S.E. Semester –IV
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)
TCET Autonomy scheme with effect from 2021-22

B.E (Information Technology)								S.E.(SEM : IV)		
Course Name : Applied Mathematics IV								Course Code : BSC-IT 401		
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	-	TW	125
3	1	-	4	4	20	20	60	-	25	

ISE: In-Semester Examination - Paper Duration – 1 Hour
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 Tutorial (40%) and Attendance/Learning Attitude (20%)

Prerequisite: Basic Mathematics.

Course Objective: The course intends to deliver the fundamentals of basic probability and discrete probability distribution and apply the concept of continuous probability distribution, logic, sampling, Correlation, Regression and algebraic structure to different applications.

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

S.No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Apply the basic probability and random variable concepts in various problem solving.	L1, L2
2	Apply discrete and continuous probability distribution and densities concepts in technical problem.	L1, L2, L3
3	Apply concepts of sampling to draw statistical inference.	L1, L2, L3
4	Apply Correlation and Regression in data analysis.	L1, L2, L3
5	Apply logic concepts in various applications.	L1, L2, L3
6	Apply algebraic structure concepts to different applications.	L1, L2, L3

Detailed Syllabus of 45 hours:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Basic Probability** Probability spaces, conditional probability, independence, Bayes theorem, Discrete random variables, Independent random variables, Expectation of Discrete Random Variables, Moments, Variance of a sum, Continuous random variables and their properties, distribution functions (Note: Content in purple color is moved from 2nd module to 1st module)	8	L1, L2
2	**Probability Distributions & Densities** Binomial, Poisson and Normal distribution, Densities, Normal, Exponential and Gamma densities. (Note: Content in purple color is moved from 1st module to 2nd module and added topic is highlighted in red color)	7	L1, L2, L3
3	**Large and Small sample** Test of significance: Large sample test for single mean, difference of means, Small sample Test for single mean, difference of means. (Note: Shifted from module number 4 to module number 3)	7	L1, L2, L3
4	**Applied Statistics** Chi-square test for goodness of fit and independence of attributes, Correlation coefficients (Karl Pearson and Rank), Regression. (Note: Shifted from module number 5 to module number 4)	7	L1, L2, L3
5	**Logic** Propositions and logical operations, Truth tables equivalence, Implications laws of logic, Normal forms, Predicates and Quantifiers, Mathematical Induction. (Note: Propositional Logic content is replaced by Logic content and shifted from module number 3 to module number 5)	8	L1, L2, L3
6	**Algebraic Structures** Algebraic structures with one binary operation – semigroup, monoid and group. Cosets, Lagrange's theorem, normal subgroup, homomorphic subgroup. Error correcting code. Algebraic structures with two binary operations- ring, integral domain, and field.	8	L1, L2, L3
Total Hrs.		45	

Online References:

S.No.	Website Name	URL	Modules Covered
1	www.nptel.ac.in	https://nptel.ac.in/courses/111106086/Lecture2.pdf	M1.M2.M3
2	www.cousera.org	https://www.coursera.org/	M4,M5,M6
3	www.wikipedia.org	https://www.wikipedia.org/	M1.M2.M3, M4,M5,M6

List of Tutorials:

Sr. No	Topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	Tutorial on Conditional Probability and Bayes theorem	1	L1, L2
2	Tutorial on discrete random variables	1	L1, L2, L3
3	Tutorial on continuous random variables	1	L1, L2, L3
4	Tutorial on Binomial and Poisson distribution	1	L1, L2
5	Tutorial on Normal distribution	1	L1, L2, L3
6	Tutorial on Normal, Exponential and Gamma densities.	1	L1, L2
7	Tutorial on large sample test	1	L1, L2, L3
8	Tutorial on small sample test	1	L1, L2
9	Tutorial on Chi-Square test	1	L1, L2, L3
10	Tutorial on correlation and regression	1	L1, L2, L3
11	Tutorial on Propositions and logical operations	1	L1, L2
12	Tutorial on Normal forms, Predicates and Quantifiers	1	L1, L2, L3
13	Tutorial on algebraic structures with one binary operation	1	L1, L2
14	Tutorial on Lagrange's theorem	1	L1, L2, L3
15	Tutorial on algebraic structures with two binary operations	1	L1, L2, L3
	Total Hours	**15**	

Books and References:

S.No.	Title	Authors	Publisher	Edition	Year
1	Introduction to Probability Theory	P. G. Hoel, S. C. Port and C. J. Stone	Universal Book Stall	-	2003
2	Advanced Engineering Mathematics	Erwin kreyszig	John Wiley & Sons	9th Edition	2006
3	A First Course in Probability	S. Ross	Pearson Education India	6th Edition	2002
4	An Introduction to Probability Theory and its Applications Vol. 1	W. Feller	Wiley	3rd Edition	1968
5	Higher Engineering Mathematics	B.S. Grewal	Khanna Publishers	36th Edition	2010
6	A text book of Engineering Mathematics	N.P. Bali and Manish Goyal	Laxmi Publications	-	2008
7	Elements of Discrete Mathematics	C. L. Liu	Tata McGraw-Hill	2nd Edition	2000
8	Engineering Mathematics for first year	Veerarajan T	Tata McGraw-Hill, New Delhi	3rd Edition	2008
9	Discrete Mathematics with Applications to Computer Science	J. P. Tremblay and R. P. Manohar	Tata McGraw-Hill	-	1997

S.E. Semester IV

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

TCET Autonomy scheme with effect from 2021-22

<table>
<tr><td colspan="5">Second Year Engineering (Information Technology)</td><td colspan="5">SEM: IV</td></tr>
<tr><td colspan="5">Course Name : Principles of Communication</td><td colspan="5">Course Code: ESC-IT 401</td></tr>
<tr><td colspan="5">Teaching Scheme (Program Specific)</td><td colspan="5">Examination Scheme (Formative/ Summative)</td></tr>
<tr><td colspan="5">Modes of Teaching / Learning / Weightage</td><td colspan="5">Modes of Continuous Assessment / Evaluation</td></tr>
<tr><td colspan="5">Hours Per Week</td><td colspan="3">Theory (100)</td><td>Practical/Oral (25)</td><td>Term Work (25)</td><td>Total</td></tr>
<tr><td>Theory</td><td>Tutorial</td><td>Practical</td><td>Contact Hours</td><td>Credits</td><td>ISE</td><td>IE</td><td>ESE</td><td>OR</td><td>TW</td><td rowspan="2">150</td></tr>
<tr><td>3</td><td>-</td><td>2</td><td>5</td><td>4</td><td>20</td><td>20</td><td>60</td><td>25</td><td>25</td></tr>
<tr><td colspan="10">ISE: In-Semester Examination - Paper Duration 1 Hour
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%)</td></tr>
<tr><td colspan="10">Prerequisite : Basics of Electrical Engineering

RBT: Revised Blooms Taxonomy</td></tr>
</table>

Course Objective: This course intends to study the basic principles and techniques used in analog and digital communications. Understand the concept of noise for designing and analyzing communication system. It acquire the knowledge of amplitude modulation technique, AM and study the block diagrams of transmitter and receiver. Study the Sampling theorem, Pulse Analog, Digital Modulation and Band pass modulation techniques and learn the concepts of information theory and coding.

