D Y Patil College of Engineering, Akurdi, Pune

an Autonomous Institute from AY 2024-25 affiliated to

Savitribai Phule Pune University

Department of Electronics and Telecommunication Engineering

Curriculum Structure and Syllabus of Second Year Engineering from AY 2025-26

National Education Policy (NEP) based Curriculum

28 March 2025

Abbreviations and Definitions

NEP: National Education Policy
PEO: Program Educational Objectives
PO: Program Outcomes
PSO: Program Specific Outcomes
CO: Course Outcomes
BSC: Basic Science Courses
ESC: Engineering Science Courses
CC: Co-Curricular Courses
IKS: Indian Knowledge System
HSSM: Humanities Social Science and Management
PCC: Program Core Course
PEC: Program Elective Course
MDM: Multidisciplinary Minor
OE: Open Elective
EEM: Entrepreneurship/Economics and Management
FEP: Field Engineering Project
VEC: Value Education Course
VSEC: Vocational and Skill Enhancement Courses
AEC: Ability Enhancement Courses
Cr: Credits
NC: Non Credit Course
CCE: Continuous Comprehensive Evaluation
ESE: End Sem Examination
L: Lecture
T: Tutorial
P: Practical
FY: First Year
SY: Second Year
TY: Third Year
BY: Final Year
Group A: Computer, IT and AIDS
Group B: ETC, Instrumentation and Robotics and Automation,
Group C: Civil and Mechanical
Group I: Civil, Mech, Robotics and Automation, Instrumentation
Group II: Computer, IT, AIDS, ETC,
Cycle I: Computer, IT and AIDS
Cycle II: Civil, Mech, Robotics and Automation, ETC, Instrumentation

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester III (2024 COURSE)

D Y Patil College of Engineering, Akurdi, Pune													
Second Year Engineering SY B Tech (E&TC Engineering) Semester III (2024 Course)													
Course Code	Course	Teaching Scheme				Evaluation Scheme							
		L	T	P	Cr	Exam	Theory % Marks			Practical % Marks			
							Max	Min for Pass		Max	Min for Pass		
PCC2	Electronic Circuits and Applications	3	0	0	3	CCE	50	20	40				
						ESE	50	20					
PCC2	Electronic Circuits and Digital Electronic Lab	0	0	2	1	CCE				50	20	40	
						ESE				50	20		
PCC3	Digital Electronics	3	0	0	3	CCE	50	20	40				
						ESE	50	40					
PCC4	Applied Mathematics	3	0	0	3	CCE	50	20	40				
						ESE	50	20					
MDM1	Introduction to Internet of Things	2	0	0	2	CCE	50	40	40				
						ESE	50	40					
OE1	Leadership & Team Management	3	1	0	4	CCE	50	20	40				
						ESE	50	20					
EEM1	Project Management	2	0	0	2	CCE	50	20	40				
						ESE	50	20					
VEC1	Sustainable Development Goals I	2	0	0	2	CCE	50	20					
FEP	Project Based Learning	0	0	4	2	CCE	100	40					
NC1	Non Credit Course- Design Thinking	1	0	2	0	CCE	50	20					
NC2	Non Credit Course - Employability Skills	0	0	2	0	CCE	50	20					
	Total	**19**	**01**	**10**	**22**								
				Hrs									
L	Lecture	**Theory**		**19**									
T	Tutorial	**Tutorial**		**01**									
P	Practical	**Pract/Lab**		**10**									
		Total		**30**									
Cr	Credits												
NC	Non Credit Course (Pass/Fail)												
CCE	Continuous and Comprehensive Evaluation												
ESE	End Semester Examination												

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester III (2024 COURSE)

D Y Patil College of Engineering, Akurdi, Pune

Second Year Engineering SY B Tech (E&TC Engineering) Semester IV(2024 Course)

Course Code	Course	Teaching Scheme				Evaluation Scheme						
		L	T	P	Cr	Exam	Theory % Marks			Practical % Marks		
							Max	Min for Pass		Max	Min for Pass	
PCC5	Principles of Communication Systems	3	0	0	3	CCE	50	20	40			
						ESE	50	20				
PCC5	Principles of Communication System Lab	0	0	2	1	CCE				50	20	40
						ESE				50	20	
PCC6	Data Structures	3	0	0	3	CCE	50	20	40			
						ESE	50	20				
PCC6	Data Structures Lab	0	0	2	1	CCE				50	20	40
						ESE				50	20	
PCC7	Signals and Systems Analysis	2	0	0	2	CCE	50	20	40			
						ESE	50	20				
MDM2	Protocols for Internet of Things	2	0	0	2	CCE	50	20	40			
						ESE	50	20				
OE2	Organizational Behaviour	2	0	0	2	CCE	50	20	40			
						ESE	50	20				
VSEC3	PCB Designing and Fabrication	1	0	2	2	CCE				100	40	
AEC2	Soft Skills: Workplace and Life	1	0	2	2	CCE	100	40				
EEM2	Engineering Economics and Finance	2	0	0	2	CCE	50	20	40			
						ESE	50	20				
VEC2	Sustainable Development Goals II	2	0	0	2	CCE	50	20				
NC3	Non Credit Course- Control Engineering	0	0	2	0	CCE	50	20				
NC4	Non Credit Course - Employability Skills	0	0	2	0	CCE	50	20				
	Total	**18**	**0**	**12**	**22**							
				Hrs								
L	Lecture	**Theory**		**18**								
T	Tutorial	**Pract/Lab**		**12**								
P	Practical	**Total**		**30**								
Cr	Credits											
NC	Non Credit Course (Pass/Fail)											
CCE	Continuous and Comprehensive Evaluation											
ESE	End Semester Examination											

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester III (2024 COURSE)

Course Category	Programme Core Course	Course Code	ET124PC301
Course Title	**Electronic Circuits and Applications**		

Teaching Scheme				Evaluation Scheme						
					Theory Marks			Practical Marks		
L	**T**	**P**	**Cr**	**Exam**	**Max**	**Min Marks for Pass**		**Max**	**Min Marks for Pass**	
3	0	0	3	CCE	50	20				
Total Hours				ESE	50	20	40			
39	0	0	Total hrs: 39		100					

Prerequisites: Basic knowledge of Semiconductor Physics, BJT and Op-amp

Course Objectives:

1. To introduce MOSFET, its operation, characteristics, and applications.
2. To analyze and interpret MOSFET circuits for small signal at low and high frequencies
3. To introduce concepts of both positive and negative feedback in electronic circuits.
4. To introduce concepts of power amplifiers and its classes.
5. To simulate electronics circuits using computer simulation software and verify desired results.

Course Outcomes: After successful completion of the course the student will be able to

CO1	**Interpret** MOSFET characteristics, parameters, and biasing circuit for different applications.	BT Level 3
CO2	**Use** small signal model of MOSFET to study its application as amplifier and oscillator	BT Level 3
CO3	**Apply** understanding of internal schematic, DC & AC analysis of Op-Amp to study its performance parameters.	BT Level 3
CO4	**Use** the Op-amp application design steps for signal processing and conditioning circuits.	BT Level 3
CO5	**Analyze** the performance of Op-amp Converters, PLL and IC regulator	BT Level 4

Syllabus

Unit I	MOSFET and DC analysis	8 hrs
	MOS Transistor operation, n-channel E-MOSFET Structure and operation, characteristics and Parameters, non-ideal voltage current characteristics, effect of W/L ratio. Voltage divider biasing, DC load line and analysis for CS circuit. Comparison with BJT & FET. MOSFET application as a switch, resistor, inverter, digital logic gate and CMOS inverter.	
Unit II	**MOSFET :Amplifier & Oscillator**	**8 hrs**
	Small-Signal Equivalent Circuit, CS Configuration analysis, common-	

	drain (source-follower) amplifier. Frequency response of CS amplifier. **Feedback amplifiers:** Properties of negative feedback, Four types of amplifiers and feedback topologies, Examples of voltage series and Current series feedback amplifiers and their analysis. **Oscillators:** Barkhausen criterion, Types of Oscillators, RC Phase Shift oscillator, LC Oscillator Hartley & Colpitts.	
Unit III	**Operational amplifier**	**7 hrs**
	Block diagram and Level shifter circuits, Differential amplifier -Dual input Balanced output configuration- DC analysis, AC analysis (using r parameter model), Op amp equivalent circuit, parameters characteristics (AC & DC), Current mirror circuit.	
Unit IV	**Operational amplifier applications**	**8 hrs**
	Inverting amplifier, non-inverting amplifier, Voltage follower, Summing amplifier, Differential amplifier, Precision rectifier, Practical integrator, Practical differentiator, Comparator, Schmitt trigger, Square & triangular wave generator. Instrumentation amplifier.	
Unit V	**Converters, PLL & Regulator**	**8 hrs**
	DAC & ADC: Resistor weighted and R-2R DAC, SAR & Flash type ADC - Characteristics, Specifications, Merits, Demerits, Comparisons. **PLL:** Block Diagram, Characteristics, phase detectors, Details of PLL IC 565 Applications, Typical circuits. **Regulator:** Block Diagram, Three terminal voltage regulators 317 & 337, Features and specifications. SMPS: Block diagram, Types, features and specifications	

References

Text Books:

1. Donald Neaman, "Electronic Circuits - Analysis and Design", Mc Graw Hill, 3rd Edition.
2. Ramakant Gaikwad, "Op Amps & Linear Integrated Circuits", Pearson Education.
3. R. L. Boylstad, L. Nashlesky, "Electronic Devices and circuits Theory", 9th Edition, Prentice Hall of India, 2006.

References Books:

1. Phillip E. Allen and Douglas R. Holberg, "CMOS Analog Circuit Design", Oxford, 2nd Edition
2. "Electronic Devices," Thomas L Floyd, 10th edition, Pearson
3. David A. Bell, "ElectronicDevicesandCircuits",5th Edition, Oxford press
4. S. Salivahanan, ―Electronic Devices and Circuits‖, Tata McGraw Hill, 2nd Edition, 2014

NPTEL/Swayam link:

1. NPTEL Course on **"Integrated Circuits, MOSFETs, OP-Amps and their Applications".** https://onlinecourses.nptel.ac.in/noc25_ee44/preview
2. NPTEL Course on **"Analog Circuits"**

https://nptel.ac.in/courses/108/101/108101094/

3. Analog Circuits, IIT Bombay
https://nptel.ac.in/courses/117101106

Scheme for Examination

Component	Level	Unit1	Unit2	Unit3	Unit4	Unit5	Total	Passing
Continuous Comprehensive Evaluation (CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

After completion of each unit subject teachers will conduct following CCE:

Sr. No.	Unit I	Unit II	Unit III	Unit IV	Unit V	Total Marks
Method	Assignment	MCQ	Assignment	Quiz	Quiz	**50**
Marks	10	10	10	10	10	

Rubrics for Assignment:-

Timely Submission(02)			Correctness (05)		Presentation(03)	
Submission on given Day	One day late	Two days late	Complete correct	Partially correct	Good	Average
02	01	00	05	03	03	02

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	2	2	1	0	1	0	0	0	0	1
CO2	2	2	2	1	0	1	0	0	0	0	1
CO3	3	2	2	2	1	1	0	1	2	0	1
CO4	3	2	2	2	1	1	1	1	2	1	1
CO5	3	2	2	2	1	1	0	1	2	0	1

3: High, 2: Moderate, 1: Low, 0: No Mapping

*****

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester III (2024 COURSE)

Course Category	**Programme Core Course**	**Course Code**	**ET124PC302**
Course Title	**Electronic Circuits and Digital Electronics Lab**		

Teaching Scheme				**Evaluation Scheme**						
					Theory Marks			**Practical Marks**		
L	**T**	**P**	**Cr**	**Exam**	**Max**	**Min Marks for Pass**		**Max**	**Min Marks for Pass**	
0	0	2	1	CCE				50	20	40
Total Hours				ESE				50	20	
0	0	26	Total hrs: 26					100		

Prerequisites: Basic knowledge of Semiconductor Physics, BJT and Op-amp

Course Objectives:

1. Concept of feedbacks in amplifiers & oscillators.
2. Operational amplifier, concept, parameters & applications.
3. The principle of voltage regulator
4. The fundamental working principles of logic gates
5. Karnaugh maps to the design and characterization of digital circuits.
6. Implement logical operations using combinational logic circuits.
7. The principles of logic design and use of simple memory devices, flip-flops, and sequential circuits for various applications.
8. Analyze sequential systems in terms of state machines and PLDs.

Course Outcomes: After successful completion of the course the student will be able to

CO1	**Implement** Amplifier and Oscillator circuit using MOSFET	BT Level 3
CO2	**Examine** op-amp performance parameters and its applications.	BT Level 4
CO3	**Implement** adjustable voltage regulator using Three pin IC	BT Level 3
CO4	**Design** and implement combinational logic circuits.	BT Level 4
CO5	**Design** and implement sequential circuits.	BT Level 4

List of Laboratory Experiments

1	To design, build single stage CS amplifier & verify dc operating point and calculate Av, Ri, Ro and B.W.
2	a) To implement current series feedback amplifier & measure Rif, Rof, Avf & bandwidth. b) To Simulate MOSFET amplifier-based Wein bridge oscillator.
3	To measure following Op- amp parameters & compare with specifications given in data sheet. a) Input bias current, b) Input offset current, c) Input offset voltage, d) Slew rate e) CMRR
4	a) To design, build & test integrator using Op-amp for given frequency fa.

	b) To design, build & test Schmitt trigger
5	To design & test an adjustable voltage regulator using three terminal voltage regulator IC.
6	Study of IC-74LS153 as a Multiplexer: a. Design and Implement 8:1 MUX using IC-74LS153 & Verify its Truth Table. b. Design & Implement the given 4 variable function using IC74LS153. Verify its Truth-Table
7	Study of IC-74LS138 as a Demultiplexer / Decoder: a. Design and Implement full adder and subtractor function using IC-74LS138. b. Design & Implement 3-bit code converter using IC-74LS138
8	Study of Counter ICs (74LS90/74LS93): a. Design and Implement MOD-N and MOD-NN using IC-74LS90 and draw Timing diagram. b. Design and Implement MOD-N and MOD-NN using IC-74LS93 and draw Timing diagram.
9	Study of synchronous counter: a. Design & Implement 4-bit Up/down Counter and MOD-N Up/down Counter using IC74HC191 / IC74HC193. Draw Timing Diagram.
10	Study of Shift Register (74HC194 / 74LS95): a. Design and Implement Pulse train generator using IC-74HC194 / IC74LS95 (Use right shift/ left shift).

