S.T. Semester –IV
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2023)
Proposed TCET Autonomy Scheme (w.e.f. A.Y. 2023-24)

Sr. No.	Course Code	Course Title	Theory	Tutorial	Practical	Contact Hours	Credits	ISE	IE	ESE	PR/OR	TW	Total
		Course Description	**Teaching Scheme (Program Specific)**					**Examination scheme**					
			Modes of Teaching / Learning / Weightage					**Modes of Continuous Assessment / Evaluation**					
			Hours Per Week				Credits	**Theory (100/50)**			**Practical / Oral / Presentation (25)**	**Term Work (25)**	**Total**
								40/20		**60/30**			
								IA					
1	BSC-IOT401	Mathematics-IV	3	1	-	4	4	20	20	60	-	25	125
2	PCC-IOT401	Computer Communication Network	3	-	2	5	4	20	20	60	25	25	150
3	PCC-IOT403	Database and Management System	3	-	2	5	4	20	20	60	25	25	150
4	PCC-IOT404	Communication Systems in IoT	3	-	2	5	4	20	20	60	25	25	150
		Total	12	1	6	19	16	**Total marks (Academic)**					575
		Course Description	**Non Credited Mandatory Course (Passing is mandatory for this course)**									**Term Work**	
1	MC-401	Environmental Studies	1	-	-	-	(Non Credit)	-				25	**25**
		Course Description	**Contact Hrs. during Week End / Semester Break/ End of Semester(Between 21st and 25th Week)**									**Term Work**	
1	SI-IOT401	Summer Internship	-	-	-	120*	3	-		-	-	50	**50**
		Course Description	**Contact Hrs. during Week End / Semester Break/ End of Semester (Between 21st and 25th Week)/During Semester**										
1	AP-IOT401	Activity Points	-	-	-	52@	-	-					

Course Description	Teaching scheme (Holistic and Multidisciplinary Education-HME) (Conducted in the beginning of Semester during first 3 Weeks)					Assessment/Evaluation Scheme		Term Work
						Presentation	Report	
						AC	AC	
1	HME – IoTPS401	Professional Skills IV (IoT Networking - II)	-	-	2	2	1	15	10	25
2	HME –IP401	Industry Practice-II JavaScript	-	-	2	2	1	15	10	25
3	HME - ABL401	Activity Based Learning	-	-	2	2	1	15	10	25
		Total	-	-	6	6	3	**Total marks (HME)**		75
		Total	12	1	12	25	22	**Grand Total marks**		725

IA- In-Semester Assessment, ESE- End Semester Examination, PR- Practical Examination, TW – Term Work Examination, OR- Oral Examination, AC- Activity evaluation, ISE-In-Semester Examinations ,IE-Innovative Examination

Guidelines for the Semester:

1. During Academic conduct, practical load shall be conducted in batches.
2. For continuous evaluation, examination shall be conducted under two heads: IA – In-Semester Assessment, ESE – End Semester Examination. Under IA, 20 marks of ISE (In-Semester Examination) shall be conducted for 1 hour. 20 marks of IE (Innovative Examination) shall also be conducted under IA. ESE shall be conducted for 60 marks with duration of 2 hours.
3. Three In-Semester Examinations (ISE) will be conducted during each semester. Out of Three, Average of Best Two ISE marks will be considered. There is no provision for the Retest in any ISE.
4. aInnovative Examination (IE) will be accessed based on the project report with presentation.
5. Professional Skills & Industry Practice-IV activitiy will run in the form of integrated theory and practical course & syllabus is linked with level 6 of NSQF.
6. Activity Based Learning-I activity will run in the form of integrated theory and practical course.
7. * Under the head of Summer Internship, student can complete internship from winter to summer with 120 hours and acquire 3 credits till the end of Semester 4. The summer Internship will be conducted in the form of in-house internship which is mandatory for all students in summer semester break. Credits will be awarded at the end of 4th Semester and will be reflected in the Grade Card of 4th Semester. Student will get 1-year span to acquire the credits and complete total contact hours. Student shall submit a report to earn Term work marks in internship.
   - **Following activities should be considered for Summer Internship:-**
   a. Participation in inhouse internship at the end of 3rd and 4th Semester of 2 week each.
   b. Other activity which also will be considered are : Participation in Hackathon, Development of new Product/ Business Plan / Registration of start-up, Participation in IPR workshop/Leadership talks/Idea/ Design / Innovation/Technical Expos, Internship with Industry / Govt. / NGO/ PSU/MSME/Online Internship, Long Term Goals under Rural Internship

   Note:- For Above Activities mentioned in point 2, if Student is part of Organizing Committee or Participating a Competition at University/State/National/international Level then it will be considered as Internship else it will be considered as Activity Points.
8. @ As per AICTE, Students has to earn 100 Points by participating in 400 Hrs. of activities during 4 years of Engineering. After Completing 52 hrs. of Activities, Students can earn 13 Points. This Points will not be reflected in Grade Card. Separate transcript will be issued to students after completion of Final Year.

TCET

DEPARTMENT OF INTERNET OF THINGS
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education [CBCGS-HME 2020]
Under TCET - Autonomy Scheme - 2020
University of Mumbai

S.T. Semester –IV
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2023) Proposed TCET Autonomy Syllabus (w.e.f. A.Y. 2023-2024)

B.Tech. (Internet of Things)								**SEM: IV**			
Course Name: Applied Mathematics IV								**Course Code: BSC-IoT 401**			
Contact Hours Per Week:04								**Credits: 04**			
Teaching Scheme (Program Specific)								**Examination Scheme (Formative/Summative)**			
Modes of Teaching /Learning/Weightage								**Modes of Continuous Assessment/Evaluation**			
Hours Per Week						Theory(100)			Practical/Oral (25)	Term Work (25)	Total
Theory	**Tutorial**	**Practical**	**Contac Hours**	**Credits**		**ISE**	**IE**	**ESE**	**PR**	**TW**	**125**
3	**1**	**-**	**4**	**4**		**20**	**20**	**60**	**-**	**25**	

ISE: In-Semester Examination - Paper Duration 1 Hours IE: Innovative Examination ESE: EndSemesterExamination-PaperDuration-2Hours **The weightage of marks for continuous evaluation of Term work/ Report: Formative (40%), Timely completion of practical (40%) and Attendance/ Learning Attitude (20%)**
Prerequisite: Mathematics I, Mathematics II, Applied Mathematics III **RBT: Revised   Taxonomy**

Course Objective:

The course intends to familiarize the prospective engineers with techniques in Basic Probability Theory, Probability distribution, Correlation & Regression, testing of hypothesis for large and small samples to engineering problems. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

