S.E. Semester –IV

Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)
TCET Autonomy scheme with effect from 2022-23

<table>
<tr><td colspan="9">B.E (Information Technology)</td><td colspan="3">S.E.(SEM : IV)</td></tr>
<tr><td colspan="9">Course Name : Applied Mathematics IV</td><td colspan="3">Course Code : BSC-IT 401</td></tr>
<tr><td colspan="5">Teaching Scheme (Program Specific)</td><td colspan="7">Examination Scheme (Formative/ Summative)</td></tr>
<tr><td colspan="5">Modes of Teaching / Learning / Weightage</td><td colspan="7">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>-</td><td>TW</td><td rowspan="2">125</td></tr>
<tr><td>3</td><td>1</td><td>-</td><td>4</td><td>4</td><td>20</td><td>20</td><td>60</td><td>-</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 Tutorial (40%) and Attendance/Learning Attitude (20%)</td></tr>
<tr><td colspan="10">Prerequisite: Basic Mathematics.</td></tr>
</table>

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 2022-23

B.E(Information Technology)								SEM: IV		
Course Name : Principles of Communication								Course Code: ESC-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)			ctical/Oral (25)	rm 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 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 : Basics of Electrical Engineering

RBT: Revised Blooms Taxonomy

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,L3
2	Identify different types of noise and significance of noise in cascaded systems	L1,L2,L3
3	Analyze the concepts of Amplitude modulation and demodulation	L3,L4
4	Analyze the concepts of angle modulation and demodulation	L3,L4
5	Apply the concepts of sampling theorem to various analog pulse modulation techniques and also represent the data in various line code formats.	L1,L2,L3
6	Analyze various digital pulse modulation and demodulation.	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 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,L3
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,L3
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	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: Balance slope detector, Foster Seely Discriminator, Ratio detector	08	L3,L4
5	Analog Pulse Modulation and Demodulation Sampling Techniques: Natural sampling & Flat Top sampling with sample and hold circuit. PAM: Pulse Amplitude modulation & generation & detection PWM: Pulse width modulation, generation and detection. PPM: Pulse position modulation of generation & detection. Comparison of PAM PWM & PPM. Line coding techniques: Return to zero (RZ), Non-Return to zero (NRZ); Manchester Encoding Differential Manchester, Bipolar Coding –	07	L1,L2,L3
6	Digital Pulse Modulation and Demodulation Introduction, Advantages and disadvantages of digital transmission, Pulse Code Modulation PCM: PCM Transmitter (Encoder), Shape of the PCM Signal, PCM Receiver (Decoder). Quantization Process, Quantization error. Differential Pulse Code Modulation DPCM: DPCM Transmitter, DPCM Receiver, Linear Delta Modulation DM: Delta Modulator Transmitter, DM Receiver, Distortions in the DM System. Adaptive Delta Modulation ADM: ADM Transmitter, ADM Receiver Comparison of Digital Pulse Modulation techniques PCM, DPCM, DM, ADM.	07	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)	To study Amplitude modulation and demodulation and its spectrum analysis	2	L1, L2, L3
2		To study Double side band suppressed carrier modulation and demodulation and its spectrum analysis	2	L1, L2, L3
3		To study Single side band modulation and demodulation and its spectrum analysis	2	L1, L2, L3
4		To study frequency modulation and its spectrum analysis	2	L1, L2, L3
5		To verify sampling theorem for different sampling frequencies	2	L1, L2, L3
6	Advance Experiments (Based on Volumetric Analysis)	To study Pulse amplitude modulation and demodulation and its spectrum analysis	2	L1, L2, L3
7		To study Time division multiplexing and demultiplexing	2	L1, L2, L3
8		To study Frequency division multiplexing and demultiplexing	2	L1, L2, L3
9		To study different line code format	2	L1, L2, L3
10	Design Based Experiments	To study BASK, BFSK and BPSK	2	L1, L2, L3
11		Study of Communication link	4	L1, L2, L3
12	Project Based Experiments- Group Activity) (Students should complete any one project Based experiment from the list or any other project in discussion Charge)	Mini Project	6	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

Online References:

Sr. No	Website Name	URL	Modules Covered
1.	https://nptel.ac.in	https://archive.nptel.ac.in/courses/108/104/108104091	M1
2.	https://nptel.ac.in	https://archive.nptel.ac.in/courses/108/104/108104091	M2
3.	https://nptel.ac.in	https://archive.nptel.ac.in/courses/108/104/108104091	M3
4.	https://nptel.ac.in	https://archive.nptel.ac.in/courses/108/104/108104091	M4
5.	https://nptel.ac.in	https://archive.nptel.ac.in/courses/108/104/108104091	M5
6.	https://nptel.ac.in	https://archive.nptel.ac.in/courses/108/104/108104091	M6

S.E. Semester –IV
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)
TCET Autonomy scheme with effect from 2022-23

B.E (Information Technology)								SEM: IV		
Course Name : Computer Organization and Architecture								Course Code: PCC-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	OR	TW	
3	1	-	4	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 tutorial (40%) and Attendance/Learning Attitude (20%)										
Prerequisite: Computer Basics, Digital Logic										

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	Demonstrate and apply computer arithmetic operations on integer and real numbers.	L1, L2, L3
3	Understand control unit operation	L1, L2
4	Understand the concept of parallelism	L1, L2
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**	01	L1, L2
	Basic combinational and sequential logic circuits, binary numbers and arithmetic, basic computer organizations		
1.	**Overview of Computer Architecture & Organization**	06	L1, L2
	Introduction of Computer Organization and Evolution of Computers, Von Neumann model. Performance measure of Computer Architecture. System bus structure: Data, address and control buses.		
2	**Data Representation and Arithmetic Algorithms**	10	L1, L2, L3
	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		
3	**Processor Organization and Architecture**	06	L1, L2
	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.		
4	**Parallel & Pipeline Processing**	05	L1, L2
	Introduction to parallel processing concepts, Flynn's classifications, Instruction Level parallelism, pipeline processing, instruction pipelining, pipeline stages, pipeline hazards.		
5	**Memory Organization**	09	L1, L2
	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.		
6	**I/O Organization**	08	L1, L2, L3, L4
	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. Case study: Study or Examines various processors available in the market based on distinct processor characteristics.		

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	John P.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.geeksforgeeks.org	https://www.geeksforgeeks.org/computer-organization-booths-algorithm/	M2
3.	https://www.geeksforgeeks.org	https://www.geeksforgeeks.org/computer-organization-risc-and-cisc/	M3
4.	https://www.javatpoint.com	https://www.javatpoint.com/flynns-classification-of-computers	M4
5.	https://www.javatpoint.com	https://www.javatpoint.com/classification-of-memory	M5
6.	https://www.geeksforgeeks.org	https://www.geeksforgeeks.org/io-interface-interrupt-dma-mode/	M6

S.E. Semester –IV

Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020) TCET Autonomy scheme with effect from 2022-23

<table>
<tr><td colspan="8">B.E (Information Technology)</td><td colspan="3">SEM: IV</td></tr>
<tr><td colspan="8">Course Name: Computer Network</td><td colspan="3">Course Code: PCC-IT 402</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>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>PR</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="11">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%)</td></tr>
<tr><td colspan="11">Prerequisite: Concept of Basic Communication and Network</td></tr>
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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.	**04**	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, Transmission Media: Guided Media, Unguided Media: Wireless, Repeaters or Hubs, Link-Layer Switches, Routers, Introduction of 1G,2G & 3G systems. Physical layer overview, Latency, Bandwidth, Delay	**06**	L1, L2,L3
3	**The Data Dink Layer** Wired Networks; Introduction: Nodes and Links, Two Types of Links, Two Sublayers, Data Link Control: Fundamentals of Error Detection and Error Correction, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Go-back–N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, Multiple access protocols - Pure ALOHA, Slotted ALOHA, CSMA/CD, CDMA/CA	**10**	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 Address mapping – ARP, RARP, BOOTP and DHCP–Delivery, Forwarding and 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, Introduction to Mobile IP.	**10**	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. Quality of Service (QoS), QoS improving techniques - Leaky Bucket and Token Bucket algorithms.	**08**	L1, L2, L3, L4
	Application layer	**0**	

