T.T. Semester –V
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS- HME 2020)
Syllabus under Autonomy Scheme

B.TECH. Internet of Things (IOT)							**T.E. SEM: V**		
Course Name: Soft Skills and Interpersonal Communication							**Course Code:** HSMC-ELE501		
Teaching Scheme (Program Specific)					**Examination Scheme (Formative/ Summative)**				
Modes of Teaching / Learning / Weightage					**Modes of Continuous Assessment/ Evaluation**				
Hours Per Week					**Theory (50)**		**Practical /Oral**	**Term Work (25)**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**IA**	**ESE**	**Pr/OR**	**TW**	**100**
3	-	-	3	3	25	75	-	-	
IA: In Semester Examination- Paper Duration –**1.5 Hours** **ESE:** End Semester Examination - Paper Duration - **3 Hours**									
Prerequisite- Basic knowledge of English language, Grammar and Vocabulary									

Course Objectives:

Sr. No.	Course Objectives	Cognitive Levels as per Bloom's Taxonomy
1	To understand basics of soft skills	L2, L3
2	To learn essential life skills	L1, L2, L3
3	To develop intrapersonal skills	L1, L2, L3
4	To develop interpersonal Skills	L2, L3
5	To learn career and employment skills.	L1, L2, L3
6	To develop corporate ethics and etiquette.	L1, L2, L3

Course Outcomes: Students will be able to

Sr. No.	Course Outcomes	Cognitive Levels as per Bloom's Taxonomy
1	Understand basics of soft skills	L2, L3
2	Learn essential life skills	L1, L2, L3
3	Understand and develop self	L1, L2, L3
4	Understand others with empathy	L2, L3
5	Use employment skills for placement and higher studies	L1, L2, L3
6	Incorporate ethics and etiquette in day to day life	L1, L2, L3

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive Levels as per Bloom's Taxonomy
1.0	**Introduction to Soft Skills**	4	L2, L3
	1.1 Meaning and Concept 1.2 Importance of soft Skills 1.3 Soft Skills for Lifelong learning- Building a better world		
2.0	**Essential Soft Skills**	6	L1, L2, L3
	2.1 Personal integrity 2.2 Taking responsibility 2.3 Professionalism 2.4 Communication 2.5 Critical Thinking 2.6 Creativity and Innovation		
3.0	**Self-Development**	5	L1, L2, L3
	3.1 Self-assessment, Awareness, Perception and Attitudes, Values and belief, Personal goal setting, career planning, Self-esteem. 3.2 Personal memory 3.3 Rapid reading & Taking notes 3.4 Complex problem solving 3.5 Creativity		
4.0	**Introduction to Interpersonal Skills**	6	L2, L3
	4.1 Team work: Mentorship, Motivation 4.2 Problem Solving 4.3 Decision Making 4.4 Time Management 4.5 Emotional Intelligence 4.6 Negotiation Skills 4.7 Stress Management		
5.0	**Employability Skills**	5	L1, L2, L3
	5.1 Cover letter 5.2 Resume 5.3 Group Discussion 5.4 Presentation skills 5.5 Interview skills		
6.0	**Introduction to Corporate Ethics and Etiquette**	4	L1, L2, L3
	6.1 Business etiquette (meeting etiquette, Dining etiquette, Interview etiquette, Professional and work etiquette and Social Skills) 6.2 Greetings and art of conversation 6.3 Dressing and grooming 6.4 Ethical codes of conduct in business Intonation Pattern for effective presentation		
Number of Lectures		**30**	

T.T. Semester –V
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS- HME 2020)
Syllabus under Autonomy Scheme

B.TECH. Internet of Things (IOT)							**T.T. SEM:** V		
Course Name: Sensor Technology							**Course Code:** PCC-IOT502		
Teaching Scheme (Program Specific)					**Examination Scheme (Formative/ Summative)**				
Modes of Teaching / Learning / Weightage					**Modes of Continuous Assessment / Evaluation**				
Hours Per Week					**Theory (100)**		**Oral (25)**	**Term Work (25)**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**IA**	**ESE**	**OR**	**TW**	**150**
03	-	02	05	4	40	60	25	25	
The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance (20%)									
Prerequisite: PCC-IOT402: IoT and Cloud Computing									

Course Objectives: Introduce the sensor used in the industries and their characteristics, properties, interfaces connection. Students learn how to analyze, design, build and troubleshoot a variety of sensor circuit

Course Outcomes:
Students will be able to:

SN	Course Outcomes	Cognitive Levels as per Blooms Taxonomy
1	Apply concepts of Measurements and instrumentation to design sensors.	L1,L2
2	Apply Analog and Digital signal Conditioning concepts while designing sensors.	L1,L2,L3
3	Apply concept of thermal sensors for designing real time Application.	L1,L2,L3
4	Apply concept of mechanical sensors for designing real time Application.	L1,L2,L3
5	Apply concept of optical sensors for designing real time Application.	L1,L2,L3
6	Apply concept of different wireless technologies and their application.	L1,L2,L3

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive Level as per Blooms Taxonomy
1	**Review of Measurements and instrumentation** Review of Static characteristics of Instrument systems, dynamic characteristics of Instrument systems Review of Op-Amp Circuit, passive-, and active-filters	5	L1,L2,L3
2	**Analog and Digital Signal Conditioning** Principles of analog signal conditioning, Signal-Level and Bias Changes, Linearization, Conversions, Filtering and Impedance Matching, Loading, Digital-to-Analog Converters (DACs), Analog-to-Digital Converters (ADCs), Data-Acquisition Systems with Hardware and Software of DAS, Digitized Value, Sampled Data Systems, Linearization	9	L1,L2,L3
3	**Thermal Sensors** Definition of Temperature (Thermal Energy, absolute and relative Temperature), Metal resistance versus temperature devices, Resistance versus Temperature Approximations, Resistance-Temperature Detectors (RTD), Thermistors, THERMOCOUPLES, Other thermal sensor (Bimetal Strips, Gas Thermometers, Vapor Pressure, Thermometers, Liquid-Expansion Thermometers), Solid-Stat Temperature Sensors Design considerations.	8	L1,L2,L3
4	**Mechanical Sensors** Displacement, Location, or Position Sensors (Resistive-, Capacitive, and Inductive Sensors), Variable-Reluctance Sensors, LVDT, Level Sensors, Metal Strain Gauges, Semiconductor Strain Gauges (SGs), Load Cells, Motion sensors, Pressure sensors, Flow sensor, Solid-Flow – and Liquid Flow Measurement, Pipe Flow Principles, Restriction Flow Sensors, Obstruction Flow Sensor Magnetic Flow Meter	8	L1,L2,L3
5	**Optical Sensors** Fundamentals of EM radiation, Nature of EM Radiation, Characteristics of Light, Photometry Photodetectors, Characteristics, Photoconductive Detectors, Photovoltaic Detectors, Photodiode Detectors, Photo emissive, Detectors PYROMETRY (Thermal Radiation, Broadband Pyrometers, Narrowband Pyrometers).	9	L1,L2,L3
6	**Different types of wireless technologies** Wireless technologies Wi-fi, Bluetooth, Zigbee, LoraWan, RFID, Applications.	8	L1,L2,L3

Books and References:

SN	Title	Authors	Publisher	Edition	Year
1	"Process Control Instrumentation Technology	Curtis D. Johnson	Prentice Hall International Edition	-	
2	Measurement, Instrumentation, and Sensors Handbook	John G. Webster	CRC – Press – Taylor and Francis Group		
3	"Introduction to Instrumentation and Measurement	Robert B. Northrop	CRC – Press – Taylor and Francis Group		

Online References:

S. No.	Website Name	URL	Modules Covered
1	https://www.sensors.co.uk/	https://www.sensors.co.uk/	M1 to M6
2	www.udemy.com	https://www.udemy.com/course/sensors-sensor-fundamentals/	M1,M2,M3,M4
3	Swayam.com	https://onlinecourses.nptel.ac.in/noc19_ee41/preview	M1 to M5

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

Work to be done	Hrs.
Experiment using analog signal conditioner	2
Experiment using digital signal conditioner	2
Experiment using thermal sensors	4
Experiment using mechanical sensors	4
Experiment using optical sensors	4
Mini Project	10
Testing of project and Preparation of Report	4
Total Hours	**30**

NOTE: Students have to submit one project based on the syllabus at the semester end.