Course Outcomes: Upon completion of the course students will be able to

Sr. No.	Course Outcomes	PO	PSO	PI	% Weightage
1	Apply the Laplace Transform and its properties to evaluate the integrals.	PO1, PO3, PO11	-	1.3.1,1.4.1,3.1.1 ,11.1.1	14%
2	Apply the Inverse Laplace Transform and integral transform calculus to solve the Ordinary differential equation by Laplace Transform.	PO2,PO3, PO4	-	2.1.2,3.1.1, 4.1.4	16%
3	Compute the Fourier Series for learning advanced Engineering Mathematics.	PO1,PO2,PO4,PO5	-	1.3.1,2.2.1, 4.1.4,5.1.1	17%
4	Apply the concept of Fourier Transform and Inverse Fourier transform.	PO1,PO2, PO5,	-	1.3.1,2.2.1, 5.1.1	16%
5	Apply the concept of Z-transform and Wavelet transforms for learning advanced Engineering Mathematics.	PO3,PO4,PO6	-	3.3.1, 4.1.4,6.1.1	17%
6	Use the Linear Algebra Vector Spaces that is fundamental to application of analysis to Engineering problems.	PO4, PO7,PO11, PO12	-	4.1.2,4.1.3, 11.1.1,12.1.2	20%

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as Taxonomy
1	**Basic Probability** Probability spaces, conditional probability, independence; Discrete random variables, Independent random variables, sums of independent random variables; Expectation of Discrete Random Variables, Moments, Variance of a sum.	6	L1, L2, L3
2	**Discrete Probability Distributions** Bernoulli, Binomial and Poisson distribution, Poisson approximation to the binomial distribution and evaluation of statistical parameters for these distributions	7	L1, L2, L3
3	**Continuous and Joint Probability Distributions** Continuous random variables and their properties, distribution functions and densities, Normal, Exponential and Gamma distribution	8	L1, L2, L3
4	**Correlation and Regression Analysis** Correlation and regression – Karl Pearson's coefficient of correlation, Spearman's Rank correlation coefficient, Regression Analysis: Line of Regression, Regression coefficient, Equations to the line of regression.	8	L1, L2, L3

5	**Large Samples Test**		
	Test of significance: large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviations	**8**	**L1, L2, L3**
6	**Small Samples Test**		
	Test for single mean, difference of means, test for ratio of variances - Chi-square test for goodness of fit and independence of attributes.	**8**	**L1, L2, L3**
	Total Hours	**45**	

Books and Reference :

Sr. No.	Title	Authors	Publisher	Edition	Year
1	Advanced Engineering Mathematics	Erwin Kreyszig	John Wiley & Sons	9th Edition	2006
2	Introduction to Probability Theory	P. G. Hoel, S. C. Port and C. J. Stone	Universal Book	-	2003
3	A First Course in Probability	S. Ross	Pearson Education India	6th Edition	2002
4	An Introduction to Probability Theory and its Applications	W. Feller	Wiley	3rd Edition	1968
5	A textbook of Engineering Mathematics	N.P. Bali and Manish Goyal	Laxmi Publications	9th Edition	2008
6	Higher Engineering Mathematics	B.S. Grewal	Khanna Publishers	36th Edition	2010
7	Engineering Mathematics	Veerarajan T	Tata McGraw-Hill, New Delhi	3rd Edition	2008
8	Higher Engineering Mathematics	Ramana B. V	Tata McGraw Hill, New Delhi	11th Edition	2010
9	Probability and Random Processes with Applications to Signal Processing	H. Stark and J. Woods	Pearson Education	3rd Edition	2002
10	Probability, Random Variables and Stochastic Processes	A.Papoulis and S. Unnikrishnan Pillai	McGraw Hill	4th Edition	2002

Online References:

Sr. No.	Website Name	URL	Modules covered

1	www.classcentral.com	https://www.classcentral.com/subject/statistics	M1
2	www.nptel.in	https://nptel.ac.in/courses/111106112/	M1-M6
3	www.nptel.in	https://nptel.ac.in/courses/117105085/	M3

S.T. Semester –IV

Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education
(CBCGS- HME 2023) Syllabus under Autonomy Scheme

B.TECH. Internet of Things (IOT)								S.T. SEM: IV		
Course Name: Computer Communication Network								**Course Code**: PCC-IOT401		
Teaching Scheme (Program Specific)						**Examination scheme**				
Modes of Teaching / Learning / Weightage						**Modes of Continuous Assessment / Evaluation**				
Hours Per Week- Theory (100)						IA		ESE	Practical/ Oral (25)	Term Work (25)	Total
Theory	Tutorial	Practical	Contact Hours	Credits		ISA	IE	-	OR	TW	
3	-	2	5	4		20	20	60	25	25	150
IA: In Semester Assessment - Paper Duration – **1 Hour** **ESE:** End Semester Examination - Paper Duration - **2 Hours** **The weightage of marks for continuous evaluation of Term work/Report:** Formative (40%), Timely completion of practical (40%) and Attendance (20%)											
Prerequisite: Principles of Communication Engineering, Digital Communication											

Course Objective:

To impart the knowledge for Understanding various networking concepts and analyze various layers & protocols.

Course Outcomes: Upon completion of the course Students will be able to

Sr. No.	Course Outcomes	PO	PSO	PI	% Weightage
1	Understand and explain Networking Concepts and Protocols	PO1, PO3,PO5	-	1.3.1, 3.1.3,5.1.1	10%
2	Demonstrate understanding of networking concepts and required protocols	PO3,PO4 ,PO5	-	3.1.3, 4.1.1, 5.1.1	20%
3	Understand and explain Data link layer services and protocols.	PO1,PO3 ,PO4,PO 5,PO6	-	1.4.1,3.1.3, 4.1.4,5.1.1,6.1.1	15%
4	Understand and explain Networking layer services and protocols	PO3,PO4 PO4, PO6,	-	3.1.3, 4.1.4,5.1.1,6. .1	20%
5	Understand and explain Transport layer & Application layer services and protocols.	PO2,PO3 ,PO4,PO 6	-	2.2.1, 3.1.3,4.1.4, 6.1.1	15%
6	Understand and explain LANs & connecting devices.	PO2, PO3,PO4 , PO11	-	2.2.1,3.1.3,4. 1.4,11.1.1	20%

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels as per bloom's Taxonomy
	Introduction to Network Architectures, Protocol Layers, and Service Models		

