and output characteristics of transistor CB configuration.	2
6.	Input and output characteristics of transistor CE configuration.	2
7.	FET characteristics.	2
8.	H-parameters of CB configuration.	2
9.	H-parameters of CE configuration.	2
10.	Frequency response of CE amplifier.	2
11.	Frequency response of CC amplifier.	2
12.	Frequency response of common source FET amplifier.	2

Text Books:

3)	A. Neamen – Semiconductor Physics and Devices, IRWIN, Times Mirror Higher Education Group, Chicago, 1997.
4)	Brijesh Iyer, S. L. Nalbalwar, R. Dudhe – Electronics Devices & Circuits, Synergy

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	Knowledgeware, Mumbai, 2017.
3)	V.K. Mehta, Rohit Mehta – Principles of Electronics, S. Chand and Company.
4)	Robert L. Boylestad, Louis Nashelsky – Electronic Devices and Circuit Theory.
Reference Books:	
6)	E.S. Yang – Microelectronic Devices, McGraw Hill, Singapore, 1988.
7)	B.G. Streetman – Solid State Electronic Devices, Prentice Hall of India, New Delhi, 1995.
8)	J. Millman and A. Grabel – Microelectronics, McGraw Hill International, 1987.
9)	A.S. Sedra and K.C. Smith – Microelectronic Circuits, Saunders College Publishing, 1991.
10)	R.T. Howe and C.G. Sodini – Microelectronics: An Integrated Approach, Prentice Hall International, 1997.



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	Second Year B. Tech. E&TC Engineering			
	Semester - III (w.e.f. A.Y. 2026-27)			
	State Machine (26UET21104)			

Teaching Scheme:			Evaluation 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:	-

Course Outcomes: At the end of this course, students shall be able to		BL Level
CO 1	Differentiate between Mealy and Moore State machines	BL-2:
CO 2	Elaborate state machines with example	BL-2:
CO 3	Characterize state machines using algorithmic approach	BL-2:
CO 4	Differentiate between concurrent and sequential processing, data objects, data types, and attribute mechanics to select the correct structures for hardware modeling.	BL-2:
CO 5	Model combinational, sequential circuits and state machines using VHDL	BL-3:

Unit	Course Contents	No. of lectures (hrs.)
Unit 1	THE FINITE STATE MACHINE The Finite State Model: State Diagram, State Table, State Reduction, State Assignment, Transition and Output Table, Excitation Table, Mealy and Moore Machines, Sequence detectors (Mealy and Moore type), Serial Adder (Moore). Moore to Mealy and Mealy to Moore Conversion	8
Unit 2	Regular (Category 1) State Machines: Introduction, Architectures for Regular (Category 1) Machines, Number of Flip-Flops, Examples of Regular (Category 1) Machines - Small Counters, Parity Detector, Basic One-Shot Circuit, Temperature Controller, Garage Door Controller, Vending Machine Controller	7
Unit 3	ALGORITHMIC STATE MACHINES: Introduction, Components of ASM, Features of ASM Charts, ASM Chart examples- Mod 6 counter, sequence detector, Serial Adder/subtractor, Traffic Light Controller, Binary Multiplier, Weighing Machine	8


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Unit 4	VHDL: Introduction, Basic Terminologies, Entity, Architecture- Dataflow, structural, behavioral, Mixed Modelling, Configuration and package declaration, Data Objects, Data Types, Operators and attributes, Concurrent and Sequential Statements, Sequential Processing	8
Unit 5	VHDL Coding: Combinational Circuits (Adder, subtractor, mux, decoder), Sequential circuits (FF, Counters), State Machine Modeling, Interacting State Machines, Modeling Moore FSM, Modeling Mealy FSM	8
Text Books:		
1)	Fundamentals of Digital Circuits by A. Anand Kumar, PHI Publication, 2 nd edition	
2)	Finite State Machines in Hardware: Theory and Design (with VHDL and System Verilog) by Volnei A. Pedroni, The MIT Press Cambridge, Massachusetts, 2013	
3)	A VHDL Primer by Jayaram Bhasker, Printice Hall	
Reference Books:		
1)	VHDL: Programming by Example by Douglas L. Perry, Fourth Edition, McGraw-Hill	
2)	Circuit Design with VHDL by Volnei A. Pedroni, The M IT Press, Cambridge, Massachusetts, 3 rd 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 and 3 Programming based on combinational, sequential and state machine one each.		