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

SN	Course Objectives	Cognitive levels of attainment as per Bloom's Taxonomy
1	Differentiate analog and digital communication systems	L1,L2
2	Identify different types of noise and significance of noise in cascaded systems	L1,L2
3	Design of different AM transmitters and receivers.	L3,L4
4	Design various FM transmitters and receivers.	L3,L4
5	State sampling theorem and describe the concept of PAM, PWM, PPM, PCM, DM, ASK, FSK, PSK and representation of data in various line codes.	L1,L2,L3
6	Explain entropy, source coding and channel capacity.	L1,L2,L3

Detailed Syllabus (Total No. of Hours: 45):

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Introduction** Introduction of analog communication systems (Block diagram), Different types of Sources , Types of signals, Frequency / Spectrum allocations, Need for modulation. Multiplexing Techniques-TDM,FDM	07	L1,L2
2	**Noise** Correlated and uncorrelated sources of noise in communication system, Noise parameters –Signal to noise ratio, Noise factor, Noise figure, Friis formula (Derivation and problems) and Equivalent noise Temperature.	06	L1, L2
3	**Amplitude Modulation and Demodulation** Amplitude modulation techniques and its types- DSBFC AM, DSBSC-AM, SSB SC AM- spectrum, waveforms, bandwidth, Power calculations. AM Receivers – Block diagram of TRF receivers and Super heterodyne receiver. Receiver characteristics - Sensitivity, Selectivity, Fidelity, Image frequency and its rejection and double spotting.	10	L1, L2, L3,L4
4	**Frequency Modulation and Demodulation** Principle of FM- waveforms, Spectrum, bandwidth. Pre- emphasis and de-emphasis in FM, FM noise triangle, Comparison of AM and FM systems, FM generation: Direct method –Varactor diode Modulator, Indirect method (Armstrong method) block diagram and waveforms. FM demodulator: Foster Seely Discriminator, Ratio detector	07	L1, L2, L3,L4
5	**Pulse Analog and Digital Modulation** Sampling theorm for low pass and band pass signals , Anti- aliasing filter, PAM, PWM and PPM generation and Degeneration. Introduction to digital communication (Block diagram), Quantization process, Pulse code modulation, Delta modulation, Adaptive delta modulation, Introduction to Line codes, representation of binary data in different line codes. Binary Amplitude Shift keying, Binary Frequency Shift keying, Binary Phase shift keying, Quadrature phase shift keying, Quadrature amplitude Modulation –	09	L1, L2, L3
6	**Introduction to Information Theory** Introduction. Entropy & Types of Entropy Source Coding Prefix Coding. Channel Capacity	06	L1, L2, L3

List of Practicals/ Tutorials:

Experiment No.	Category of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	Basic Experiments (Based on measurements of properties)	Generation of various periodic and non-periodic signals	2	L1, L2, L3
2		Demonstration of Amplitude modulation.	2	L1, L2, L3
3		Demonstration of Frequency modulation	2	L1, L2, L3
4		Study of radio receiver.	2	L1, L2, L3
5	Advance Experiments (Based on Volumetric Analysis)	Signal sampling and reconstruction.	2	L1, L2, L3
6		PAM generation and detection	2	L1, L2, L3
7		PWM, PPM generation and detection.	2	L1, L2, L3
8		PCM coding and decoding.	2	L1, L2, L3
9	Design Based Experiments	Study of BASK, BFSK	2	L1, L2, L3
10		Study of BPSK, QPSK.	2	L1, L2, L3
11	Project Based Experiments- Group Activity) (Students should complete any one project Based experiment from the list or any other project in discussion with Faculty in-Charge)	Study of Inter symbol Interference and Line coding	2	L1, L2, L3, L4
12		Study of Communication link	4	L1, L2, L3, L4
13		Mini Project	2	L1, L2, L3, L4
Total			**30**	

Books and References:

Sr. No	Name of Book	Authors	Publisher	Edition	Year
1	Electronic Communication Systems	George Kennedy, Bernard Davis, SRM Prasanna	Tata McGraw Hill	5th	2015.
2	Electronic Communications Systems	Wayne Tomasi	Pearson Publication	5th	2008
3	Introduction to Analog & Digital Communications	Simon Haykin, Michael Moher	Wiley India Pvt	2nd	2012.
4	Principles of Communication Systems	Herbert Taub, Donald L Schilling	Tata McGraw Hill	5th .	2015
5	Information Theory, Coding and Cryptography	Ranjan Bose	Tata McGrawHill	2nd	2008

Online References:

Sr. No	Website Name	URL	Modules Covered
1.	https://nptel.ac.in	https://nptel.ac.in/courses/117102059/6	M1
2.	https://nptel.ac.in	https://nptel.ac.in/courses/117102059/7	M2
3.	https://nptel.ac.in	https://nptel.ac.in/courses/117102059/15	M3
4.	https://nptel.ac.in	https://nptel.ac.in/courses/117102059/39	M4
5.	https://nptel.ac.in	https://nptel.ac.in/courses/117102059/40	M5
6.	https://nptel.ac.in	https://nptel.ac.in/courses/117/101/117101053/	M6

S.E. Semester –IV

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

TCET Autonomy scheme with effect from 2021-22

<table>
<tr><td colspan="8">B.E (Information Technology)</td><td colspan="3">SEM: IV</td></tr>
<tr><td colspan="8">Course Name : Computer Organization and Architecture</td><td colspan="3">Course Code: PCC-IT 401</td></tr>
<tr><td colspan="5">Teaching Scheme (Program Specific)</td><td colspan="6">Examination Scheme (Formative/ Summative)</td></tr>
<tr><td colspan="5">Modes of Teaching / Learning / Weightage</td><td colspan="6">Modes of Continuous Assessment / Evaluation</td></tr>
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<tr><td colspan="11">ISE: In-Semester Examination - Paper Duration – 1 Hour
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 tutorial (40%) and Attendance/Learning Attitude (20%)</td></tr>
<tr><td colspan="11">Prerequisite : Computer Basics, Digital Logic

RBT: Revised Bloom’s Taxonomy</td></tr>
</table>

Course Objective: The course intends to deliver the fundamentals of organizational and architectural issues of a digital computer, apply and analyze processor performance, Instruction & Processor parallelism, various multiplication, and division algorithms of digital computer, memory hierarchy and various components of computer.

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	Describe basic organization and the architecture of computer	L1, L2
2	Understand control unit operation	L1, L2
3	Understand the concept of parallelism	L1, L2
4	Demonstrate and apply computer arithmetic operations on integer and real numbers.	L1, L2, L3
5	Understand Categorize memory organization and explain the function of each element of a memory hierarchy.	L1, L2
6	Analyze, Identify and compare different methods for computer I/O mechanisms.	L1, L2, L3, L4

Detailed Syllabus (Total No. of Hours: 45):

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
0	**Prerequisite** Basic combinational and sequential logic circuits, binary numbers and arithmetic, basic computer organizations	01	L1, L2
1.	Overview of Computer Architecture & Organization Introduction of Computer Organization and Evolution of Computers, Von Neumann model. Performance measure of Computer Architecture. System bus structure: Data, address and control buses.	06	L1, L2
2.	**Processor Organization and Architecture** CPU Architecture, Register Organization, Instruction formats, basic instruction cycle. Overview of 80x86 families. Instruction set types, instruction format, addressing modes, Control Unit: Soft wired (Micro- programmed) and hardwired control unit. Complex Instruction Set Computer (CISC) Reduced Instruction Set Computer (RISC), CISC vs RISC.	06	L1, L2
3.	**Parallel & Pipeline Processing** Introduction to parallel processing concepts, Flynn's classifications, Instruction Level parallelism, pipeline processing, instruction pipelining, pipeline stages, pipeline hazards.	05	L1, L2
4.	**Data Representation and Arithmetic Algorithms** Number representation: Binary Data representation, two's complement representation and Floating-point representation. Multiplication: Unsigned & Signed multiplication-Add & Shift Method, Booth's algorithm. Division of integers: Restoring and non-restoring division, signed division, basics of floating pointer presentation IEEE754 floating point (Single &double precision) number representation. Floating point arithmetic: Addition, subtraction, Range, precision and errors in floating-point arithmetic	10	L1, L2, L3
5.	**Memory Organization** Introduction to Memory and Memory parameters. Classifications of primary and secondary memories. Types of RAM and ROM, Allocation policies, Memory hierarchy and characteristics. Cache memory: Cache Coherency, Interleaved memory, virtual memory system: page table and TLB.	09	L1, L2
6.	**I/O Organization** Input/output systems, I/O modules and 8089 IO processor. Types of data transfer techniques: Programmed I/O, Interrupt driven I/O and DMA. Peripherals: Keyboard, Mouse, Monitors, Disk drives, etc.	08	L1, L2,L3,L4

List of Tutorials:

Tutorial No.	Tutorial Topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1.	Multiply two numbers using add & shift unsigned multiplication algorithm.	1	L1, L2, L3
2.	Multiply two numbers using booth multiplication algorithm	2	L1, L2, L3
3.	Divide two numbers using restoring division algorithm	2	L1, L2, L3
4.	Divide two numbers using non- restoring division algorithm	2	L1, L2, L3
5.	Solve number using single precision IEEE floating point representation format.	1	L1, L2, L3
6.	Solve number using double precision IEEE floating point representation format.	1	L1, L2, L3
7.	Solve problem using various page replacement algorithm	2	L1, L2, L3
8.	Solve problem using best fit, first fit and worst fit algorithm.	2	L1, L2, L3
9.	Solve problem on various memory mapping techniques.	2	L1, L2, L3
Total		15	

Books and References:

Sr. No.	Name of Book	Author Name	Edition
1	Computer Organization	Carl Hamacher, Zvonko Vranesic and Safwat Zaky	5th
2	Computer Organization and Architecture: Designing for Performance	William Stallings	5th
3	Computer Architecture and Organization: Design Principles and Applications	Dr. M.Usha,T.S. Srikanth	1st
4	Computer Architecture and Organization	JohnP.Hayes	3rd
5	8086/8088 family: Design Programming and Interfacing	John Uffenbeck	2nd

Online References:

Sr. No	Website Name	URL	Modules Covered
1.	https://www.geeksforgeeks.org	https://www.geeksforgeeks.org/computer-organization-von-neumann-architecture/	M1
2.	https://www.w3schools.com	https://www.tutorialspoint.com/data_structures_algorithms/index.htm	M2
3.	https://www.w3schools.com	https://www.tutorialspoint.com/data_structures_algorithms/index.htm	M3
4.	https://www.geeksforgeeks.org	https://www.geeksforgeeks.org/python-programming-language/	M4
5.	https://www.tutorialspoint.com	https://www.tutorialspoint.com/python/	M5
6.	https://www.tutorialspoint.com	https://www.tutorialspoint.com/python/	M6

S.E. Semester –IV

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

TCET Autonomy scheme with effect from 2021-22

B.E (Information Technology)								**SEM:** IV		
Course Name: Computer Network								**Course Code: PCC-IT 402**		
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**	**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 : Concept of Basic Communication and Network

RBT: Revised Bloom's Taxonomy

Course Objective: The course intends to deliver the fundamentals of computer networking and apply the knowledge of computer networks for analyzing various algorithms spread over various layer of OSI reference model.

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	Describe the functions of each layer in OSI and TCP/IP model.	L1, L2
2	Understand the types of transmission media with real time applications.	L1, L2, L3
3	Describe the functions of data link layer and explain the protocol	L1, L2, L3
4	Classify the routing protocols and analyze how to assign the IP addresses for the given network.	L1, L2, L3, L4
5	Describe and analyze the Session layer design issues and Transport layer services.	L1, L2, L3, L4
6	Explain and analyze the functions of Application layer and Presentation layer paradigms and Protocols.	L1, L2, L3,L4

Detailed Syllabus (Total No. of Hours: 45):

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Introduction** Network Criteria, Physical Structures and Network Types: LAN, WAN, Switching, protocol implementation issues - Quantitative performance metrics OSI Reference model, TCP/IP suite, Comparison of OSI and TCP/IP, Network devices. Network Applications.	**4**	L1, L2
2	**The Physical Layer** Data and Signals: Analog and Digital, Transmission Impairment, Data Rate Limits, Performance, Digital Transmission: Digital-to-Digital Conversion, Analog-to-Digital Conversion, Analog Transmission: Digital-to-Analog Conversion, Analog-to-Analog Conversion, Bandwidth Utilization: Multiplexing, Spread Spectrum, Transmission Media: Guided Media, Unguided Media: Wireless, Repeaters or Hubs, Link-Layer Switches, Routers, PSTN, Mobile Telephone system – Introduction of 1G,2G & 3G systems. Physical layer overview, Latency, Bandwidth, Delay, wireless 802.11 introduction, IEEE 802.15, IEEE 802.15.4 standards	**7**	L1, L2,L3
3	**The Data Dink Layer** Wired Networks; Introduction: Nodes and Links, Two Types of Links, Two Sublayers, Data Link Control: Error Detection and Correction, Framing, Flow and Error Control techniques, Sliding Window Protocols, Medium Access Protocols: Random Access, Controlled Access, Channelization, Link Layer Addressing, Wired LANS: Ethernet Protocol; IEEE Project 802, Standard Ethernet, Fast Ethernet (100 Mbps), Gigabit Ethernet,10-Gigabit Ethernet, Virtual LANs, Other Wired Networks: Point-to-Point Networks, SONET, **ADSL -** Asymmetric Digital Subscriber Loop, Switched Network :ATM, connecting Devices: Sliding Window Compression. RFID – Architecture, Physical Layer, Tag identification layer, Tag identification message formats	**7**	L1, L2, L3

4	**The Network Layer** Introduction: Network-Layer Services, Packet Switching, Network-Layer Performance, Network-Layer Congestion, Structure of A Router, Network Layer Protocols: IPv4 Datagram Format, IPv4 Addresses, Forwarding of IP Packets, ICMPv4,Unicast Routing: General Idea, Routing Algorithms, Unicast Routing Protocols, Multicast Routing : Introduction, Multicasting Basics, Intra domain Routing Protocols, Inter domain Routing Protocols, Next generation IP: Packet Format , IPv6 Addressing , Transition from IPv4 to IPv6, traffic shaping and policing ,Congestion control algorithms , Mobile IP: Addressing , Agents , Three Phases , Inefficiency in Mobile IP. Quality of service – traffic shaping, packet scheduling & Admission control	**12**	L1, L2, L3, L4
5	**The Transport Layer** Simple Protocols, Stop-and-Wait protocol, Go-Back-N protocol, Selective repeat protocol, Piggybacking. User Datagram Protocol: UDP Services, UDP Applications, Transmission Control Protocol: TCP Services, TCP Features, Segment, Segment, A TCP Connection, State Transition Diagram, Windows in TCP, TCP Flow Control, TCP Error Control, TCP Congestion Control, TCP Timers.	**10**	L1, L2, L3, L4
6	**Application layer** Introduction: Providing Services, Application layer Paradigms, Client-Server Paradigm: Application Programming Interface, Using Services of the Transport Layer, Standard Client Server applications: World Wide Web and HTTP, FTP, Electronic Mail, TELNET, Secure Shell (SSH), Domain Name System (DNS), Peer-to-Peer Paradigm: P2P Networks, distributed hash table, Chord, Pastry, Socket Interface Programming.	5	L1, L2, L3,L4

List of Practicals/ Tutorials:

Experiment No.	Category of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Basic Experiments (Based on measurements of properties)**	Installation of Linux Operating System	2	L1, L2
2		Study of vi editor and its commands	2	L1, L2, L3
3	**Design Based Experiments**	Study & demonstration of basic networking commands.	2	L1, L2, L3
4		Installation of NS-2	2	L1, L2, L3
5		Programming in NS-2	2	L1, L2, L3, L4

6		Implementation of network topology	2	L1, L2, L3
7	**Advance Experiments (Based on Volumetric Analysis)**	Study & Analysis of TCP/IP header using Wireshark.	2	L1, L2, L3
8		Study & Analysis of UDP or SSL Protocol using Wireshark	2	L1, L2, L3
9		Implement connection-oriented client server programming using TCP/IP.	4	L1, L2, L3, L4
10		Implementation of connectionless client server using UDP.	4	L1, L2, L3, L4
11	**Project Based Experiments- Group Activity)** (Students should complete any one project Based experiment from the list or any other project in discussion with Faculty in-Charge)	Case study to design and configure college network.	6	L1, L2, L3, L4,L5
Total			**30**	

Books and References:

S. No.	Title	Authors	Publisher	Edition	Year
1	Data Communication & Networking	Behrouz A. Forouzan	Mc Graw Hill education.	5th Edition	2014
2	Computer Networks	Andrew S Tanenbaum	Pearson Education	5th Edition	2014
3	Computer Networking: A Top-Down Approach Featuring the Internet	James F. Kurose, K. W. Ross	Pearson Education	5th Edition	2014
4	Computer Networks: A Systems Approach	L. L. Peterson and B. S. Davie	Elsevier India	5th Edition	2012
5	Understanding communications and Networks	W. A. Shay	Cengage Learning	2nd Edition	2001
6	Introduction to Data Compression	Khalid Sayood, Morgan Kaufman	Elseiver	Third Edition	2011

Online References:

S. No.	Website Name	URL	Modules Covered
1	https://www.javatpoint.com https://beginnersbook.com	https://www.javatpoint.com/computer-network-features https://beginnersbook.com/2019/04/osi-model-in-computer-network/	M1
2	https://nptel.ac.in	https://nptel.ac.in/courses/Webcourse-contents/IIT%20Kharagpur/Computer%20networks/New_index1.html	M2
3	https://www.cse.iitk.ac.in/	https://www.cse.iitk.ac.in/users/dheeraj/cs425/lec14.html	M3
4	https://www.cse.iitk.ac.in/	https://www.cse.iitk.ac.in/users/dheeraj/cs425/lec10.html	M4
5	https://www.cse.iitk.ac.in/	https://www.cse.iitk.ac.in/users/dheeraj/cs425/lec09.html	M5
6	https://www.cse.iitk.ac.in/	https://www.cse.iitk.ac.in/users/dheeraj/cs425/lec03.html	M6

S.E. Semester –IV
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)
TCET Autonomy scheme with effect from 2021-22

B.E (Information Technology)								S.E.(SEM : IV)		
Course Name :Programming Skill II (Python)								Course Code : PCC-IT 403		
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	TW	
3	-	2	5	4	20	20	60	25	25	150

ISE: In-Semester Examination - Paper Duration – 1 Hour
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 : Programming Knowledge, C language

RBT: Revised Bloom's Taxonomy

Course Objective: The course intends to deliver the fundamentals of Python programming, control statements and Functions, apply object Oriented Programming concept using Python, Errors and Exceptions, Files Handling and Analyze to Implement GUI application using Database.