1	Uses of computer networks. Topologies, LAN, MAN, WAN, Network topologies Addressing: Physical / Logical /Port addressing, Protocols and Standards. Protocol Architecture: Need of layered protocol architecture, Layers details of OSI, Protocol Layers and Their Service Models TCP/IP Model: Protocol suite,Comparison of OSI and TCP/IP	06	L1,L2
2	Physical Layer	06	L1,L2,L3
	Transmission Media: Guided media like Coaxial, fiber, twisted pair, and Wireless media, Transmission Impairments. Interconnecting Devices: Hub, Bridges, Switches,Router, Gateway Data communication model : DTE, DCE, RS-232D Interface Multiplexing : FDM , Synchronous TDM , Statistical TDM, ADSL , xDSL, Cable Modem		
3	Data Link Control	08	L1,L2,L3
	Data link services: Framing, Flow control, Error control, ARQ methods, Piggybacking High Level Data Link Control (HDLC): HDLC configurations, Frame formats, and Typical frame exchanges. Medium Access Control Protocols: ALOHA, Slotted ALOHA, CSMA, CSMA/CA, CSMA/CD. Controlled Access: Reservation, Polling, Token Passing.		
4	Network Layer	12	L1, L2, L3, L4, L5
	Switching: Switched Communication networks, Circuit switching Networks, Circuit switching Concepts, Packet switching Principles: Virtual circuit switching and Datagram switching Routing in Packet Switching Networks: Characteristics, Routing strategies, Link state Routing versus Distance vector Routing. Least-Cost Routing Algorithms:Dijkstra's Algorithm, Bellman Ford Algorithm. Internet Protocol: Principles of Internetworking: Requirements, Connectionless Operation, Internet Protocol Operation: IP packet, IP addressing, subnet addressing, IPv4, ICMP, ARP, RARP IPv6 (IPv6 Datagram format, comparison with IPv4, and transition from IPv4 to IPv6)		
5	Transport Layer & Application Layer	08	L1, L2, L3, L4
	Connection –oriented Transport Protocol Mechanisms: Transmission ControlProtocol (TCP): TCP Services, TCP Header format, TCP three-way handshake, TCPstate transition diagram.User datagram Protocol (UDP) Congestion: Effects of congestion, Congestion control methods, Traffic management, Congestion control in Packet switching Networks Application layer Protocols : HTTP, FTP, DNS,SMTP, SSH		
6	LANs. High speed Ethernet	05	L1,L2,L3
	Wired LANs: Ethernet: IEEE802, Ethernet Evolution, Standard Ethernet: Characteristics, Addressing, Access Method, Efficiency, Implementation, Fast Ethernet: Access Method, Physical Layer, Gigabit Ethernet: MAC Sublayer, Physical Layer, 10 Gigabit Ethernet. L1, L2. Wireless LANs: Introduction: Architectural Comparison, Characteristics, IEEE 802.11: Architecture, MAC Sublayer, Addressing Mechanism, Physical Layer, Bluetooth: Architecture, Layers. Connecting Devices: Hubs, Switches Virtual LANs: Membership, Configuration, Communication between Switches and Routers, Advantages.		
	Total Hrs.	**45**	

Books and References:

S.No.	Title	Authors	Publisher	Edition	Year
1	Computer Networks	S. Tanenbaum	Pearson Education	4th Edition	-
2	Computer Networks	J. F. Kurose and K. W. Ross	Addison Wesley	5th edition	-
3	Communication Networks	Alberto Leon Garcia	McGraw Hill Education	2nd edition	-
4	Data and Computer communications	William Stallings	Pearson Education	10th edition	-

Online Resources:

S.No	Website Name	URL	Modules Covered
1	www.courseera.org	https://www.coursera.org/learn/networking for beginners	M1,M2,M3
2	www.udemy.org	https://www.udemy.com/networking concepts	M1,M2,M3,M4
3	https://nptel.ac.in	https://nptel.ac.in/courses/106105194/	M4, M5
4	http://www.cisco.in	http://www.ciscoh.in/courses/networking/router configuration	M5, M6

Suggested list of Practical/ Experiments: (not limited to these only)

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive Levels as per Blooms Taxonomy
1	**Basic Experiments**	To design Bus, Star, Ring topology using cisco packet tracer.	2	L1,L2,L3
2		To design Tree, Mesh and Hybrid topology using cisco packet tracer	2	L1,L2,L3
3		To design local area network(LAN) network using HUB	2	L1,L2,L3
4		To design local area network(LAN) network using Switch	2	L1,L2,L3
5		Communication between two LAN network by using router	2	L1,L2,L3
6		To configure the email server using Cisco Packet Tracer	2	L1,L2,L3
7		To configure HTTP / Web server using Cisco Packet tracer	2	L1,L2,L3
8	**Design Experiments**	To configured the wired network using NS2 simulator	2	L1,L2,L3
9		To configure the wireless network using the NS2 simulator	2	L1,L2,L3
10	Advanced Experiments	To Implement UDP protocol and study performance using network simulator (ns2)	2	L1,L2,L3
11-13	Mini/Minor Projects/ Seminar/ Case Studies	GroupWise Mini/Minor Projects/ Seminar/ Case Studies	6	L1,L2,L3
14-15	Group Presentation / Case studies	Group Wise Group Presentation / Case studies	4	L1,L2,L3

S.T. Semester –IV

Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS- HME 2023) Syllabus under Autonomy Scheme

B.TECH. Internet of Things (IOT)							S.T. SEM: IV		
Course Name: Database and Management System							**Course Code**: PCC-IOT403		
Teaching Scheme (Program Specific)							**Examination scheme**		
Modes of Teaching / Learning / Weightage							**Modes of Continuous Assessment / Evaluation**		
Hours Per Week- Theory (100)							**Practical/Oral (25)**	**Term Work (25)**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**IA**	**ESE**	**OR**	**TW**	**150**
3	-	2	5	4	40	60	25	25	
IA: In Semester Assessment - Paper Duration – **1 Hour** **ESE:** End Semester Examination - Paper Duration - **3 Hours** **The weightage of marks for continuous evaluation of Term work/Report:** Formative (40%), Timely completion of practical (40%) and Attendance (20%)									
Prerequisite: Computer Basics.									

Course Objective:

To impart fundamentals of Database Management System including familiarization of SQL commands for the manipulating database & different normalization techniques.

Course Outcomes: Students will be able to:

SN	Course Objectives	Cognitive Levels as per Bloom's Taxonomy
1	Explain the fundamentals of Database Management System	L1, L2
2	Design and draw ER and EER diagrams for real-life problems and convert it to relational databases.	L1, L2, L3
3	Convert conceptual model to relational model and formulate relational algebra queries.	L1, L2, L3
4	Design and querying database using SQL	L1, L2, L3
5	Analyze and apply concepts of normalization to relational database design	L1, L2, L3
6	Explain the concept of transaction, concurrency, and recovery	L1, L2

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive Levels as per Bloom's Taxonomy
1	**Introduction Database Concepts** Introduction and Characteristics of databases, File system v/s Database system, Users of Database system, DBMS system architecture, Database Administrator.	4	L1, L2
2	**Entity–Relationship Data Model** Introduction to Entity-Relationship Model, Entity types: Weak and strong entity sets, Entity sets, Types of Attributes, Keys, Cardinality and Participation, Generalization, Specialization, Aggregation, Examples on ER & EER Model.	8	L1, L2, L3
3	**Relational Model and relational Algebra**	8	L1, L2, L3