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Second Year B. Tech. (E&TC)

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

State Machine Laboratory (26UET21105)

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:	25 Marks

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

	BL Level
CO 1 Implement Combinational circuits using VHDL	BL-3
CO 2 Implement Sequential circuits using VHDL	BL-3
CO 3 Implement State machines using VHDL	BL-3

Ex.	Experiment Details	No. of Ex. Sessions (hrs.)
Ex. 1	Implement half and full adder using VHDL using various models	2
Ex. 2	Implement Multiplexer using VHDL using various models	2
Ex. 3	Implement decoder using VHDL using various models	2
Ex. 4	Implement Different Flip Flops using VHDL	2
Ex. 5	Implement decade counter using VHDL	2
Ex. 6	Implement Right/ left shift register using VHDL	2
Ex. 7	Implement Mealy state machine using VHDL	2
Ex. 8	Implement Moore State machine using VHDL	2
Ex. 9	To be designed by Course Cocordinator	2
Ex. 10	To be designed by Course Cocordinator	2

Text Books:

- 1) Circuit Design with VHDL, Volnei A. Pedroni, The MIT Press Cambridge, Massachusetts, Third Edition,
- 2) VHDL: Programming by Example by Douglas L. Perry, Fourth Edition, McGraw-Hill
- 3) A VHDL Primer by Jayaram Bhasker, Printice Hall

Internal Continuous Assessment (ICA):

Students are expected to perform min 8 experiments. 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-III(w.e.f. A.Y. 2026-27)

MDM-I: Sensor & Transducer (26UET21401)

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 the principles, types and characteristics of sensors, transducers and actuators.	BL-2: Understand
CO 2	Apply the physical principles of sensing to explain the operation and selection of different types of sensors for engineering applications.	BL-3: Apply
CO 3	Describe the construction, working principles, and performance characteristics of strain gauges, LVDT, inductive, and capacitive transducers.	BL-2: Understand
CO 4	Explain the operating principles, characteristics, and applications of commonly used sensors.	BL-2: Understand
CO 5	Develop sensor interfacing systems by integrating amplifiers, bridge circuits, ADCs, and Arduino for effective signal acquisition and processing.	BL-3: Apply

Unit	Course Contents	No. of lectures (hrs.)
Unit 1	Introduction Sensors and transducer. Definitions: Sensor, Transducer and actuators, types of sensors and transducer, Difference between sensors, transducers, and actuators. Signals and Systems, Sensor Characteristics.	8
Unit 2	Physical Principles of Sensing. Electric Charges, Fields, and Potentials, Capacitance, Magnetism, Inductance, Resistance, Piezoelectric Effect, Hall Effect, Temperature and Thermal Properties of Material, Heat Transfer, Light, Dynamic Models of Sensor Element.	7
Unit 3	Transducers Strain Gauges, LVDT (Linear Variable Differential Transformer): Construction, working principle, input/output characteristics, Inductive and Capacitive Transducers.	7
Unit 4	Sensors Ultrasonic Sensor, PIR Sensor, IR Sensor, Smoke & Gas Sensor, Capacitive touch Sensor, Potentiometer, Temperature Sensor, LDR, Accelerometer Sensor, Accelerometer Sensor (MPU 6050), Atmospheric Pressure Sensor (GY 65), Soil Moisture detection Sensor, Optical Sensor.	7
Unit 5	Interface Electronic Circuits Input Characteristics of Interface Circuits, Amplifiers, Excitation Circuits, Analog to Digital Converters, Direct Digitization and Processing, Bridge Circuits, Data Transmission, Batteries for Low Power Sensors, Introduction to Arduino.	7


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Text Books:

- | | |
|---|---|
| 1 | J. Fraden, Handbook of Modern Sensors: Physical, Designs, and Applications, AIP Press, Springer |
| 2 | Sensors and Actuators Engineering System Instrumentation By Clarence W deSilva |
| 3 | Electrical and Electronic Measurements and instrumentation R.K Rajput S. Chand. |

Reference Books:

- | | |
|---|---|
| 1 | D. Patranabis, Sensors and Transducers, PHI Publication, New Delhi |
| 2 | A Course in Electronics and Electrical Measurements and Instruments, J.B. Gupta, Katson Books |
| 3 | A Course in Electrical and Electronic Measurements and Instrumentation, A.K.Sawheny, Dhanpat Rai. |
| 4 | Sensors and Actuators, Engineering System Instrumentation (second edition) by Clarence W. Desilva, CRC press is an imprint of Taylor and Francis Group. |
| 5 | Mechatronic Systems, Sensors and Actuators (Fundamental Modeling) edited by Robert H. Bishop, CRC press is an imprint of Taylor and Francis Group. |

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Second Year B. Tech.