References

V-Lab Links:

Electronic Circuits and Applications:|

1. https://aec-iitkgp.vlabs.ac.in/
2. https://ae-iitr.vlabs.ac.in/List%20of%20experiments.html

Digital Electronics:

1. https://da-iitb.vlabs.ac.in/List%20of%20experiments.html
2. https://dld-iitb.vlabs.ac.in/List%20of%20experiments.html

Scheme for Examination

Component	Level	Parameters	Marks	Total	Passing
Continuous Comprehensive Evaluation (CCE)	Progressive Evaluation	Understanding Viva Voce	20	50	20
		Involvement, Participation, and Engagement	10		
		Quality of Submission of Report	10		
		Attendance	10		
	End Evaluation	Performance	25	50	20
		Oral Examination	25		

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester III (2024 COURSE)

Course Marking Scheme

Progressive Evaluation:

Attendance	05 Marks	If Present 5 Marks	If Absent 0 Marks
Presentation	05 Marks	On time 5 Marks	Late 3 Marks
Viva	05 Marks	Correct Answer to all questions 5 marks	Partially correct 03 Marks
Total	15		

Total No. of Experiments	**Marks To each Experiment based on above parameters**	**Total Marks**	**Converted Marks**
10	15	150	50

CO-PO Mapping

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	3	3	3	3	3	0	0	0	0	0	2
CO2	3	3	3	0	3	0	0	1	0	0	2
CO3	3	2	3	2	2	1	1	0	1	0	2
CO4	3	2	2	2	3	0	0	0	0	0	2
CO5	3	0	3	0	2	0	0	0	0	1	1

3: High, 2: Moderate, 1: Low, 0: No Mapping

*****

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester III (2024 COURSE)

Course Category	**Programme Core Course**	**Course Code**	**ET124PC303**
Course Title	**Digital Electronics**		

Teaching Scheme				**Evaluation Scheme**						
					Theory Marks			**Practical Marks**		
L	**T**	**P**	**Cr**	**Exam**	**Max**	**Min Marks for Pass**		**Max**	**Min Marks for Pass**	
3	0	0	3	CCE	50	20				
Total Hours				ESE	50	20	40			
39	0	0	Total hrs: 39		100					

Prerequisites: Basic knowledge of Semiconductor Physics, BJT and Op-amp

Course Objectives:

1. The fundamental working principles of logic gates
2. Karnaugh maps to the design and characterization of digital circuits.
3. Implement logical operations using combinational logic circuits.
4. The principles of logic design and use of simple memory devices, flip-flops, and sequential circuits for various applications.
5. Analyze sequential systems in terms of state machines and PLDs.

Course Outcomes: After successful completion of the course the student will be able to

CO1	**Compare** logic families in digital circuits like TTL, CMOS for interfacing of circuits	BT Level 4
CO2	**Analyze** K-map reduction technique for implementing digital logic circuit.	BT Level 4
CO3	**Design** combinational logic circuits like multiplexer, decoder for data processing	BT Level 4
CO4	**Design** sequential circuits like flip flop, shift register for data storage, processors	BT Level 4
CO5	**Design** digital circuits using Mealy, Moore machines and Programmable logic devices.	BT Level 4

Syllabus

Unit I	**Logic Families**	**7hrs**
	Characteristics of Digital ICs. Classification of Logic Families: TTL, CMOS, TTL NAND Gate, active pull up, wired AND, open collector output, unconnected inputs. Tri-State logic. CMOS logic: CMOS inverter, NAND, NOR gates, unconnected inputs, wired logic, open drain output. Interfacing CMOS and TTL.	
Unit II	**Logic Simplification and Combinational Logic Design**	**8hrs**
	Definition of combinational logic, Canonical forms, Standard representations for logic functions, Sum-of- Products and Product-of-Sums forms of Boolean function, Minters and Maxterms, Karnaugh map	

	up to 4 variables, Don't care conditions, Code Conversion: Binary Coded Decimal code, Gray code, Excess-3 code.	
Unit III	**Combinational Circuits**	**8hrs**
	Half and Full Adder, Half and Full Subtractor, Ripple Carry Adder, Carry Look Ahead adder, BCD Adder, Digital Comparator, Multiplexer and De-multiplexers and their use in combinational logic designs , Encoder and Decoder, Parity generator and checker	
Unit IV	**Sequential Circuits**	**9hrs**
	1 Bit Memory Cell, Clocked SR, JK, MS J-K flip flop, D and T flip-flops, Master-Slave JK FF, Edge triggered FF, Excitation Table for flip flop, Conversion of flip flops , Registers, Shift registers, Application of register, Counters: Ripple counters, Mod-n counters, up/down counters, synchronous counters, lock out, Clock Skew, Clock jitter. Sequence Generators.	
Unit V	**Finite State Machines and PLDs**	**7hrs**
	Finite state model, Basic Design steps for sequential circuits, State diagram, State Table, State reduction and state assignment, Mealy machine and Moore machine representation and implementation, Sequence detector , Detail architecture Study of PROM, PAL, PLA, Designing combinational circuits using PLDs, its application in industrial processes.	

References

Text Books:

1. Anand Kumar, "Fundamentals of Digital Circuits", Prentice Hall of India, 1st Edition.
2. J. F. Wakerly, "Digital Design- Principles and Practices," Pearson, 3rd Edition.
3. M. M. Mano, "Digital Design," Prentice Hall India.

References Books:

1.R.P. Jain, "Modern Digital Electronics", Tata McGraw Hill Publication, 3rd Edition.
2. Thomas Floyd, "Digital Electronics", 11th Edition.
3. Taub and Schilling, "Digital Principles and Applications," TMH.

NPTEL/Swayam link:

1. NPTEL Course "Digital Electronic Circuits"

https://onlinecourses.nptel.ac.in/noc25_ee20

2. MOOC course, "Digital Circuit Design - A Practical Approach"

https://onlinecourses.swayam2.ac.in/ntr25_ed34

3. NPTEL Course "Digital Circuits & Systems"

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester III (2024 COURSE)

https://nptel.ac.in/courses/117/106/117106086/https://nptel.ac.in/courses/117/106/117106086/

Scheme for Theory Examination

Component	Level	Unit1	Unit2	Unit3	Unit4	Unit5	Total	Passing
Continuous Comprehensive Evaluation (CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

After completion of each unit subject teachers will conduct following CCE

Sr. No.	Unit I	Unit II	Unit III	Unit IV	Unit V	Total Marks
Method	Assignment	MCQ	Assignment	Quiz	Quiz	**50**
Marks	10	10	10	10	10	

Rubrics for Assignment-

Timely Submission(02)			Correctness (05)		Presentation(03)	
Submission on given Day	One day late	Two days late	Complete correct	Partially correct	Good	Average
02	01	00	05	03	03	02

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	2	2	1	0	1	1	0	0	0	0
CO2	3	2	2	2	1	1	0	1	2	0	0
CO3	3	2	2	2	1	1	0	1	2	0	0
CO4	3	2	2	2	1	1	0	1	2	0	0
CO5	2	2	1	2	0	1	0	0	0	1	1

3: High, 2: Moderate, 1: Low, 0: No Mapping

*****

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester III (2024 COURSE)

Course Category	**Programme Core Course**	**Course Code**	**ET124PC304**
Course Title	**Applied Mathematics**		

Teaching Scheme				**Evaluation Scheme**						
					Theory Marks			**Practical Marks**		
L	**T**	**P**	**Cr**	**Exam**	**Max**	**Min Marks for Pass**		**Max**	**Min Marks for Pass**	
3	0	0	3	CCE	50	20	40			
Total Hours				ESE	50	20				
39	0	0	Total hrs: 39		100					

Prerequisites: Differential & Integral calculus, Differential equations of first order & first degree, Fourier series, Collection, classification and representation of data and Vector algebra.

Course Objectives:

1. To make the students familiarize with concepts and techniques in Ordinary differential equations, Fourier Transform, Laplace-Transform, Statistical methods and Probability.
2. The aim is to equip them with the techniques to understand advanced level mathematics and its applications that would enhance analytical thinking power, useful in their disciplines

Course Outcomes: After successful completion of the course the student will be able to

CO1	**SOLVE** higher order linear differential equations using appropriate techniques for modelling, analysing electrical circuits and control systems.	BT Level 3
CO2	Learn the concept Laplace Transform and **APPLY** it to continuous & discrete systems, signal processing and communication systems. .	BT Level 3
CO3	Learn the concept Fourier Transform and **APPLY** it to continuous & discrete systems, signal processing and communication systems. .	BT Level 3
CO4	Perform Statistical methods like correlation, regression as applicable to **ANALYZE** e and interpret experimental data related to energy management, power systems, testing and quality control	BT Level 4
CO5	Learn the Probability theory as applicable to **ANALYZE** and **INTERPRET** experimental data related to energy management, power systems, testing and quality control.	BT Level 4

Syllabus

Unit I	**Differential Equation & Its Application**	**8 hrs**
	LDE of nth order with constant coefficients, Complementary Function, Particular Integral, Short methods, Method of variation of parameters, Cauchys and Legendre‟s DE. Modeling of Electrical circuits.	
Unit II	**Integral Transforms**	**8 hrs**
	Laplace Transform (LT): Definition of LT, Inverse LT, Properties & theorems, LT of standard functions, LT of some special function. Applications of LT for solving Linear differential equations	

B Tech in E & TC Engineering | S Y B Tech Semester III (2024 COURSE)

Unit III	**Transforms for Signal and Control Systems**	**8 hrs**
	Fourier Transform (FT): Complex exponential form of Fourier series, Fourier integral theorem, Fourier Sine & Cosine integrals, Fourier transform, Fourier Sine & Cosine transforms and their inverses. Z-Transform (ZT): Introduction, Definition, Standard properties, ZTof standard sequences and their inverses. Solution of difference equations..	
Unit IV	**Statistics**	**8 hrs**
	Measures of central tendency, Measures of dispersion, Coefficient of variation, Moments, Skewness and Kurtosis, Correlation and Regression, Reliability of Regression estimates.	
Unit V	**Probability**	**7 hrs**
	Probability, Random variables, Mathematical Expectation, Probability distributions: Binomial, Poisson, Normal.	

References

Text Books:

1. Higher Engineering Mathematics by B. V. Ramana (Tata McGraw Hill)
2. Higher Engineering Mathematics by B. S. Grewal (Khanna Publication, Delhi

References Books:

1. Advanced Engineering Mathematics by Erwin Kreyszig (Wiley Eastern Ltd.)
2. Advanced Engineering Mathematics by M. D. Greenberg (Pearson Education)
3. Advanced Engineering Mathematics by Peter V. O'Neil (Thomson Learning)
4. Thomas' Calculus by George B. Thomas, (Addison-Wesley, Pearson)
5. Applied Mathematics (Vol. I and II) by P.N. Wartikar and J.N.Wartikar Vidyarthi Griha Prakashan, Pune.
6. Differential Equations by S. L. Ross (John Wiley and Sons)

Scheme for Theory Examination

Component	Level	Unit1	Unit2	Unit3	Unit4	Unit5	Total	Passing
Continuous Comprehensive Evaluation (CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

- **Theory**: - After completion of each unit subject teachers will conduct following activities during lecture

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester III (2024 COURSE)

Sr. No.	Unit I	Unit II	Unit III	Unit IV	Unit V	Total Marks
Method	Assignment	Assignment	Quiz	Quiz	Quiz	50
Marks	10	10	10	10	10	

- Rubrics for Assignment

Timely Submission (02)			Correctness (05)		Presentation (03)	
Given Day	One day Late	Two Day Late	Complete correct	Partially correct	Good	Average
02	01	00	05	03	03	02

If student is not submitting Assignment within time then marks will be zero and if absent for quiz his/her marks will be considered as zero for that unit quiz.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	1	1	0	0	0	1	0	0	1
CO2	3	3	0	0	0	0	0	1	0	0	1
CO3	3	3	0	0	0	0	0	1	0	0	1
CO4	3	3	0	1	1	1	0	1	1	0	1
CO5	3	3	0	1	0	0	0	1	1	1	1

3: High, 2: Moderate, 1: Low, 0: No Mapping

*****

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester III (2024 COURSE)

Course Category	Multidisciplinary Minor	Course Code	ET124MD305
Course Title	Introduction to Internet of Things		

Teaching Scheme				Evaluation Scheme						
					Theory Marks			Practical Marks		
L	T	P	Cr	Exam	Max	Min Marks for Pass		Max	Min Marks for Pass	
2	0	0	2	CCE	50	20	40			
Total Hours				ESE	50	20				
26	0	0	Total hrs: 26		100					

Prerequisites:

1. Fundamentals of sensors and hardware components
2. Basic networking concepts
3. Knowledge of Digital electronics, Embedded systems and Microcontroller

Course Objective

1. To introduce the fundamentals of sensors and actuators along with the basic concepts of an IoT & IoE.
2. To give Insights into the Architecture and M2M technology for an IoT.
3. To Exposing students to the usage of Protocol Standardization for IoT with IoT Edge and Gateway Network with Communication protocols.
4. To develop design skills in industrial IoT.
5. To provide IoT Solutions with sensor-based application through embedded system platform.

Course Outcomes: After successful completion of the course the student will be able to

CO1	**Elaborate, comprehend and analyze** concepts of sensors, actuators, IoT and IoE	BT Level 3/4
CO2	**Interpret** IoT Architecture Design Aspects.	BT Level 3
CO3	**Evaluate** the operation of IoT protocols	BT5Level 4
CO4	**Develop** programming skills for interfacing applications to various IoT boards	BT Level 6
CO5	**Design** suitable use cases solution for domain specific applications of IoT.	BT Level 6

Syllabus

Unit I	Fundamentals of IoT	5 hrs
	Definition, Characteristics of an IoT, History of IoT, Physical Design of an IoT, Logical design of IoT, Types of IoT (like Industrial IoT, Internet of Everything)	
Unit II	**Devices of IoT**	**5 hrs**

	Devices of IoT (Electronic components, sensors, actuators), Fundamentals, Types of sensors (like Temperature, IR), Types of Actuators (LED, Buzzer), Example and Working of Sensor & actuator	
Unit III	**IoT Architecture**	**5hrs**
	Architectural Overview, Layers of IoT architecture, Types of architecture (Cloud-Based Architecture, Fog Computing Architecture, Service-Oriented Architecture (SOA), Blockchain-Based Architecture)	
Unit IV	**Introduction to IoT Programming**	**6 hrs**
	Introduction to IoT Boards, Types of boards with summary, IoT deployment for Programming Arduino Board, Programming for LED, Temperature sensor LM 35, serial communication	
Unit V	**Applications of IoT**	**5 hrs**
	Applications of IoT, Current status and Future scope of IoT, Case Study on Smart Home like power management for electrical appliances,	

References

Text Books:

1. Ovidiu Vermesan, Peter Fresiss, “Internet of Things” From research and innovation to market Deployment”, River Publishers series in Communication, USA.
2. Olivier Hersent, David Boswarthick and Omar Elloumi, “The Internet of Things: Key Applications and Protocols”, 2nd Edition, Wiley Publications.