	Introduction to the Relational Model, Relational schema, Concept of keys, Mapping the ER and EER Model to the Relational Model, Introduction to Relational Algebra, Unary and set operations, Relational Algebra Queries, Examples on Relational Database.		
4	**Structured Query Language (SQL)**		L1, L2, L3
	Overview of SQL, Data Definition Commands, Data Manipulation commands, Data Control commands, Transaction Control Commands, Set and string operations, aggregate function - group by, having. Views in SQL, Nested and complex queries, Domain Constraints, Integrity constraints: - key constraints, Referential integrity, check constraints, Triggers.	11	
5	**Relational–Database Design**		L1, L2, L3
	Pitfalls in Relational-Database designs, Concept of normalization, Functional Dependencies, Normal Forms: 1NF, 2NF, 3NF, BCNF, 4NF, Multi valued dependencies.	7	
6	**Transactions Management and Concurrency**		L1, L2
	Transaction concept, Transaction states, ACID properties, Concurrent Executions, Serializability – Conflict and View, Concurrency Control: Lock-based protocols, Concurrency Control: Timestamp-based protocols, Log based recovery, Deadlock handling.	7	

Books and References:

S. No.	Title	Authors	Publisher	Edition	Year
1	Database System Concepts	Korth, Silberchatz, Sudarshan	McGraw Hill	6th Edition	2010
2	Fundamentals of Database Systems	Elmasri and Navathe	Pearson education	5th Edition	2011
3	Database Management Systems	Raghu Ramkrishnan and Johannes Gehrke	McGraw Hill	5th Edition	2010
4	Database Management Systems	G. K. Gupta	McGraw Hill.	6th Edition	2011

Online References:

S. No.	Website Name	URL	Modules Covered
1	www.w3schools.com	https://www.w3schools.com/sql/default.asp	M1, M2, M3, M4, M5, M6
2	www.geeksforgeeks.org	https://www.geeksforgeeks.org/sql-tutorial/	M1, M4, M6
3	www.tutorialspoint.com	https://www.tutorialspoint.com/database management_system.html	M1, M2, M3
4	https://swayam.gov.in	https://swayam.gov.in/nd1_noc19_cs46/preview https://swayam.gov.in/nd2_cec19_cs05/preview	M1, M2, M3, M4, M5, M6

Suggested list of Practical/ Experiments:

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive Levels as per Bloom's Taxonomy
1		Prerequisite & identify the case study on ER model.	2	L1, L2
2		Implement Data Definition Language (DDL) commands on a database in SQL	2	L1, L2, L3
3		Implement Data Manipulation Language (DML) on a database in SQL	2	L1, L2, L3
4		Implement Advance DML commands on a database in SQL	2	L1, L2, L3
5	Basic Experiments	Implement Aggregate functions on a database in SQL	2	L1, L2, L3
6		Implement Set & view operations on a database in SQL	2	L1, L2, L3
7		Design various Joins on tables in a database in SQL	2	L1, L2, L3
8		Design various Constraints and Subqueries on tables in a database in SQL	2	L1, L2, L3
9	Design Experiments	Design Normalized Database for any Real-World Example.	2	L1, L2, L3
10	Advanced Experiments	Map ER diagram of identified case study to tables	2	L1, L2, L3
11-12	Mini/Minor Projects/ Seminar/ Case Studies	1)Develop a program for Library database management system 2)Develop a program for colleges or Universities database management system 3)Develop a program for Automobile companies database management system 4)Develop a program for Insurance 0. companies database management system 5)Design a Hotel Management System	6	L1, L2, L3
13-15	Group Presentation	1) Case study of ER diagram designing 2) Introduction to SQL programming	4	L1, L2, L3

S.T. Semester –IV
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education
(CBCGS- HME 2023) Syllabus under Autonomy Scheme

B.TECH. Internet of Things (IOT)							S.T. SEM : IV		
Course Name: Communication Systems in IoT							**Course Code :** PCC-IOT404		
Teaching Scheme (Program Specific)							**Examination scheme**		
Modes of Teaching / Learning / Weightage							**Modes of Continuous Assessment / Evaluation**		
Hours Per Week- Theory (100)							**Practical /Oral (25)**	**Term Work (25)**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	SE	IA	ESE	**OR**	**TW**	
03	-	02	05	4	20	20	60	25	25	**150**
IA : In Semester Assessment - Paper Duration – **1.5 Hours**										
ESE : End Semester Examination - Paper Duration - **3 Hours**										
The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance (20%)										
Prerequisite: Mathematics I, Mathematics II, Mathematics III										

Course Objective:

To impart knowledge of various modulation and demodulation techniques for Digital communication systems and knowledge of signals and systems.

Course Outcomes: Students will be able to

SN	Course Outcomes	Cognitive Levels as per Bloom's Taxonomy
1	Apply Discrete & Digital Modulation & Demodulation techniques.	L1,L2,L3
2	Apply Digital Modulation techniques.	L1,L2,L3
3	Apply Source and Channel Coding techniques.	L1,L2,L3
4	Identify and represent mathematically continuous and discrete time signals and systems	L1,L2,L3
5	Define and analyze Linear time invariant System	L1,L2,L3
6	Understand multi-user radio communication.	L1,L2,L3

Detailed Syllabus:

Module No.	Topics	Hrs	Cognitive Levels as per Bloom's Taxonomy
1	**Discrete & Digital Modulation & Demodulation** Sampling and quantization: Sampling Theorem, Aliasing error, Quantization of Signals, Types of sampling. Pulse Modulation Techniques: Generation and detection of Pulse Amplitude Modulation (PAM), Pulse Width Modulation (PWM), Pulse Position Modulation (PPM). Comparison between PAM, PWM and PPM PCM: Quantization, Pulse-Code Modulation (PCM), Noise Performance of PCM Systems, Multiplexing in Telecommunications Networks: TDM & FDM	8	L1,L2,L3
2	**Digital Modulation Techniques** Concept of Binary and M-ary transmission, Coherent and Non- Coherent reception, Digital Amplitude Modulation & Demodulation: BASK, Digital Phase Modulation & Demodulation: BPSK, QPSK, M-ary PSK. Digital Frequency Modulation & Demodulation: BFSK, MSK, M-ary FSK. Comparison of all techniques based on Spectral efficiency, Power efficiency, Probability of error in detection.	9	L1,L2,L3
3	**Source and Channel Coding**	6	L1,L2,L3