6	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),Introduction to SNMP.	**7**	L1, L2, L3,L4

List of Practical's/ Tutorials:

Exp 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)**	Study & demonstration of basic networking commands.	2	L1, L2
2		Network System Administration: Understanding various networking devices	2	L1, L2, L3
3	**Design Based Experiments**	Implementation of LAN topologies using Packet tracer	2	L1, L2, L3
4		Implementation of CRC technique	2	L1, L2, L3
5		Implementation of IP addressing (first IP address and last IP address of a given Subnet)	2	L1, L2, L3, L4
6		Study & Analysis of TCP/IP header using Wireshark.	2	L1, L2, L3
7		Implementation of Dijkstra's routing algorithms	2	L1, L2, L3
8	**Advance Experiments (Based on Volumetric Analysis)**	Implementation of AODV protocol	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 2022-23

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										

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 Analyse to Implement GUI application using Database.

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 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

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 , Generators, 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, Math Module and user defined function.	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	9	L1, L2, L3
	Total No. of Hours: 45		

Detailed Syllabus (Total No. of Hours: 45)

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 2022-23

<table>
<tr><td colspan="9">BE (Information Technology)</td><td colspan="2">S.E. (SEM : IV)</td></tr>
<tr><td colspan="9">Course Name : Value Education</td><td colspan="2">Course Code : MC- 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>
<tr><td colspan="5">Hours Per Week</td><td colspan="3">Theory (100)</td><td>Presentation (25)</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>ISE</td><td>IE</td><td>ESE</td><td>AC</td><td>AC</td><td rowspan="2">25</td></tr>
<tr><td>1</td><td>--</td><td>--</td><td>1</td><td>Non credit</td><td>--</td><td>--</td><td>--</td><td>--</td><td>25</td></tr>
<tr><td colspan="10">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%)</td></tr>
<tr><td colspan="10">Prerequisite: Moral Science</td></tr>
</table>

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:

Sr. 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

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** 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	L1, L2
3	**Right Understanding** 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.	3	L1, L2, L3
4	**Dealing with Habits** 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.	3	L1, L2, L3
5	**Dealing with Stress** 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.	3	L1, L2, L3
6	**Harmony at Various Levels** 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.	2	L1, L2,L3
Total Hrs.		**15**	

Detailed Syllabus of 15 hours:

Books and References:

Sr. 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

<table>
<tr><td colspan="6">B. E. Information Technology</td><td colspan="3">S.E.SEM: IV</td></tr>
<tr><td colspan="6">Course Name: Summer Internship</td><td colspan="3">Course Code: SI-IT 401</td></tr>
<tr><td colspan="5" rowspan="2">Contact Hrs. during Weekend / Semester Break/ End of Semester (Between 21st and 25th Week)</td><td colspan="3">Assessment/Evaluation Scheme</td></tr>
<tr><td>Presentation</td><td>Report</td><td>Non-Grant Term work based on Presentation and Report</td></tr>
<tr><td>Theory</td><td>AC</td><td>Practical</td><td>Contact Hours</td><td>Credits</td><td>AC</td><td>AC</td><td>TW</td></tr>
<tr><td>-</td><td>-</td><td>-</td><td>160 *</td><td>4*</td><td>-</td><td>-</td><td>50</td></tr>
<tr><td colspan="8">AC- Activity evaluation TW – Term Work Examination

* Students may go up to 160 hrs. to acquire maximum 4 credits. Students should collectively acquire total contact hrs in below given activities in a span of 1 year (3rd and 4th 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.</td></tr>
<tr><td colspan="8">Prerequisite: Fundamental knowledge of Information Technology related tools</td></tr>
</table>

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** 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	L1, L2, L3
2	**Inter disciplinary Internship** • 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	L1, L2, L3
3	**Industry Specific Internship** • To explore and understand issues and challenges in industry • Developing solutions for industry specific problems • Design, develop and deploy products for start-up and SMEs	L1, L2, L3
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=internships	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 2022-23

<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>Term Work</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, Usingsettable properties to update eager attributes, Iterator, Generator **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 2022-23