References Books:

1. Dr. Ovidiu Vermesan, Dr. Peter Friess, “Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems”, River Publishers Series in Communication
2. “Internet of Things: Case Studies”,LibeliumInc, Whitepapers, Spain
   http://www.libelium.com/resources/case-studies

MOOC/NPTEL Courses:

1. NPTEL Course on “**Introduction to IoT**”, by Prof. Sudip Misra, IIT Kharagpur
   Link of the Course : https://nptel.ac.in/courses/106105166
2. NPTEL Course on “**Introduction to Industry 4.0 and Industrial Internet of Things**”, by Prof. Sudip Misra, IIT Kharagpur
   Link of the Course: https://nptel.ac.in/courses/106105195

Scheme for Examination

Component	Level	Unit1	Unit2	Unit3	Unit4	Unit5	Total	Passing
Continuous Comprehensive Evaluation (CCE)	Faculty	10	10	10	10	10	50	20

B Tech in E & TC Engineering | S Y B Tech Semester III (2024 COURSE)

End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	1	2	1	1	1	2	1	1	1	2	1
CO2	1	2	2	1	2	1	2	1	2	2	1
CO3	2	1	2	1	1	1	1	2	1	3	1
CO4	1	1	3	2	2	2	1	1	2	2	1
CO5	1	1	1	1	3	1	2	1	1	2	1

3: High, 2: Moderate, 1: Low, 0: No Mapping

*****

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester III (2024 COURSE)

Course Category	**Open Elective 1**	**Course Code**	**ET124OE306**
Course Title	**Leadership & Team management**		

Teaching Scheme				**Evaluation Scheme**						
					Theory Marks			**Practical Marks**		
L	**T**	**P**	**Cr**	**Exam**	**Max**	**Min Marks for Pass**		**Max**	**Min Marks for Pass**	
3	1	0	4	CCE	50	20	40	-	-	-
Total Hours				ESE	50	20		-	-	
39	13	0	Total hrs: 52		100			-	-	

Prerequisites: Basic knowledge of Semiconductor physics, Boolean Algebra

Course Objectives:

1. To provide a framework for the students to understand the importance of Leadership and team effectiveness in organizations..
2. To develop an understanding of the interpersonal processes and group dynamics.
3. To provide a theoretical understanding of leadership practices in organizations.
4. To provide an understanding of factors influencing teamwork and team leadership.
5. To evaluate the role of leadership in the development of an institution

Course Outcomes: After successful completion of the course the student will be able to

CO1	Explain how global leadership skills contribute to leadership effectiveness.	BT Level 3
CO2	Understand the leader's role in team-based organizations	BT Level 3
CO3	Explain the potential contribution of outdoor training to the development of team leadership	BT Level 3
CO4	Explain the basics of leadership during a crisis	BT Level 3
CO5	Explain how evidenced based leadership can contribute to contingency and situational leadership.	BT Level 3

Syllabus

Unit I	**Introduction to Leadership and Models**	**7 hrs**
	Introduction to Leadership & Team Management; Leadership Myths; Interactional Framework for analyzing leadership; Leadership Development: The First 90 Days as a Leader; Leader Development- The Action-Observation-Reflection Model, LMX Theory and Normative Decision Model; Situational Leadership Model; Contingency Model and Path Goal Theory,Leadership for Tomorrow	
Unit II	**Leadership Attributes and Skills**	**7 hrs**

	Leadership Attributes; Personality Traits and Leadership; Personality Types and Leadership; Intelligence and Leadership; Emotional Intelligence and Leadership, Power and Leadership; The art of influence in leadership; Leadership and "Doing the Right Things; Character-Based Approach to Leadership; Role of Ethics and Values in Organisational Leadership	
Unit III	**Leadership Behaviour**	**8 hrs**
	Leadership Behaviour; Leadership Pipeline; Assessing Leadership Behaviors: Multi-rater Feedback Instruments; The Dark Side of; Leadership- Destructive Leadership; Managerial Incompetence and Derailment Conflict Management, Negotiation and Leadership; Leadership under a crisis situation; The Situation and the Environment; Culture and Leadership; Global Leadership	
Unit IV	**Leadership and Team Work**	**9 hrs**
	Motivation and Leadership; Introduction to Groups and Teams; Characteristics of Leader, Follower and Situation; Group Dynamics; Team Formation Delegation and Empowerment; Leading teams: Enhancing teamwork within a group; The leader's role in team-based organizations Understanding Team processes and Team Coaching; Team decision making and conflict management; Virtual teams; Managing Multicultural teams; Building great teams Coaching and Mentoring; Women in Leadership Roles.	
Unit V	**Effective Relationship for team management**	**8 hrs**
	Building Effective Relationship with subordinates and peers; Fostering Followers satisfaction; The Art of Communication; Setting Goals and Providing Constructive Feedback; Enhancing Creativity problem solving skills,Building High-Performance Teams: The Rocket Model; Building Credibility and Trust; Skills for Developing. Community Leadership.	

References

Text Books :

1. Enhancing the lessons of experience by Hughes, R.L., Ginnett, R.C., & Curphy, G.J. (2019), 9th Edition, McGraw Hill Education, Chennai, India.

Reference Books:

1. Inside Out Leadership by Rajiv Vij

NPTEL/Swayam link:

1. https://onlinecourses.nptel.ac.in/noc25_mg38/

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester III (2024 COURSE)
Scheme for Examination

Component	Level	Unit1	Unit2	Unit3	Unit4	Unit5	Total	Passing
Continuous Comprehensive Evaluation (CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

After completion of each unit subject teachers will conduct following CCE.

Sr. No.	Unit I	Unit II	Unit III	Unit IV	Unit V	Total Marks
Method	Assignment	MCQ	Quiz	MCQ	Assignment	**25**
Marks	10	10	10	10	10	
Converted to	05	05	05	05	05	

Rubrics for Assignment:-

Timely Submission(02)			Correctness (05)		Presentation(03)	
Submission on given Day	**One day late**	**Two days late**	**Complete correct**	**Partially correct**	**Good**	**Average**
02	01	00	05	03	03	02

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	1	0	0	0	0	0	3	3	0	2	0
CO2	1	0	0	0	0	0	0	3	0	2	0
CO3	1	0	0	0	0	0	3	3	0	3	3
CO4	1	2	0	0	0	0	3	3	0	3	3
CO5	1	0	0	0	0	0	3	3	3	3	3

3: High, 2: Moderate, 1: Low, 0: No Mapping

Tutorials:

1	Conflict Resolution
2	Dealing with change
3	Problem Solving
4	Effective communication skill
5	Give and take feedback
6	Project Planning and delegating
7	Coaching to improve employee performance
8	Motivating and encouraging employee

*****

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester III (2024 COURSE)

Course Category	**Entrepreneurship/Economics/ Management Courses I**	**Course Code**	**ET124EE307**
Course Title	**Project Management**		

Teaching Scheme				**Evaluation Scheme**						
					Theory Marks			**Practical Marks**		
L	**T**	**P**	**Cr**	**Exam**	**Max**	**Min Marks for Pass**		**Max**	**Min Marks for Pass**	
2	0	0	2	CCE	50	20	40			
Total Hours				ESE	50	20				
26	0	0	Total hrs: 26		100					

Prerequisites: Fundamentals of Management, Indian Construction Industry, Economics.

Course Objective

1. To understand the Fundamentals of Project Management
2. To Identify, Select, and Plan Projects Effectively
3. To understand Organizational Structures and Management Issues
4. To apply Project Scheduling Techniques
5. To analyze and Manage Project Risks

Course Outcomes: After successful completion of the course the student will be able to

CO1	Apply the fundamental knowledge of project management for effectively handling projects.	BT Level 3
CO2	Identify and select appropriate projects based on feasibility studies and undertake effective planning.	BT Level 3
CO3	Assimilate effectively within the organizational structure of a project and handle management-related issues efficiently.	BT Level 3
CO4	Apply project scheduling techniques to create a project schedule plan and effectively utilize resources.	BT Level 4

Syllabus

Unit I	**Fundamentals of Project Management**	**5 hrs**
	Definition of Project and Project Life Cycle , Definition and Importance of Project Management , Project Management Process and Key Principles ,Role of the Project Manager (PM) ,Phases of Project Management Life Cycle , Impact of Delays in Project Completion	
Unit II	**Project Identification, Selection & Planning**	**5 hrs**
	Project Identification Process and Initiation , Pre-Feasibility and Feasibility Studies ,Project Break-even Analysis ,Project Planning: Need, Process, and Life Cycle ,Work Breakdown Structure (WBS) ,Roles, Responsibilities, and Teamwork	

B Tech in E & TC Engineering | S Y B Tech Semester III (2024 COURSE)

Unit III	**Project Organizational Structure & Issues**	**5 hrs**
	Concept of Organizational Structure ,Roles and Responsibilities of Project Leader ,Relationship between Project Manager and Line Manager ,Leadership Styles for Project Managers ,Conflict Resolution and Team Management ,Change Management and Diversity Management.	
Unit IV	**Project Scheduling**	**5 hrs**
	Introduction to PERT and CPM ,Development of Project Network and Time Estimation, Critical Path Method (CPM) and PERT Model ,Measures of Variability and Network Cost System ,Resource Allocation and Scheduling ,Project Cost Estimation and Budgeting	
Unit V	**Project Risk Management**	**6 hrs**
	Definition and Importance of Risk Management ,Risk Identification and Analysis Techniques,Risk Mitigation Strategies ,Role of Risk Management in Project Success ,Introduction to Project Management Tools: Trello, JIRA, and Asana	

References

Text Books :

1. H.Kerzer, “Project Management: A Systems Approach to Planning, Scheduling, and Controlling”, John Wiley & Sons, Inc., 10th Edition, 2009.
2. Chandra, P., “Projects”, Tata McGraw-Hill Education, 8th Edition, 2009.

Reference Books:

1. Morris, P. W. G. and Pinto, J. K., “The Wiley Guide to Managing Projects”, JohnWiley & Sons, 2004.
2. Karl Ulrich, Steven Eppinger, “Product Design and Development”, McGraw Hill / Irvin, 3rd Edition 2009.
3. R. Majumdar, “Product Management in India”, PHI, 2nd Edition, 2010.
4. G.S. Batra, “Development of Entrepreneurship”, Deep and Deep publications, New Delhi.
5. Christine Petersen, “The Practical Guide to Project Management”, PMP,1st Edition, 2013.

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester III (2024 COURSE)

Scheme for Examination

Component	Level	Unit1	Unit2	Unit3	Unit4	Unit5	Total	Passing
Continuous Comprehensive Evaluation (CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

After completion of each unit subject teachers will conduct following CCE

Sr. No.	Unit I	Unit II	Unit III	Unit IV	Unit V	Total Marks
Method	Assignment	MCQ	Assignment	Quiz	Quiz	**50**
Marks	10	10	10	10	10	

Rubrics for Assignment-

Timely Submission(02)			Correctness (05)		Presentation(03)	
Submission on given Day	One day late	Two days late	Complete correct	Partially correct	Good	Average
02	01	00	05	03	03	02

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	2	2	1	0	1	0	0	0	0	1
CO2	3	2	2	2	1	1	0	1	2	0	1
CO3	3	2	2	2	1	1	1	1	2	0	1
CO4	3	2	2	2	1	1	1	1	2	2	1

*****

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester III (2024 COURSE)

Course Category	Value Education Course I	Course Code	ET124VE308
Course Title	Sustainable Development Goals I		

Teaching Scheme				Evaluation Scheme				
					Theory Marks		Practical Marks	
L	T	P	Cr	Exam	Max	Min Marks for Pass	Max	Min for Pass
2	0	0	2	CCE	100	40	-	-
Total Hours								
26	0	0	Total hrs: 26					

Prerequisites: -

Subjects Included:

Sustainable Development Goals (SDG - Basic)- 2 units
Environment Studies- 2 units
Intellectual Property Rights (IPR)-1 unit

Course Objectives:

1. **Understand the Concept of SDGs** – Introduce students to the importance of sustainable development and the role of SDGs in global and local contexts.
2. **Explore SDG Interconnections** – Analyze how various SDGs are linked and the challenges in achieving them collectively.
3. **Understand Environmental Issues** – Examine environmental challenges and their impact on sustainable development.
4. **Study Environmental Policies** – Analyze national and global policies related to environmental sustainability.
5. **Learn Intellectual Property Rights (IPR)** – Understand the basics of patents, copyrights, trademarks, and their role in innovation.

Course Outcomes: After successful completion of the course the student will be able to

CO1	**DEFINE** the key concepts of SDGs and LIST the 17 SDGs with their significance.	BT Level 3
CO2	**EXPLAIN** interconnections between different SDGs and analyze their holistic impact.	BT Level 3
CO3	**DESCRIBE** key environmental challenges and their implications for sustainable development.	BT Level 4
CO4	**DISCUSS** major environmental policies and governance frameworks.	BT Level 3
CO5	**UNDERSTAND** fundamental concepts of Intellectual Property Rights (IPR) and their applications.	BT Level 3

Syllabus

Unit I	**Introduction to SDGs & Sustainability**	**6 hrs**
	Evolution from MDGs to SDGs, significance in the UN 2030 Agenda, India's contributions, real-world applications. India's contribution and policies towards SDGs.	
Unit II	**SDG Targets & Interconnections**	**6 hrs**

	Understanding SDG indicators, interlinkages, roles of stakeholders, case studies, impact assessment frameworks.	
Unit III	**Environmental Challenges & Sustainability**	**5 hrs**
	Key environmental issues like climate change, biodiversity loss, pollution; impact on health and society, mitigation strategies.	
Unit IV	**Environmental Policies & Governance**	**5 hrs**
	National and global environmental policies, role of regulatory bodies, sustainability standards, case studies of successful interventions.	
Unit V	**Introduction to Intellectual Property Rights (IPR)**	**4 hrs**
	Basics of patents, copyrights, trademarks, importance in innovation and sustainability, protection of intellectual property in academia and industry.	