	INFORMATION THEORY AND SOURCE CODING - Entropy, Information rate, Channel capacity, Shannon – Hartley Capacity Theorem, Shannon-Fano encoding, Huffman encoding, Code Efficiency & Redundancy. CHANNEL CODING - Need for channel encoding, Concept of Error detection and correction, Forward Error correction. Linear block codes: Hamming Distance, Hamming Weight, Systematic codes, Syndrome Testing. Cyclic codes: Generator polynomial for Cyclic codes, Systematic cyclic codes, Feedback shift register for Polynomial division. Convolution codes: Convolution encoder, Impulse response of encoder, State diagram, trellis diagram Representations.		
4	**Continuous and Discrete Time Signals**	9	
	Mathematical Representation and Classification of CT and DT signals, Orthogonality of signals, Arithmetic operations on the signals, Time Shifting, Time scaling, Time Reversal of signals, Sampling and Reconstruction, Aliasing effect		L1,L2,L3
5	**Continuous and Discrete Systems**	9	L1,L2,L3
	Mathematical Representation and classification of CT and DT systems, Properties of LTI systems, impulse and step response, Use of convolution integral, convolution sum and correlation for analysis of LTI systems, Properties of convolution integral and convolution sum		
6	**Multi-User Radio Communication**	4	L1,L2,L3
	Global System for Mobile Communications (GSM) - Code division multiple access (CDMA) – Cellular Concept and Frequency Reuse, Overview of Multiple Access Schemes - Satellite Communication.		

Books and References:

S N	Title	Authors	Publisher	Edition	Year
1	Electronics communication systems	Wayne Tomasi	Pearson education	5th Edition,	2005
2	Electronics communication system	Kennedy and Davis	Tata McGraw Hill	5th Edition,	2012
3	Principles of communication systems	Taub and Schilling	McGraw Hill	3rd Edition	2014
4	Digital Signal Processing	John Proakis and Dimitris Monolakis	Pearson Publication	4th Edition	
5	Signals and Systems	Alan V. Oppenheim, Alan S. Willsky, and S. Hamid Nawab	PHI learning	2nd Edition	2010

Online References:

S. No.	Website Name	URL	Modules Covered
1	www.nptel.ac.in	https://nptel.ac.in/courses/117/105/117105143/	M1,M2,M3,M4,M5,M6
2	www.tutorialspoint.com	https://www.tutorialspoint.com/analog_communication/analog_communication_modulation.htm	M3, M5

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Suggested list of Practical/ Experiments as a mini-project:

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive Levels as per Bloom's Taxonomy
1	**Basic Experiments**	Generation & Demodulation of Normal, Flat Top & Sample & Hold circuit. Implementation & Demodulation of Normal, Flat Top & Sample & Hold circuit.	2	L1, L2, L3
2		Generation & Demodulation of Pulse Width Modulation (PWM). Implementation & demodulation of Pulse Width Modulation (PWM).	2	L1, L2, L3
3	**Design Experiments**	Generation & Demodulation of Pulse Code Modulation (PCM).	2	L1, L2
4		Generation of Signals	2	L1, L2, L3
5		Basic Operations on Signals	2	L1, L2, L3
6		Checking Periodicity	2	L1, L2
7		Evaluating Energy/Power of signal	2	L1, L2, L3
8		Evaluating Even & ODD part of Signal	2	L1, L2
9	**Advanced Experiments**	Sampling Theorem	2	L1, L2
10		To implement various communication applications using Pulse Amplitude Modulation (PAM), Pulse Width Modulation (PWM) and Pulse Position Modulation (PPM) concepts.	2	L1, L2, L3
11-15	**Mini/Minor Projects/ Seminar/ Case Studies**	Case studies on one topic from all 6 modules of syllabus.	10	L1, L2, L3

S.E. Semester –IV

Choice-Based Credit Grading Scheme with Holistic and Multidisciplinary Education
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B.T. (Internet of Things)								SEM: IV		
Course Name: Environmental Studies								Course Code: MC-401		
Contact Hours Per Week: -								Credits: 04		
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)					
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation					
Hours Per Week					Theory(100)			Practical/Oral (25)	Term Work (25)	Total
					IA(40)	ESE(60)				
Theory	Tutorial	Practical	Contact Hours	Credits	ISE	IE	ESE	PR	TW	**2**
1	-	-	-	(Non credit)	-	-	-	-	25	

ISE: In-Semester Examination - Paper Duration –
IE: Innovative Examination
ESE: End Semester Examination - Paper Duration –

The weightage of marks for continuous evaluation of Term work/ Report: Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)

Prerequisite: Biology, Chemistry, Geography, geology, physics

RBT: Revised Bloom's Taxonomy

Course Objective:

The course intends to deliver the fundamental concepts of Environmental Sciences. It will also help in understanding & analyzing the major challenges and current issues in Environment and evaluate possible solutions.

Course Outcome: **Upon completion of the course students will be able to:**

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Relate the concept of Environmental Sciences and provide solutions to the major challenges and current issues in Environment.	L1, L2
2	Relate the fundamentals and importance of Natural Resources and understand the importance of Biodiversity and its Conservation.	L1, L2
3	Interpret and Analyze various types of Environmental Pollution and theireffects on plants and animals	L1, L2, L3, L4
4	Relate and Apply various laws available in the country to protect the Environment.	L1, L2, L3
5	Interpret and Analyze address social issues for sustainable development.	L1, L2, L3, L4
6	Relate and Analyze the importance of Environmental Monitoring.	L1, L2, L3, L4

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment asper Bloom's Taxonomy
1	**Concepts of Environmental Sciences**		
	Environment, Levels of organizations in environment, Structure and functionsin an ecosystem; Biosphere, its Origin and distribution on land in water and inair.	2	L1, L2
2	**Natural Resources, Biodiversity and its conservation**		
	Renewable and Non-renewable Resources, Forests, water, minerals, Food andland (with example of one case study); Energy, Growing energy needs, energysources (conventional and alternative), Biodiversity at global, national and local levels; India as a mega-diversity nation; and strategies for conservation of Biodiversity.	3	L1, L2
3	**Environmental Pollution**		
	Types of pollution- Air, water (including urban, rural, marine), soil, noise, thermal, nuclear; Pollution prevention; Management of pollution- Rural/Urban/Industrial waste management [with case study of any one type, e.g., power (thermal/nuclear), fertilizer, tannin, leather, chemical, sugar], Solid/Liquid waste management, disaster management.	3	L1, L2, L3, L4
4	**Environmental Biotechnology**		
	Biotechnology for environmental protection- Biological indicators, bio-sensors; Remedial measures- Bio-remediation, photo remediation, bio-pesticides, bio-fertilizers; Bio-reactors-Design and application	2	L1, L2, L3
5	**Social Issues and Environment**		
	Problems relating to urban environment- Population pressure, water scarcity, industrialization; remedial measures; Climate change- Reasons, effects (globalwarming, ozone layer depletion, acid rain) with one case study; Legal issues- Environmental legislation (Acts and issues involved), Environmental ethics	3	L1, L2, L3, L4
6	**Environmental Monitoring**		
	Monitoring- Identification of environmental problem, tools for monitoring (remote sensing, GIS); Sampling strategies- Air, water, soil samplingtechniques	2	L1, L2, L3, L4
	Total Hours	**15**	