T.T. Semester –V
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS- HME 2020)
Syllabus under Autonomy Scheme

B. TECH Internet of Things (IOT)								**S.T. SEM: V**		
Course Name: Internet of Things and Networking Protocols								**Course Code:** PCC-IOT503		
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**	**Contact Hours**	**Credits**	**ISE**	**IE**	**ESE**	**PR/ OR**	**TW**	
3	-	2	5	4	20	20	60	25	25	**150**
ISE: In-Semester Examination - Paper Duration – 1 Hours **IE: Innovative Examination** **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/Learning Attitude (20%)										
Prerequisite: Computer Basics, Procedural Programming Languages										

Course Objective: The course intends to deliver the fundamentals of data structures by providing a platform to learn, compare and apply them in real world scenario.

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**
1	Comprehend the essentials of IoT and its applications	L1, L2
2	Understand the concepts of IoT Architecture Reference model and IoT reference architecture	L1, L2, L3
3	Analyze and understand the various IoT Data Link and Network layer Protocols.	L1, L2, L3
4	Analyze and understand the various IoT Transport and Session layer Protocols.	L1, L2, L3
5	Analyze and understand the various IoT Service layer Protocols and also understand the Security and Authentication Protocol	L1, L2, L3
6	Analyze and understand the various IoT Application layer Protocols.	L1, L2, L3, L4

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Overview**	6	L1, L2
	IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations. M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service (XaaS), M2M and IoT Analytics, Knowledge Management		
2	**Reference Architecture**	8	L1, L2, L3
	IoT Architecture-State of the Art – Introduction, State of the art, Reference Model and architecture, IoT reference Model - IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. Real-World Design Constraints- Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control.		
3	**Iot Data Link Layer & Network Layer Protocols**	8	L1, L2, L3
	PHY/MAC Layer (3GPP MTC, IEEE 802.11, IEEE 802.15), Wireless HART, Z Wave, Bluetooth Low Energy, Zigbee Smart Energy, DASH7 - Network Layer-IPv4, IPv6, 6LoWPAN, 6TiSCH, ND, DHCP, ICMP, RPL, CORPL, CARP UNIT IV – TRANSPORT & SESSION LAYER PROTOCOLS 12 hours Transport Layer (TCP, MPTCP, UDP, DCCP, SCTP)- (TLS, DTLS) – Session Layer HTTP, CoAP, XMPP, AMQP, MQTT		
4	**Transport & Session Layer Protocols**	9	L1, L2, L3
	Transport Layer (TCP, MPTCP, UDP, DCCP, SCTP)- (TLS, DTLS) – Session Layer HTTP, CoAP, XMPP, AMQP, MQTT		
5	**Service Layer Protocols & Security**	7	L1, L2, L3
	Service Layer -oneM2M, ETSI M2M, OMA, BBF – Security in IoT Protocols – MAC 802.15.4 , 6LoWPAN, RPL		
6	**Application Layer Protocol**	7	L1, L2, L3, L4
	Application Layer: UPnP, CoAP, MQTT, XMPP. SCADA, WebSocket; IP-based protocols: 6LoWPAN, RPL.		
	Total Hours	**45**	

Books and References:

SN	Title	Authors	Publisher	Edition	Year
1	Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence	Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle	Academic Press	1Edition	2009
2	Learning Internet of Things	Peter Waber	PACKT publishing, BIRMINGHAM – MUMBAI	2nd Edition	
3	Architecting the Internet of Things	Bernd Scholz-Reiter, Florian Michahelles		2nd Edition	

Online References:

S. No.	Website Name	URL	Modules Covered
1	You tube	https://youtu.be/jqbBWJ622Jo	M1-M6
2	coursera	https://www.coursera.org/lecture/iot-devices-il/lecture-7-iot-protocols-WmhKs	M1-M3, M6
3	Edx.org	https://www.edx.org/course/iot-networks-and-protocols	M1-M4, M6

List of Practical/ Experiments:

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive Levels as per Blooms Taxonomy
1	Basic Experiments	Familiarization with the concept of IOT, Arduino/Raspberry Pi and perform necessary software installation.	2	L1,L2,L3
2		Gas Detecting Sensor Using NODEMCU	2	L1,L2,L3
3		Greeting Message through Webpage with ESP as Server.	2	L1,L2,L3
4		Servo Motor Control with web page	2	L1,L2,L3
5		Temperature and Humidity Monitoring in Cloud Platform.	2	L1,L2,L3
6		Servo motor with ESP32	2	L1,L2,L3
7		Temperature and Humidity Monitoring using raspberry Pi.	2	L1,L2,L3
8	Design Experments	Interface sensors to Arduino board and Raspberry Pi	2	L1,L2,L3
9		Interface Actuators to Arduino board and Raspberry Pi	2	L1,L2,L3
10	Advanced Experiments	Home Automation System using Arduino.	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	GroupWise Group Presentation / Case studies	4	L1,L2,L3

NOTE: Student have to submit one project based on the syllabus at the semester end.

T.T. Semester –V
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS- HME 2020)
Syllabus under Autonomy Scheme

B. TECH Internet of Things (IOT)								**S.T. SEM:V**		
Course Name: Microcontroller & Embedded System								**Course Code:** ESC-IOT501		
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**	**Contact Hours**	**Credits**	**ISE**	**IE**	**ESE**	**PR/OR**	**TW**	
3	-	2	5	4	20	20	60	25	25	**150**

ISE: In-Semester Examination - Paper Duration – 1 Hours

IE: Innovative Examination

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/Learning Attitude (20%)

Prerequisite: PCC-EIOT301: Analog and Digital Circuits, PCC-EIOT403: Microprocessors and Computer Organization

Course Objective: The course intends to deliver the fundamentals of data structures by providing a platform to learn, compare and apply them in real world scenario.

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**
1	Understand and explain 8-bit microcontroller architecture.	L1,L2
2	Understand and develop programs for 8051 microcontroller and perform input and output, interrupt, Timer, Serial communication operations in a microcontroller system.	L1,L2,L3
3	Explain and perform input and output, interrupt, timer, serial communication operations in a microcontroller system	L1,L2,L3
4	Design and implement 8051 based systems	L1,L2,L3,L4
5	Explain and analyse different real time systems, Scheduling algorithms	L1,L2,L3,L4
6	Explain and analyse different communication standards for ES	L1,L2,L3

Detailed Syllabus:

Module No.	Topics	Hrs	Cognitive Levels as per Blooms Taxonomy
1	**8051 Microcontroller Architecture** Introduction to microcontroller, 8051 architectural features, Memory Organization	4	L1,L2
2	**8051 Microcontroller Assembly Language Programming** Addressing Modes of 8051, Instruction set of 8051, Assembler Directives, Data movement / copy operations, Block transfer of data, data swap / exchange , Arithmetic, logical, and stack operation, loops, condition evaluation, decision making based on flags, Call, return, jumps, Programming Examples of 8051	6	L1,L2,L3
3	**8051 Internal Hardware and Programming** I/O port structure and programming, Interrupts and its programming, Timer / Counter and programming, Serial port communication and programming	10	L1,L2,L3
4	**8051 Interfacing & Applications** Display interfacing: 7-segment LED display, 16x2 generic alphanumeric LCD display. Keyboard interfacing: 4x4 matrix keyboard Analog devices interfacing: 8-bit ADC/DAC, Relay, Temperature sensor (LM35). Motor interfacing: DC motor, PWM, stepper motor and servo motor.	12	L1,L2,L3,L4
5	**Introduction to Embedded Systems** Characteristics and Design metrics of Embedded system, Challenges in Embedded system Design, Power, Speed and Code density, Power supply considerations in Embedded systems. Hard and Soft Real-time Systems, Preemptive and non preemptive scheduling algorithms, RM and EDF algorithm, Priority inversion and its solutions	7	L1,2,L3,L4
6	**Embedded communication** On board peripherals- SBC, Multiplexers, Power devices, Displays and glue logic for I/Os Intraboard communication - SPI, I2C Intersystem communication (wired) : LIN, CAN, RS232, RS485 Intersystem communication (wireless) : Bluetooth, Wi-Fi, ZigBee, GSM	6	L1,L2,L3