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

OE I: Behavioral Economics (26UOE21501E)

Teaching Scheme:

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

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 behavioral economics theories and their departures from traditional economic assumptions	BL - 2
CO 2	Identify and analyze cognitive biases, heuristics, and behavioral patterns in real-world decision-making contexts	BL - 3
CO 3	Design and interpret behavioral experiments to test hypotheses about human decision-making.	BL - 4
CO 4	Apply behavioral insights to design effective interventions in policy, business, and personal contexts.	BL - 3
CO 5	Critically evaluate empirical research in behavioral economics and assess its implications for theory and practice.	BL - 3

Unit	Course Contents	No. of lecture (hrs.)
Unit 1	Introduction to Behavioral Economics Historical development and emergence of behavioral economics ,Comparison with traditional neoclassical economics, The concept of bounded rationality, Key contributors: Kahneman, Tversky, Thaler, Ariely, Overview of methodology: experiments, field studies, and natural experiments..	6
Unit 2	Economic Behavior Simple heuristics for complex choices, Choice with risk, Choosing when to act, Learning from new information, Interacting with others, Social preferences	6
Unit 3	Origins of Behaviour Evolution and culture, Neuroeconomics.	5

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Unit 4	Intertemporal Choice and Self-Control Time discounting and hyperbolic discounting, Present bias and procrastination, Commitment devices and precommitment strategies, Mental accounting and budgeting, Temptation and willpower Applications to savings, health behaviors, and addiction.	6
Unit 5	Happiness and Well-being Economics (6 hours) Measuring happiness and subjective well-being, The Easterlin paradox: income and happiness, Adaptation and hedonic treadmill, Relative income effects and social comparisons, Life satisfaction and experienced utility, Policy implications for well-being	6
Text Books:		
1	Cartwright, Edward . (2018). Behavioral Economics (3rd ed.). Routledge.	
2	Angner, E. (2016). A Course in Behavioral Economics (2nd ed.). Palgrave Macmillan	
3	Neuroeconomics, Decision Making and the Brain 2nd Edition 2013 Latest edition, Imprint: Academic Press Editor: Paul W. Glimcher.	
4	<i>Measuring Happiness: The Economics of Well-Being</i> by Joachim Weimann et al. (Available on MIT Press Direct).	
Reference Books:		
1	Ariely, D. (2008). Predictably Irrational: The Hidden Forces That Shape Our Decisions. Harper Collins	
2	Kahneman, D. (2011). Thinking, Fast and Slow. Farrar, Straus and Giroux..	
3	Thaler, R.H., & Sunstein, C.R. (2009). Nudge: Improving Decisions About Health, Wealth, and Happiness. Penguin Books	

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Second Year B. Tech. (E&TC)

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

State Machine Laboratory (26UET21105)

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:	25 Marks

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

	BL Level
CO 1 Implement Combinational circuits using VHDL	BL-3
CO 2 Implement Sequential circuits using VHDL	BL-3
CO 3 Implement State machines using VHDL	BL-3

Ex.	Experiment Details	No. of Ex. Sessions (hrs.)
Ex. 1	Implement half and full adder using VHDL using various models	2
Ex. 2	Implement Multiplexer using VHDL using various models	2
Ex. 3	Implement decoder using VHDL using various models	2
Ex. 4	Implement Different Flip Flops using VHDL	2
Ex. 5	Implement decade counter using VHDL	2
Ex. 6	Implement Right/ left shift register using VHDL	2
Ex. 7	Implement Mealy state machine using VHDL	2
Ex. 8	Implement Moore State machine using VHDL	2
Ex. 9	To be designed by Course Cocordinator	2
Ex. 10	To be designed by Course Cocordinator	2

Text Books:

- 1) Circuit Design with VHDL, Volnei A. Pedroni, The MIT Press Cambridge, Massachusetts, Third Edition,
- 2) VHDL: Programming by Example by Douglas L. Perry, Fourth Edition, McGraw-Hill
- 3) A VHDL Primer by Jayaram Bhasker, Printice Hall

Internal Continuous Assessment (ICA):