References

Website:
https://sdgs.un.org/goals# https://unstats.un.org/sdgs/indicators/indicators-list/
https://sdgs.un.org/publications/sdg-good-practices-2020
https://unstats.un.org/sdgs/iaeg-sdgs/tier-classification/
https://unstats.un.org/UNSDWebsite/undatacommons/countries?p=country/IND
https://unstats.un.org/sdgs/report/2022/extended-report/

Scheme for Examination

Component	Level	Unit1	Unit2	Unit3	Unit4	Unit5	Total	Passing
Continuous Comprehensive Evaluation (CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	3	3	1	1	1	1	0	1	1
CO2	3	3	3	3	0	0	0	1	1	0	1
CO3	3	3	3	3	0	1	0	0	0	0	1
CO4	3	3	3	3	1	1	0	1	2	1	2
CO5	3	3	3	3	1	2	0	1	0	1	2

3: High, 2: Moderate, 1: Low, 0: No Mapping

*****

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester III (2024 COURSE)

Course Category	**Field Engineering Project**	**Course Code**	**ET124FP309**
Course Title	**Project Based Learning**		

Teaching Scheme				**Evaluation Scheme**						
L	**T**	**P**	**Cr**	**Exam**	**Theory Marks**			**Practical Marks**		
					Max	**Min Marks for Pass**		**Max**	**Min Marks for Pass**	
0	0	4	2	CCE				100	40	40
Total Hours										
0	0	52	Total hrs: 52					100		

Prerequisites: -

Course Objectives:

1. To emphasize project based learning activities that are long-term, interdisciplinary and student-centric.
2. To inculcate independent and group learning by solving real world problems with the help of available resources.
3. To be able to develop applications based on the fundamentals of electronics and communication engineering by possibly the integration of previously acquired knowledge.
4. To get practical experience in all steps in the life cycle of the development of electronic systems: specification, design, implementation, and testing.
5. To be able to select and utilize appropriate hardware and software tools to design and analyze the proposed system.
6. To provide every student the opportunity to get involved either individually or as a group so as to develop team skills and learn professionalism.

Course Outcomes: After successful completion of the course the student will be able to

CO1	Apply problem-solving techniques to define and frame real-world engineering problems	BT Level 3
CO2	Analyze technical literature and existing solutions to select an appropriate approach for the project	BT Level 4
CO3	Develop innovative and feasible solutions using fundamental engineering principles	BT Level 3
CO4	Analyze the results and arrive at a valid economical conclusion.	BT Level 3
CO5	Use of technology in proposed work and demonstrate learning in oral and written form including Cost benefit analysis.	BT Level 3
CO6	Develop ability to work as an individual and as a team member.	BT level 3

Syllabus

Step I	**Group Structure**	**Week 1-2**

	Working in supervisor/mentor —monitored groups. The students plan, manage and complete a task/project/activity which addresses the stated problem. 1. Create groups of 5 (five) to 6 (six) students in each class	
Step II	**Project Selection**	**Week 2-4**
	Survey through journals, patents or field visit (A problem can be theoretical, practical, social, technical, symbolic, cultural and/or scientific), check the feasibility of solution, analyze the problem, design and find the values of components.There are no commonly shared criteria for what constitutes an acceptable project. Projects vary greatly in the depth of the questions explored, the clarity of the learning goals, the content and structure of the activity. The problem-based project oriented model for learning is recommended. The model begins with the identifying of a problem, often growing out of a question or "wondering". This formulated problem then stands as the starting point for learning. A problem can be theoretical, practical, social, technical, symbolic, cultural and/or scientific and grows out of students' wondering within different disciplines and professional environments. As stated in the preamble as electronics is an important grounding for other disciplines (computer science, signal processing, and communications), the project topic can be Interdisciplinary in nature. However, the chosen problem must involve the application of electronics and communication engineering fundamentals. Out of the total developed system setup, the project must involve minimum 40% electronic components. Although in a genuine case 100% software based project topic may be allowed.	
Step III	**Ethical Practices, team work and project management**	**Week 2-10**
	Use IEEE standards for project manufacturing, respect the time of others, attend the reviews, poster presentation and model exhibitions, strictly follow the deadline of project completion, comply with all legislation requirements that govern workplace health and safety practices.	
Step IV	**Effective Documentation**	**Week 10-12**
	In order to make our engineering graduates capable to prepare effective documentation, it is required for the students to learn the effective writing skills. The PBL final report is expected to consist of the Literature Survey, Problem Statement, Aim and Objectives, System Block Diagram, System Implementation Details, Discussion and Analysis of Results, Conclusion, System Limitations and Future Scope. Many freely available software tools (for instance Medley (Elsevier), Grammerly) are expected to be used during the preparation of PBL synopsis and final report. It is expected that the PBL guides/mentors shall teach	

	students about utilizing valid sources of information (such as reference papers, books, magazines, etc) related to their PBL topic.	
Step V	**Evaluation & Continuous Assessment:**	**Week 1-12**
	The institution/head/mentor is committed to assessing and evaluating both student performance and program effectiveness. Progress of PBL is monitored regularly on weekly basis. Weekly review of the work is necessary. During process of monitoring and continuous assessment and evaluation the individual and team performance is to be measured. PBL is monitored and continuous assessment is done by supervisor /mentor and authorities. Students must maintain an institutional culture of authentic collaboration, self-motivation, peer-learning and personal responsibility. The institution/department should support students in this regard through guidance/orientation programs and the provision of appropriate resources and services. Supervisor/mentor and Students must actively participate in assessment and evaluation processes. It is recommended that all activities are required to be recorded and regularly. A regular assessment of PBL work is required to be maintained at the department in PBL log book by students. It is expected that the PBL log book must include following: Weekly monitoring by the PBL guide, Assessment sheet for PBL work review by PBL guide and PBL Evaluation Committee (PEC). The PEC structure shall consist of Head of the department, 1/2 senior faculties of the department and one industry expert (optional). Continuous Assessment Sheet (CM) is to be maintained by the department.	

Parameters for assessment, evaluation and weightage:

1. Idea Inception (kind of survey). (10%)
2. Outcome (Participation/ publication, copyright, patent, product in market). (50%)
3. Documentation (Gathering requirements, design & modeling, implementation/execution, use of technology and final report, other documents). (15%)
4. Attended reviews, poster presentation and model exhibition. (10%)
5. Demonstration (Poster Presentation, Model Exhibition etc). (10%).
6. Awareness /Consideration of - Environment/ Social /Ethics/ Safety measures/Legal aspects. (5%)

References

References Books:

1. John Larmer and Suzie Boss, "Project Based Teaching: How to Create Rigorous and Engaging Learning Experiences".2018
2. SINHA A K; SINHA R., “PROJECT ENGINEERING AND MANAGEMENT” MC GRAW HILL publication.

3. John M. Nicholas, "PROJECT MANAGEMENT FOR ENGINEERING, BUSINESS AND TECHNOLOGY" edition 6 August 2020
4. Martina Huemann, Rodney Turner, "The Handbook of Project Management", 2024

NPTEL/Swayam link:

1. NPTEL- https://onlinecourses.swayam2.ac.in/ntr20_ed12/preview

Scheme for Practical Examination

Component	Level	Phase1	Phase2	Phase 3	Phase4	Phase 5	Total	Passing
Continuous Comprehensive Evaluation (CCE)	Faculty	10	10	10	10	10	50	20
Practical Examination	Department	10	10	10	10	10	50	20
Total Marks (out of 100)		20	20	20	20	20	**100**	**40**

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	3	2	1	0	0	1	1	1	2
CO2	2	3	2	3	2	0	0	0	2	0	2
CO3	3	3	3	2	2	0	0	0	1	0	2
CO4	3	3	3	3	2	2	0	0	1	0	2
CO5	2	2	2	2	3	2	0	0	3	0	3
CO6	0	0	0	0	1	0	3	3	3	2	2

3: High, 2: Moderate, 1: Low, 0/-: No Mapping

*****

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester III (2024 COURSE)

Course Category	**Non Credit Course 1**	**Course Code**	**ET124NC410**
Course Title	**Design Thinking**		

Teaching Scheme				**Evaluation Scheme**				
					Theory Marks		**Practical Marks**	
L	**T**	**P**	**Cr**	**Exam**	**Max**	**Min Marks for Pass**	**Max**	**Min Marks for Pass**
1	0	2	0	CCE	50	20		
Total Hours								
13	0	26	Total hrs: 39					

Prerequisites: Basic Mathematics & Fundamentals of Programming

Course Objective

1. Define the concepts related to design thinking.
2. Explain the fundamentals of Design Thinking and innovation.
3. Apply the design thinking techniques for solving problems
4. Examine to work in a multidisciplinary environment.
5. Appraise the value of creativity.

Course Outcomes: After successful completion of the course the student will be able to

CO1	Understand the concepts related to design thinking.	BT Level 3
CO2	Generate and develop different design ideas	BT Level 3
CO3	Appreciate the innovation and benefits of design thinking.	BT Level 3
CO4	Investigate design thinking techniques for solving problems in various sectors	BT Level 3
CO5	Analyze & evaluate work in a multidisciplinary environment	BT Level 4

Syllabus

Unit I	**Introduction to Design Thinking**	**3 hrs**
	Introduction to design, characteristics of successful product development, product development process, identification of opportunities product planning, Innovation in product development.	

	Design thinking: Introduction, Principles, the process, Innovation in design thinking, benefits of Design thinking, design thinking and innovation, case studies.	
Unit II	**Design Thinking Process**	**3 hrs**
	Design thinking process (empathize, analyze, idea & prototype), implementing the process in driving inventions. Tools of design thinking - person, costumer, journey map, brainstorming,. Product development Activity: Every student presents their idea in three minutes, every student can present design process in the form of flow diagram or flow chart etc	
Unit III	**Idea Generation**	**2 hrs**
	Idea generation: Introduction, techniques, Conventional methods, Intuitive methods, Brainstorming, Gallery method, Delphi method, Synectics, etc Select ideas from ideation methods, case studies.	
Unit IV	**Art of Innovation**	**3 hrs**
	Difference between innovation and creativity, role of creativity and innovation in organizations. Creativity to Innovation. Teams for innovation, Measuring the impact and value of creativity. Flow and planning from idea to innovation.	
Unit V	**Product Design**	**2 hrs**
	Problem formation, introduction to product design, Product strategies, Product value, Product planning, product specifications. Innovation towards product design Case studies. Activity: Importance of modeling, how to set specifications, Explaining their own product design	

References

Text Books:

1. Tim Brown, Change by design, 1/e, Harper Bollins, 2009.
2. Idris Mootee, Design Thinking for Strategic Innovation, 1/e, Adams Media, 2014
3. Marc stickdorn and Jacob Schneider, “This is Service Design Thinking”, Wiely, 2011
4. Pahl and Vietz, “Engineering Design”, Springer, 2007.

References Books:

1 Christoph Meinel and Larry Leifer, “Design Thinking”, Springer, 2011
2 David Lee, Design Thinking in the Classroom, Ulysses press, 2018
3 William lidwell, Kritinaholden, & Jill butter, Universal principles of design, 2/e, Rockport Publishers, 2010

E Resources:

http://www.algarytm.com/it-executives-guide-to-design-thinking:e-book

NPTEL/Swayam link:
https://onlinecourses.nptel.ac.in/noc22_mg32/preview
https://nptel.ac.in/courses/110/106/110106124/

https://nptel.ac.in/courses/109/104/109104109/

List of Laboratory Experiments

1	To find innovation in design thinking.
2	To generate idea by using conventional method
3	To generate idea by using brainstorming, Intuitive methods, Gallery method
4	To measure the impact and value of creativity
5	To plan Product , execution of it
6	**Case study**
7	**Case study**
8	**Presentation**

Scheme for Continuous Evaluation

Component	Level	Parameters	Marks	Total	Passing
Continuous Comprehensive Evaluation (CCE)	Progressive Evaluation	Understanding Viva Voce	20	50	20
		Involvement, Participation, and Engagement	10		
		Quality of Submission of Report	10		
		Attendance	10		
		Oral Examination	25		

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	3	3	3	0	0	0	0	0	0
CO2	3	3	3	0	3	0	0	0	0	0	0
CO3	3	3	3	3	0	0	2	0	0	0	0
CO4	3	3	3	3	3	0	0	2	2	0	0
CO5	3	3	3	3	3	0	0	0	0	2	2

3: High, 2: Moderate, 1: Low, 0: No Mapping

*****

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester III (2024 COURSE)

Course Category	**Non Credit Course 2**	**Course Code**	**ET124NC411**
Course Title	**Aptitude & Technical Mastery for Placements-II**		

Teaching Scheme				**Evaluation Scheme**				
					Theory Marks		**Practical Marks**	
L	**T**	**P**	**Cr**	**Exam**	**Max**	**Min Marks for Pass**	**Max**	**Min Marks for Pass**
0	0	2	0	CCE			50	20
Total Hours								
0	0	26	Total hrs: 26					

Prerequisites: Basic Mathematics & Fundamentals of Programming

Course Objective

1. Strengthen **fundamental quantitative, verbal, and logical reasoning** skills for placement aptitude tests.
2. Develop **critical thinking and problem-solving** abilities through real-world aptitude challenges.
3. Enhance **soft skills, networking strategies, and LinkedIn profile building** for career readiness.
4. Improve **resume-writing techniques** to create an ATS-proof CV

Course Outcomes: After successful completion of the course the student will be able to

CO1	Solve basic to intermediate-level aptitude problems with accuracy and speed.	BT Level 4
CO2	Demonstrate proficiency in verbal reasoning for placement exams and interviews.	BT Level 3
CO3	Develop a strong professional network through LinkedIn and networking skills.	BT Level 4
CO4	Build an optimized ATS resume tailored for placement success.	BT Level 4

Syllabus

Unit I	**Quantitative Aptitude**	**4 hrs**
	1. Linear Equations 2. Quadratic Equations 3. Profit and Loss 4. Simple Interest and Compound Interest 5. Time, Speed, and Distance - Basic 6. Race & Game & Problem on Trains	

B Tech in E & TC Engineering | S Y B Tech Semester III (2024 COURSE)

Unit II	**Verbal Ability**	**3 hrs**
	1. Sentence Correction - Intermediate and Advanced 2. Sentence Completion	
Unit III	**Reasoning Ability**	**6 hrs**
	1. Analytical Reasoning – I 2. Clock & Calendars 3. Coding and Decoding & Odd Man Out	
Unit IV	**Career Skills**	**3 hrs**
	Resume Building ATS Resume Hard Copy Video Resume Cover Letter	

References

References Books:

1. R. S. Aggarwal,. Quantitative Aptitude for Competitive Examinations, 3rd (Ed.). New Delhi: S. Chand Publishing
2. ETHNUS,. Aptimithra, 1st (Ed.). Bangalore: McGraw-Hill Education Pvt. Ltd.
3. Arun Sharma, (2016). Quantitative Aptitude, 7th (Ed.). Noida: McGraw Hill Education Pvt. Ltd.
4. Soft Skills & Interview Prep – Dale Carnegie, LinkedIn Learning

SEMESTER - IV

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester IV (2024 COURSE)

Course Category	**Programme Core Course**	**Course Code**	**ET124PC401**
Course Title	**Principles of Communication Systems**		

Teaching Scheme				**Evaluation Scheme**						
					Theory Marks			**Practical Marks**		
L	**T**	**P**	**Cr**	**Exam**	**Max**	**Min Marks for Pass**		**Max**	**Min Marks for Pass**	
3	0	0	3	CCE	50	20				
Total Hours				ESE	50	20	40			
39	0	0	Total hrs: 39		100					

Prerequisites: Knowledge of basic programming concepts

Course Objective

1. To familiarize students with basic mathematical tools for communication signal and systems.
2. To acquaint the students with introduction to Communication System, the fundamental principles of modulation process and different amplitude and angle modulation systems.
3. To introduce the students with the concept of Sampling process and practical its approaches.
4. To impart pre-requisites of digital communication systems and explore digital representation techniques

Course Outcomes: After successful completion of the course the student will be able to

CO1	Illustrate basic Communication System and its requirements.	B3
CO2	Analyze various techniques of AM generation, transmission and reception.	B4
CO3	Analyze various FM generation and detection techniques and compare with AM systems.	B4
CO4	Compare various Pulse Modulation technique PAM, PWM, and PPM.	B4
CO5	Compare various digital representation techniques PCM, DPCM, DM and ADM.	B4

Syllabus

Unit I	**Fundamentals of Communication system**	**7 hrs**
	Objectives of Communication, Communication system block diagram, Modes of communication, Communication Media, Electromagnetic spectrum and its application, Analog signal and Digital signal, mathematical representation and properties of signal, Frequency domain representation of signal, spectrum, magnitude and angle plot, Signal Bandwidth, Energy Spectral density, Power Spectral Density. Regenerative repeaters, Concept of baseband and bandpass signals, Need for modulation, PSD of modulated signal.	
Unit II	**AM transmission & reception for signal tone**	**8 hrs**
	Amplitude modulation (DSB-C), Double sideband Suppressed carrier (DSB-SC) modulation, Single sideband modulation (SSB), Vestigial Sideband modulation (VSB),Spectrum and Bandwidth of AM, DSB-SC, SSB & VSB, Calculation of modulation index for AM wave, Modulation index for more than one modulating signals, comparison of AM spectrum between single tone and multitone, Power and power efficiency, AM reception	

B Tech in E & TC Engineering | S Y B Tech Semester IV (2024 COURSE)

Unit III	**Angle Modulation**	**8 hrs**
	Phase Modulation (PM) and Frequency Modulation (FM), Relationship between Phase and Frequency Modulation, Modulation Index, Spectrum of FM (single tone): Feature of Bessel Coefficient, Power of FM signal, Bandwidth of modulated FM signal, modulation index: AM vs. FM, Compare AM and FM, Narrowband and Wideband FM. **FM Modulators and Demodulators:** FM generation by Armstrong's Indirect method, frequency multiplication and application to FM, FM demodulator.	
Unit IV	**Pulse Modulation**	**8 hrs**
	Need of analog to digital conversion, sampling theorem for low pass signal in time domain, Nyquist criteria, Types of sampling- natural and flat top. Pulse amplitude modulation & concept of TDM: Channel bandwidth for PAM, Signal Recovery through holding. Pulse Width Modulation (PWM) and Pulse Position Modulation (PPM): Generation & Detection. Quantization of Signals**:** Quantization error, Uniform & Non-Uniform types of Quantization, Mid-rise & Mid-tread Quantizer. Companding: A-law & μ-law.	
Unit V	**Digital Representation of Analog Signals**	**8 hrs**
	Pulse Code Modulation system: Generation & Reconstruction, Differential Pulse code modulation, Delta Modulation, Adaptive Delta Modulation. Line codes: properties and spectrum. Digital multiplexing: AT&T,CCITT Synchronization: Carrier synchronization, bit synchronization and frame synchronization, Scrambling and Descrambling.	

References

Text Books:

1. B.P. Lathi, "Communication Systems", BS publications.
2. George Kennedy, "Electronic Communications", McGraw Hill Kennedy.

References Books:

1. Simon Haykin, "An introduction to analog & digital communications", John Wiley & Sons
2. Roddy and Coolen, "Electronic Communication Systems", Pearson Education.
3. Frank R. Dungan, "Electronic Communication Systems", Delmar Publishers.

NPTEL/Swayam link:

1. NPTEL Course "Principles of Communication"
   https://onlinecourses.nptel.ac.in/noc25_ee68

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester IV (2024 COURSE)

Scheme for Theory Examination

Component	Level	Unit1	Unit2	Unit3	Unit4	Unit5	Total	Passing
Continuous Comprehensive Evaluation (CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

After completion of each unit subject teachers will conduct following CCE:

Sr. No.	Unit I	Unit II	Unit III	Unit IV	Unit V	Total Marks
Method	Assignment	MCQ	Quiz	MCQ	Assignment	**50**
Marks	10	10	10	10	10	

Course marking scheme for Assignment

Timely Submission(02)			Correctness (05)		Presentation(03)	
Submission on given Day	One day late	Two days late	Complete correct	Partially correct	Good	Average
02	01	00	05	03	03	02

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	2	1	0	1	0	0	1	1	1
CO2	3	3	3	2	1	1	1	1	1	1	1
CO3	3	3	3	2	0	1	1	0	1	1	1
CO4	3	2	2	1	1	0	0	1	1	1	1
CO5	3	2	3	1	1	0	0	0	1	1	1

3: High, 2: Moderate, 1: Low, 0/-: No Mapping

*****

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester IV (2024 COURSE)

Course Category	**Programme Core Course**	**Course Code**	**ET124PC402**
Course Title	**Principles of Communication System Lab**		

Teaching Scheme				**Evaluation Scheme**						
					Theory Marks			**Practical Marks**		
L	**T**	**P**	**Cr**	**Exam**	**Max**	**Min Marks for Pass**		**Max**	**Min Marks for Pass**	
0	0	2	1	CCE				50	20	
Total Hours				ESE				50	20	40
0	0	26	Total hrs: 26					100		

Prerequisites: Knowledge of basic programming concepts

Course Objective

1. To familiarize students with basic mathematical tools for communication signal and systems.
2. To acquaint the students with introduction to Communication System, the fundamental principles of modulation process and different amplitude and angle modulation systems.
3. To introduce the students with the concept of Sampling process and practical its approaches.
4. To impart pre-requisites of digital communication systems and explore digital representation techniques

Course Outcomes: After successful completion of the course the student will be able to

CO1	Generate Analog modulation scheme and sketch the waveforms. (AM and FM)	B3
CO2	Examine Sampling Theorem and differentiate Flat top and Natural sampling methods.	B4
CO3	Generate and detect various digital representation techniques and sketch the waveforms.	B3
CO4	Differentiate various line coding techniques.	B4
CO5	Simulate PCM using MATLAB and also plot SNR Vs BER	B4
CO6	Demonstrate Scrambling and descrambling operation using MATLAB simulation.	B3

List of Laboratory Experiments

Group A: Hardware Practical	
1	AM Generation (DSB-FC): Calculation of modulation index by graphical method, Power of AM Wave for different modulating signal and observe spectrum.
2	Frequency modulator & calculation of modulation index & BW of FM.
3	Verification of Sampling Theorem, PAM Techniques, (Flat top & Natural sampling), reconstruction of original signal, Observe Aliasing Effect in frequency domain.
4	Generation and Detection of PWM using IC 555
5	Study of PCM.
6	Study of DM: Generation and detection
7	Study of ADM: Generation and detection
8	Study of line codes (NRZ, RZ, POLAR RZ, BIPOLAR (AMI), MANCHESTER)
Group B: Simulation Practical [Any 3 to be performed]	
9	Simulation of T1/E1 system using suitable software.

10	Simulation program to calculate Signal to noise ratio for PCM system & DM system.
11	Verify Sampling Theorem using simulation.
12	Demonstrate Scrambling and descrambling operation either using hardware or any simulation tool.

VLAB: http://vlabs.iitkgp.ac.in/dsp/exp1/index.html

Scheme for Continuous Evaluation

Component	Level	Parameters	Marks	Total	Passing
Continuous Comprehensive Evaluation (CCE)	Progressive Evaluation	Understanding Viva Voce	20	50	20
		Involvement, Participation, and Engagement	10		
		Timely submission	10		
		Attendance	10		
	End Evaluation	Performance	25	50	20
		Oral Examination	25		

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	2	1	0	1	1	1	1	0	1
CO2	3	3	3	2	2	1	1	1	1	1	1
CO3	3	3	3	2	2	1	1	1	1	0	1
CO4	3	2	2	1	3	0	0	1	1	1	1
CO5	3	2	3	1	3	0	0	1	1	0	1
CO6	3	2	3	1	3	0	0	1	1	0	1

3:High, 2:Moderate, 1:Low, 0:NoMapping

*****

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester IV (2024 COURSE)

Course Category	**Programme Core Course**	**Course Code**	**ET125PC403**
Course Title	**Data Structures**		

Teaching Scheme				**Evaluation Scheme**						
					Theory Marks			**Practical Marks**		
L	**T**	**P**	**Cr**	**Exam**	**Max**	**Min Marks for Pass**		**Max**	**Min Marks for Pass**	
3	0	0	3	CCE	50	20	40			
Total Hours				ESE	50	20				
39	0	0	Total hrs: 39		100					

Prerequisites: Knowledge of basic programming concepts

Course Objective

1. To learn basic concepts of C programming.
2. To learn different searching and sorting methods along with their analysis.
3. To learning linear and nonlinear data structures with applications.
4. To solve problems using data structures such as binary tree, binary search tree, and graph.

Course Outcomes: After successful completion of the course the student will be able to

CO1	Apply basic concepts of C programming to write programs using loops, decision making & strings.	BT Level 3
CO2	Execute searching and sorting algorithms ,compare them based on complexity.	BT Level 3
CO3	Implement Stack and Queue using Array, Linked list and for various applications.	BT Level 3
CO4	Demonstrate knowledge of Binary tree for applications like Binary search tree, AVL tree.	BT Level 3
CO5	Apply concept of graph for applications like of spanning tree and shortest path algorithm.	BT Level 3

Syllabus

Unit I	**Basics of C Programming**	**9 hrs**
	C Fundamentals: Constants, Variables and Keywords in C, Operators, Bitwise Operations, Decision Control and Looping Statements. **Arrays & Pointers:** Arrays, Functions, Recursive Functions, Pointers, String Manipulations, Structures, Union, Enumeration, MACROS. **File Handling:** Basic File Operations- Open, Close, Read, Write and Append. **Algorithms:** Algorithm basics**,** Analysis of Iterative and Recursive algorithms, Space & Time complexity, Asymptotic notation- Big-O, Theta and Omega notations.	
Unit II	**Linked List and Searching ,Sorting Algorithms**	**9 hrs**

	Linked List : Concept of linked organization, Singly Linked List, Doubly Linked List, Circular Linked List, Linked list as ADT. Representation and manipulations of polynomials using linked list. **Searching methods:** Linear and Binary Search. **Sorting methods:** Bubble, Insertion, Selection, Merge, and Quick Sort.	
Unit III	**Stack and Queue**	**9 hrs**
	Stack: Concept, Basic Stack operations, Array representation of stack, Stack as ADT, Stack Applications: Reversing data, Arithmetic expressions conversion and evaluation, Stack using Array, Stack using linked list. **Queue:** Concept, Queue operations, Array representation of queue, Queue as ADT, Circular queue, Priority Queue, Applications of queue: Categorizing data, Simulation of queue, Queue using Array, Queue using linked list.	
Unit IV	**Trees**	**6 hrs**
	Introduction to trees: Basic Tree Concepts. **Binary Trees:** Concept & Terminologies, Representation of Binary Tree in memory, Traversing a binary tree. **Binary Search Trees (BST):** Basic Concepts, BST operations, Concept of Threaded Binary Search Tree **AVL Tree**: Basic concepts and rotations of a Tree.	
Unit V	**Graphs**	**6 hrs**
	Graph: Basic Concepts & terminology. **Representation of graphs:** Adjacency matrix, Adjacency list. **Operations on graph:** Traversing a graph. **Spanning trees:** Minimum Spanning tree- Kruskal's Algorithm, Prim's Algorithm and Dijkstra's Shortest Path Algorithm.	

References

Text Books:

1. E Balgurusamy, "Programming in ANSI C", Tata McGraw-Hill, 3rd Edition.
2. Yedidyah Langsam, Moshe J Augenstein and Aaron M Tenenbaum "Data structures using C and C++" PHI Publications, 2nd Edition.

References Books:

1. Ellis Horowitz and Sartaj Sahni, "Fundamentals of Data Structures", Galgotia Books Source,2nd Edition
2. Richard. F. Gilberg and Behrouz A. Forouzan, "Data Structures: A Pseudocode Approach with C," Cengage Learning, 2nd Edition.

NPTEL/Swayam link:

1. NPTEL Course "Programming & Data Structure"
   https://nptel.ac.in/courses/106/105/106105085/

2. NPTEL Course "Data Structures & Algorithms"
   https://nptel.ac.in/courses/106/102/106102064/

Scheme for Theory Examination

Component	Level	Unit1	Unit2	Unit3	Unit4	Unit5	Total	Passing
Continuous Comprehensive Evaluation (CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

Rubrics for Theory

Sr. no	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Total marks
Method	Assignment / Pedagogy activity + class test	Assignment / Pedagogy activity + class test	Assignment / Pedagogy activity + class test	Assignment / Pedagogy activity + class test	Assignment / Pedagogy activity + class test	50
Marks	5+5	5+5	5+5	5+5	5+5	

Rubrics for Assignment

Timely submission (03)		Correctness (02)	
On time	After deadline	Correct	Partially correct
03	02	02	01

Rubrics for Class test

Attendance	Passed	Marks above 60%
02	02	01

Rubrics for Pedagogy activity

Timely submission (03)		Correctness (02)	
On time	After deadline	Correct	Partially correct
03	02	02	01

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	1	0	0	0	1	0	1	0	1	2
CO2	2	0	1	0	1	0	0	1	0	0	2
CO3	2	2	2	0	0	1	1	2	0	1	2
CO4	2	0	2	0	2	1	1	1	1	0	2
CO5	2	2	0	2	2	1	0	1	1	0	2

3: High, 2: Moderate, 1: Low, 0/-: No Mapping

*****

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester IV (2024 COURSE)

Course Category	Programme Core Course	Course Code	ET125PC404
Course Title	Data Structures Lab		

Teaching Scheme				Evaluation Scheme						
					Theory Marks		Practical Marks			
L	T	P	Cr	Exam	Max	Min Marks for Pass	Max	Min Marks for Pass		
0	0	2	1	CCE			50	20		
Total Hours				ESE			50	20	40	
0	0	26	Total hrs: 26				100			

Prerequisites: Knowledge of basic programming concepts

Course Objective

1. To learn basic concepts of C programming.
2. To learn different searching and sorting methods along with their analysis.
3. To learning linear and nonlinear data structures with applications.
4. To solve problems using data structures such as binary tree, binary search tree, and graph.