Books and References:

S. No.	Title	Authors	Publisher	Edition	Year
1	The 8051 Microcontroller Microprocessor: hardware, Software and Interfacing	Kenneth J. Ayala	Cengage Learning India Pt. Ltd	3rdEdition	--
2	The 8051 Microcontroller and Embedded Systems Using Assembly and C	M. A. Masindi, J. C. Masindi, Rollin D. McKinley	Pearson Education	2nd Edition	2012
3	Embedded Real Time System	Rd. K.V. K. K. Prasad	Dreamtech	2nd Edition	2014
4	Embedded Systems: Architecture, Programming and Design	Rajkamal	McGraw Hill Education	3rd edition	2015
5	Embedded Real Time Systems Programming	Sriram Iyer, Pankaj Gupta	Tata McGraw Hill	3rdEdition	2003
6	ARM system developers guide	Andrew N Sloss, Dominic Symens and Chris Wright	Elsevier, Morgan Kaufman publishers	2nd Edition	2008
7	Embedded System Design: A Unified Hardware/Software Introduction	F. Valid and T. Garages,	Wiley India Pt. Ltd.	2nd Edition	2002
8	Introduction to Embedded Systems	Shabo K V	Tata McGraw Hill Education, Private Limited	2nd Edition	2016

Online References:

S. No.	Website Name	URL	Modules Covered
1	https://mswista.files.wordpress.com (Raj Kamal)	https://mswista.files.wordpress.com/2015/04/unit-4-program-modeling.pdf https://www.youtube.com/watch?v=2dJBrBb6rTc https://www.youtube.com/watch?v=KkxcehpkQ2M https://www.youtube.com/watch?v=hZFwL7n6wus	M4
2	www.udemy.com	https://www.udemy.com/course/introduction-to-embedded-systems/	M4 - M6
3	www.udemy.com	https://www.udemy.com/the-8051-microcontroller https://www.coursera.org/learn/interface-with-arduino	M1,M2,M3
4	www.coursera.org	https://www.udacity.com/course/introduction-to-operating-systems--ud923 https://www.coursera.org/courses?query=operating%20system	M3-M6
5	www.coursera.org	https://www.coursera.org/learn/modeling-debugging-embedded-systems	M3-M6

Suggested list of Practical/ Experiments:

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive Levels as per Blooms Taxonomy
1	**Basic Experiments**	Comparing different embedded systems based on specifications and analysing how they balance challenges in Embedded system Design: Power, Speed and Code density.	2	L1,L2,L3,L4
2		Write and Execute an Assembly language program for 8051 to transfer a block of data I) From external memory to internal memory ii) Within the internal memory	2	L1,L2,L3
3		Write and Execute an Assembly language program for 8051to transmit data "HAPPY" serially at the baud rate of 9600.	2	L1,L2,L3,L4
4	**Design Experiments**	Design and implementation of LED interfacing with 8051. Write and Execute an assembly language program to generate a square wave of particular frequency using built in timers	2	L1,L2,L3,L4
5		Design and implementation of 7-seg interfacing with 8051. . Write and Execute an assembly language program to display up counter on 7-seg display.	2	L1,L2,L3,L4
6		Design and implementation of DC Motor interfacing with 8051. Write and Execute an Assembly language program to run DC motor in clockwise as well in anticlockwise direction.	2	L1,L2,L3,L4
7		Interfacing sensors using MSP430 / STM/ ARM boards (example - Temperature measurement and display)	2	L1,L2,L3,L4
8		Interfacing actuators using MSP430 / STM/ ARM boards (example - speed control using PWM signal)	2	L1,L2,L3,L4
9		Design and implementation of FSM –vending machine or elevator or traffic controller.	2	L1,L2,L3,L4
10		To write a program to perform given scheduling. Find and display the average waiting and TAT time.	2	L1,L2,L3,L4
11 - 13	**Mini/Minor Projects/ Seminar/ Case Studies**	Suggested but not limited to these only- 1. Smart water management system 2. Smart street light , Smart parking 3. Remote tracking of vehicles 4. Fingerprint based attendance systems for institutes 5. Automatic water dispenser system 6. Automatic passport verification system for air ports	6	L1,L2,L3,L4,L5
14 - 15	**Group Presentation / Case studies**	Suggested but not limited to these only- 1. Case study on soft real time systems 2. Case study on hard real time systems 3. Group presentations on latest developments in the field of embedded systems 4. IOT to improve healthcare	4	L1,L2,L3, L4

T.T. Semester –V

Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020) Syllabus under Autonomy Scheme

B.TECH. Internet of Things (IOT)							**T.T. SEM:** V		
Course Name: Design and Analysis of Algorithm							**Course Code:** PEC-IOT5011		
Teaching Scheme (Program Specific)					**Examination Scheme (Formative/ Summative)**				
Modes of Teaching / Learning / Weightage					**Modes of Continuous Assessment / Evaluation**				
Hours Per Week					**Theory (100)**		**Oral (25)**	**Term Work (25)**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**IA**	**ESE**	**OR**	**TW**	150
3	0	2	5	4	40	60	25	25	
The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance (20%)									
Prerequisite: Programming (C or C++), Data and file structure									

Course Objectives: Obtaining efficient algorithms is very important in modern computer engineering as the world wants applications to be time and space and energy efficient. This course enables to understand and analyze efficient algorithms for various applications.

Course Outcomes: Students will be able to

SN	Course Outcomes	Cognitive levels as par bloom's Taxonomy
1	Analyze the asymptotic performance of algorithms.	L1, L2, L3
2	Derive and solve recurrences describing the performance of divide-and-conquer algorithms.	L1, L2, L3
3	Find optimal solution by applying various methods.	L1, L2, L3
4	Apply pattern matching algorithms to find particular pattern	L1, L2, L3
5	Differentiate polynomial and no polynomial problems.	L1, L2, L3
6	Explain the major graph algorithms and their analyses. Employ graphs to model engineering problems, when appropriate	L1, L2, L3

Detailed Syllabus:

Module No.	Topics	Hrs.	RBT Levels
1	**Basic of algorithms and its analysis** What is an algorithm? Mathematics for Algorithmic Sets, Functions and Relations, Vectors and Matrices, Linear Inequalities and Linear Equations The efficient algorithm, Average, Best and worst-case analysis, Amortized analysis, Asymptotic Notations, Analysing control statement, Loop invariant and the correctness of the algorithm, Sorting Algorithms and analysis: Bubble sort, Selection sort, Insertion sort,	8	L1,L2,L3
2	**Divide and Conquer Algorithm** Introduction, Recurrence and different methods to solve recurrence, multiplying large Integers Problem, Problem Solving using divide and conquer algorithm - Binary Search, Max-Min problem, Sorting (Merge Sort, Quick Sort), Matrix Multiplication, Exponential.	6	L1,L2,L3
3	**Dynamic Programming** Introduction, The Principle of Optimality, Problem Solving using Dynamic Programming – Calculating the Binomial Coefficient, Making Change Problem, Assembly Line-Scheduling, Knapsack problem, All Points Shortest path, Matrix chain multiplication, Longest Common Subsequence	8	L1,L2,L3
4	**Greedy Algorithm** General Characteristics of greedy algorithms, Problem solving using Greedy Algorithm - Activity selection problem, Elements of Greedy Strategy, Minimum Spanning trees (Kruskal's algorithm, Prim's algorithm), Graphs: Shortest paths, The Knapsack Problem, Job Scheduling Problem, Huffman code	8	L1,L2,L3
5	**Exploring Graphs and np completeness** An introduction using graphs and games, Undirected Graph, Directed Graph, Traversing Graphs, Depth First Search, Breath First Search, Topological sort, Connected components The class P and NP, Polynomial reduction, NP- Completeness Problem, NP-Hard Problems.	8	L1,L2,L3
6	**Backtracking and String Matching** Introduction, The Eight queens problem, Knapsack problem, Travelling Salesman problem introduction, The naive string-matching algorithm, The Rabin-Karp algorithm, String Matching with finite automata	8	L1,L2,L3