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Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	Textbook of EnvironmentalStudies for Undergraduate Courses	Erach Bharucha	University's Press	Second Edition	2013
2	Fundamentals of Environmental Studies	Mahua Basu& Xavier Savarimuthu SJ	Cambridge Publication	First Edition	2016
3	Environmental Studies	Benny Joseph	Tata McGraw – Hill Publishing Company Limited	First Edition	2015
4	Environmental Studies	R.J.Ranjit Daniels, Jagadish Krishnaswamy	Wiley India PrivateLtd., New Delhi.	First Edition	2013
5	Introduction to Environmental Engineering and Science	Gilbert M. Masters	Pearson-Education	Third Edition	2008

Online References:

Sr. No.	Website Name	URL	Modules Covered
1.	www.conserve-energy-future.com	https://www.conserve-energy-future.com/what-is- environmental-science-and-its-components.php	M1
2.	www.vikaspedia.in/InDG	http://vikaspedia.in/energy/environment/biodiversity-1/conservation-of-biodiversity	M2
3.	www.encyclopedia.com	https://www.encyclopedia.com/earth-and-environment/ecology-and-environmentalism/environmental-studies/environmental-toxicology	M3
4.	www.environmentalscience.org	https://www.environmentalscience.org/career/environmental- biotechnology	M4
5.	www.forestresearch.gov.uk	https://www.forestresearch.gov.uk/tools-and-resources/urban- regeneration-and-greenspace-partnership/greenspace-in- practice/practical-considerations-and-challenges-to-greenspace/social-and-environmental-justice/	M5
6.	www.unece.org/info/ece-homepage.html	https://www.unece.org/environmental-policy/environmental- monitoring-and-assessment/areas-of-work/environmental-monitoring.html	M6

S.T. Semester IV
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education
(CBCGS HME 2023) Syllabus under Autonomy Scheme (w.e.f. A.Y. 2023-24)

B.TECH. Internet of Things (IOT)						S.T. SEM : IV	
Course Name : Professional Skills-IV (IoT - Network Specialist-1)						**Course Code :** HME-IOTPS401	
Teaching Scheme (Program Specific)					**Examination Scheme (Formative/ Summative)**		
Modes of Teaching / Learning / Weightage					**Modes of Continuous Assessment / Evaluation**		
Hours Per Week					**Presentation**	**Report**	**Total**
Theory	**Tutorial**	**Practical**	**Contact**	**Credits**	AC	AC	**75**
1	-	2	3	2	50	25	
AC: Activity Evaluation							
The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance (20%)							
Prerequisite: IoT boards, Networking, Sensors							

Course Objective:

Evolution of IoT and its impact on businesses and society. Describe the characteristics specific to IoT networks and evaluate key IoT network concepts.

Course Outcomes: Upon completion of the course, students will be able to

Sr. No.	Course Outcomes	PO	PSO	PI	% Weightage
1	To describe the characteristics of various deployment models, network	PO1, PO2,PO5	-	1.3.1, 2.1.2,5.1.1	10%
2	To develop network dashboards to monitor IoT networks	PO1,PO2,PO3,PO5	-	1.3.1,2.1.2,3.1,5.1.1	20%
3	Evaluate the components and connections that form an IoT network.	PO2,PO4,PO5,PO6	-	2.2.1, 4.1.4,5.1.1,6.1.1	15%
4	Describe ways to reduce bandwidth consumption.	PO1,PO2PO4, PO5,	-	1.3.1,2.2.1, 4.1.4,5.1.1	20%
5	Describe the needs of the audience for which documentation is to be created.	PO2,PO4,PO6,PO11	-	2.2.1, 4.1.4,6.1.1, 11.1.1	15%
6	Apply different approaches to maintain gender equality and increase inclusiveness for PwD	PO4, PO5,PO11, PO12	-		20%

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Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive Levels as per Bloom's Taxonomy
1	**IoT Network Design Basic**	2	L1,L2
	Theory: components and connections that form an IoT network infrastructure based on the needs of the IoT solution. characteristics of various deployment models, networks. **Lab Experiment:** To prepare the application connectivity protocols based on the needs of IoT solutions.		
2	**IoT Network Design advance**	2	L1, L2,
	Theory: characteristics of wired/wireless connectivity protocols for device-device or device-gateway communications (this may include protocols such as NFC, NB-IoT, Bluetooth/BLE, ZigBee, Mesh, and Lora). **Lab Experiment:** To automate tasks to remove redundancy across the network.		
3	**IoT Network Design Considerations**	2	L1,L2,L3
	Theory: key network design considerations such as network coverage, capacity, reliability, availability, compatibility, power consumption, connectivity, and scalability. **Lab Experiment:** To measure various network security measures, including those that implement physical security.		
4	**IoT Network Maintenance**	3	L1,L2,L3
	Theory: Elaborate on methods of conducting on-site surveys and analyses of the IoT network. Evaluate network usage patterns and monitor network bandwidth consumption. Describe ways to reduce bandwidth consumption. **Lab Experiment:** Perform configuration, maintenance, and troubleshooting of IoT networks.		
5	**Technical Documentation**	3	L1,L2,L3
	Theory: significance of technical documentation. importance of various stakeholders in collating relevant data for documentation. **Lab Experiment:** Employ methods that ensure documentation is clear and concise.		
6	**Presentation using Beamer**	3	L1,L2,L3,L4
	Theory: different approaches for resourceful energy utilisation and waste management. Discuss the importance of promoting, sharing and implementing gender equality and PwD sensitivity guidelines at organization level. **Lab Experiment:** Demonstrate different methods of energy resource optimization and conservation.		
	Total	15	

Books and References:

SN	Title	Authors	Publisher	Edition	Year
1	Internet of Things (IoT)	Dr Kamlesh Lakhwani	T Balaji Publication	1st	2021
2	IOT (Internet of things) and Its Application	P K PANDEY	T Balaji Publication	Multilingual	2020

Online References:

S. No.	Website Name	URL	Modules Covered
1	https://youtube.com	https://www.youtube.com/watch?v=LlhmzVL5bm8	M1,M2,M3,M4,M5
2	www.Nasscom.com	MC_SSCQ8208_IoT-Network Specialist_V2.pdf (amazonaws.com)	M1,M2,M3,M4,M5

Suggested list of Practical/ Experiments: (not limited to these only)