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

S.No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python	L1, L2
2	Apply different Decision Making statements and Functions	L1, L2,L3
3	Interpret and apply Object oriented programming concept	L1, L2, L3
4	Understand and Apply need based exceptions in the application	L1, L2, L3
5	Understand and summarize different File handling operations	L1, L2, L3
6	Construct GUI Applications in Python and evaluate different database	L1, L2, L3

Detailed Syllabus (Total No. of Hours : 45)

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Basics of Python** Theory: Numbers in Python, Basic & Built-in Math functions, Number Formats, Strings, Quotes, print() Function, Assigning Values to Names & Changing Data Through Names, Copying Data, Tuples — Unchanging Sequences of Data, Lists — Changeable Sequences of Data, Dictionaries — Groupings of Data Indexed by Name, Special String Substitution Using Dictionaries , Arrays, Treating a String Like a List, Special Types, Ranges of Sequences, Working with Sets, Arrays	6	L1, L2
2	**Decision Making and Functions** Theory: If statement, if-elif-else, Repetition using while loop, for loop, break statement, Handling Errors- try: statement, except: statement, Functions- Grouping Code under a Name, defining a Function, describing a function in the function, Checking & Setting Your Parameters, Calling Functions from within Other Functions, Functions Inside of Functions, Python Lambda function, Python filter function	6	L1, L2, L3
3	**OOP's Using Python** Theory: Creating a Class, Self-Variables, Constructors, Types of Methods, Inner Classes, Constructors in Inheritance, Polymorphism, Abstract classes, The super() Method, Method Resolution Order (MRO), Operator Overloading, Method Overloading & Overriding, Interfaces in Python.	8	L1, L2, L3
4	**Exception Handling and Packages** Exceptions Handling: Errors in a Python Program, Exceptions, Exception Handling, Types of Exceptions, The Except Block, The assert Statement. Modules and Packages: Creating Modules and Packages, Documenting & Viewing Module, Basics of Testing Your Modules and Packages, Importing & exporting Modules	8	L1, L2, L3
5	**Files Handling** Theory: Types of Files in Python, Opening a File, Closing a File. Writing Text Files, Knowing Whether a File Exists or Not, Working with Binary Files, Appending Text to a File, Reading Text Files, File Exceptions, The with Statement Pickle in Python, Lambda and Filter, Map & range functions	8	L1, L2, L3
6	**GUI Programming and Databases** Theory: GUI Programming - Writing a GUI with Python: GUI Programming Toolkits, Creating GUI Widgets with Tkinter, Creating Layouts, Radio Buttons and Checkboxes, Dialog Boxes, Event driven programming Database Access - Python's Database Connectivity, Types of Databases Used with Python, Mysql database Connectivity with Python, Performing Insert, Deleting & Update operations on database **Total No. of Hours: 45**	9	L1, L2, L3

List of Practicals/ Experiments:

S. No.	Type of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	Basic Experiments	Problems on Basics of Python	2	L1, L2
2		Problems on Decision Making and Functions	2	L1, L2
3	Design Experiments	Problems on OOP's using Python programming (Abstraction, Encapsulation)	2	L1, L2, L3
4		Problems on OOP's using Python programming (Inheritance and Polymorphism)	2	L1, L2, L3
5		Problems on Exception Handling(Inbuilt Exceptions)	2	L1, L2, L3
6		Problems on Exception Handling (User defined Exceptions)	2	L1, L2, L3
7		Problems on Packages	2	L1, L2, L3
8		Problems on Files Handling	2	L1, L2, L3
9	Advanced Experiments	GUI Programming using python-1	2	L1, L2, L3
10		GUI Programming using python -2	2	L1, L2, L3
11		Databases Connectivity using python	2	L1, L2, L3, L4
12		GUI with Databases connectivity using python	2	L1, L2, L3, L4
13	Mini/Minor Projects/ Seminar/ Case Studies	Employee Payment Management System in Python, . Restaurant Management system in Python, Courier Management system in Python https://www.kashipara.com/project/category/download_python-project-source-code_12 (For more Project Ideas)	6	L1, L2, L3, L4,L5,L6
Total Hrs.			**30**	

Books & References:

S. No	Title	Authors	Publisher	Edition	Year
1	Beginning Python: Using Python 2.6 and Python 3.1	James Payne	Wrox Publication	2nd	2010
2	Core Python Programming	Dr. R. Nageswara Rao	Dreamtech Press, Wiley Publication	2nd	2010
3	Beginning Python From Novice to Professional	Magnus Lie Hetland	Apress Publication	2nd	2012.
4	Core Python Applications Programming	Wesley J Chun	Pearson Publication	3rd.	2015
5	Introduction to Computing and Problem Solving using Python	E. Balguruswamy	McGraw Hill Publication	2nd	2014

Online References:

S. No.	Website Name	URL	Modules Covered
1.	https://www.w3schools.com	https://www.w3schools.com/python/	M1
2.	https://www.w3schools.com	https://www.tutorialspoint.com/data_structures_algorithms/index.htm	M2
3.	https://www.w3schools.com	https://www.tutorialspoint.com/data_structures_algorithms/index.htm	M3
4.	https://www.geeksforgeeks.org	https://www.geeksforgeeks.org/python-programming-language/	M4
5.	https://www.tutorialspoint.com	https://www.tutorialspoint.com/python/	M5
6.	https://www.tutorialspoint.com	https://www.tutorialspoint.com/python/	M6

S.E. Semester –IV

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

TCET Autonomy scheme with effect from 2021-22

BE (Information Technology)								**S.E. (SEM :** IV)		
Course Name : Value Education								**Course Code : MC- IT 401**		
Teaching Scheme (Program Specific)					**Examination Scheme (Formative/ Summative)**					
Modes of Teaching / Learning / Weightage					**Modes of Continuous Assessment / Evaluation**					
Hours Per Week					**Theory (100)**			**Presentation (25)**	**Report (25)**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**ISE**	**IE**	**ESE**	**AC**	**AC**	
1	--	--	1	Non credit	--	--	--	--	25	**25**
AC- Activity Evaluation **Total weightage of marks for continuous evaluation of Term work/Report:** Formative (40%), Timely Completion of Assignments (40%) and Attendance/ Learning Attitude (20%)										
Prerequisite: Moral Science										

Course Objective: The course intends to deliver the fundamentals of the concept of Ethics in Engineering & Human values, significance of values in Self-development, ethical human value and apply values needed for peaceful society, aware value education, towards personal, national and global development.