Students are expected to perform min 8 experiments. 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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	real-world applications.	
Unit 4	Average Concept of arithmetic mean, weighted averages, inclusion/exclusion of elements, and replacement problems, Mixture and Alligations.	3
Unit 5	Ratio and Proportion Ratio and Proportion, Direct proportion, Inverse proportion, Mean proportion, Joint proportion, Scaling Concept, • Problems on Ages Useful results.	3

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-III (w.e.f. A.Y. 2026-27)

Start-up Ecosystem (26UET21802)

Teaching Scheme:

Evaluation Scheme:

	No. of Hrs./week	No. of Credits		
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

CO 1	Explain the fundamental concepts, characteristics, and importance of entrepreneurship in economic and social development.	
CO 2	Identify business opportunities and generate innovative ideas to address real-world problems.	
CO 3	Understand the process of establishing and managing a new venture, including basic business planning concepts.	
CO 4	Demonstrate awareness of government schemes, startup support systems, incubation centers, and funding opportunities available for entrepreneurs.	
CO 5	Develop an entrepreneurial mindset with skills related to creativity, innovation, leadership, teamwork, and risk-taking.	

Unit	Course Contents	No. of lecture s (hrs.)
Unit 1	Introduction to Entrepreneurship Entrepreneur vs Employee , Characteristics of Entrepreneurs , Success Stories of Indian Entrepreneurs , Start-up Ecosystem in India	7
Unit 2	Business Opportunities Identifying Problems and Opportunities , Idea Generation Techniques , Local Business Opportunities , Innovation and Creativity	6
Unit 3	Basics of Business Planning What is a Business Model? , Cost and Revenue Concepts , Value Proposition , Simple Business Plan	6
Unit 4	: Government Support & Funding Startup India , MSME Schemes , Mudra Loan , Incubation Centers	7

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Text Books:	
1)	<i>Entrepreneurship Development</i> by S. S. Khanka
2)	<i>Entrepreneurship Development and Small Business Enterprises</i> by Poornima M. Charantimath
3)	<i>Entrepreneurship Development</i> by C. B. Gupta and N. P. Srinivasan
4)	<i>Entrepreneurship</i> by Robert D. Hisrich, Michael P. Peters, and Dean A. Shepherd.
Reference Books:	
1)	<i>Innovation and Entrepreneurship</i> is a 1985 book by management thinker Peter F. Drucker
2)	<i>The Lean Startup</i> by Eric Ries
3)	<i>Zero to One</i> by Peter Thiel with Blake Masters.
4)	<i>Business Model Generation</i> by Alexander Osterwalder and Yves Pigneur
5)	<i>Start With Why: How Great Leaders Inspire Everyone to Take Action</i> by leadership expert Simon Sinek.
6)	<i>Disciplined Entrepreneurship</i> by Bill Aulet



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

Second Year B. Tech.

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

Start-up Ecosystem Laboratory (26UET21803)

Teaching Scheme:

Evaluation 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

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

		<i>BL Level</i>
CO1	Explain the fundamentals of entrepreneurship, startup ecosystem, and entrepreneurial characteristics through laboratory activities and case studies.	BL2
CO2	Analyze business opportunities, market needs, and entrepreneurial problems to identify innovative startup ideas.	BL4
CO3	Apply entrepreneurial tools such as Business Model Canvas, cost estimation, and revenue analysis to develop feasible startup models.	BL3
CO4	Evaluate startup opportunities, government support schemes, funding options, and business sustainability for successful venture creation.	BL5

Ex.	Experiment (Any Six)	No. of Ex. Sessions (hrs.)
Ex. 1	Entrepreneur vs Employee Comparison	2
Ex. 2	Identifying Entrepreneurial Characteristics	2
Ex. 3	Case Study of an Indian Entrepreneur	2
Ex. 4	Study of the Indian Startup Ecosystem	2
Ex. 5	Problem Identification Survey	2
Ex. 6	Idea Generation Workshop	2
Ex. 7	Local Business Opportunity Analysis	2
Ex. 8	Business Model Canvas Preparation	2
Ex. 9	Cost, Revenue and Profit Estimation	2
Ex. 10	Government Scheme and Funding Study	2

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(An Autonomous Institute)

Second Year B. Tech.