<table>
<tr><td colspan="8">B.E.(Information Technology)</td><td colspan="4">S.E.(SEM : IV)</td></tr>
<tr><td colspan="8">Course Name: Professional Skills IV-ASP.NET</td><td colspan="4">Course Code : HME –ITPS401</td></tr>
<tr><td colspan="8">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="8">Modes of Teaching / Learning / Weightage</td><td colspan="4">Modes of Continuous Assessment / Evaluation</td></tr>
<tr><td colspan="6">Hours</td><td colspan="2">Theory (100)</td><td>Presentation (50)</td><td>Report (25)</td><td>Term Work</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="10">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="10">Prerequisite: Database , HTML , Object oriented language, any scripting language</td></tr>
</table>

Course Objective: The course intends to deliver the fundamentals of .NET Architecture. It aims to focus on database connectivity with GUI, developing simple websites, validation of the WebPages.

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	Identify the components of .NET and implement oops concept in C#.NET	L1, L2
2	Perform connectivity of front end with back end	L1, L2,L3
3	Incorporate the asp server control on web page	L1, L2,L3,L4
4	Implement session and application objects in web page	L1, L2,L3,L4
5	Design and Develop web site	L1, L2,L3,L4 ,L6
6	Develop web services using SOAP protocol	L1, L2,L3,L4

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**An Introduction to C#.NET** .NET Overview, CLR, Assemblies (monolithic vs. component-based applications), data types , classes , objects , error handling including error logging	2	L1,L2
2	ADO.NET	3	L1, L2, L3

	Introduction to Data Controls Data grid view, data set, data adapter, data reader, connectivity between front-end and back end.		
3	Introduction to ASP.NET	**3**	L1, L2, L3,L4
	Web page life cycle , page rendering , HTML , client side controls , ASP.NET Controls: Checkbox, Radio Button, List Box, Textbox, Label.		
4	Session and Application Management	**2**	L1, L2, L3,L4
	Introduction to session and application, Session objects. Developing webpage using session and application object		
5	Website development	**3**	L1,L2,L3,L4,L6
	Design simple website , Design website including database connectivity, Incorporating ADO.NET component in website , Validation controls , 3 tier architecture / Layer Architecture		
6	Web services	**2**	L1, L2, L3,L4
	Introduction to SOA and SOAP protocol, Simple web service to get input and process it. Secure coding guidelines.		
	Total Hr.	**15**	

List of Practical/ Experiment:

Practical No.	**Type of Experiment**	**Practical/Experiment topic**	**Hrs**	**Cognitive levels of attainment as per Bloom's Taxonomy**
1	**Basic experiment**	Develop simple application in C#.NET to demonstrate looping, branch concept of programming language.	4	L1, L2
2		Develop application to demonstrate classes , object , inheritance in C#.NET	4	L2,L3
3		Create a application to implement the controls such as text box , radio button , check box , list view, dropdown on web page	4	L2,L3,L4
4	**Design Experiment**	Design webpage to demonstrate session management concept in asp.net	2	L2,L3,L4
5		Design webpage to demonstrate application management in asp.net	2	L2,L3,L4
6		Develop a registration and login form and show implementation of ADO.NET	4	L2,L3,L4
7		Demonstrate the SOAP protocol by implementation of web service	4	L2,L3,L4
8	**Group Activity/ Case study**	Design a website for online shopping / Online banking / Online Reservation System	6	L2,L3,L4,L6
Total Hrs.			**30**	

Books and References:

S. No.	Title	Authors	Publisher	Edition	Year
1.	ASP.NET 3.5 UNLEASHED	Stephen Walther	SAMS	1 edition	2008
2.	ASP.NET 3.5 AJAX	by Bill Evjen , Matt Gibbs, Dan Wahlin, Dave Reed	Wrox	1 edition	2009
3.	Microsoft® ASP.NET and AJAX: Architecting Web Applications	Dino Esposito	Microsoft Press	1 edition	2009

Online Recourses:

S. No.	Website Name	URL	Modules covered
1.	https://dotnet.microsoft.com	https://dotnet.microsoft.com/learn/dotnet/hello-world-tutorial/create https://www.youtube.com/watch?v=XjtB0GIyQgk	M1
2.	https://www.javatpoint.com	https://www.javatpoint.com/ado-net-tutorial	M2
3.	https://www.javatpoint.com	https://www.javatpoint.com/asp-net-tutorial	M3
4.	https://www.tutorialspoint.com	https://www.tutorialspoint.com/asp.net/asp.net_managing_state.htm	M4
5.	https://www.tutorialspoint.com	https://www.tutorialspoint.com/asp.net/asp.net_database_access.htm	M5
6.	https://www.tutorialspoint.com	https://www.tutorialspoint.com/asp.net/asp.net_web_services.htm	M6

S.E. Semester –IV

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

TCET Autonomy scheme with effect from 2022-23

<table>
<tr><td colspan="6">B.E.(Information Technology)</td><td colspan="3">S.E. SEM:IV</td></tr>
<tr><td colspan="6">Course Name: Project Based Learning-II</td><td colspan="3">Course Code: HME – ITPBL401</td></tr>
<tr><td colspan="5">Teaching Scheme (Holistic and Multidisciplinary Education)
Industry Specific/Interdisciplinary</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">Total Hours</td><td>Presentation</td><td>Report</td><td>Term Work</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>-</td><td>1</td><td>10</td><td>15</td></tr>
<tr><td colspan="8">AC: Activity Evaluation
The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance (20%)
*Total Number of Hours utilized PBL activities: 40 (30 Hours-Instructional + 10 hours for collaborative and self-learning) hours per semester</td></tr>
<tr><td colspan="8">Course will be conducted in the beginning of the semester during first 03 weeks</td></tr>
<tr><td colspan="8">Prerequisite: Prerequisite: ABLIII, ABLIV, PSIII, PSIV,ESDIII, ESDIV (SEM III ,&IV), Internship</td></tr>
</table>

Course Objective:

To create platform for conducible learning environment for undergraduate students through Inspiration: Research: Ideation: Implementation phases and to develop feasible, viable and desirable problem statement of technical solution

Course Outcomes:

Students will be able to

Sr No	Course Outcomes	Cognitive levels as par bloom's Taxonomy
1	Recognize about different stages of design thinking used in problem solving	L1,L2,L3
2	Explore and empathize the problem-solving approach through Inspiration stage	L1, L2,L3,L4,L5
3	Experiment, Engage and Evolve solution to the problem through appropriate problem statement	L1, L2, L3,L4,L5,L6

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive Levels as per Bloom's Taxonomy
1	**Inspiration: Explore** **Introduction of department domain** and linking sector to it through explore and reframe opportunity such as STEEP Analysis, Activity System, Stakeholder Mapping, Opportunity Framing Sectors are according five domains of department.	6	L1, L2, L3
2	**Research: Empathize** **Methods & Tools:** Observation, User Interviews, Needs Finding, Persona Development, Mind Map: Various Available Tools and how to make effective use of it.	6	L1, L2, L3, L4
3	**Ideation: Experiment** **To generate design parameters** from different perspectives, identify and plot the steps or phases of the project overall journey. Identify key-touch points and/or gaps in the journey where you can integrate selected ideas, Address end user needs, enhance their wrt to parameters.	6	L1, L2, L3, L4
4	**Ideation: Engage** Core competence: collective learning in the organization, especially the capacity to coordinate diverse production skills and integrate streams of technologies. **To check the target users**/ constraints met or not early in the development process of your solution ideas in order to enhance and refine the design parameters	6	L1, L2, L3, L4
5	**Implementation: Evolve** Strategic Requirements: Implementation Plan that will achieve solution deduced from earlier phases to suggest the technical solution, To determine the needed resources & capabilities to implement these ideas. Current Activity System→ Solution concept→ Evolved Activity System, To formulate a feasible, viable and desirable problem statement to offer technical solution	6	L1, L2, L3, L4,L5,L6

Books and References:

SN	Title	Authors	Publisher	Edition	Year
1	**Industry X.0: Realizing Digital Value in Industrial Sectors**	Eric Schaeffer	Kogan Page	-	2017
2	Mind Map Mastery: The Complete Guide to Learning and Using the Most Powerful Thinking Tool in the Universe	Tony Buzan	Watkins	-	2018
3	The Mind Map Book: How to Use Radiant Thinking to Maximize Your Brain's Untapped Potential	Tony Buzan and Barry Buzan	**Amazon Digital Services LLC.**	-	1996