Books and References:

SN	Title	Authors	Publisher	Edition	Year
1	Introduction to Algorithms	thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein	PHI	2nd Edition	-
2	Fundamental of Algorithms	Gills Brassard, Paul Bratley	PHI	1st edition	-
3	Design and Analysis of Algorithms	Dave and Dave	Pearson	2nd Edition	2018

Online References:

S. No.	Website Name	URL	Modules Covered
1	https://nptel.ac.in	https://nptel.ac.in/courses/106102064	M1,M2,M3
2	www.udemy.com	https://www.udemy.com/course/algorithm/	M1,M2,M3
3	https://nptel.ac.in	https://onlinecourses.nptel.ac.in/noc22_cs01/	M4,M5,M6
4	www.coursera.org	https://www.coursera.org/learn/comparch/	M4,M5,M6

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

Work to be done	Hrs.
Write a program for insertion sort.	2
Write a program for selection sort.	2
Write a program for bubble sort.	2
Write a program for binary search.	2
Write a program for quick sort.	2
Write a program for merge sort.	2
Write a program for minimum spanning trees using Kruskal's algorithm.	2
Write a program for minimum spanning trees using Prim's algorithm.	2
Write a program for traveling salesman problem.	4
Mini Projects	10
Total Hours	**30**

T.T. Semester –V

Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020) Syllabus under Autonomy Scheme

B.TECH. Internet of Things (IOT)								**T.E. SEM :V**	
Course Name : Fuzzy logic and Genetic Algorithm								Course Code : PEC-IOT5012	
Teaching Scheme (Program Specific)					**Examination scheme**				
Modes of Teaching / Learning / Weightage					**Modes of Continuous Assessment / Evaluation**				
Hours Per Week- Theory (100)							**Presentation**	**Report**	**Term Work**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**IA**	**ESE**	**PR & OR**	**TW**	**125**
3	0	2	5	4	40	60	25	25	
AC : Activity **The weightage of marks for continuous evaluation of Term work/Report:** Formative (40%), Timely completion of practical (40%) and Attendance / Learning Attitude (20%)									
Prerequisite: Data Structures, Mathematics									

Course Objective: To introduce the soft computing concepts and techniques and to foster their abilities in designing appropriate technique for a given scenario. To implement fuzzy logic-based solutions for real world problems. T give students knowledge about non-traditional techniques like fuzzy logic.

Course Outcomes:

Students will be able to

SN	Course Objectives	Cognitive Levels as per Bloom's Taxonomy
1	Understand the fuzzy logic with sets.	L1, L2, L3
2	Appreciate the underlying mathematical relationships within and across fuzzy algorithms.	L1, L2, L3
3	Apply fuzzy logic in various real-world problems.	L1, L2, L3
4	Apply fuzzy reasoning to handle uncertainty and solve various engineering problems.	L1, L2, L3
5	Understanding the fuzzy relation and proposition.	L1, L2, L3
6	Evaluate the fuzzy propositions, Dumpster link etc.	L1, L2, L3

Detailed Syllabus

Module No.	Topics	Hrs.	Cognitive levels as par bloom's Taxonomy
1	Introduction to Fuzzy sets , Crisp vs Fuzzy Types of Fuzzy sets, Membership functions , Alpha cuts Cond alpha cuts, Operation on fuzzy sets, t-norm, complements t-conform, combination of operations continued	6	L1, L2, L3
2	Introduction to Fuzzy arithmetic Interval arithmetic, +,-,,* using alpha cuts MIN and MAX fuzzy numbers	8	L1, L2, L3
3	Fuzzy arithmetic using Alpha cuts continued Decomposition principle, Extension principle Fuzzy arithmetic using Extension Principle Fuzzy Equations	8	L1, L2, L3
4	Relations, Introduction to fuzzy relations Projections, Equivalence relation, transitive closure, compatibility relation, Introduction to propositional Logic, Boolean Algebra Multi valued logic	8	L1, L2, L3
5	Fuzzy Logic, Linguistic hedges, Fuzzy propositions (conditional and unconditional), Inference from conditional and qualified fuzzy propositions	8	L1, L2, L3
6	Fuzzy Quantifiers, Inference from quantified fuzzy propositions, Introduction to possibility theory Possibility vs probability Belief and Plausibility, Dumpsters rule	8	L1, L2, L3

Books and References:

SN	Title	Authors	Publisher	Edition	Year
1	Soft Computing: Fundamentals and Applications	D.K.Pratihar	Nervosa Publishing House	2nd Edition	2014
2	Fuzzy Sets and Fuzzy Logic: Theory and Applications	George J. Klir, Bo Yuan	Prentice Hall	-	1995

Online References:

S. No.	Website Name	URL	Modules Covered
1	https://nptel.ac.in	https://archive.nptel.ac.in/courses/108/104/108104157/	M1,M2,M3
2	www.udemy.com	https://www.udemy.com/course/fuzzy-logic/	M1,M2,M3
3	https://nptel.ac.in	https://archive.nptel.ac.in/courses/127/105/127105006/	M4,M5,M6
4	www.coursera.org	https://www.coursera.org/learn/comparch/	M4,M5,M6

Suggested list of Practical/ Experiments:

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive Level s as per Blooms Taxonomy
1	**Basic Experiments**	Write a program to solve logical AND function using perceptron network	**2**	**L1, L2, L3**
2		Write a program for BPN network for XOR function using bipolar inputs and binary targets.	**2**	**L1, L2, L3**
3		Write a program to train NAND gate using neuro fuzzy hybrid technique	**2**	**L1, L2, L3**
4		Write a program to match 2 strings using fuzzy logic	**2**	**L1, L2, L3**
5		Implement the fuzzy rules in any suitable language	**2**	**L1, L2, L3**
6	**Advanced Experiments**	Write a program to implement the properties of fuzzy sets.	**2**	**L1, L2, L3**
7		Create the neuro fuzzy network.	**2**	**L1, L2, L3**
8		Parameter tuning in fuzzy network	**2**	**L1, L2, L3**
9		Study on Tsukamoto Fuzzy Models	**2**	**L1, L2, L3**
10		**Case study**	**2**	**L1, L2, L3**

T.T. Semester –V

Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020) Syllabus under Autonomy Scheme

B.TECH. Internet of Things (IOT)							**T.T. SEM:** V		
Course Name: Distributed Operating System							**Course Code:** PEC-IOT5013		
Teaching Scheme (Program Specific)					**Examination Scheme (Formative/ Summative)**				
Modes of Teaching / Learning / Weightage					**Modes of Continuous Assessment / Evaluation**				
Hours Per Week					**Theory (100)**		**Oral (25)**	**Term Work (25)**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**IA**	**ESE**	**OR**	**TW**	**150**
3	0	2	5	4	40	60	25	25	
The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance (20%)									
Prerequisite : Data Structures, Mathematics									

Course Objectives: The work of Operating System is different in the distributed environment. Student should understand Message passing, RPC, Synchronization, Load Balancing. Migration of processes, Deadlock management etc in distributed environment

Course Outcomes:

SN	Course Outcomes	RBT Level
1	Understand Distributed Computing techniques, Synchronous and Processes	L1, L2, L3
2	Apply Shared Data access and Files concepts.	L1, L2, L3
3	Design a distributed system that fulfils requirements with regards to key distributed systems properties.	L1, L2, L3
4	Understand Distributed File Systems and Distributed Shared Memory.	L1, L2, L3
5	the importance of security in distributed systems	L1, L2, L3