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

Professional Ethics (26UET21804)

Teaching Scheme:

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

Evaluation Scheme:

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

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

		BL
CO 1	Understand the fundamental principles of ethics, values, and professional responsibility in personal and professional life.	BL - 2
CO 2	Develop awareness of ethical issues and challenges encountered in engineering practice, industry, and society.	BL - 2,3
CO 3	Recognize the importance of integrity, honesty, accountability, and professionalism in the workplace.	BL - 2,3
CO 4	Apply ethical reasoning and decision-making skills to address professional and societal issues responsibly.	BL - 2
CO 5	Appreciate the social, environmental, and ethical responsibilities of engineers towards sustainable development and public welfare.	BL - 3

Unit	Course Contents	No. of lectures (hrs.)
Unit 1	Introduction to Ethics Meaning and Importance of Ethics, Values, Morals, and Ethics, Personal and Professional Ethics, Ethical Decision-Making	3
Unit 2	Engineering Profession and Responsibilities Role of Engineers in Society, Professional Responsibilities, Accountability and Integrity, Code of Professional Conduct	3
Unit 3	Workplace Ethics Teamwork and Professional Relationships, Workplace Discipline and Etiquette, Conflict of Interest, Respect, Diversity, and Inclusion and resisting unethical authority.	4


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Unit 4	Ethics, Society, and Sustainability Social Responsibility ,Environmental Ethics ,Sustainable Development ,Case Studies on Ethical Issues in Engineering	3
Text Books:		
1)	Professional Ethics and Human Values by R. S. Naagarazan	
2)	Professional Ethics by R. Subramanian	
3)	Engineering Ethics: Concepts and Cases by Charles E. Harris Jr., Michael S. Pritchard, and Michael J. Rabins.	
Reference Books:		
1)	Ethics in Engineering is a textbook by Mike W. Martin and Roland Schinzinger	
2)	Human Values and Professional Ethics by A. Alavudeen, R. Kalil Rahman, and M. Jayakumaran	
3)	The Seven Habits of Highly Effective People is a self-help and leadership book by Stephen R. Covey,	
4)	Professional Ethics and Human Values by M. Govindarajan, S. Natarajan, and V. S. Senthil Kumar	

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(An Autonomous Institute)

Second Year B. Tech.

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

Professional Ethics Laboratory (26UET21805)

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:	25 Marks

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

		BL Level
CO1	Explain fundamental ethical principles, professional values, and the responsibilities of engineers towards society and the profession.	Understand (BL2)
CO2	Analyze ethical dilemmas, workplace situations, and professional case studies to identify appropriate ethical decisions.	Analyze (BL4)
CO3	Apply professional ethics, teamwork, communication skills, and code of conduct while addressing engineering and workplace issues.	Apply (BL3)
CO4	Evaluate engineering practices with respect to environmental ethics, sustainability, diversity, and social responsibility.	Evaluate (BL5)

Ex.	Experiment (Any Six)	No. of Ex. Sessions (hrs.)
Ex. 1	Identifying Personal Values and Ethical Principles	
Ex. 2	Ethical Decision-Making Using Case Scenarios	2
Ex. 3	Role of Engineers in Society	2
Ex. 4	Study of Professional Code of Conduct	2
Ex. 5	Teamwork and Professional Communication Activity	2
Ex. 6	Workplace Ethics Role Play	2
Ex. 7	Conflict of Interest Analysis	2
Ex. 8	Diversity and Inclusion Survey	2
Ex. 9	Environmental Ethics and Sustainable Engineering Study	2
Ex. 10	Case Study on Ethical Issues in Engineering	2

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	FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH		
	(An Autonomous Institute)		
	Second Year B. Tech.		
	Semester - III (w.e.f. A.Y. 2026-27)		
	PCB Design Laboratory (26UET21742)		

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

Course Outcomes: At the end of this course, students shall be able to			BL Level
CO 1	Identify the various types of devices/components		BL-1: Remember
CO 2	Develop skills in starting projects, using design tools, and creating net lists		BL-3: Apply
CO 3	Understand Soldering Techniques and Quality Control		BL-2: Understand
CO 4	Understanding of the PCB layout techniques for optimized component density and power saving.		BL-2: Understand
CO 5	Design different circuits on PCB		BL-3: Apply