Suggested List of Practical/ Experiments:

Sr No	Title of Project	Type of Project
1	To be given by PBL coordinator with clear understanding of department domains and its linkage with various industry sector and TV2035 Challenges and students topic of interest while assigning the problem same domain/sector /challenge with different solving aspect also can be considered as a new project	Application
2	Project group formation: 2 to 3 members per group with versatile skillsets and ready to work as team to address identified challenge/s to formulate and address problem statement.	Application
3	Project sample tiles:	Application
4	Health Prediction Website	Application
5	Water quality detection using ML	Application
6	Mobile Application Development for Alumini Connect	Application
7	Stock Prize Prediction	Application
8	Loan eligibility prediction	Application
9	Mobile / web based healthcare application(Calorie tracker etc..)	Application
10	Carrier Counselling for engineering students	Application

S.E. Semester –IV
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)
TCET Autonomy scheme with effect from 2022-23

B.E.(Information Technology)					**SEM: IV**				
Course Name: Activity Based Learning IV					**Course Code: HME ITABL 401**				
Contact Hours Per Week: 2					**Credits: 01**				
Teaching Scheme (Program Specific)					**Examination Scheme (Formative/ Summative)**				
Modes of Teaching / Learning / Weightage					**Modes of Continuous Assessment / Evaluation**				
Hours Per Week					**Theory (25)**	**Presentations (25)**		**Reports (25)**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**IA -**	**ESE -**	**(AC)**	**(AC)**	**50**
-	-	30	30	1	-	-	25	25	

Course Objectives:

- The larger objective of the course is to understand the factors that influence **decision making** process and its importance in understanding what **decisions** are made. That is, the factors that influence the process may impact the outcomes of life, organization and nation as a whole.
- This course brings out the **Response Analysis** by creating excellent questionnaires and carry out efficiently the **survey** for the necessary information, and **analysing** their collected **data**.
- The interpretation of **survey responses**, using statistical techniques gives a complete understanding of the survey objective.
- 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.
- Word Association Test tend to determine behavioural tendencies, assessing how a candidate will respond for different word and knowledge instruction, which evaluates the effectiveness of possible responses and analyse attitudinal shift for betterment in individual.
- It also intends to address the social issues and help the society in the area of work.

Course Outcomes:

Sr. No.	Course Outcome	Cognitive level attainment as per revised Bloom Taxonomy
1	Students will have Personal development or self improvement with activities that develop a person's capabilities and potential, build human capital, facilitate employability, and enhance quality of life and the realization of dreams and aspirations.	L1, L2, L3
2	Students will be able to identify the most appropriate response or to rank the responses in the order they feel is most effective in Situation Reaction Test . This gives a psychological assessment of one.	L1, L2, L3
3	Student will be able to know the importance of the Lecturette/extempore speech which will help them to think and develop presence of mind.	L1, L2, L3
4	Students will be able to have an exposure to Blog writing will provide an opportunity to all team members individually to give their ideas and opinion on a certain topic. It increases one's reading skills and confidence in writing . Individual personality will improve.This will give them wings of imagination with self-expression in the topic. Learn on multidisciplinary subjects.	L1, L2, L3
5	Students will be able to know the strengths of Drama/skit understanding its effectiveness, generalizability, reliability, and versatility. Students will be able to make the awareness about various social issues.	L1, L2, L3
6	Students will be able to communicate ideas and render and information to a group. A presentation carries the speaker's personality better and allows immediate interaction between all the participants.	L1,L2,L3

Detailed Syllabus:

Module No.	Topics	Hrs	Cognitive level attainment as per revised Bloom Taxonomy
1	**Personality**	5	L1, L2, L3
	I. Every individual has his own characteristic way of behaving, responding to emotions, perceiving things and looking at the world. No two individuals are similar. Personality is nothing but the aggregate conglomeration of memories and incidents in an individual's entire life span. Environmental factors, family background, financial conditions, genetic factors, situations and circumstances also contribute to an individual's personality. Students will be divided into teams and will get some tasks so that their personality is self-assessed and also assessed by faculties and communicated for improvement. Evaluation by faculty as per format		
2	**Personality Development (Attitudinal Shift)**	5	L1,L2,L3
	II. Problem Identification: Zero Carbon Emission / Recycling of Waste/ Economical solution to country with domain topics Introduction: For example, a host of countries have recently announced major commitments to significantly cut carbon emissions, promising to reach "net zero" in coming years. The term is becoming a global rally cry, frequently cited as a necessary step to successfully beat back the climate change, and the devastation it is causing. In many sectors of the economy, technologies exist that can bring emissions to zero. In electricity, it can be done using renewable and nuclear generation. A transport system that runs on electricity or hydrogen, well insulated homes and industrial processes based on electricity rather than gas can all help to bring sectoral emissions to absolute zero. Domain wise distribution: The different branches can plan as per their domain knowledge or can be worked in multidisciplinary way. Evaluation by faculty as per format		
3	**Lecturette (Extempore speech) Organizing Self**	5	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. Lecturette/Presentation by each student Evaluation by faculty as per format		
4	**Blog writing (Response Effectiveness)**	5	L1, L2, L3
	I. Introduction to Blog writing, a blog (a truncation of "weblog") is a discussion or informational website published on the World Wide Web consisting of discrete, often informal diary-style text entries (posts). Technical writing is the art of explaining complex technical topics in simple language for readers at different experience levels. Technical writers can create anything from manuals, articles, and tutorials to whitepapers, ebooks, and product descriptions for various organizations. Before one becomes a technical writer, one has to study a number of tech blogs and learn about various writing opportunities in the tech industry so that one can better understand how to do it. A Blog writer creates dynamic content for both print and digital formats covering a variety of potential topics. It's useful to know the steps one can take to get started. Form the skeleton of the paper with data properly designed. check the plagiarism and shaping the content with the team. II. Drafting and editing Write Eye catching Headlines, Add Subheadings and Shorter Paragraphs to Break up the Page, Support by Images, Set up a campaign for social connect, if possible, supported by literature survey. Submit the article 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 content. Evaluation by faculty as per format.		
5.	**Drama / Skit (Self Organizing, Response Effectiveness)**	5	L1,L2,L3
	I Introduction: Drama/Learning Program contains three categories of drama objectives: Self-Management, Collaborative, and Discipline-based Art Objectives. Self-Management or Intrapersonal Objectives: in order to participate in drama, which feels like and looks like play, participants must also achieve self-discipline. Drama enhances verbal and nonverbal expression of ideas. It improves voice projection, articulation of words, fluency with language, and persuasive speech. Listening and observation skills develop by playing drama games, being an audience, rehearsing, and performing. Evaluation by faculty as per format.		

6.	**Presentation and Report (Organizing Self, Decision Making)**	5	L1,L2,L3
	I. Presentation will be a result of amalgamation of all modules. Blog content and on the topic with a connect to society will provide major data. II. Report writing in format. Evaluation by faculty as per format Based on Presentation and report written by students		
	Total Hours (30 hrs. conduct in class in 15 week semester +Self learning 10 hours)	40	

Books and References:

1. James, O., & Whittakar. (1970). Introduction to Psychology (pp-459-494). London: W.B. Sanders Company

2. Territorial Army Officers Exams eBook – [3000+ Questions ... books.google.co.in › books
SSB Crack
3. Extempore speech, how to acquire and practice it, Book by William Pettinger
4. "Energy efficiency and specific CO2 emissions (TERM 027) - Assessment published Jan 2013". *europa.eu*. Archived from the original on 2 April 2015. Retrieved 21 March 2015

5. Bruns, Axel, and Joanne Jacobs, eds. *Uses of Blogs*, Peter Lang, New York, 2006. ISBN 0-8204-8124-6.

6. Taxidou, Olga. 2004. *Tragedy, Modernity and Mourning*. Edinburgh: Edinburgh UP. ISBN 0-7486-1987-9 7. Agboola Sogunro, O. (2004). Efficacy of role-playing pedagogy in training leaders: some reflections. Journal of Management Development, 23(4), 355–371. https://doi.org/10.1108/026217104105298