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels as par bloom's Taxonomy
1	**Introduction to distributed Systems:** Definition and goals, Hardware and Software concepts, Design issues Computer Network and Layered protocols, Message passing and related issues, synchronization, Client Server model & its implementation, remote procedure call and implementation issues	6	L1, L2, L3
2	**Synchronization in distributed systems:** Clock synchronization and related algorithms, mutual exclusion, Deadlock in distributed systems, Threads, system model, processor allocation, scheduling in distributed systems: Load balancing and sharing approach, fault tolerance, Real time distributed systems, Process migration and related issues	8	L1, L2, L3
3	**Distributed File Systems:** Introduction, features & goal of distributed file system, file models, file accessing models, file sharing semantics, file caching scheme, file replication, fault tolerance, trends in distributed file system, case study	8	L1, L2, L3
4	**Distributed Shared Memory:** Introduction, general architecture of DSM systems, design and implementation issues of DSM, granularity, structure of shared memory space, consistency models, replacement strategy, thrashing	8	L1, L2, L3
5	**Naming** Overview, Features, Basic concepts, System oriented names, Object locating mechanisms, Issues in designing human oriented names, Name caches, Naming and security, DNS	8	L1, L2, L3
6	**Security** Introduction of Security in Distributed OS, Overview of security techniques, features, Need, Access Control, Security Management	8	L1, L2, L3

Books and References:

SN	Title	Authors	Publisher	Edition	Year
1	Distributed Operating Systems Concepts and Design	Pradeep K. Sinha	PHI	1st Edition	1998
2	Distributed Systems: Principles and Paradigms PHI	Andrew S Tanebaum, Maarten Van Steen	PHI	2nd Edition	2019
3	Distributed Systems: Concepts and Design	George Coulouris, Jean Dollimore,Tim Kindberg,	Pearson	5th Edition	2011
4	Distributed Computing, Fundamentals, Simulations and Advanced topics	Hagit Attica and Jennifer Welch	, Wiley India	2nd Edition	2000

Online References:

S. No.	Website Name	URL	Modules Covered
1	https://nptel.ac.in	https://nptel.ac.in/courses/106105077	M1,M2
2	www.edureka.co	https://www.edureka.co/masters-program/machine-learning-engineer-training	M1,M2,M3
3	https://nptel.ac.in	https://nptel.ac.in/courses/106106139	M3, M4,M5,M6
4	www.coursera.org	https://www.coursera.org/learn/artificial-intelligence-an-overview	M1,M2

Suggested list of Practical/ Experiments:

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive Level s as per Blooms Taxonomy
1	Basic Experiments	Write a Program to implement Concurrent Echo Client Server Application.	2	L1, L2, L3
2		Write the Programs for Remote Procedure call.	2	L1, L2, L3
3		Write the Programs for Remote Method Invocation.	2	L1, L2, L3
4		Write the Programs for Thread Programming in JAVA.	2	L1, L2, L3
5		Implement CORBA file	2	L1, L2, L3
6	Advanced Experiments	Write a Program to Increment a Counter in Shared Memory.	2	L1, L2, L3
7		Implement Network File System (NFS).	2	L1, L2, L3
8		Creation of a BPEL (Business Process Execution Language) Module and a Composite Application.	2	L1, L2, L3
9		Study of Web Service Programming.	2	L1, L2, L3
10		Study of Grid Services using various Tools	2	L1, L2, L3

T.T. Semester –V

Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020) Syllabus under Autonomy Scheme

B.TECH. Internet of Things (IOT)							T.E. SEM :V		
Course Name : Artificial intelligence							Course Code : PEC-IOT5014		
Teaching Scheme (Program Specific)					Examination scheme				
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation				
Hours Per Week- Theory (100)							Presentation	Report	Term Work
Theory	Tutorial	Practical	Contact Hours	Credits	IA	ESE	PR & OR	TW	125
3	0	2	5	4	40	60	25	25	
AC : Activity **The weightage of marks for continuous evaluation of Term work/Report:** Formative (40%), Timely completion of practical (40%) and Attendance / Learning Attitude (20%)									
Prerequisite: Data Structures, Mathematics									

Course Objective: With the usage of Internet and World Wide Web increasing day by day, the field of AI and its techniques are being used in many areas which directly affect human life. Various techniques for encoding knowledge in computer systems such as Predicate Logic, Production rules, Semantic networks find application in real world problems. The fields of AI such as Game Playing, Natural Language Processing, and Connectionist Models are also important. Student should know some programming language for AI.

Course Outcomes:

Sr. No.	Course Outcomes	Cognitive levels as par bloom's Taxonomy
1	Understand the search technique procedures applied to real world problems	L1, L2, L3
2	Understand and use various types of logic and knowledge representation schemes.	L1, L2, L3
3	the underlying mathematical relationships within and across Machine Learning algorithms	L1, L2, L3
4	Appreciate the underlying mathematical relationships within and across Machine Learning algorithms	L1, L2, L3
5	Evaluate the various Supervised and Unsupervised Learning algorithms using appropriate Dataset.	L1, L2, L3
6	Design and evaluate Deep learning Algorithms	L1,L2, L3

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels as par bloom's Taxonomy
1	**What is AI?** Introduction: Overview and Historical Perspective, Turing Test, Physical Symbol Systems and the scope of Symbolic AI, Agents. State Space Search: Depth First Search, Breadth First Search, DFID	6	L1, L2, L3
2	**Heuristic Search** Best First Search, Hill Climbing, Beam Search Traveling Salesman Problem, Tabu Search, Simulated Annealing	8	L1, L2, L3
3	**Population Based Search** Genetic Algorithms, Ant Colony Optimization, Branch & Bound, Algorithm A, Admissibility of A	8	L1, L2, L3
4	**Population Based Search** Monotone Condition, IDA, RBFS, Pruning OPEN and CLOSED in A, Problem Decomposition, Algorithm AO, Game Playing	8	L1, L2, L3
5	**Game Playing** Algorithms Minimax, AlphaBeta, SSS, Rule Based Expert Systems, Inference Engine, Rete Algorithm	8	L1, L2, L3
6	**Planning** Forward/Backward Search, Goal Stack Planning, Sussman's Anomaly, Plan Space Planning, Algorithm Graphplan	8	L1, L2, L3

Books and References:

SN	Title	Authors	Publisher	Edition	Year
1	Artificial Intelligence	Elaine Rich And Kevin Knight	Tata McGraw-Hill	2nd Edition	1990
2	Machine Learning	Samika Dutta, Subramanian Chandramouli, Amit Kumar Das	Pearson.	1st Edition	2019
3	"Artificial Intelligence: A Modern Approach" -, PHI	By Stuart Russel, Peter Nerving	PHI	3rd Edition	2018

Online References:

S. No.	Website Name	URL	Modules Covered
1	https://nptel.ac.in	https://nptel.ac.in/courses/106105077	M1,M2
2	www.edureka.co	https://www.edureka.co/masters-program/machine-learning-engineer-training	M1,M2,M3
3	https://nptel.ac.in	https://nptel.ac.in/courses/106106139	M3, M4,M5,M6
4	www.coursera.org	https://www.coursera.org/learn/artificial-intelligence-an-overview	M1,M2

Suggested list of Practical/ Experiments

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive Level s as per Blooms Taxonomy
1	Basic Experiments	Write a program to implement Tic-Tac-Toe game problem.	2	L1, L2, L3
2		Write a program to implement BFS (for 8 puzzle problem or Water Jug problem or any AI search problem).	2	L1, L2, L3
3		Write a program to implement DFS (for 8 puzzle problem or Water Jug problem or any AI search problem)	2	L1, L2, L3
4		Write a program to implement Single Player Game (Using any Heuristic Function)	2	L1, L2, L3
5		Write a program to Implement A* Algorithm.	2	L1, L2, L3
6	Advanced Experiments	Using PCA reduces the dimensions of linearly inseparable data.	2	L1, L2, L3
7		Write a program for reducing the dimensionality of sparse feature matrices.	2	L1, L2, L3
8		Perform Linear Regression.	2	L1, L2, L3
9		Perform Logistic Regression.	2	L1, L2, L3
10		Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.	2	L1, L2, L3

T.T. Semester –V

Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020) Syllabus under Autonomy Scheme

B.TECH. Internet of Things (IOT)					**T.E. SEM: V**		
Course Name : Professional Elective I (Mobile Computing)					**Course Code:** PEC-IOT5015		
Teaching Scheme (Program Specific)				**Examination scheme**			
Modes of Teaching / Learning / Weightage				**Modes of Continuous Assessment / Evaluation**			
Conducted in the Beginning of semester in first 03weeks					**Presentation**	**Report**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**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/Learning Attitude (20%)							
Prerequisite: PEC-IOT5015: Computer Network							

Course Objective: To understand the basic concepts of mobile computing and be familiar with the network protocol stack and also learn the basics of mobile telecommunication system.