Ex.	Experiment Details	No. of Ex. Sessions (hrs.)
Ex. 1	Introduction to Design Tools: Study PCB layers, through-hole vs. SMD components, and layout software interface.	2
Ex. 2	Schematic Capture & Simulation: Create schematics for circuits (e.g., Clamper, RLC circuit) and simulate output using software like TINAPRO or Proteus.	2
Ex. 3	Basic PCB Layout (LED/Simple Circuit): Design a single-layer PCB layout for an LED blinker or basic diode circuit.	2
Ex. 4	Analog Circuit Layout (Rectifiers): Design layout for a Half-Wave and Full-Wave Center Tapped Rectifier.	2
Ex. 5	Active Component Layout (Timer/Op-Amp): Create PCB layouts for a 555 Astable Multivibrator or an Op-Amp Inverting Amplifier.	2
Ex. 6	Digital Circuit Layout: Design a layout for a Half-Adder/Full-Adder or logic gate circuit.	2
Ex. 7	PCB Fabrication - Artwork & Printing: Generate Gerber files, print layouts on glossy paper, and transfer to a copper clad board.	2
Ex. 8	PCB Fabrication - Etching & Drilling: Use Ferrous Chloride for etching, followed by cleaning and manual/machine drilling.	2
Ex. 9	Component Assembly & Soldering: Solder components onto the fabricated board.	2
Ex. 10	Testing & Troubleshooting: Test finished boards for continuity, short circuits, and functionality.	2


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Text Books:	
1.	Printed Circuit Board Designer's Reference: Basics, by Christopher T. Robertson
Reference Books:	
1)	Complete PCB Design Using OrCAD Capture and PCB Editor 2nd Edition, Kindle Edition, by Kraig Mitzner (Author), Bob Doe (Author), Alexander Akulin (Author), Anton Suponin (Author), Dirk Müller (Author).
2)	PCB Design for Real-World EMI Control By: Bruce R. Archambeault (Author) , James Drewniak (Author) , Bruce R Archambeault (Author) Publisher: Springer, 2002.
In Semester Examination (ISE):	
Internal Continuous Assessment (ICA):	

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FABTECH TECHNICAL CAMPUS COLLEGE OF ENGINEERING & RESEARCH
(An Autonomous Institute)

Second Year B. Tech.

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

Constitution of India (26UME21901)

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		BL Level
CO 1	Identify and explore the basic features and modalities about Indian constitution.	Understand -2
CO 2	Differentiate and relate the functioning of Indian parliamentary system at the center and state level.	Apply-3
CO 3	Differentiate different aspects of Indian Legal System and its related bodies.	Apply-3
CO 4	Discover and apply different laws and regulations related to engineering practices	Analyze-5
CO5	Correlate role of engineers with different organizations and governance models.	Apply-3

Module No	Details	No. of hrs
1.	Meaning of the constitution law and constitutionalism Historical perspective of the Constitution of India Salient features and characteristics of the Constitution of India	6
2.	Scheme of the fundamental rights The scheme of the Fundamental Duties and its legal status The Directive Principles of State Policy – Its importance and implementation	4
3.	Federal structure and distribution of legislative and financial powers between the Union and the States Parliamentary Form of Government in India – The constitution powers and status of the President of India Amendment of the Constitutional Powers and Procedure	6
4.	The historical perspectives of the constitutional amendments in India Emergency Provisions : National Emergency, President Rule, Financial Emergency Local Self Government – Constitutional Scheme in India	4

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5.	Scheme of the Fundamental Right to Equality Scheme of the Fundamental Right to certain Freedom under Article 19 Scope of the Right to Life and Personal Liberty under Article 21.	4
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Suggested Readings :

- 1) Brij Kishore Sharma: Introduction to the Indian Constitution, PHI, New Delhi, latest edition.
Granville Austin: The Indian Constitution: Cornerstone of a Nation. 1966, Oxford Clarendon Press.
Subhash C. Kashyap: Our Constitution: An Introduction to India's Constitution and constitutional Law, NBT, 2018.
- 2) PM Bakshi: The Constitution of India, Latest Edition, Universal Law Publishing.
V.K. Ahuja: Law Relating to Intellectual Property Rights (2007)
Suresh T. Viswanathan: The Indian Cyber Laws, Bharat Law House, New Delhi-88
- 3) P. Narayan: Intellectual Property Law, Eastern Law House, New Delhi
Prabudh Ganguli: Gearing up for Patents: The Indian Scenario, Orient Longman.
BL Wadehra: Patents, Trademarks, Designs and Geological Indications. Universal Law Publishing - LexisNexis.
- 4) Intellectual Property Rights: Law and Practice, Module III by ICSI (only relevant sections)
Executive programme study material Company Law, Module II, by ICSI (The Institute of Companies Secretaries of India) (Only relevant sections i.e., Study 1, 4 and 36).
<https://www.icsi.edu/media/webmodules/publications/Company%20Law.pdf>
Handbook on e-Governance Project Lifecycle, Department of Electronics & Information Technology, Government of India,
https://www.meity.gov.in/writereaddata/files/eGovernance_Project_Lifecycle_Participant_Handbook-5Day_CourseV1_20412.pdf
- 4) Companies Act, 2013 Key highlights and analysis by PWC.
<https://www.pwc.in/assets/pdfs/publications/2013/companies-act-2013-keyhighlights-and-analysis.pdf>