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

S.No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Develop commitment to professional ethics, responsibilities and norms of the engineering practice.	L1, L2
2	Develop a good moral character and social attitude.	L1, L2
3	Determine the proper use of engineering knowledge to bring uplift in quality of life, along with peace and conflict resolution.	L1, L2, L3
4	Propagate ethics and values in society.	L1, L2, L3
5	Apply values such as care and compassion; honesty and trustworthiness;	L1, L2, L3
6	Global development through integrity; respect; responsibility and understanding, tolerance and inclusion.	L1, L2, L3

Detailed Syllabus of 15 hours:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Value Education - Introduction** Understanding the importance of Value Education, Need in modern Society, Benefits for students, Adding Value to Life, Self-Exploration as the Process for Value Education.	2	L1, L2
2	**Values and Ethics**		L1, L2

	Definition, Concept, Classification, value based life, Present day materialistic approach, importance of value in human lives, Humility, Attitude, self-confidence,Theory, Criteria and Sources of values, Social values and individual attitudes. Ethics, Role of Ethics, Educational Ethics, imparting ethics in educational age, Indian vision of humanism ,integrating spiritualty with education.	2	
3	**Right Understanding**	3	L1, L2, L3
	Providing the Basis for Universal Human values and Ethical Human Conduct, Basis for the Holistic Alternative Unit Universal Human Order, Professional Ethics in the Light of Right Understanding, Vision for Holistic Technologies, and Journey towards the Holistic Alternative- The Road Ahead.		
4	**Dealing with Habits**	3	L1, L2, L3
	Introduction to Habits- Simple , Serious and Grave bad Habits, Cause of Addiction to bad habits, How some bad habit are bad though they feel good, what implies one to go on with bad habits, How to have right perception ,The Power of Good habits, awareness of self-destructive habits, importance of right association and Cooperation.		
5	**Dealing with Stress**	3	L1, L2, L3
	About Stress, definition and causes, Positive stress, Negative Stress, Statistics of Stress, and Suicides the present day Stupid idea. How to deal with cries in our life, Art of Tolerance, Making Right Choice, Life Style Management. Sense of duty. Devotion, Self-reliance. Confidence, Concentration. Truthfulness, Cleanliness,Honesty, Humanity.		
6	**Harmony at Various Levels**	2	L1, L2,L3
	Understanding the Human Being as co-existence of self and body . Self-management and Good health.Science of reincarnation. Harmony in Self, Harmony with the body, Harmony in the Family, Harmony in the Society, Harmony in Nature, Harmony in Existence.		
Total Hrs.		**15**	

Books and References:

S.No.	Title	Authors	Publisher	Edition	Year
1.	Value Education for Young Leaders	Dr. P Hari Krishna	Vashnavi Krishna Publication	2nd Edition	2015
2.	Value education	Singh Y K	APH Publishing Corporation	2nd Edition	2009
3.	Professional Ethics	R. Subramanian	Oxford Publication	4th Edition	2017
4.	Beyond Illusion and Doubt	A. C Bhaktivedanta Swami	BBT	5th Edition	2017
5.	Open eyed Meditation	Shubha Vilas Das	FinGer Print Belief	2nd Edition	2016
6.	Life Amazing Secrets	Gaur Gopal Das	Penguin India	1st Edition	2018
7.	Ethics from Epics	Govinda Das	Tulsi Publication	1st Edition	2015
8.	Peace and Value Education	Kiruba Charles & V. Arul Selvi	Neelkamal Publications	1st Edition	2016
9.	Mind Your Mind: Three Principles for Happy Living	Venugopal Acharya	Hachette India	1st Edition	2019
10.	A Hand Book on PANCH KOSH	Rajesh A Kadam	Shishmahal Arts Co	1st Edition	2019
11.	Are You Connected?: 25 keys to live, grow and succeed with self and others	Venugopal Acharya	Penguin Books	1st	2017

Online References:

S. No.	Website Name	URL	Modules Covered
1	http://www.yourarticlelibrary.com	http://www.yourarticlelibrary.com/education/values-education/value-education-meaning-objectives-and-needs-india/86967	M1,M2
2	https://ed100.org	https://ed100.org/lessons/valueshabits	M4
3	http://www.indiancurrents.org	http://www.indiancurrents.org/article-new-education-policy-stress-on-value-education-in-schools-103.php	M5
4	vedabase.io	https://vedabase.io/en	M1-M6

S.E. Semester –IV

Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)
TCET Autonomy scheme with effect from 2021-22

B. E. Information Technology					S.E.SEM: IV		
Course Name: Summer Internship					Course Code: SI-IT 401		
Contact Hrs. during Weekend / Semester Break/ End of Semester (Between 21st and 25th Week)					Assessment/Evaluation Scheme		
					Presentation	Report	Non-Grant Term work based on Presentation and Report
Theory	AC	Practical	Contact Hours	Credits	AC	AC	TW
-	-	-	160 *	4*	-	-	50

AC- Activity evaluation TW – Term Work Examination

* * Students may go upto 160 hrs. to aquire maximum 4 credits. Students should collectively acquire total contact hrs in below given activities in a span of 1 year (3rd and 4 th Semester).

Total hrs. mentioned should be completed till end of Semester 4. Credits will be awarded at the end of 4th Semester and will be reflected in the Grade Card of 4th Semester.

Prerequisite: Fundamental knowledge of Information Technology related tools

Course Objectives: To get industry like exposure in the college laboratories by carrying out projects using subject studied till 4th semester. Also design innovative techniques / methods to develop the products.
To gain knowledge of marketing and publicizing products developed.

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	To apply subject's knowledge in the college laboratories for carrying out projects	L1, L2, L3
2	Able to develop innovative techniques / methods to develop the products	L1, L2, L3
3	Able to do marketing and publicity of products developed	L1, L2, L3

Detailed Syllabus:

Module No.	Topics	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Program Specific Internship**	L1, L2, L3
	Training and certification on emerging technologies in domains offered by Department of Computer Engineering Applying classroom and laboratory knowledge to design, develop and deploy the products	
2	**Inter disciplinary Internship**	L1, L2, L3
	• To explore and understand issues and challenges in the other disciplines (E&TC, ELEX, MECH and CIVIL) • Design, develop and deploy cost effective products using multidisciplinary approach	
	Industry Specific Internship	L1, L2, L3

3	• To explore and understand issues and challenges in industry • Developing solutions for industry specific problems • Design, develop and deploy products for startup and SMEs	
4	**Interpersonal Internship** • To develop interpersonal skills such as leadership, marketing, publicity and corporate ethics and communication • To get competence in problem solving, presentation, negotiation skills	L1, L2, L3
5	**Social Internship** • Identify and study different real-life issues in the society • Identify societal problems and provide engineering solutions to solve these problems	L1, L2, L3
6	**Academic Internship** • Study report preparation, preparation of presentations, copy table book preparation , business proposal and IPR • Capture aspirations & expectations through interviews of students. • Ways to connect research in technical institutes with industry. • Taking inputs from self, local stakeholders and global stake holders which will help to develop process with comparative and competitive study.	L1, L2, L3

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	The Ultimate Guide to Internships: 100 Steps to Get a Great Internship and Thrive in It (Ultimate Guides)	Eric Woodard	Allworth	I	2015

Online References:

Sr. No.	Website Name	URL	Modules Covered
1	https://www.letsintern.com/	https://www.letsintern.com/internships/summer-internships	M1-M6
2	https://codegnan.com	https://codegnan.com/blog/benefits-of-internships-and-importance	M1-M6
3	https://www.honorsociety.org	https://www.honorsociety.org/articles?category=interns hips	M1-M6

S.E. Semester –IV

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

TCET Autonomy scheme with effect from 2021-22

<table>
<tr><td colspan="5">B. E. Information Technology</td><td colspan="3">S.E. SEM: IV</td></tr>
<tr><td colspan="5">Course Name: Employability Skill Development Programme-II (Python for IoT)</td><td colspan="3">Course Code: ESD-IT 401</td></tr>
<tr><td colspan="5">Teaching Scheme (Holistic and Multidisciplinary Education-Conducted in the beginning of Semester during first 3 Weeks)</td><td colspan="3">Examination Scheme (Formative/ Summative)</td></tr>
<tr><td colspan="5">Modes of Teaching / Learning / Weightage</td><td colspan="3">Modes of Continuous Assessment / Evaluation</td></tr>
<tr><td colspan="5">Hours</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>Term work</td></tr>
<tr><td>-</td><td>-</td><td>30</td><td>30</td><td>1</td><td colspan="2">Based on Parameters Decided by Training and Placement Cell</td><td>50</td></tr>
<tr><td colspan="8">AC : Activity Evaluation
The weightage of marks for continuous evaluation of Term work: Formative (60%) and Attendance / Learning Attitude (40%)
Presentation/Report: Knowledge (50%), Skills (30%) and Competency (20%)</td></tr>
<tr><td colspan="8">Prerequisite: Computer Basics, Procedural Programming Languages</td></tr>
</table>

Course Objective: The course intends to make students learn how to use Python programming for IoT applications. The main purpose of the course is to develop professional skills required for Industry 4.0 for becoming technically skilled personnel, so as to get an edge over others.