Course Outcomes: Students will be able to:

SN	Course Outcomes	Cognitive Levels as per Blooms Taxonomy
1	Describe the basics of mobile computing and its applications	L1,L2
2	Demonstrate the different wireless technologies such as GSM, GPRS, UMTs etc.	L1, L2, L3
3	Provide the overview of network and transport layer.	L1, L2,L3
4	Demonstrate the different routing protocols.	L1,L2,L3
5	Explain the design considerations for deploying the wireless network infrastructure.	L1, L2,L3
6	Describe the various mobile platforms and its applications.	L1,L2,L3, L4

Detailed Syllabus:

Module No.	Topics		Cognitive Levels as per Blooms Taxonomy
1	**Introduction**	**6**	L1,L2
	Mobile Computing – Mobile Computing Vs Wireless Networking – Mobile Computing Applications – Characteristics of Mobile computing – Structure of Mobile Computing Application. MAC Protocols – Wireless MAC Issues – Fixed Assignment Schemes – Random Assignment Schemes – Reservation Based Schemes.		
2	**GSM**	**6**	L1, L2,L3
	GSM- Services, system architecture, radio interface, logical channels, protocols, localization and calling, handover, security, HSCSD, GPRS-architecture, Interfaces, Channels, mobility management DECT, TETRA, UMTS.		
3	**Mobile Internet Protocol And Transport Layer**	**8**	L1,L2,L3
	Overview of Mobile IP – Features of Mobile IP – Key Mechanism in Mobile IP – route Optimization. Overview of TCP/IP – Architecture of TCP/IP- Adaptation of TCP Window – Improvement in TCP Performance.		
4	**Mobile Routing Protocol**	**8**	L1,L2,L3
	Routing Protocols: DHCP – Ado– Proactive protocol-DSDV, Reactive Routing Protocols – DSR, AODV, Hybrid routing –ZRP, Multicast Routing-ODMRP, Vehicular Ad Hoc networks (VANET) –MANET Vs VANET – Security.		
5	**Wireless Lan**	**9**	L1,L2,L3
	IEEE 802.11: LAN-architecture, 802.11 a, b and g, protocol architecture, physical layer, MAC layer , MAC management, HIPERLAN-protocol architecture, physical layer, access control sub layer, MAC sub layer. Bluetooth-user scenarios- physical layer, MAC layer.		
6	**Mobile Platforms And Applications**	**8**	L1,L2,L3,L4
	Device Operating Systems – Special Constrains & Requirements – Commercial Mobile Operating Systems – Software Development Kit: iOS, Android, BlackBerry, Windows Phone – Commerce – Structure – Pros & Cons – Mobile Payment System – Security Issues.		
	Total	45	

Books and References:

S. No.	Title	Authors	Publisher	Edition	Year
1	Mobile Communication	J. Schiller	Pearson Education	Second Edition	2007
2	Fundamental of Mobile Computing	Prashant Kumar Patnaik, Rajiv Mall	PHI Learning Pvt. Ltd		2012
3	Mobile Cellular Telecommunications-Analog and Digital Systems	William.C.Y.Lee	Tata Mc Grew Hill	Second Edition	2006
4	Introduction to Wireless and Mobile systems	Dharma Prakash Agarwal, Qing and An Zeng	Thomson Asia Put Ltd,		2005
5	Ado Mobile Wireless Networks	C.K.Toh	Pearson Education	First Edition	2002
6	Mobile Communication	J. Schiller	Pearson Education	Second Edition	2007

Online References:

S. No.	Website Name	URL	Modules Covered
1	www.javatpoint.com	https://www.javatpoint.com/mobile-computing	M1,M2,M3,M4, M5,M6
2	www.courseera.org	https://www.coursera.org/courses?query=mobile%20cloud%20computing	M1,M2,M3,M4, M5
3	Siit.co	https://siit.co/courses/mobile-computing-course-and-certification/718	M1,M2,M3,M4, M5
4	www.tutorialspoint.com	https://www.tutorialspoint.com/mobile_computing/index.htm	M1,M2,M3,M4, M5,M6
5	https://youtube.com	https://www.youtube.com/watch?v=GT-tYP8RGIs	M1,M2,M3,M4, M5,M6

Suggested List of Practical/ Experiments:

Work to be done	**Hrs.**
To implement mobile network using open source software's like NS2 etc.	2
Implement Code Division Multiple Access (CDMA).	2
Study of OPNET tool for modeling and simulation of different cellular standards.	2
Study and Analysis of wireless network.	2
Study of Mobile IP.	2
Write programs using WML	10
Mini Project	10
Total Hours	**30**

T.T. Semester –V

Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020) Syllabus under Autonomy Scheme

B.TECH. Internet of Things (IOT)							**T.T. SEM:** V		
Course Name: Indian Constitution							**Course Code:** MC-IOT501		
Teaching Scheme (Program Specific)					**Examination Scheme (Formative/ Summative)**				
Modes of Teaching / Learning / Weightage					**Modes of Continuous Assessment / Evaluation**				
Hours Per Week					**Theory (100)**		**Oral (25)**	**Term Work (25)**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**IA**	**ESE**	**OR**	**TW**	**25**
1	-	-	1	-	-	-	-	25	
The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance (20%)									
Prerequisite: N.A.									

Course Objectives:

To impart knowledge of human values, Fundamental rights & duties, social problems and their suitable solutions, philosophy and g=features of Indian Constitution and working of Indian Political System.

Course Outcomes:

SN	Course Outcomes	RBT Level
1	Enhance human values , create awareness about law enactment and importance of Constitution	L1,L2,L3
2	To Understand the Fundamental Rights and Fundamental Duties of the Indian Citizen to instill morality, social values, honesty, dignity of life and their social Responsibilities.	L1,L2,L3
3	Create Awareness of their Surroundings, Society, Social problems and their suitable solutions while keeping rights and duties of the citizen keeping in mind	L1,L2,L3
4	Understand distribution of powers and functions of Local Self Government.	L1,L2,L3
5	Understand the National Emergency, Financial Emergency and their impact on Economy of the country.	L1,L2,L3

Detailed Syllabus:

Module No.	Topics	Hrs.	RBT Levels
1	Historical Background, Salient Features of the Constitution of India, Territory of the Union, Citizenship	02	L1,L2,L3
2	Fundamental Rights, Fundamental Duties, Directive Principles of State Policy, Procedure for Amendment	04	L1,L2,L3
3	The Union Executive, The Union Legislature, The State Executive, The State Legislature, Parliamentary Form of Government in India, Judiciary	04	L1,L2,L3
4	The Federal System, Distribution of Legislative and Executive Powers, Distribution of Financial Powers, Emergency Provisions: National Emergency, President Rule, Financial Emergency	03	L1,L2,L3
5	Local Government, Services, Public Service Commissions, Elections, Election Commission,	01	L1,L2,L3
6	Provisions for protection of minorities, Provisions for upliftment of the Scheduled Castes and Tribes	01	L1,L2,L3

Books and References:

SN	Title	Authors	Publisher	Edition	Year
1	Constitutional Law of India	Dr. J.N. Pandey	Central Law Agency	11th	2016
2	Introduction to the Constitution of India	Druga Das Base	LexisNexis	24th	2018
3	Indian Constitutional Law	M.P. Jain	LexisNexis	8th	2018
4	V.N.Shukla's Constitution of India	Mahindra Pal Singh	Eastern Book Company	13th	2017