Course Outcomes: After successful completion of the course the student will be able to

CO1	**Use** C programming knowledge to write programs using loops, decision making & strings.	BT Level 3
CO2	**Analyze** sorting algorithms based on time and space complexity.	BT Level 4
CO3	**Apply** linear data structures for creating applications like stack and queue.	BT Level 3
CO4	**Use** of Binary tree for applications like Binary search tree.	BT Level 3
CO5	**Select** suitable graph algorithm for applications like finding shortest path ,traversal.	BT Level 5

List of Laboratory Experiments

Group A[All experiments are compulsory]
1. Data base Management using array of structure with operations Create, display, Modify, Append, Search and Sort.(For any database like Employee or Bank database with and without pointers to structures)
2. Create a singly linked list with options: a. Insert (at front, at end, in the middle), b. Delete (at front, at end, in the middle), c. Display, d. Display Reverse.
3. Implement stack & Queue using arrays .
4. Implement Binary search tree with operations Create, search, and recursive traversal .
5. Implement Dijkstra's Algorithm
Group B [Any three to be performed]
6. Perform following String operations with and without pointers to arrays (without using the library functions):

a. substring b. palindrome c. compare d. copy e. reverse.
7. Implement stack & Queue using Linked List.
8. Implement Quick sort.
9. Implement in order tree traversal without recursion.
10. Case study on use of Binary search tree in real life.
11. Implement Graph using adjacency Matrix with BFS & DFS traversal.
12. Case study on use of Dijkstra's Algorithm in finding shortest path while traveling.

Scheme for Continuous Evaluation

Component	Level	Parameters	Marks	Total	Passing
Continuous Comprehensive Evaluation (CCE)	Progressive Evaluation	Understanding Viva Voce	20	50	20
		Involvement, Participation, and Engagement	10		
		Timely submission	10		
		Attendance	10		
	End Evaluation	Performance	25	50	20
		Oral Examination	25		

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	2	2	2	1	-	1	-	1	2
CO2	2	2	1	1	1	1	-	1	-	-	2
CO3	2	2	2	1	2	1	1	2	-	1	2
CO4	2	2	1	1	2	1	1	1	1	-	2
CO5	3	3	2	2	2	1	-	1	1	-	2

3:High ,2:Moderate,1:Low, 0:No Mapping

*****

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester IV (2024 COURSE)

Course Category	**Programme Core Course**	**Course Code**	**ET125PC405**
Course Title	**Signals and Systems Analysis**		

Teaching Scheme				**Evaluation Scheme**						
					Theory Marks			**Practical Marks**		
L	**T**	**P**	**Cr**	**Exam**	**Max**	**Min Marks for Pass**		**Max**	**Min Marks for Pass**	
2	0	0	2	CCE	50	20	40			
Total Hours				ESE	50	20				
26	0	0	Total hrs: 26		100					

Prerequisites: Engineering Mathematics

Course Objective

1. To understand the mathematical representation of continuous and discrete time signals and systems.
2. To classify signals and systems into different categories.
3. To analyze Linear Time Invariant (LTI) systems in time domain and frequency domains.
4. To transform the signals into frequency domain and analyze the properties.

Course Outcomes: After successful completion of the course the student will be able to

CO1	**Classify** basic signals and perform operations on signals to form complex signal.	BT Level 2
CO2	**Compute** the convolution between two signals and classify the systems according to their characteristics.	BT Level 3
CO3	**Apply** Fourier series for analysis of periodic signal in frequency domain	BT Level 3
CO4	**Analyze** the non-periodic signals in frequency domain using Fourier Transform.	BT Level 4
CO5	**Analyse** the stability of systems in complex frequency domain using Laplace Transform	BT Level 4

Syllabus

Unit I	**Introduction to Signals & Systems**	**6 hrs**
	Signals: Introduction of signals & systems, Classification of signals: Even -odd signal, Periodic-Non periodic, Energy -Power, Causal-Non- Causal, Deterministic and Random, Elementary signals: Unit step, Unit ramp, Impulse, Sinusoidal, Real exponential, Rectangular pulse, Triangular, Signum and Sinc function. Operations on signals: Operation on independent variable-time & operation on dependent Variable-Amplitude, Signal processing examples.	
Unit II	**LTI System Analysis**	**6 hrs**

	Systems: Introduction, Classification of Systems, Communication system & control system. Representation of the System: Input-output relation, Impulse Response convolution sum, convolution integral, computation of convolution integral using graphical method for unit step to unit step, unit step to exponential, exponential to exponential, unit step to rectangular and rectangular to rectangular only, Computation of convolution sum, Properties of convolution.	
Unit III	**Fourier Series**	**4 hrs**
	Fourier series (FS) representation of periodic Continuous Time (CT) signals, Dirichlet condition for existence of Fourier series, Amplitude and phase response, FS representation of CT signals using trigonometric and exponential Fourier series	
Unit IV	**Fourier Transform**	**4 hrs**
	Fourier Transform (FT) representation of aperiodic CT signals, Dirichlet condition for existence of Fourier transform, evaluation of magnitude and phase response, FT of standard CT signals, Properties and their significance.	
Unit V	**Laplace Transform**	**5 hrs**
	Definition of Laplace Transform (LT), Limitations of Fourier transform and need of Laplace transform, ROC, Properties of ROC, Laplace transform of standard periodic and aperiodic functions, properties of Laplace transform, Inverse Laplace transform based on partial fraction expansion, stability considerations in S domain	

References

Text Books:

1. M. J. Roberts “Signal and Systems”, Tata McGraw Hill 2007.
2. Simon Haykins and Barry Van Veen, “Signals and Systems”, Wiley India, 2nd Edition.

References Books:

1. Charles Phillips, “Signals, Systems and Transforms”, Pearson Education, 3rd Edition.
2. A.Nagoor Kanni “Signals and Systems”, Mc Graw Hill, 2nd Edition.
3. M. Gopal, “Control System – Principles and Design”, Tata McGraw Hill, 4th Edition

NPTEL/Swayam link:

NPTEL Course “Signals and Systems” : https://onlinecourses.nptel.ac.in/noc25_ee78/preview

Scheme for Theory Examination

Component	Level	Unit1	Unit2	Unit3	Unit4	Unit5	Total	Passing

Continuous Comprehensive Evaluation (CCE)	Faculty	5	5	5	5	5	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

After completion of each unit subject teachers will conduct following CCE:

Sr. No.	Unit I	Unit II	Unit III	Unit IV	Unit V	Total Marks
Method	Assignment / Pedagogy activity + class test	Open book test / Pedagogy activity + class test	Assignment / Pedagogy activity + class test	GATE Questions / Pedagogy activity + class test	Assignment / Pedagogy activity + class test	**50**
Marks	10	10	10	10	10	

Rubrics for Assignment-

Timely Submission(02)			Correctness (05)		Presentation(03)	
Submission on given Day	**One day late**	**Two days late**	**Complete correct**	**Partially correct**	**Good**	**Average**
02	01	00	05	03	03	02

Rubrics for Class test:

Attendance	Passed	Marks above 60%
02	02	01

Rubrics for Pedagogy activity:

Timely submission (03)		Correctness (02)	
On time	**After deadline**	**Correct**	**Partially correct**
03	02	02	01

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	1	0	0	1	1	1	1	0	1
CO2	2	3	2	2	1	0	0	1	1	0	1
CO3	2	3	2	2	1	1	1	1	1	1	1
CO4	3	3	2	2	1	1	1	1	2	1	1
CO5	2	3	2	3	1	1	1	0	0	0	2

3: High, 2: Moderate, 1: Low, 0/-: No Mapping

*****

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester IV (2024 COURSE)

Course Category	**Multidisciplinary Minor**	**Course Code**	**ET124MD406**
Course Title	**Protocols for Internet of Things**		

Teaching Scheme				**Evaluation Scheme**						
					Theory Marks			**Practical Marks**		
L	**T**	**P**	**Cr**	**Exam**	**Max**	**Min Marks for Pass**		**Max**	**Min Marks for Pass**	
2	0	0	2	CCE	50	20	40			
Total Hours				ESE	50	20				
26	0	0	Total hrs: 26		100					

Prerequisites:

1. Concept of Embedded Systems
2. Basics of Computer Network and security

Course Objective

1. Equip students with knowledge and understanding of the protocols for Internet of Things (IoT).
2. Establish a strong foundation in the fundamentals of wireless technologies of IoT and the importance of IoT security.
3. Familiarize students with various communication protocols used in IoT.
4. Provide a comprehensive understanding of the current scope of IoT through case studies.

Course Outcomes: After successful completion of the course the student will be able to

CO1	**Elaborate & Design** Model the Internet of Things (IoT) using different standard communication protocols across various layers.	BT Level 3/6
CO2	**Analyze and compare** different communication models based on specific parameters.	BT Level 4
CO3	**Distinguish** the most suitable communication model based on the given design criteria.	BT Level 4
CO4	**Investigate** the key principles of IoT security.	BT Level 6
CO5	**Develop** the most efficient connectivity solution model for various devices across different application domains.	BT Level 6

B Tech in E & TC Engineering | S Y B Tech Semester IV (2024 COURSE)
Syllabus

Unit I	**Fundamentals of IoT Protocols**	**6 hrs**
	Need of IoT Protocols, Importance of Wireless Technologies for IoT, Logical Design of IoT, IoT communication Models	
Unit II	**IoT Protocols Part - 1**	**5 hrs**
	PHY/MAC Layer: Wireless HART, ZWave, Bluetooth Low Energy, Zigbee Smart Energy. Network Layer: IPv4, IPv6, 6LoWPAN, ICMP, RPL, COAP	
Unit III	**IoT Protocols Part - 2**	**5 hrs**
	Transport Layer: (TCP, UDP, DCCP, SCTP)-(TLS, DTLS) Session Layer: HTTP, CoAP, XMPP, AMQP, MQTT	
Unit IV	**IoT Security and Software Modules**	**5 hrs**
	IoT Security : Threat Analysis, Misuse Cases, IoT Security Tomography, Layered Attacker Model, IoT Security Protocols Software Modules: Software Libraries for Internet connectivity, IDE, Simulator, Emulator, Debugger.	
Unit V	**IoT Case Studies**	**5 hrs**
	Case Study on Smart Agriculture and Smart City using IoT protocols with different Wireless Technology	

References

Text Books:

1. Vijay Madisetti and ArshdeepBahga, “Internet of Things (A Hands-on Approach)”, University Press 1st Edition, 2014
2. Jeeva Jose, “Internet of Things”, ISBN-10 : 938617359X, Khanna Book Publishing, 2018
3. Raj Kamal, Internet of Things: Architecture and Design Principle” , ISBN-13: 978-93-5260- 522-4, McGraw Hill Education (India) 2017

References Books:

1. The Internet of Things: From RFID to the Next-Generation Pervasive Networked Lu Yan, Yan Zhang, Laurence T. Yang, Huansheng Ning
2. Designing the Internet of Things , Adrian McEwen (Author), Hakim Cassimally
3. HakimaChouchi, “The Internet of Things Connecting Objects to the Web”, ISBN 078 -1- 84821-140-7, Wiley Publications Asoke K Talukder and Roopa R Yavagal, “Mobile Computing,” Tata McGraw Hill, 2010.
4. Computer Networks; By: Tanenbaum, Andrew S; Pearson Education Pte. Ltd., Delhi, 4th Edition 5. Data and Computer Communications; By: Stallings, William; Pearson Education Pte.Ltd., Delhi, 6th Edition
5. **http://www.libelium.com/resources/case-studies**

MOOC/NPTEL Courses:

B Tech in E & TC Engineering | S Y B Tech Semester IV (2024 COURSE)

1. NPTEL: Introduction to internet of things - Course (nptel.ac.in)
2. Coursera: An Introduction to Programming the Internet of Things (IOT) | Coursera

Scheme for Theory Examination

Component	Level	Unit1	Unit2	Unit3	Unit4	Unit5	Total	Passing
Continuous Comprehensive Evaluation (CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

After completion of each unit subject teachers will conduct following CCE:

Sr. No.	Unit I	Unit II	Unit III	Unit IV	Unit V	Total Marks
Method	Assignment	MCQ	Quiz	MCQ	Assignment	**50**
Marks	10	10	10	10	10	

Rubrics for Assignment

Timely Submission(02)			Correctness (05)		Presentation(03)	
Submission on given Day	**One day late**	**Two days late**	**Complete correct**	**Partially correct**	**Good**	**Average**
02	01	00	05	03	03	02

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	1	2	1	1	1	2	1	1	1	2	1
CO2	1	2	2	1	2	1	2	1	2	2	1
CO3	2	1	2	1	1	1	1	2	1	3	1
CO4	1	1	3	2	2	2	1	1	2	2	1
CO5	1	1	1	1	3	1	2	1	1	2	1

3: High, 2: Moderate, 1: Low, 0/-: No Mapping

*****

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester IV (2024 COURSE)

Course Category	**Open Elective**	**Course Code**	**ET124OE407**
Course Title	**Organizational Behaviour**		

Teaching Scheme				**Evaluation Scheme**						
					Theory Marks			**Practical Marks**		
L	**T**	**P**	**Cr**	**Exam**	**Max**	**Min Marks for Pass**		**Max**	**Min Marks for Pass**	
2	0	0	2	CCE	50	20				
Total Hours				ESE	50	20	40			
26	0	0	Total hrs: 26		100					

Prerequisites:

Algebra, Calculus, Linear algebra, Ordinary differential equations, Signals and systems

Course Objectives:

1. To understand individual and group behavior at work place to improve the effectiveness of an organization.
2. To understand different types of personality and learning styles.
3. To learn recognizing and valuing individual Personalities and Behaviour by working on Perceptions from Organizational Perspective.
4. To have a understanding on the Theories of Motivation and Work Behavior.
5. To understand organizational culture and organizational effectiveness.