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive Level s as per Blooms Taxonomy
1	Basic Experiments	To prepare the application connectivity protocols based on the needs of IoT solutions.	2	L1, L2
2		To automate tasks to remove redundancy across the network.	2	L1, L2, L3
3		To measure various network security measures, including those that implement physical security.	2	L1, L2
4		Perform configuration, maintenance, and troubleshooting of IoT networks.	2	L1, L2, L3
5		Demonstrate the application connectivity protocols based on the needs of IoT solutions.	2	L1, L2, L3
6	Advanced Experiments	Demonstrate different methods of energy resource optimization and conservation.	2	L1, L2, L3
7		Employ methods that ensure documentation is clear and concise.	2	L1, L2, L3
8	Group Presentation	Tutorial-1 (Group presentations on topics beyond syllabus)	6	L1, L2, L3
9		Tutorial-2	6	L1, L2, L3
10		Case Study	2	L1, L2, L3

S.T. Semester IV
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education
(CBCGS HME 2023) Syllabus under Autonomy Scheme (w.e.f. A.Y. 2023-24)

B.TECH. Internet of Things (IOT)								S.E. SEM : IV	
Course Name : Industry Practice-II (Employability Skills) (JavaScript/React)								Course Code : HME -IP401	
Teaching Scheme (Program Specific)						Examination Scheme (Academic)			
Modes of Teaching / Learning / Weightage						Modes of Continuous Assessment / Evaluation			
Theory	Tutorial	Practical	Contact Hours	Credits	Presentation		Report	TW	
					AC		AC		25
		2	2	1	15		10	2 5	
The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion ofpractical (40%) and Attendance / Learning Attitude (20%)									
Prerequisite: Computer Basics, Procedural Programming Languages									

Note:- IP Syllabus is Design Looking into the Current Market Scenario & Industry Trends. In Future Contents may be revised based on Industry Requirements.

Course Objective: The course intends to make students learn how to make applications in Procedural & Object-Oriented Programming (OOP) in JavaScript. The course intends to develop expert level skills necessary for becoming technically skilled personnel.

Course Outcomes: Upon completion of the course students will be able to:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy	PO Mapping (Write only Number/s)	PSO Mapping (Write only Number/s)
1	Understand Basic Java Script and Conditional programming	L1, L2	1-6,8-12	
2	Understand concept of Iterative Statements, Functions	L1, L2, L3	1-6,8-12	
3	Implement Basic Programming using JS	L1, L2, L3	1-6,8-12	
4	Comprehend concepts of application JS in browser	L1, L2	1-6,8-12	
5	Comprehend concepts of JS Event Handling/ Exceptions	L1, L2, L3	1-6,8-12	
6	Implement Embedding JavaScript in HTML	L1, L2, L3, L4	1-6,8-12	

Detailed Syllabus:

Module No.	Topics	Hrs.	Self Study	Cognitive levelsof attainment as per Bloom's Taxonomy
1	**JS datatypes, conditional statements** Introduction to Variables: Declaration and Naming Conventions. Data Types: Primitive Types, Objects, Type Coercion, Variable Scope. Working with Numbers and Boolean.	05	2	L1, L2
2	**Iterative Statements, Functions** The "for", "while" and "do-while" Loop and its Syntax, Control Statements (break and continue), Iterating over Arrays and Objects, Nested Loops, Iteration Patterns, Introduction to Functions in JavaScript, Function Parameters and Arguments, Return Values, Scope and Variable Visibility in Functions, Anonymous Functions, Higher-Order Functions and Callbacks, Arrow Functions and their Syntax	05	3	L1, L2, L3
3	**Basic Programming Approaches** Procedural Programming in JavaScript, Object-Oriented Programming (OOP) in JavaScript, Functional Programming in JavaScript, Imperative vs. Declarative Programming, Modular Programming and Modularization Techniques, Event-Driven Programming in JavaScript, Asynchronous Programming with Callbacks, Promises and Asynchronous Programming, Asynchronous Functions and Async/Await, Error Handling and Exception Management	05	2	L1, L2, L3
4	**JS in browser** The Window Object, Working with the Document Object	05	2	L1, L2
5	**Event Handling/ Exceptions** Events in JavaScript, Event Object, Event Propagation and Event Delegation, Exception Handling and Error Types, Throwing and Catching Exceptions, Error Handling Best Practices, Debugging Tools, Asynchronous JavaScript	05	3	L1, L2, L3
6	**Integration with HTML, CSS** Embedding JavaScript in HTML, Linking External JavaScript Files, Selecting HTML Elements, Modifying HTML Elements, Manipulating CSS Styles, Responding to User Interactions, Creating Dynamic HTML Content, DOM Traversal and Manipulation, Adding and Removing HTML Elements, Validating User Input and Animating HTML Elements with JavaScript, AJAX and Fetch API for Asynchronous Data Loading	05	3	L1, L2, L3, L4
	Total Hours	30	15	

Text /Reference Books:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	Eloquent JavaScript	Marijn Haverbeke	No Starch Press	Third	2018

2	JavaScript: The Good Parts"	Douglas Crockford	O'Reilly Media	First	2009
3	"You Don't Know JS" (series)	Kyle Simpson	O'Reilly Media	(multiple books with different years	2014-15
4	"JavaScript: The Definitive Guide"	David Flanagan	O'Reilly Media	Seventh	2020
5	JavaScript and JQuery: Interactive Front-End Web Development"	Jon Duckett	Wiley		2014

Online References:

Sr. No.	Website Name	URL	Modules Covered
1	www.w3schools.com	https://www.w3schools.com/js/DEFAULT.asp	M1-M5
2	www.w3schools.com	https://www.w3schools.com/html/default.asp	M6
3	www.javatpoint.com	https://www.javatpoint.com/javascript-tutorial	M1-M5
4	www.geeksforgeeks.org/	https://www.geeksforgeeks.org/javascript/	M1-M5

S.E. Semester –IV
Choice Based Credit Grading Scheme with Holistic Student Development
(CBCGS-HME 2023-24)
Proposed Syllabus under Autonomy Scheme based on Life skill topic: "Leadership and Excellence".

SE/ST (ALL BRANCHES)					SEM: IV				
Course Name: Activity Based Learning					Course Code: HME -ABL401				
Contact Hours Per Week: 02					Credits: 01				
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)				
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation				
Hours Per Week					Theory(25)	Presentations (25)		Reports (25)	Total
Theory	Tutorial	Practical	Contact Hours	Credits	IA -	ESE -	(AC)	(AC)	
-	-	2	2	1	-	-	25	25	**50**
IA-In Semester Assessment -Paper Duration -1.5 Hours. ESC- End Semester Exam- Duration - 3 Hours. AC: Activity The weightage of marks for continuous evaluation of Term work : Formative (40%), Timely completion of practical (40%), and Attendance / Learning Attitude (20%).									
Prerequisite: Basics of Computer programming ,General knowledge, Social awareness,									

Course Objectives:

- The larger objective of the course is to prepare students for Leadership and Excellence in their life roles by continually engaging students in both individual and team activities that explore important issues or phenomena, use multiple media and technologies, create products that embody the results of the students explorations, and call the students to explain their work and products to adult and student audience.
- Further the course also aims to develop the Society Sensitive Citizens by creating awareness among students and take up the initiatives in the Activity mode..
- The course intends to deliver the understanding of the concepts of critical thinking, encourage the students to look beyond their textual knowledge, establish the relationship between theory and the applications of the learned concepts.
- It also intends to address the society future in the area of work.