Online References:

S. No.	Website Name	URL	Modules Covered
1	https://www.india.gov.in	https://www.india.gov.in/sites/upload_files/npi/files/coi_part_full.pdf	M1,M2,M3,M4, M5,M6
2	https://www.constitutionofindia.net	https://www.constitutionofindia.net/constitution_of_india	M1,M2,M3,M4, M5,M6
3	http://legislative.gov.in	http://legislative.gov.in/sites/default/files/coi-4March2016.pdf	M1,M2,M3,M4, M5,M6

T.T. Semester –V
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020) Syllabus under Autonomy Scheme

B.TECH. Internet of Things (IOT)							T.E. SEM :V		
Course Name : Employability Skills Development (Web Development Skills)							Course Code : ESD-IOT501		
Teaching Scheme (Program Specific)					Examination scheme				
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation				
Hours Per Week- Theory (100)							Presentation	Report	Term Work
Theory	Tutorial	Practical	Contact Hours	Credits	IA	ESE	PR & OR	TW	50
-	-	-	30	1	-	-	25	25	
AC : Activity **The weightage of marks for continuous evaluation of Term work/Report:** Formative (40%), Timely completion of practical (40%) and Attendance / Learning Attitude (20%)									
Prerequisite: Computer Basics, Procedural Programming Languages									

Course Objective: The course intends to make students learn how to design and develop web applications. The course intends to develop professional skills necessary for becoming technically skilled personnel.

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

SN	Course Objectives	Cognitive Levels as per Bloom's Taxonomy
1	Understand the core concepts and features of HTML5.	L1, L2
2	Design static web pages using HTML5 and CSS3.	L1, L2, L3
3	Apply the concept of client side validation and develop dynamic web pages using JavaScript and JQuery.	L1, L2, L3
4	Understand and implement JavaScript fundamentals for client's site	L1, L2, L3
5	Apply JavaScript object notations, AJEX for Rich Internet Application	L1, L2, L3, L4
6	Create website by understanding the methods for hosting a website	L1, L2,L3, L6

Detailed Syllabus:

Module No.	Topics	Key Differentiator	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
	Prerequisites			
	Data model, Database management system, Data structure concepts			
1	**Introduction to HTML**			
	Introduction to HTML and HTML5, Formatting and Fonts, Commenting Code, Anchors, Backgrounds Images, Hyperlinks, Lists – Tables.	Frames – HTML Forms and controls, Advanced HTML controls	4	L1, L2, L3,L4
2	**Cascading Style Sheet (CSS3)-I**			
	The need for CSS, Introduction to CSS 3 – Basic syntax and structure of CSS.	CSS Properties-Inline Styles. Embedding Style Sheets	5	L1, L2, L3,L4
3	**Cascading Style Sheet 3(CSS3)-II**			
	Linking External Style Sheets – Backgrounds –Box Model (Introduction, Border Properties, Padding Properties, Margin Properties), Manipulating text – Margins and Padding	Positioning using CSS., Creating page Layout and Site Designs	5	L1, L2,L3,L4
4	**Introduction to Programming Using JavaScript**			
	Introduction – Core features – Data types and Variables – Operators, Logic Statements, Loops, Expressions, and Statements	Closures to Extend Variable Scope , Object literals to pass optional arguments	6	L1, L2,L3,L4
5	**Interactive JavaScript Content DOM**			
	Functions – Objects – Array, Date and Math related Objects, Object constructor and Prototyping – Sub classes and Super classes,– JSON – jQuery and AJAX., Rich Internet	Contextual targeting of DOM elements , Application with AJAX, JQuery Framework	5	L1, L2, L3, L4,L5,L6
6	**Hosting Website**			
	WordPress overview-Introduction to web Hosting-How to find and purchase a Domain Name, How to purchase a Hosting Package-How to Associate your Domain Name with your Hosting Package- How to Upload your Website to your Domain.	File and Resource management in Web Hosting , Set up a WordPress Blog	5	L1, L2, L3, L4,L5,L6
	Total Hours		**30**	

Books and References:

SN	Title	Authors	Publisher	Edition	Year
1	Internet & World Wide Web	Paul Diestel, HarveyDeitel& Abbey Diestel	PEARSON Education.	1st	2013
2	Web Technologies, Black Book	Cogent Learning Solutions Inc.	Dreamtech Press	1st	2012
3	HTML 5, CSS 3 & Bootstrap 4 All-in-One: a complete introduction to front end web development	Mike Ludo	Code Blaze Books	1st	2014
4	Learning PHP, MySQL, JavaScript, CSS & HTML5	Robin Nixon	O'REILLY	1st	2012

Online References:

S. No.	Website Name	URL	Modules Covered
1	NPTEL	www.nptelvideos.in	M1,M2,M3
2	W3SCHOOLS	www.w3schools.com	M1-M5
3	SPOKEN-TUTORIAL	http://spoken-tutorial.org	M1-M6
4	UDEMY	https://www.udemy.com/course/bootstrap-website-design/	M5
5	UDEMY	https://www.udemy.com/course/web-hosting-101/	M6
6	CODECADEMY	https://www.codecademy.com/learn/paths/learn-how-to-build-websites	All

T.T. Semester –V

Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020) Syllabus under Autonomy Scheme

B.TECH. Internet of Things (IOT)					**T.E. SEM: V**		
Course Name : Professional Skill V (Web Development)					**Course Code:** HME-IOTPS501		
Teaching Scheme (Program Specific)				**Examination scheme**			
Modes of Teaching / Learning / Weightage				**Modes of Continuous Assessment / Evaluation**			
Conducted in the Beginning of semester in first 03weeks					**Presentation**	**Report**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**AC**	**AC**	**75**
15	-	30	45	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/Learning Attitude (20%)							
Prerequisite: Computer Basics, Computer Programming-Java							

Course Objective: By the end of the course students will be able to design and implement static and dynamic websites.

Course Outcomes: Students will be able to:

SN	Course Outcomes	Cognitive Levels as per Blooms Taxonomy
1	Understand different components in web technology and to know about web servers.	L1,L2
2	Develop an interactive Web pages using HTML/XHTML	L1,L2, L3, L4
3	Present a professional document using Cascaded Style Sheets	L1,L2, L3, L4
4	Construct websites for user interactions using JavaScript and JQuery	L1,L2,L3,L4, L5
5	Know the different information interchange formats like XML and JSON	L1,L2, L3, L4
6	Develop Web applications using PHP	L1,L2,L3,L4

Detailed Syllabus:

Module No.	Topics		Cognitive Levels as per Blooms Taxonomy
1	**Introduction to the Internet** The World Wide Web, Web Browsers, Uniform Resource Locators, WWW Architecture – SMTP – POP3 – File Transfer Protocol The Hypertext Transfer Protocol, HTTP request – response — Generation of dynamic web pages- W3C Validator, How web works - Setting up the environment (LAMP/XAMP/WAMP server)	2	L1,L2
2	**HTML/XHTML** Basics of HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, Images, forms, XHTML, Meta tags, Character entities, frames and frame sets, Browser architecture and Web site structure. Overview and features of HTML5, Syntactic Differences between HTML and XHTML	2	L1,L2,L3,L4
3	**Introduction to Cascading Style Sheets** Cascading Style Sheets: Levels of Style Sheets - Style Specification Formats, Selector Forms, Property-Value Forms, Font Properties, List Properties, Alignment of Text, Color, The Box Model, Background Images, The span and div Tags	2	L1,L2, L3, L4
4	**Introduction to JavaScript** Introduction: client-side scripting-First program: Displaying a Line of Text-JavaScript. Alert-Dynamic Page-Web Application-Variables in JavaScript-Data Types in JavaScript-Operators and Expressions-Simple If Statement- If Else Statement- Nested If Else Statement-Switch Case-For Loop-While Loop-Functions-Events-Arrays- Objects –Math and Date in JavaScript-Redirect to Another HTML Page	4	L1,L2,L3,L4,L5
5	**Introduction to Data Interchange Formats** XML: The Syntax of XML, XML Document Structure, Namespaces, XML Schemas, Displaying Raw XML Documents, Displaying XML Documents with CSS, XSLT Style Sheets, XML Applications. JSON(Basics Only): Overview, Syntax, Datatypes, Objects, Schema, Comparison with XML	3	L1,L2,L3,L4
6	**Introduction to PHP** Introduction to simple PHP, program converting between data types - arithmetic operators, Manipulating arrays & String processing Basic commands with PHP examples	2	L1,L2,L3,L4