Course Outcomes: After successful completion of the course the student will be able to

CO1	Demonstrate understanding of the basic concepts of organizational behaviour and their applicability in contemporary organizations.	BT Level 3
CO2	Analyze the various means of managing people at the workplace.	BT Level 4
CO3	Learn recognizing and valuing individual Personalities and Behaviour by working on Perceptions from Organizational Perspective	BT Level 2
CO4	Understand the Theories of Motivation and Work Behaviour.	BT Level 2
CO5	Develop good Work Culture and Climate in an Organization by working on both the Extrinsic and Intrinsic factors associated with the Organization to provide a Quality Work Life balance.	BT Level 3

Syllabus

Unit I	**Understanding organizational behaviour**	**6 hrs**
	Understanding organizational behavior: Tracing the evolution**,** Individual in the organization: The building blocks, Understanding individual differences, Diversity and inclusion in organization, Diverse workforce, inclusive mindset**,** Perception of diversity and inclusion**,** Ableism and inclusion Diversity management.	

Unit II	**Perception, Decision making and Emotions**	**5 hrs**
	The perceptual process, Factors that influence perception, Perception and decision making, Parameters which affects decisions**,** Ethical decision making, Learning- concept, theories and reinforcement, Affect and emotions, Affective events theory**,** emotional intelligence**,** Understanding stress**,** Emotions and moods: Application at workplace.	
Unit III	**Personality and Values at Workplace**	**5 hrs**
	Understanding self and personality, Types and theories of personality, Measuring personality, Personality traits relevant to organization, Assessing personality: caveats and concerns, Values and its importance, Sources and types of values, Values that cut across cultures, Person-job fit, Person-organization fit.	
Unit IV	**Motivation: Application at Workplace**	**5 hrs**
	Motivation: Basic understanding and definition, Tracing the roots: Early theories, Keeping up with times: Contemporary theories, Job Design and job characteristics model, Employee involvement, Motivating the employees: Strategies for organization, Organizational justice and employee motivation.	
Unit V	**Creativity, Psychological Capital and Knowledge Sharing**	**5 hrs**
	Understanding creativity, Stages of individual creativity, Creativity and problem solving, Defining psychological capital, Using Psychological capital and mindfulness at work, Understanding knowledge sharing, Understanding knowledge hiding- what it is and what it is not, Individual factors affecting knowledge hiding, Integrating knowledge sharing and hiding behavior**,** Strategies for individuals to foster knowledge sharing.	

References

Text Books:

1. Steven L. McShane and Mary Ann Von Glinow (2022). Organizational Behavior (9th Edition). Noida: McGraw Hill.
2. Fred Luthans (2013). Organizational Behavior. New Delhi: McGraw Hill.

References Books:

1. Robbins, P.Stephen - Organizational Behaviour-Concepts, Controversies & Applications - Prentice Hall of India Ltd., New Delhi.
2. Luthans Fred – Organizational Behaviour - McGraw Hill Publishers Co. Ltd., New Delhi,
3. Rao, VSP and Narayana, P.S. - Organization Theory & Behaviour - Konark Publishers Pvt.

Ltd., Delhi.
4. Prasad, L.M - Organizational Theory & Behaviour - Sultan Chand & Sons, NewNorman S. Nise, "Control System Engineering", Wiley, 2014

MOOC/NPTEL Courses:
https://onlinecourses.nptel.ac.in/noc25_mg50/preview

Scheme for Theory Examination

Component	Level	Unit1	Unit2	Unit3	Unit4	Unit5	Total	Passing
Continuous Comprehensive Evaluation (CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

After completion of each unit subject teachers will conduct following CCE:

Sr. No.	Unit I	Unit II	Unit III	Unit IV	Unit V	Total Marks
Method	Assignment	MCQ	Quiz	MCQ	Assignment	**50**
Marks	10	10	10	10	10	

Rubrics for Assignment

Timely Submission(02)			Correctness (05)		Presentation(03)	
Submission on given Day	One day late	Two days late	Complete correct	Partially correct	Good	Average
02	01	00	05	03	03	02

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	1	0	0	0	0	0	1	1	0	1	2
CO2	0	0	1	0	0	1	1	1	1	1	2
CO3	0	1	0	1	0	0	2	1	1	1	2
CO4	0	1	0	1	1	0	2	1	1	1	2
CO5	1	0	0	0	0	1	1	1	1	1	2

3: High, 2: Moderate, 1: Low, 0: No Mapping

*****

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester IV (2024 COURSE)

Course Category	**Vocational and Skill Enhancement Course (VSEC3)**	**Course Code**	**ET124VS408**
Course Title	**PCB Designing and Fabrication**		

Teaching Scheme				**Evaluation Scheme**				
					Theory Marks		**Practical Marks**	
L	**T**	**P**	**Cr**	**Exam**	**Max**	**Min Marks for Pass**	**Max**	**Min Marks for Pass**
1	0	2	2	CCE			100	40
Total Hours								
13	0	26	Total hrs: 39					

Prerequisites:

1. Knowledge of analog and digital circuits.
2. Knowledge of Simulation software like Multisim / proteus / etc.
3. Knowledge of soldering techniques

Course Objectives:

1. Acquire & understand basics of PCB and need for PCB Design
2. To give a comprehensive understanding and hands-on exposure to the various processes, industrial tools, protocols, and design specifics which are involved in PCB Designing.
3. To make students capable to design their own projects PCB for a specific application using industry-standard software.

Course Outcomes: After successful completion of the course the student will be able to:

CO1	Apply the basics of PCB, necessity and evolution of PCB, types and classes of PCBs	BT Level 3
CO2	Implement the rules / steps involved in schematic, layout, fabrication and assembly process for PCB design.	BT Level 5
CO3	Design (schematic and layout) PCB for analog circuits, digital circuits, mixed circuits and fabricate the same	BT Level 6
CO4	Evaluate the Visual inspection, X-ray inspection and multimeter testing methods for fault finding / repairing of fabricated PCB.	BT Level 5
CO5	Analyse transmission line, crosstalk and thermal issues in PCBs	BT Level 4

Syllabus

Unit I	**Introduction to PCB**	**2 Hrs**
	• Definition and Need/Relevance of PCB • Background and History of PCB • Types of PCB: Single, double, multilayer, and flexible boards, • Classes of PCB Design, PCB Materials • Terminology in PCB Design • Different Electronic design automation (EDA) tools and comparison.	

B Tech in E & TC Engineering | S Y B Tech Semester IV (2024 COURSE)

Unit II	**PCB Design Process**	**3 Hrs**
	• PCB Design Flow, Placement, routing and auto routing • Steps involved in layout design • Artwork generation Methods - manual and CAD • General design factors for digital and analog circuits • Layout and Artwork making for Single-side, double-side and Multi-layer Boards. • Exporting Drill and Gerber Files • Design-specification standards	
Unit III	**PCB Fabrication & Assembly**	**4 Hrs**
	• Steps involved in fabrication of PCB: Film master preparation, Image transfer, photo printing (UV exposure), Plating techniques, Etching techniques • PCB Fabrication techniques-single, double sided and multilayer • Etching: chemical principles and mechanisms • Post operations- stripping, black oxide coating and solder masking • PCB component assembly processes	
Unit IV	**Study of Fault Finding methods and repairing techniques of PCBs**	**2 Hrs**
	Fault Finding methods: • Visual inspection, X-ray inspection and multimeter testing methods **Repairing techniques:** • Repairing Techniques, De-soldering techniques, replacement of Component /Solder Pad /Track repairing methods.	
Unit V	**Transmission lines & crosstalk and introduction to SMD**	**2 Hrs**
	Transmission Lines: • Transmission lines and its effects • Significance of Transmission line in Board design • Types of Transmission lines. **Crosstalk:** • The crosstalk in transmission lines • Crosstalk control in PCB design parts, planes, tracks, connectors, terminations • Minimization of crosstalk. • Thermal issues: Thermal mapping of design **Introduction to SMDs:** • SMD soldering methods • Placing methods of SMDs	

References

References Books:

1. Printed Circuit Boards: Design and Technology, Walter C Bosshart, Tata McGraw-hill
2. Printed Circuit Boards: Design, Fabrication, Assembly & Testing, R. S. Khandpur, Tata McGraw-hill
3. Open source EDA Tool KiCad Tutorial: http://kicad-pcb.org/help/tutorials/

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester IV (2024 COURSE)

List of Practical / Practice Exercises

1	Introduction to PCB design & fabrication
2	Study of Tools required for PCB design & fabrication: 1. Open source EDA tool KiCad, PCB express, etc.
3	Study of materials required for PCB fabrication: 1. Single-sided copper clad sheet. 2. Diluted Acidic solution for copper etching purpose with plastic tray. 3. Tapes and pads for layout design of different dimensions. 4. Tool kit (tong, hand gloves etc.)
4	Study of various types of PCBs
5	Study of equipment required for PCB fabrication 1. Film maker 2. UV exposer 3. DIP coating 4. Etching machine 5. Hand drilling/Power drilling machine.
6	Design PCB (Schematic, Layout & Artwork) for any 2 circuits of following: 1. A regulated power supply using IC 78XX / LM317 / etc. 2. Inverting Amplifier or Summing Amplifier using op-amp 3. Astable or Monostable multivibrator using IC555 4. 4 bit binary /MOD N counter using D-Flip flops. 5. Instrumentation amplifier for any application
7	Preparation of 2 films as per design mentioned in sr.No.6
8	Fabrication of 2 single-sided PCBs for 2 circuits mentioned in sr.No.6
9	Mount components on above fabricated 2 PCBs, make soldering & test the circuit
10	Study of fault finding / trouble shooting in a PCB, De-soldering techniques & analysis of transmission line, crosstalk and thermal issues

Scheme for Continuous Evaluation

Component	Level	Parameters	Marks	Total	Passing
Continuous Comprehensive Evaluation (CCE)	Progressive Evaluation	Understanding Viva Voce	20	100	40
		Involvement, Participation, and Engagement	20		
		Quality of Submission of Report	40		
		Attendance	20		

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	3	3	3	0	0	1	0	0	2
CO2	3	3	3	0	3	2	2	2	1	2	2
CO3	3	2	3	2	2	2	1	2	2	2	2
CO4	3	2	2	2	3	3	2	2	1	2	2
CO5	3	3	2	2	2	2	0	1	0	2	2

3: High, 2: Moderate, 1: Low, 0: No Mapping

*****

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester IV (2024 COURSE)

Course Category	**Ability Enhancement Course**	**Course Code**	**ET124AE409**
Course Title	**Soft Skills: Workplace and Life**		

Teaching Scheme				**Evaluation Scheme**				
					Theory Marks		**Practical Marks**	
L	**T**	**P**	**Cr**	**Exam**	**Max**	**Min Marks for Pass**	**Max**	**Min Marks for Pass**
1	0	2	2	CCE	100	40		
Total Hours								
13	0	26	Total hrs: 39					

Prerequisites: Basic English Grammar Skills

Course Objective

1. This course is designed to equip students with essential professional and technical communication skills necessary for success in the modern workplace.
2. Emphasizing both written and verbal communication
3. The course covers a wide range of topics, including effective written communication, active listening and public speaking.

Course Outcomes: After successful completion of the course the student will be able to

CO1	Express effectively through verbal or oral communication and Write precise briefs, essays, summaries or reports and technical documents for official communication.	BT level 3
CO2	Students will understands ethics and values for being a good professional	BT level 2
CO3	Learn to work in a heterogeneous and multidisciplinary teams and handle conflicting situations in corporate world	BT level 3
CO4	Students will develop their leadership qualities for being a successful professional	BT level 4
CO5	Students will be able to constructively participate in group discussion, meetings, prepare and deliver presentations	BT level 4

Syllabus

Unit I	**Self-Introduction & SWOC Analysis**	**2 hrs**
	Difference between hard skills and Soft skills, Introduction of SWOC Analysis, Importance of Soft Skills in corporate setting, Formal / Informal self-introduction, goal setting, and how to maintain your attitude towards various circumstances. Applications of SWOC in domain specific Industry.	
Unit II	**Writing Skills**	**2 hrs**
	Practicing and understanding various formats of writing skills. Discussion on types of reports, various formats of report writing. Understanding Email etiquette and types of email. Writing emails on	

	different topics. Practicing resume writing and its various formats. Types of application and how to write them.	
Unit III	**Professionalism & Ethics**	**3 hrs**
	Understanding ethics and morals, Importance of Professional Ethics, hindrances due to absence of Work ethics, Professional etiquette – Introductions, with colleagues, attire, events, dinning, telephone, travelling, netiquette, social media, writing. Stress as integral part of life, Identifying signs and sources of stress, Steps to cope with stress – open communication, positive thinking, Belief in oneself, ability to handle failure, Retrospective thinking for future learning, Organizing skills to enhance time management, Focusing on goals, smart work vs hard work, Prioritizing activities, Perils of procrastination, Daily evaluation of "to-do" list. Case studies about development of ethics	
Unit IV	**Group Discussion & Personal Interview**	**3 hrs**
	Introduction to Group Discussion, Difference between Group Discussion and debate, Etiquettes while conducting Group Discussion, Professional Phases to be used in Group Discussion, handling complexities in GD, Understanding types of Interview, Grooming and etiquette while giving an Interview, Understanding Job Description and Studying Company Profile, Strategies and techniques to ace the interview.	
Unit V	**Interpersonal & Intrapersonal Skills**	**3 hrs**
	Differences of interpersonal and interpersonal skills, Introduction of team building, Introduction to leadership and types of Leadership, Identifying your weakness and focussing on your strength to become a good leader, Introduction to Presentation Skills, 5P's of Presentation, Types of Presentation	
	Practical/ Lab Sessions	
Lab Session	**Activities**	**Duration (Hrs.)**
1	Speaking Skills- Self Introduction: Introduce your friend	2
2	Team Building Activity	2
3	How to study job description and company profile : "Job Detective"	2
4	Grooming and image management	2
5	Speaking Skills- JAM Session	2
6	Speaking Skills- Debate session	2
7	Group Discussion	2
8	Group Discussion	2

9	Case study analysis : Problem solving and critical thinking : "The Problem-Solvers' Challenge"	2
10	Presentation Skills	2
11	Presentation Skills	2
12	Personal Interview – Conducting of mock interview	2
13	Personal Interview – Conducting of mock interview	2

References

References Books:

1. Indrajit Bhattacharya, “An Approach to Communication Skills”, Dhanpat Rai.
2. Simon Sweeney, “English for Business Communication”, Cambridge University Press.
3. Sanjay Kumar and Pushpa Lata, “Communication Skills”, Oxford University Press.
4. Atkinson and Hilgard's, “Introduction to Psychology”, 14th Edition.
5. Kenneth G. Mcgee, “Heads Up: How to Anticipate Business Surprises & Seize Opportunities First”, Harvard Business School Press, Boston, Massachusetts.
6. R. Gajendra Singh Chauhan and Sangeeta Sharma, “Soft Skills-An integrated approach to maximize personality”, Wiley Publication, ISBN: 987-81-265-5639-7

NPTEL Courses:

1. NPTEL Course “Developing Soft skills & Personality” https://nptel.ac.in/courses/109/104/109104107/
2. NPTEL Course “Communication Skills” https://nptel.ac.in/courses/109/104/109104030/
3. NPTEL Course “Effective Writing” https://nptel.ac.in/courses/109/107/109107172/
4. NPTEL Course “Interpersonal Skills” https://nptel.ac.in/courses/109/107/109107155/

Rubrics for Continuous Evaluation

Rubrics for ISE (100)		
No	**Component**	**Marks**
1	Assignment 6 Assignments*5 Marks each = 30Marks	30
2	Quiz - Pre & Post Diagnostic Test-15 Marks Quiz on Unit 1 & 2 -15 Marks	30
3	Micro Project: Content creation- 15 Marks Presentation of the Report-15 Marks	30
4	Attendance	10
	Total Marks:	**100**

B Tech in E & TC Engineering | S Y B Tech Semester IV (2024 COURSE)

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	0	0	0	0	0	0	1	3	0	2
CO2	0	2	0	0	0	0	3	1	0	0	2
CO3	0	0	2	0	0	1	3	3	1	3	2
CO4	0	0	0	2	0	0	3	1	0	2	2
CO5	0	0	0	0	2	0	2	2	1	1	3

3: High, 2: Moderate, 1: Low, 0: No Mapping

*****

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester IV (2024 COURSE)

Course Category	**Entrepreneurship/Economics/ Management Courses II**	**Course Code**	**ET124EE410**
Course Title	**Engineering Economics and Finance**		

Teaching Scheme				**Evaluation Scheme**						
					Theory Marks			**Practical Marks**		
L	**T**	**P**	**Cr**	**Exam**	**Max**	**Min Marks for Pass**		**Max**	**Min Marks for Pass**	
2	0	0	2	CCE	50	20	40			
Total Hours				ESE	50	20				
26	0	0	Total hrs: 26		100					

Prerequisites: Fundamentals of Management, Mathematics

Course Objective

1. To understand Financial Management in Projects
2. To develop Cost and Resource Management Strategies
3. To gain Knowledge of Product Development Processes
4. To develop Entrepreneurial and Business Management Skills
5. To understand Legal and Intellectual Property Aspects

Course Outcomes: After successful completion of the course the student will be able to

CO1	Understand project financial structures and manage finances effectively.	BT Level 3
CO2	Develop cost management plans and allocate resources effectively.	BT Level 4
CO3	Develop new products and assess their commercial viability.	BT Level 5
CO4	Develop entrepreneurial skills and evaluate business opportunities.	BT Level 4
CO5	Understand legal aspects related to product development and entrepreneurship.	BT Level 3

Syllabus

Unit I	**Financial Management in Projects**	**5 hrs**
	Introduction to Project Finance Structure, Conducting Feasibility Studies for Financial Planning, Arranging and Controlling Financial Packages, Managing Financial Risks and Budget Forecasting.	
Unit II	**Cost and Resource Management**	**5 hrs**
	Project Cost Estimation Techniques, Budgeting Methods and Cost Control, Resource Allocation and Optimization, Financial Forecasting and Investment Analysis.	

B Tech in E & TC Engineering | S Y B Tech Semester IV (2024 COURSE)

Unit III	**Product Development & Entrepreneurship**	**5 hrs**
	Product Development Process and Planning, Identifying Customer Needs and Market Analysis, Concept Generation, Selection, and Prototyping, Design for Manufacturing and Robust Design.	
Unit IV	**Entrepreneurship and Business Strategies**	**5 hrs**
	Characteristics of Successful Entrepreneurs, Entrepreneurship Process and Market Opportunities, Factors Impacting the Emergence of Entrepreneurship, Business Model Development and Start-up Financing.	
Unit V	**Legal and Intellectual Property Considerations**	**6 hrs**
	Introduction to Intellectual Property Rights (IPR), Patents, Trademarks, Copyrights, and Trade Secrets, Licensing, Franchising, and Regulatory Compliance, Legal Issues in Product Development and Entrepreneurship	

References

Text Books:

1. H.Kerzer, “Project Management: A Systems Approach to Planning, Scheduling, and Controlling”, John Wiley & Sons, Inc., 10th Edition, 2009.
2. Chandra, P., “Projects”, Tata McGraw-Hill Education, 8th Edition, 2009.

References Books:

1. Russell W. Darnall, John M. Preston, “Project Management from Simple to Complex”, The Saylor Foundation.
2. Levy, F. K. and Wiest, J. D., “A Management Guide to PERT/CPM”, Prentice Hall, 2nd Edition, 1969.
3. Lewis, R., “Project Management: Strategic Design and Implementation”, McGraw-Hill, 5th Edition. 2006.
4. Venkataraman. R., J.K. Pinto,“Cost and Value Management in Projects”, John Wiley & sons.

Scheme for Theory Examination

Component	Level	Unit1	Unit2	Unit3	Unit4	Unit5	Total	Passing
Continuous Comprehensive Evaluation (CCE)	Faculty	10	10	10	10	10	50	20
End Semester Examination (ESE)	Institute	10	10	10	10	10	50	20

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester IV (2024 COURSE)
After completion of each unit subject teachers will conduct following CCE:

Sr. No.	Unit I	Unit II	Unit III	Unit IV	Unit V	Total Marks
Method	Assignment	MCQ	Quiz	MCQ	Assignment	**50**
Marks	10	10	10	10	10	

Rubrics for Assignment

Timely Submission(02)			Correctness (05)		Presentation(03)	
Submission on given Day	**One day late**	**Two days late**	**Complete correct**	**Partially correct**	**Good**	**Average**
02	01	00	05	03	03	02

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	2	2	1	0	1	0	0	0	0	0
CO2	3	2	2	2	1	1	1	1	2	0	0
CO3	3	2	2	2	1	1	0	1	2	0	0
CO4	3	2	2	2	1	1	0	1	2	2	0
CO5	2	2	1	2	0	1	1	0	0	0	1

3: High, 2: Moderate, 1: Low, 0: No Mapping

*****

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester IV (2024 COURSE)

Course Category	**Value Education Course 2**	**Course Code**	**ET124VE411**
Course Title	**Sustainable Development Goals II**		

Teaching Scheme				**Evaluation Scheme**				
					Theory Marks		**Practical Marks**	
L	**T**	**P**	**Cr**	**Exam**	**Max**	**Min Marks for Pass**	**Max**	**Min Marks for Pass**
2	0	0	2	CCE	100	40		
Total Hours								
26	0	0	Total hrs: 26					

Prerequisites: -

Subjects Included:

1. Universal Human Values (UHV) - 3 units
2. Constitution of India- 1 unit
3. Corporate Laws -1 unit

Course Objective

1. **Understand Universal Human Values (UHV)** – Develop ethical, moral, and professional values in students.
2. **Apply UHV in Personal and Professional Life** – Explore human relationships, harmony, and responsible behavior.
3. **Develop Ethical Decision-Making Skills** – Analyze real-life scenarios and case studies to build decision-making abilities.
4. **Study Constitutional Rights and Duties** – Understand fundamental rights, directive principles, and governance structure.
5. **Understand Corporate Laws** – Explore the regulatory framework governing businesses and corporate ethics.

Course Outcomes: After successful completion of the course the student will be able to

CO1	**DEFINE** the fundamental concepts of Universal Human Values (UHV).	BT Level 4
CO2	**EXPLAIN** the significance of ethical values and human relationships in society.	BT Level 3
CO3	**ANALYZE** ethical dilemmas and decision-making frameworks in professional contexts.	BT Level 4
CO4	**DESCRIBE** the fundamental rights, duties, and governance structure of India.	BT Level 4
CO5	**UNDERSTAND** key aspects of corporate laws and ethical business practices.	BT Level 3

Syllabus

Unit I	**Introduction to Universal Human Values (UHV)**	**6 hrs**

	Meaning and importance of UHV, ethical values, role in personal and professional life, self-exploration.	
Unit II	**Human Relationships & Harmony**	**6 hrs**
	Role of relationships in family, society, and workplace; conflict resolution; social responsibility; sustainability in human interactions.	
Unit III	**Ethical Decision-Making**	**6 hrs**
	Case studies on ethical dilemmas, corporate ethics, moral reasoning, frameworks for ethical decision-making.	
Unit IV	**Constitution of India**	**4 hrs**
	Fundamental rights and duties, directive principles, governance structure, significance of constitutional amendments, case laws.	
Unit V	**Corporate Laws & Business Ethics**	**4 hrs**
	Overview of business laws, corporate governance, ethical leadership, corporate social responsibility (CSR), impact of regulations on industries.	

Scheme for Examination (CCE)

Component	Parameters	Marks	Total	Pass
Continuous Comprehensive Evaluation (CCE)	Viva Voce for assessment of Understanding	20	50	20
	Involvement, Participation, and Engagement	10		
	Quality of Submission of Report	10		
	Attendance	10		
End Evaluation	Performance (Internal)	25	50	20
	Oral Examination (Internal)	25		

CCE: Continuous Comprehensive Assessment (CCE)

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	3	3	3	0	0	0	0	0	0	0
CO2	3	3	3	3	0	0	0	0	0	0	0
CO3	3	3	3	3	0	0	0	0	0	0	0
CO4	3	3	3	3	0	0	0	0	0	0	0
CO5	3	3	3	3	0	0	0	0	0	0	0

3: High, 2: Moderate, 1: Low, 0: No Mapping

*****

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester IV (2024 COURSE)

Course Category	**Non Credit Course 3**	**Course Code**	**ET124NC412**
Course Title	**Control Engineering**		

Teaching Scheme				**Evaluation Scheme**				
					Theory Marks		**Practical Marks**	
L	**T**	**P**	**Cr**	**Exam**	**Max**	**Min Marks for Pass**	**Max**	**Min Marks for Pass**
0	0	2	0	CCE	50	20		
Total Hours								
0	0	26	Total hrs: 26					

Prerequisites: Engineering Mathematics

Course Objective

5. To understand the mathematical representation of continuous and discrete time signals and systems.
6. To classify signals and systems into different categories.
7. To analyze Linear Time Invariant (LTI) systems in time domain and frequency domains.
8. To transform the signals into frequency domain and analyze the properties.

Course Outcomes: After successful completion of the course the student will be able to

CO1	**Classify** basic signals and perform operations on signals to form complex signal.	BT Level 2
CO2	**Compute** the convolution between two signals and classify the systems according to their characteristics.	BT Level 3
CO3	**Apply** Fourier series for analysis of periodic signal in frequency domain	BT Level 3
CO4	**Analyze** the non-periodic signals in frequency domain using Fourier Transform.	BT Level 4
CO5	**Analyse** the stability of systems in complex frequency domain using Laplace Transform	BT Level 4

Syllabus

Student should enrol for NPTEL Control Engineering Course and Solve NPTEL Assignments	**26 hrs**

D Y Patil College of Engineering, Akurdi, Pune

An Autonomous Institute from AY 2024-25, Affiliated to Savitribai Phule Pune University, Pune

B Tech in E & TC Engineering | S Y B Tech Semester IV (2024 COURSE)

Course Category	Non Credit Course 4	Course Code	ET124NC413
Course Title	Aptitude & Technical Mastery for Placements-II		

Teaching Scheme				Evaluation Scheme				
					Theory Marks		Practical Marks	
L	T	P	Cr	Exam	Max	Min Marks for Pass	Max	Min Marks for Pass
0	0	2	0	CCE			50	20
Total Hours								
0	0	26	Total hrs: 26					

Prerequisites: Basic Mathematics & Fundamentals of Programming

Course Objective

1.Strengthen **advanced aptitude and reasoning skills** for competitive placement tests.

2.Introduce **industry-relevant programming concepts** for technical rounds.

3.Provide **hands-on coding practice** on **LeetCode & HackerRank** for problem-solving.

4.Improve **data interpretation, decision-making, and coding efficiency** for placement exams..

Course Outcomes: After successful completion of the course the student will be able to

CO1	Solve **complex aptitude problems** with confidence and efficiency.	BT Level 4
CO2	Demonstrate **logical reasoning and data interpretation** skills for real-world scenarios.	BT Level 3
CO3	Write, debug, and optimize **Python/Java programs** to solve industry-standard coding problems.	BT Level 4
CO4	Successfully attempt **company-specific technical assessments** using hands-on coding practice.	BT Level 4

Syllabus

Unit I	Quantitative Aptitude	4 hrs
	1. Time, Speed, and Distance - Intermediate and Advanced 2. Areas and Volumes - Intermediate and Advanced	
Unit II	**Verbal Ability**	**3 hrs**
	1.Critical Reasoning & Analogies 2.Sentence Completion- Advance	

B Tech in E & TC Engineering | S Y B Tech Semester IV (2024 COURSE)

Unit III	**Reasoning Ability**	**6 hrs**
	1.Data Interpretation - Advanced 2.Cubes & Dices 3.Data Sufficiency	
Unit IV	**Career Skills**	**3 hrs**
	1.Networking Skills 2.LinkedIn Profile Building & Internship Outreach	
Unit V	**Tech Essentials**	**10 hrs**
	1.Python for Non-Circuit, 2.Java for Circuit Branches 3.Programming fundamentals & applications 4.Hands-on Coding on LeetCode & HackerRank 5.Solving industry-standard problems	

References

References Books:

1. R. S. Aggarwal,. Quantitative Aptitude for Competitive Examinations, 3rd (Ed.). New Delhi: S. Chand Publishing
2. ETHNUS,. Aptimithra, 1st (Ed.). Bangalore: McGraw-Hill Education Pvt. Ltd.
3. Arun Sharma, (2016). Quantitative Aptitude, 7th (Ed.). Noida: McGraw Hill Education Pvt. Ltd.
4. Soft Skills & Interview Prep – Dale Carnegie, LinkedIn Learning
5. Python & Java Programming – CodeWithHarry, GeeksforGeeks, HackerRank, LeetCode

*****