Course Outcomes:

SN	Course Outcome	Cognitive level attainment as per revised Bloom Taxonomy
1.	Students will be able to understand The Thematic Apperception Test, or TAT, a type of projective test that involves describing ambiguous scenes to learn more about a person's emotions, motivations, and personality.	L1, L2, L3
2.	Student will be able to learn on multidisciplinary subjects with an essence of team spirit. This will bring out the excellence attribute in students with updated awareness in technical topics listed in **Technology Vision -2035** related to their domains. They will explore of a real issue within a defined context, using a variety of data sources	L1, L2, L3

	and present Case Study . They will be able to analyse a defined problem consisting in a real situation and use a real information as methodological tool.	
3.	Students will be able to outline the procedures for Brainstorming and demonstrate Technical discussion styles.	L1, L2, L3
4.	Student will in the process figure out the various benefits of Survey and also Work as a team and think in higher order which facilitate the creative problem-solving acumen in students to develop realistic solutions to complex problems in Technology vision -2035.	L1, L2, L3
5.	Students will be able to know the strengths of Drama/Skit understanding its effectiveness, generalizability, reliability, and versatility. Students will be able to make the awareness about various social issues.	L1, L2, L3
6.	Students will be able to communicate ideas and render and information to a group. A presentation carries the speaker's personality better and allows immediate interaction between all the participants.	L1, L2, L3

Detailed Syllabus:

Module No.	Topics	Hrs	Cognitive level attainment as per revised Bloom Taxonomy
1	**Personality Development & Team Building (a part of Student Leadership program)** **I**. **Word association (Test Sentence Building)** Students are shown 60 English words one after other and a short sentence using the words shown are to be written. Each word will appear for 15 seconds and sentence is to be written within this period only. At least 45 words are to be attempted to get good marks **II. Thematic Apperception Test (Short Story Writing)** 12 Slides will be projected, and stories are to be written in 03 Minutes. Discussions on Stories written by students **Evaluation by faculty as per format .**Students are introduced to team concepts with four major insights: Setting goals, Role clarification, Problem solving and Interpersonal- relations. Students will be exposed via Team Rapport, to align the team members with the goal, to break the communication barriers. **III**.To understand what team building is, team formation activities will be carried out with domain related topics distribution under Theme Technology Vision -2035. **Evaluation by faculty as per format .**	5	L1, L2, L3
2	**Case Study or Story Writing** **I. Introduction Case study and Story weaving** . Types of case studies . In the process of writing a case study paper, one need to have a least four sections in case study. These are the introduction, background information with reasons as to why the case study was formulated, presentation of findings and a conclusion. Problem identification; Domain linked problems that makes our Nation self reliant and sustainable can be chosen from listed topics and offer a suggestive solutions to it. **II.Presentation:** Showcase the Problems You identified. Tell the Story of your research Experience of topic chosen related to your domain.. **III. Topic: TECHNOLOGY VISION -2035**	5	L1, L2, L3

	Introduction: "Technology Vision 2035," developed by the Technology Information, Forecasting and Assessment Council, claims to identify key challenges and needs of India and describe its technology capability landscape in 2035. It is important to understand the backstage process of participation in the development of this vision document, and bring forth the imagination of the citizen underlining the vision's horizon. In the context of its "diversity" claims, it is essential to ask if one vision is really possible for such a huge and diverse country, or should we be talking, instead, of many visions, and a diversity of visions? **II Domain wise distribution:** The different branches can plan as per their domain knowledge or can be worked in multidisciplinary way in the form of case study . Each Dept will pick domain wise topics listed in Technology vision 2035 booklet. **Evaluation by faculty as per format**		
3	**Brainstorming** **I**. Introduction to Brainstorming, Definition and types of Brainstorming Brainstorming session among students on various topics floated for debate. Topics can be Academic or Parliamentary, Financial, International affairs, technology trends, Technical or philosophical. Expressing views by each student and the team for /against topic for 3 minute. **II.** Paraphrasing/summarizing. Evaluation will be based on Creativity skills supported by listening and participating proactively by presentation of teams. Brain storming among the teams members sequentially, other teams will be audience to discussing team and vice versa. It's a team task . Evaluation by faculty as per format	5	L1, L2, L3
4	**Survey Designing** Introduction and Orientation to research methodology emphasizing on survey designing. Surveys can be administered in many modes, including: online surveys, email surveys, social media surveys, paper surveys, mobile surveys, telephone surveys, and face-to-face interview surveys. Select the topic of survey topic with feasible insight either from choice or in consultation with teacher. Discussion forum or Use of internet is allowed for the same. Its a team task. Structuring and Designing the Questionnaire Create the sample questionnaires(max 10) mapping with goal established Interview the peer team members for data (all students should be asked.) Field survey topics can also be collected. II. Collection of the data and use the tools for analyses of the survey incorporated if any. Finalizing the results Data analyses in the form of written article and graphs projection for the same. Presentation of survey results by teams a)Demonstration by students 4 teams b) Presentation of another 4 teams	5	L1, L2, L3

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	Submission of projects as hard copy		
	Evaluation by faculties		
5	**Drama / Skit (with a connect to society)**	5	**L1,L2,L3**
	I.Introduction: Drama/Learning Program contains three categories of drama objectives: **Self-Management, Collaborative, and Discipline-based Art Objectives**. Self-Management or Intrapersonal Objectives: in order to participate in drama, which feels like and looks like play, participants must also achieve self-discipline. Drama enhances verbal and nonverbal expression of ideas. It improves voice projection, articulation of words, fluency with language, and persuasive speech. Listening and observation skills develop by playing drama games, being an audience, rehearsing, and performing. **Evaluation by faculty as per format** Based on video/types of video captured by students.		
6	**Presentation and Report**	5	L1, L2, L3
	I. Presentation will be a amalgamation of four modules, Case study , Brainstorming understanding , Survey and Drama/skit on the topic to connect to society . II. Report writing in format. **Evaluation by faculty as per format** Based on Presentation and report written by students		
	Total Hours (30 hrs. conduct in class in 15 week semester +Self learning 10 hours)	**40**	

Books and References:

1. ADAIR. J., 1986. *Effective Teambuilding*. Aldershot: GowerCase study research book by Yin (1994).
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3. Territorial Army Officers Exams eBook – [3000+ Questions ...books.google.co.in › books SSB Crack
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