Books and References:

S. No.	Title	Authors	Publisher	Edition	Year
1	Internet &World Wide Web How to Program	P. J. Diestel, H.M. Diestel	Pearson education	4th Edition	2010
2	Programming the World Wide Web	Robert W Segesta	Pearson education	7th edition	2014
3	HTML 5	DT Editorial services	Dreamtech Press	2nd edition	2016
4	Web Technologies Black Book	Cogent Learning Solutions	Dreamtech Press	2nd edition	2016

Online References:

S. No.	Website Name	URL	Modules Covered
1	W3schools	https://www.w3schools.com	M1-M6
2	Tutorialspoint	https://www.tutorialspoint.com	M1-M6
3	Java point	https://www.javatpoint.com	M1-M6

Suggested list of Practical/ Experiments:

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive Levels as per Blooms Taxonomy
1	**Basic Experiments**	Write an HTML code to display your education details in a tabular format. [M2 & M3]	2	L1,L2,L3
2		Write an HTML code to display your CV on a web page [M2 & M3]	2	L1,L2,L3
3		Write an HTML code to create a Home page having three links: About Us, Our Services and Contact Us. Create separate web pages for the three links [M2 & M3]	2	L1,L2,L3
4	**Design Experiments**	Write an HTML code to create your Institute website, Department Website and Tutorial website for specific subject. [M2 & M3]	2	L1,L2,L3,L4
5		Write an HTML code to demonstrate the usage of inline & internal CSS. [M3]	2	L1,L2,L3,L4
6		Write an HTML code to demonstrate the usage of external CSS. [M3]	2	L1,L2,L3,L4

7		Write a Java script to prompt for users name and display it on the screen. [M4]	2	L1,L2,L3,L4
8	**Advanced Experiments**	Design HTML form for keeping student record and validate it using Java script [M4]	2	L1,L2,L3,L4, L5
9		Write an XML program to display products [M5]	2	L1,L2,L3,L4, L5
10		Write a program using PHP and HTML to create a form and display the details entered by the user [M6]	2	L1,L2,L3,L4, L5

T.T. Semester –V

Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020) Syllabus under Autonomy Scheme

<table>
<tr><td colspan="6">B.TECH. Internet of Things (IOT)</td><td colspan="3">T.T. SEM: V</td></tr>
<tr><td colspan="6">Course Name: Project Based Learning-III</td><td colspan="3">Course Code: HME -IOTPBL501</td></tr>
<tr><td colspan="6">Teaching Scheme (Holistic Student Development-HSD)
Industry Specific/Interdisciplinary</td><td colspan="3">Examination Scheme (Formative/ Summative)</td></tr>
<tr><td colspan="6">Modes of Teaching / Learning / Weightage</td><td colspan="3">Assessment / Evaluation Scheme</td></tr>
<tr><td colspan="5" rowspan="2">Hours Per Week Teaching scheme (Holistic Student Development - HSD) (Conduct in the Beginning of the semester During First 03 weeks)</td><td>Presentation</td><td>Report</td><td>Total</td></tr>
<tr><td>Theory</td><td>Tutorial</td><td>Practical</td><td>Contact Hours</td><td>Credits</td><td>(AC)</td><td>(AC)</td><td rowspan="2">25</td></tr>
<tr><td>-</td><td>-</td><td>30</td><td>30</td><td>1</td><td>25</td><td>-</td></tr>
<tr><td colspan="9">AC: Activity Evaluation
The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of tutorial (40%) and Attendance (20%)</td></tr>
<tr><td colspan="9">Prerequisite: Project Based Learning-III (Web Development)</td></tr>
</table>

Course Objective:

The course intends to aid students to understand the high-level, general-purpose dynamic programming language. It includes work on real time projects to get hands-on experience.

Course Outcomes:

SN	Course Outcomes	Cognitive levels as par bloom's Taxonomy
1	Interpret the basic real time problems.	L1, L2
2	Apply knowledge and necessary programming skills to solve problems.	L1, L2, L3
3	Inspect the results obtained for documentation and presentation	L1, L2, L3, L4
4	Self-develop any project based on DevOps	L1, L2, L3, L4

List of Projects:

Sir No	Title of Project	Type of Project
1	Smart city	Research
2	Smart parking	Research
3	Smart health	Research
4	Smart drones	Research
5	Smart institutes	Research
6	Smart teaching	Research
7	Smart vehicles	Research
8	Smart agriculture	Research

T.T. Semester –V

Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020) Syllabus under Autonomy Scheme

TE (ALL BRANCHES)					SEM: V		
Course Name: Research Based Learning 1					Course Code: HME -IOTRBL501		
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)		
Modes of Teaching / Learning / Weightage					Assessment/Evaluation Scheme		
Hours Per Week					Presentation	Report	Term Work
Theory	Tutorial	Practical	Contact Hours	Credits	AC	AC	TW
-	-	2	2	1	25	25	50
The course will be conducted for direct contact mode and practical (30 + 30) hours.							
Prerequisite: Subject knowledge, Domain knowledge							

Course Objectives: This course is focused to engage the learner in research using critical thinking, problem solving, coding and technical writing related to upcoming latest technologies.

Course Outcomes: Upon completion of the course:

S.N.	Course Outcome	Cognitive level attainment as per revised Bloom Taxonomy
1	Student will be aware of latest technologies in their discipline in a competitive environment.	L1, L2
2	Student will be able to create new idea for problem solving related to industry or societal issues.	L1, L2, L3, L4
3	Students will be aware of different research methodologies.	L1, L2, L3, L4, L5, L6
4	Students will be able to write a technical paper.	L1, L2, L3, L4, L5

Detailed Syllabus:

Module No.	Topics	Hours(contact& Practical)	Cognitive level attainment as per revised Bloom Taxonomy
1	**Technical Quiz and Technical Debate**	15	L1, L2, L3

	I. Quiz competition on technical topics from different domains with 50 MCQ (Questions will vary according to department). II. Formation of eight teams for four topics. Two teams (For and against) Need to be completed in two sessions		
2	**Idea generation with design thinking aspects and related literature survey** I. Introduction to design thinking and its stages (workshop/seminar) II. Formation of groups, Generation of an idea and conducting literature survey.	15	L1, L2, L3,L4
3	**Proof of concept and validation of idea through survey Seminar on Research methodology** I. Seminar on different research methods and procedures for designing and conducting scientific research. II. Validate the idea by conducting the survey (through Google docs, interviews or any other suitable method).	15	L1, L2, L3,L4
4	**Paper writing skills (Seminar/workshop) Documentation of Selected Idea and its validation** I. Seminar or workshop on paper writing skills. II. Write a research paper on idea generated.	15	L1, L2, L3,L4,L5

References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1.	Writing Research Papers: A Complete Guide	James D. Lester	Longman	10th	2001
2.	Creativity in Product Innovation	Jacob Goldenberg	Cambridge University Press	Kindle	2002

Online References:

Sr. No.	Website Name	URL	Modules Covered
1.	https://www.geeksforgeeks.org	https://www.geeksforgeeks.org/tag/c-quiz-references/	M1
2.	Interaction Design Foundation: Design Thinking	https://www.interaction-design.org/literature/topics/design-thinking	M2
3.	Scribbr: How to write a research methodology.	https://www.scribbr.com/dissertation/methodology/	M3
4.	https://www.statpac.com	https://www.statpac.com/online-software-manual/Basic-Research-Concepts.htm	M4
5.	https://www.slideshare.net	https://www.slideshare.net/AsirJohnSamuel/1introduction-to-research-methodology?next_slideshow=1	M4