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

SN	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Understand basic concepts of IoT & Python	L1, L2
2	Understand and apply concepts of python & IoT connectivity.	L1, L2, L3
3	Illustrate various OOP concepts of networking & RESTfull APIs.	L1, L2, L3
4	Implement web socket using Flask framework.	L1, L2,L3
5	Comprehend basic functionality of Rasberry Pi and various GPIO libraries.	L1, L2, L3
6	Apply python concepts for connecting Rasberry Pi with physical world.	L1, L2, L3, L4

Detailed Syllabus:

Sr.No.	Topic	Total Hours	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Introduction to IoT using Python**	4	L1, L2
	Programming with Python and the Raspberry Pi , Technical requirements , Understanding your Python installation , Setting up a Python virtual environment , Installing Python GPIO packages with pip ,Anatomy of a virtual environment ,Alternative methods of executing a Python script , Using sudo within virtual environments , Executing Python scripts outside of their virtual environments , Running a Python script at boot Configuring the GPIO interface on our Raspberry Pi ,Configuring the PiGPIO daemon.		
2	**Python and IoT Connectivity**	4	L1, L2 ,L3
	Technical requirements , Creating a breadboard prototype circuit ,Understanding the breadboard , Positioning and connecting the push button , Positioning and connecting the LED ,Positioning and connecting the resistor ,Reading an electronic schematic diagram ,Reading the push button schematic connection ,Reading the LED and resistor schematic connection ,Introducing ground connections and symbols ,Exploring two ways to flash an LED in Python ,Blinking with GPIOZero , Pin Factory configuration , Blinking the LED , Blinking with PiGPIO , PiGPIO and pin configuration ,Blinking the LED ,Comparing the GPIOZero and PiGPIO examples , Exploring two ways to integrate a push button in Python ,Responding to a button press with GPIOZero ,Button pressed handler ,Button configuration ,Preventing the main thread from terminating ,Responding to a button press with PiGPIO ,Button pin configuration, Button pressed handler ,Creating your first IoT program ,Running and testing the Python server ,Understanding the server code ,Variable definitions ,The resolve_thing_name() method , The get_lastest_dweet() method ,The poll_dweets_forever() method ,The process_dweet() method ,The main program entry point ,Extending your IoT program ,Implementing a dweeting button ,PiGPIO LED as a class.		
3	**Networking with RESTful APIs**	2	L1, L2 ,L3
	Technical requirements, Introducing the Flask microservices framework ,Creating a RESTful API service with Flask-RESTful ,Running and testing the Python server ,Understanding the server code ,Flask and Flask-RESTful API instance variables ,Global variables ,The init_led() method ,Serving a web page,The LEDControl class ,The get() class method ,The post() class method ,LEDController registration and starting the server ,Introduction to PWM ,Adding a RESTful API client web page ,Understanding the client-side code JavaScript imports ,The getState() function,The postUpdate() function ,The updateControls() function ,Registering event handlers with jQuery		
4	**Web Sockets Using Flask**	2	L1, L2 ,L3
	The web page HTML ,Creating a Web Socket service with Flask-SocketIO ,Running and testing the Python server ,Server code walkthrough ,Imports ,Flask and Flask-RESTful API instance variables ,Serving a web page ,Connecting and disconnecting handlers ,LED handler ,Starting the server ,Adding a Web Socket client web page ,Understanding the client-side code ,Socket.IO connect and disconnect handlers ,The on LED handler ,The		

	document ready function ,The web page HTML ,Comparing the RESTful API and Web Socket servers		
5	**Connecting Your Raspberry Pi to the Physical World-Part I**	**4**	L1, L2 ,L3
	Technical requirements , Understanding Raspberry Pi pin numbering ,Exploring popular Python GPIO libraries ,Reviewing GPIOZero – simple interfacing for beginners ,Reviewing RPi.GPIO – a low-level GPIO for beginners ,Reviewing Circuit Python and Blinka – interfacing for complex devices ,Reviewing PiGPIO – a low-level GPIO library ,Exploring remote GPIO with PiGPIO (and GPIOZero) , Reviewing SPIDev and SMBus – dedicated SPI and I2C libraries ,Why PiGPIO? , Exploring Raspberry Pi electronic interfacing options ,Understanding digital IO , Understanding analog IO ,Understanding Pulse-Width Modulation ,Creating PWM signals ,Understanding SPI, I2C, and 1-wire interfaces ,Understanding the serial / UART protocol ,Interfacing with an analog-to-digital converter ,Building the ADS1115 ADC circuit ,Making sure the ADS1115 is connected to your Raspberry Pi ,Reading analog input with the ADS1115 ,Understanding the code , Imports ,ADS1115 setup and configuration , Global variables , Program entry point ,Using PWM to control an LED ,Understanding the code , Global variables ,Range mapping function , Generating the PWM signal ,Visually exploring PWM with PiScope , Visualizing software and hardware-timed PWM		
6	**Connecting Your Raspberry Pi to the Physical World-Part II**	**4**	L1, L2 ,L3,L4
	Technical requirements ,Making color with an RGB LED and PWM ,Creating the RGB LED circuit ,Running and exploring the RGB LED code ,Controlling a multi-color APA102 LED strip with SPI ,Creating the APA102 circuit ,Powering the APA102 circuit ,Configuring and running the APA102 LED strip code ,APA102 LED strip code walkthrough ,Discussion of APA102 and the SPI interface ,APA102 LED strip troubleshooting tips ,Using an OLED display ,Connecting the OLED display ,Verifying whether the OLED display is connected ,Configuring and running the OLED example ,LED code walkthrough ,Making sound with buzzers and PWM,Building the RTTTL circuit,Running the RTTTL music example **Measuring Temperature, Humidity, and Light Levels** Technical requirements,Measuring temperature and humidity ,Creating the DHT11/DHT22 circuit ,Running and exploring the DHT11/DHT22 code ,Detecting light ,Creating an LDR light-detecting circuit ,Running the LDR example code ,LDR code walkthrough ,LDR configuration summary ,Detecting moisture, Comparing detection options		
	Total Hours	**20**	

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	Internet of Things with Python	Gaston C. Hillar	Packt	Second	2016
2	Practical Python Programming for IoT	Gary Smart	Packt	First	2020

Online References:

S. No.	Website Name	URL	Modules Covered
1	www.data-flair.training	https://data-flair.training/blogs/iot-raspberry-pi/	M1,M2,M5,M6
2	www. programminghistorian.org	https://programminghistorian.org/en/lessons/creating-apis-with-python-and-flask	M3,M4

S.E. Semester –IV

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

TCET Autonomy scheme with effect from 2021-22

<table>
<tr><td colspan="5">B. E. Information Technology</td><td colspan="3">S.E. SEM : IV</td></tr>
<tr><td colspan="5">Course Name: Employability Skill Development Programme-II (Expert Python Programming)</td><td colspan="3">Course Code: ESD-IT 401</td></tr>
<tr><td colspan="5">Teaching Scheme (Holistic and Multidisciplinary Education-Conducted in the beginning of Semester during first 3 Weeks)</td><td colspan="3">Examination Scheme (Formative/ Summative)</td></tr>
<tr><td colspan="5">Modes of Teaching / Learning / Weightage</td><td colspan="3">Modes of Continuous Assessment / Evaluation</td></tr>
<tr><td colspan="5">Hours</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">50</td></tr>
<tr><td>-</td><td>-</td><td>30</td><td>30</td><td>1</td><td colspan="2">Based on Parameters Decided by Training and Placement Cell</td></tr>
<tr><td colspan="8">AC : Activity Evaluation
The weightage of marks for continuous evaluation of Term work: Formative (60%) and Attendance / Learning Attitude (40%)
Presentation/Report: Knowledge (50%), Skills (30%) and Competency (20%)</td></tr>
<tr><td colspan="8">Prerequisite: Computer Basics, Procedural Programming Languages</td></tr>
</table>

Course Objective: The course intends to make students learn expert python programming concepts. The main purpose of the course is to develop professional skills required for Full Stack Developer, so as to get an edge over others with the sharpen technical skills.