5) Referred Case Studies

- Keshavanand Bharati V. State of Kerala, AIR 1973 SC 1461.
- Maneka Gandhi V. Union of India AIR, 1978 SC 597.
- S.R. Bammai V. Union of India, AIR 1994 SC 1918.
- Kuldip Nayyar V. Union of India, AIR 2006 SC312.
- A.D.M. Jabalpur V. ShivkantShakla, AIR 1976 SC1207.
- Remshwar Prasad V. Union of India, AIR 2006 SC980.
- Keshav Singh in re, AIR 1965 SC 745.
- Union of India V. Talsiram, AIR 1985 SC 1416.
- Atiabari Tea Estate Co.V. State of Assam, AIR 1961SC232.
- SBP & Co. Vs. Patel Engg. Ltd. 2005 (8) SCC 618.
- Krishna Bhagya Jala Nigam Ltd. Vs. G. Arischandra Reddy (2007) 2 SCC 720.
- Oil & Natural Gas Corporation Vs. Saw Pipes Ltd. 2003 (4) SCALE 92 – 185.

******(Other relevant case studies can be consulted by the teacher as per the topic).


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(An Autonomous Institute)**

Second Year B. Tech.

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

Technical Aptitude - I (26UET21901)

Teaching Scheme:

	No. of Hrs./week	No. of Credits
Lectures:	-	-
Tutorials:	-	-
Practical:	2	-
Total:	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	Apply rules of English grammar including tenses, articles, prepositions, and active/passive voice to construct grammatically correct sentences.	BL-3
CO 2	Demonstrate vocabulary skills by identifying synonyms, antonyms, analogies, and one-word substitutions in context.	BL-3
CO 3	Comprehend and analyze unseen passages to extract main ideas, inferences, and author intent through reading comprehension.	BL-4
CO 4	Evaluate arguments, identify assumptions, correct erroneous sentences, and rearrange jumbled paragraphs to produce coherent text.	BL -5

Module No	Details	No. of hrs
1	Verbal Ability I - English grammar — tenses, articles, prepositions, active/passive voice - Vocabulary — synonyms, antonyms, analogies, one-word substitution - Reading comprehension - Critical reasoning — argument evaluation, assumption identification - Sentence correction and para-jumbles	6
2	Reasoning and Corrections - Critical reasoning — argument evaluation, assumption identification - Sentence correction and para-jumbles	4
3	Numerical Ability - Number system — HCF, LCM, divisibility, prime numbers - Arithmetic — percentage, ratio & proportion, profit & loss, simple & compound interest - Permutations, combinations, probability basics	6

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4	Calculations and Data Interpretations • Time & work, time & distance, pipes & cisterns • Geometry — mensuration, areas, volumes • Data interpretation — tables, bar charts, pie charts, line graphs	4
5	Analytical Reasoning • Logical deduction, syllogisms • Blood relations, directions • Seating arrangements, coding-decoding	2
6	Series and Diagrams • Series completion — number, letter, figure • Venn diagrams, statement & conclusion	2
Text Books:		
1	High School English Grammar & Composition, Wren & Martin, S. Chand	
2	How to Prepare for Verbal Ability & Reading Comprehension, Arun Sharma & Meenakshi Upadhyay, McGraw-Hill	
3	A Modern Approach to Verbal & Non-Verbal Reasoning, R.S. Aggarwal, S. Chand	
Reference Books:		
1)	GATE Prep (ECE) ,GATE Electronics & Communication Engineering, R.K. Kanodia Nodia & Co.	
2)	How to Prepare for Data Interpretation for CAT, Arun Sharma, McGraw-Hill	
3)	Quantitative Aptitude for Competitive Examinations, R.S. Aggarwal, S. Chand	


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