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

SN	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Understand OOP's concepts in Python.	L1, L2
2	Understand concept of Packages & Atomisator in python.	L1, L2, L3
3	Implement web services using various tools in python.	L1, L2, L3
4	Comprehend concepts of application integration with Python	L1, L2
5	Comprehend concepts of managing code life cycle in python.	L1, L2, L3
6	Show project documentation in python.	L1, L2, L3, L4

Detailed Syllabus of 20 hours:

Sr. No.	Topic	Total Hours	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Introduction to Python OOP's Concepts**	4	L1, L2
	Basics : Introduction , Using a class to encapsulate data and processing ,Designing classes with lots of processing , Designing classes with little unique processing ,Optimizing small objects with __slots__ ,Using more sophisticated collections ,Extending a collection – a list that does statistics Using properties for lazy attributes ,Using settable properties to update eager attributes , Iterator ,Genrator **Advanced Class Design :** Introduction ,Choosing between inheritance and extension – the is-a question, Separating concerns via multiple inheritance Leveraging Python's duck typing , Managing global and singleton objects Using more complex structures – maps of lists , Creating a class that has orderable objects ,Defining an ordered collection ,Deleting from a list of mappings		
2	**Packages & Atomisator**	2	L1, L2 ,L3
	Packages : A Common Pattern for All Packages , The Template-Based Approach , Creating the Package Template **Atomisator:** An Introduction , Overall Picture , Working Environment , Writing the Packages , Distributing Atomisator , Dependencies between Packages		
3	**Web Services & Testing**	4	L1, L2 ,L3
	Introduction : Reading JSON,HTML, XML documents. **Web Services :** Introduction ,Implementing web services with WSGI ,Using the Flask framework for RESTful APIs ,Parsing the query string in a request Making REST requests with urllib ,Parsing the URL path Parsing a JSON request ,Implementing authentication for web services **Testing :** Introduction , Using docstrings for testing , Testing functions that raise exceptions ,Handling common doctest issues , Creating separate test modules and packages ,Combining unittest and doctest tests ,Testing things that involve dates or times ,Testing things that involve randomness ,Mocking external resources		
4	**Application Integration**	4	L1, L2 ,L3
	Introduction , Finding configuration files , Using YAML for configuration files Using Python for configuration files , Using class-as-namespace for configuration ,Designing scripts for composition ,Using logging for control and audit output ,Combining two applications into one ,Combining many applications using the Command design pattern , Managing arguments and configuration in composite applications , Wrapping and combining CLI applications ,Wrapping a program and checking the output , Controlling complex sequences of steps		
5	**Managing Code & Life Cycle**	4	L1, L2 ,L3

	Version Control Systems-GITHub ; Centralized systems , Distributed systems Continuous Integration Different Approaches , Defining a Life Cycle ,Setting Up a Tracking System		
6	**Documenting Your Project**	**2**	L1, L2 ,L3
	The Seven Rules of Technical Writing , A restructured Text Primer , Building the Documentation ,Make Your Own Portfolio		
	Total Hours	**20**	

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	Modern Python Cookbook	Steven F. Lott	Packt	Second	2016
2	Expert Python Programming	Michał Jaworski , Tarek Ziadé	Packt	Third	2019

Online References:

S. No.	Website Name	URL	Modules Covered
1	www.learnpython.org	https://www.learnpython.org/	M1,M2,M3
2	www.w3schools.com	https://www.w3schools.com/python/	M1-M5
3	www. realpython.com	https://realpython.com/documenting-python-code/	M6

S.E. Semester –IV

Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)
TCET Autonomy scheme with effect from 2021-22

<table>
<tr><td colspan="5">B.E (Information Technology)</td><td colspan="4">S.E. (SEM: IV)</td></tr>
<tr><td colspan="5">Course Name: Professional Skill IV (Data Pre-processing for Machine Learning)</td><td colspan="4">Course Code: HME-ITPS401</td></tr>
<tr><td colspan="5">Teaching scheme (Holistic Student Development - HSD) (Conducted in the beginning of Semester during first 3 Weeks)</td><td colspan="4">Examination Scheme (Formative/ Summative)</td></tr>
<tr><td colspan="5">Modes of Teaching / Learning / Weightage</td><td colspan="4">Modes of Continuous Assessment / Evaluation</td></tr>
<tr><td colspan="5">Hours</td><td>Theory (100)</td><td>Presentation (50)</td><td>Report (25)</td><td>Total</td></tr>
<tr><td>Theory</td><td>Tutorial</td><td>Practical</td><td>Contact Hours</td><td>Credits</td><td>IA</td><td>ESE</td><td>AC</td><td>AC</td><td rowspan="2">75</td></tr>
<tr><td>15</td><td>-</td><td>30</td><td>45</td><td>2</td><td>--</td><td>--</td><td>50</td><td>25</td></tr>
<tr><td colspan="9">AC- Activity Evaluation
Total weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely Completion of Practical (40%) and Attendance/Learning Attitude (20%).</td></tr>
<tr><td colspan="9">Prerequisite: Database and Programming Language</td></tr>
</table>

Course Objective: The course intends to deliver the advance python concept to create easy-to-use and easy- to-maintain modules and packages. This Course will help to manipulate data, build custom classes and functions, create lists, and write more elegant, optimized code.

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

Sr. No.	Course Objectives	Cognitive levels of attainment as per Bloom's Taxonomy
1	To Understand fundamentals of data preprocessing.	L1, L2
2	To learn Python Libraries and utilize them to solve real life problems based on data.	L1, L2
3	Develop the understanding to manipulate the dataset using different technique.	L1, L2, L3
4	To learn how to use lists, tuples, and dictionaries in Python.	L1, L2, L3
5	To understand file handling using Python.	L1, L2, L3,L4
6	Understand how to use data visualization and create great dashboards and visualizations.	L1, L2, L3,L4

Detailed Syllabus (Total No. of Hours : 15)

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
01	**Introduction** What is data preprocessing? Missing data - columns, rows. Working with data types, Converting a column type, Class distribution, Class imbalance, Stratified sampling.	02	L1, L2
02	**Introduction to Python Libraries** Installation of the Python libraries, Importing the libraries, Useful Python Libraries: NumPy, Scipy, Scikit-learn, Pandas, Matplotlib.	02	L1, L2
03	**Python Objects and Data structures** Primitive Data Structures: Integers, Float, Strings, Boolean. Non-Primitive Data Structures: Arrays, Lists, Tuples, Dictionary, Sets.	02	L1, L2, L3
04	**Data Preprocessing using Python** Steps in Data Preprocessing: Importing the libraries, Importing the data, handling missing data, Encoding Categorical data, Splitting the dataset into the Training set and Test set, Feature Scaling.	03	L1, L2, L3, L4
05	**Python File Handling** File Modes in Python, Open a Text File, Create a Text File, Append to a File, Read Files, Read a File line by line, Writing to a File, Import an Excel File with Python.	03	L1, L2, L3, L4
06	**Data Visualization** Introduction to Data Visualization, Visualization Packages: Matplotlib, Pandas Visualization, Seaborn, ggplot, Plotly	03	L1, L2, L3, L4

List of Practicals/ Experiments:

Sr. No.	Type of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Basic Experiments**	To study data processing using python.	2	L1, L2, L3
2		Code on Python Objects and Data structures.	2	L1, L2, L3
3	**Design Experiments**	To study python libraries.	4	L1, L2, L3
4		Code on Python Arrays, Lists, Tuples, Dictionary, Sets	4	L1, L2, L3

5		To study Data Preprocessing using Python to solve real life data problem	4	L1, L2, L3
6	**Advanced Experiments**	Code for handling Missing Data, Categorization Data, Splitting Datasets into Training Sets and Test Set, Features Scaling	2	L1, L2, L3
7		To study python file handling. Code on Reading and Writing Text Files, Excel files with Python	2	L1, L2, L3
8		To study Data Visualization using Python to solve real life data problem.	4	L1, L2, L3
9	**Mini/Minor Projects/ Seminar/ Case Studies**	Design a Mini Project	6	L1, L2, L3, L4, L5
	Total Hrs.		**30**	

Books and References:

Sr. No	Title	Authors	Publisher	Edition	Year
1	The Complete reference Python	Martin Brown	McGraw- Hill	Second	2018
2	Advanced Python Programming	Dr. Gabriele Lanaro, Quan Nguyen	Packt Publishing	First	2019
3	Data Visualization with Python: Create an impact with meaningful data insights using interactive and engaging visuals	Mario Dobler, Tim Großmann	Packt Publishing	First	2019

Online References:

Sr. No.	Website Name	URL	Modules Covered
1	https://realpython.com	https://realpython.com/tutorials/advanced/	M1-M6
2	https://analyticsindiamag.com https://towardsdatascience.com/	https://analyticsindiamag.com/data-pre-processing-in-python/ https://towardsdatascience.com/data-preprocessing-in-python-b52b652e37d5	M1

3	https://data-flair.training/	https://data-flair.training/blogs/python-libraries/	M2
4	https://www.datacamp.com	https://www.datacamp.com/community/tutorials/data-structures-python	M3
5	https://www. javatpoint.com/	https://www.javatpoint.com/data-preprocessing-machine-learning	M4
6	https://stackabuse.com/	https://stackabuse.com/file-handling-in-python	M5
7	https://medium.com/ https://towardsdatascience.com/	https://medium.com/codex/step-by-step-guide-to-data-visualizations-in-python-b322129a1540 https://towardsdatascience.com/introduction-to-data-visualization-in-python-89a54c97fbed	M6
8	https://www.techbeamers.com	https://www.techbeamers.com/python-tutorial-step-by-s	M1-M6

S.E. Semester –IV
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)
TCET Autonomy scheme with effect from 2021-22

B.E (Information Technology)					**S.E(SEM :** IV)		
Course Name : Project Based Learning-II					**Course Code: HME-ITPBL401**		
Teaching scheme (Holistic Student Development - HSD) (Conducted in the beginning of Semester during first 3 Weeks)					**Examination Scheme (Formative/ Summative)**		
Modes of Teaching / Learning / Weightage					**Modes of Continuous Assessment / Evaluation**		
Hours					**Presentation (25)**	**Report (25)**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**AC**	**AC**	
-	-	30	30	1	25	-	**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 Fundamentals & knowledge of Programming Languages							

Course Objectives: The course intends to deliver the fundamental knowledge of basic real time problems, study existing solutions, prepare literature survey, and apply basic computing & mathematics fundamentals and fundamental concepts of Programming such as C/C++ and Java to solve Basic real time problems.

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

S. No.	Course outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	To identify & analyze the basic real time problems and prepare literature survey.	L1, L2, L3,L4
2	Identify & apply appropriate technologies & programming constructs to solve problems.	L1, L2, L3
3	Presenting & Documenting results obtained.	L1, L2, L3,L4

Suggested Project Topics:

Sr. No.	Project Titles for PBL
1	Multiple contingency services application
2	GST calculating website
3	Book Benchers website
4	Prediction of lifestyle disease
5	Automated Canteen web application
6	Healthcare Application

7	E-Ticketting App
8	Food Donation App
9	Human Safety Application
10	Medical help website
11	Job Finder Application
12	Book review website
13	Traffic and Accident Management
14	Medical Emergency App
15	Platform that Lists All Startup Related Events
16	Citizen Feedback on Maintenance of Road
17	Group messaging solution
18	Online personal diary
19	Drive mode app for road safety
20	Paperless office
21	Accident prevention.
22	Android app for university helpline,
23	Community based Web application
24	Virtual Assistant
25	Student Monitoring System
26	Personal management assitant
27	Common mobility application
28	Mobile app for Sansad adarsh gram yojna
29	To design dynamic website using advanced web technologies
30	Sustainable tourism management
31	Efficient, easy and integrated billing system
32	Identifying accident prone area for roads
33	Yoga helathcare management system
34	IOT in agriculture
35	Games on Road Safety
36	App development using IOT
37	Indian Railways on Google Earth
38	Google Ad Grants online marketing challenge

Note: Project topic can be selected as per the Domain and current Trends in the Technology.

S.E. Semester –IV
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)
TCET Autonomy scheme with effect from 2021-22

<table>
<tr><td colspan="5">B.E. (Information Technology)</td><td colspan="3">S.E. (SEM : IV)</td></tr>
<tr><td colspan="5">Course Name :Activity Based Learning IV</td><td colspan="3">Course Code:HME-ITABL401</td></tr>
<tr><td colspan="5">Teaching scheme (Holistic Student Development - HSD) (Conducted in the beginning of Semester during first 3 Weeks)</td><td colspan="3">Examination Scheme (Formative/ Summative)</td></tr>
<tr><td colspan="5">Modes of Teaching / Learning /Weightage</td><td colspan="3">Modes of Continuous Assessment / Evaluation</td></tr>
<tr><td colspan="5">Hours</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">50</td></tr>
<tr><td>-</td><td>-</td><td>30</td><td>30</td><td>1</td><td>25</td><td>25</td></tr>
<tr><td colspan="8">AC- Activity Evaluation</td></tr>
<tr><td colspan="8">The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)</td></tr>
<tr><td colspan="8">Prerequisite: Basics of Computer Programming, General knowledge, Social awareness,</td></tr>
</table>

Course Objectives: The larger objective of the course is to develop the Society Sensitive Citizens by creating awareness among students and take up the initiatives in the Activity mode for the needy.
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 social issues and help the society in the area of work.

Course Outcomes:

S.No.	Course Outcome	Cognitive level attainment as per revised Bloom Taxonomy
1	Student will be able to outline the procedures for Creative writing, which will give them wings of imagination with self-expression in the topic. Learn on multidisciplinary subjects.	L1, L2, L3
2	Student will know the importance of the *extempore* speech which will help them to think and develop presence of mind. Exposure to Group discussion will provide an opportunity to all team members to give their ideas and opinion on a certain topic. It increases one's listening skills and confidence in speaking. Team building improves.	L1, L2, L3
3	Students will learn the strengths of survey research including its effectiveness, generalizability, reliability, and versatility. Students will be able to make the awareness about various social issues.	L1, L2, L3

Detailed Syllabus:

Module No.	Topics	Hrs	Cognitive level attainment as per revised Bloom Taxonomy
1	**Creative writing (technical/non-technical**		L1, L2, L3
	I. Introduction to creative writing. a) Orientation and Introduction to Writing skills both article form and paper writing. Information about the rules and regulations about original writing. Templates of good journals eg. (IEEE format) with emphasize on originality, plagiarism check. Topic distribution in different categories as per choice of students Select the topic of article/ paper either from choice or in consultation with teacher. Discussion forum or Use of internet is allowed for the same. **Brainstorming and prewriting** Form teams divide into 8 teams. 5 students per team. Form the skeleton of the paper with data properly designed. check the plagiarism and shaping the article/paper with the team. **II. Drafting and editing** Continuation of the article/paper shaping, taking care of plagiarism Submit the article /paper introduction in one page outlining the salient features of the topic in hard copy. Students can have the freedom of choosing mentor faculty from college if needed. Finalizing the article/ paper. **Demonstration by students** and evaluation (Presentation of papers of 4 teams with inputs from mentors/teachers) **Evaluation by faculty as per format.**	2 2	
2	**Lecturette (Extempore speech)**		L1, L2, L3
	I. Introduction Orientation and Introduction to lecturette/ extempore rules The candidate is required to deliver a short talk for 03 minutes to the group watching him. Choice of topic discussion. Technical/ Non-technical **A suitable topic** is to be chosen out of 04 topics given. 03 minutes will be given for thinking, jotting down points and organizing the speech without any help. Candidate has to introduce himself/herself in brief before starting the talk. **II. Extempore/Presentation by each student** **Evaluation by faculty as per format.**	2 2	
3	**Group Discussion**		L1, L2, L3
	I. Introduction and orientation about Group discussion and rules . GDs form an important part of the short-listing process for recruitment or admission in a company or institution. Types of GD Topics such as social, political, economic, technical etc. Topic choice to be given to students and based on that Team formation on the chosen topic Brainstorming among the students to form teams on topics selected. **.Prepare the points for group discussion.** Formation of four teams for two topics. Two teams (For and against) for topic I will debate first and the other two team will be audience and for topic II vice-versa. **II. Paraphrasing/summarizing.** Evaluation will be based on Creativity skills supported by listening and participating proactively by presentation of teams.	2 2	

	Group discussion among the teams members sequentially, other teams will be audience to discussing team and vice versa. **Evaluation by faculty as per format**		
4	**SURVEY DESIGNING AND STUDY**		
	I. 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. Brainstorming and establishing the goal of the project Form teams, divide into 8 teams. 5 students per team. 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. **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 Submission of projects as hard copy Evaluation by faculties	2 2	
5	**Extended Work**		L1, L2, L3
	I Orientation and Introduction about social responsibilities. Team formation 5 students in each team. Visit to nearby community to provide necessary help based on the following topics **(a)Food Waste (TCET canteen) and societies.** Keep record of food waste daily in kilogram, help in designing the display of food wastage every day. Similarly extend the idea in their own society during festivals, gatherings. **(B) Health awareness** Take the record of the societies in which they reside, collect the information about vaccinations (age wise , validity of time etc) Record maintenance **(c) 3-minute Film making or case study** on the above two themes by teams and presentation. **Evaluation by faculty as per format.**	4 4 6	
	Total Hours	**30**	

Books and References:

1.Creative Writing Book,Book by Louie StowelL

2. Group Discussion on Current Topics,Book by By : Major (retd.) P. N. Joshi

3.Complete Guide to Group Discussion,Book by PRASOON. PROF SHRIKANT

4. Extempore speech, how to acquire and practice it,Book by William Pittenger

5. http://theconversation.com/awareness-of-food-waste-can-help-us-appreciate-holiday-meals-105798

6. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5072240/