

T.E. Semester –V

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

B.E. (All Branches)					T.E. (SEM: V)					
Course Name: Soft Skills and Interpersonal Communication					Course Code: HSMC501					
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 (00)	Total
Theory	Tutorial	Practical	Contact Hours	Credits	ISE	IE	ESE	OR	TW	100
3	-	-	3	3	20	20	60	-	-	
ISA: In-Semester Examination- Paper Duration – 1 Hour										
ESE: End Semester Examination - Paper Duration - 2 Hours										
The weightage of marks for continuous evaluation of Term work/ Report: Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)										
Prerequisite- Communication Skills, English language, and Organization culture										

Course Objective: The course intends to understand basics of soft skills, learn essential life skills, understand and develop self, and incorporate ethics and etiquette in day-to-day life.

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

Sr. No.	Course Outcomes	Cognitive Levels of Attainment as per Revised Bloom's Taxonomy
1	Understand the basics of soft skills	L1, L2, L3
2	Learn essential life skills to develop a humanitarian approach	L1, L2, L3
3	Understand and develop intrapersonal skills	L1, L2, L3
4	Develop effective relationships with the community	L1, L2, L3
5	Develop a career in the interested fields by developing the basics required for employment, entrepreneurship, and higher studies	L1, L2, L3
6	Incorporate ethics and etiquette in personal and professional life	L1, L2, L3

Detailed Syllabus (Total No. of Hours: 30):

Module No.	Topics	Hrs.	Cognitive Levels of Attainment as per Revised Bloom's Taxonomy
1	Introduction to Soft Skills	06	L1, L2, L3

	1.1. Meaning and Concept 1.2. Importance of Soft Skills 1.3. Soft Skills for Lifelong learning for building a better world 1.4. Soft Skills and Culture 1.5. Soft Skills, Employment 1.6. Entrepreneurship		
2	Essential Soft Skills 2.1 Personal integrity 2.2 Taking responsibility and accountability 2.3 Professionalism, Communication, Networking and Socializing 2.4 Customer awareness, relationship, and satisfaction 2.5 Critical and Adaptive Thinking 2.6 Creativity and innovation 2.7 Social and cultural awareness; Financial and Legal literacy 2.8 Diversity and inclusion with gender sensitivity	08	L1, L2, L3
3	Self-Development 3.1 Importance of 21 st Century skills 3.2 Self-assessment. Awareness, and Personal memory 3.3 Perception, Attitude 3.4 Values and Beliefs 3.5 Personal goal setting, Self-esteem, 3.6 Career planning 3.7 Listening, Speaking, Rapid reading and Taking notes 3.8 Complex problem solving	08	L1, L2, L3
4	Interpersonal Skills 4.1 Teamwork, Mentorship, Motivation and Leadership 4.2 Problem-Solving, Decision Making 4.3 Strategic thinking and planning 4.4 Time Management 4.5 Emotional Intelligence 4.6 Persuasion and Negotiation Skills 4.7 Stress Management	07	L1, L2, L3
5	Career Development 5.1 Cover letter, Resume 5.2 SOP and LOR 5.3 Group discussion 5.4 Presentation skills and Interview skills 5.5 Identifying employment process and portals for internship, apprenticeship, projects, entrepreneurship, and job 5.6 Identifying potential entrepreneurship opportunities and sources of funding agencies and legal literacy 5.7 Career planning for Higher Studies 5.8 Preparedness for professional career	08	L1, L2, L3
6	Introduction to Corporate Ethics and Etiquette 6.1 Business etiquette: Meeting etiquette, Dining etiquette 6.2 Interview etiquette, Professional and work etiquette, 6.3 Social skills 6.4 Greetings and art of conversation 6.5 Dressing and grooming	08	L1, L2, L3

	6.6 Ethical codes of conduct in business organization 6.7 Industry Image and Meeting customer needs and demands 6.8 Understanding and adapting industry culture for productivity and excellence		
Total		45	

Books and References:

Sr. No	Name of the Book	Name of the Author	Publisher	Edition	Year of Publication
1	The 7 Habits of Highly Effective People	Stephen Covey	Free Press	2016 Edition	2016
2	Presence: Bringing Your Boldest Self to Your Biggest Challenges	Amy Cuddy	Little, Brown Spark	1 st	2015
3	Trust Factor: The Science of Creating High-Performance Companies	Paul J. Zak	Amacom	1 st	2017
4	Leader's Guide to Mindfulness: How to Use Soft Skills to Get Hard Results	Audrey Tang	FT Publishing International	1 st	2018
5	Personality Development and Soft Skills	Barun Mitra	Oxford University Press	2 nd	2016
6	Life's Amazing Secrets: How to Find Balance and Purpose in Your Life	Gaur Gopal Das	Penguin Ananda	1 st	2018
7	Soft Skills: An Integrated Approach to Maximise Personality	Gajendra Singh Chauhan and Sangeeta Sharma	Wiley	1 st	2015

Online References:

Sr. No.	Website Name	URL	Modules Covered
1	NPTEL	NPTEL: Humanities and Social Sciences - NOC:Developing Soft Skills and Personality	M1 to M6
2	NPTEL	NPTEL: Humanities and Social Sciences - NOC:Soft skills	M1 to M6
3	NPTEL	https://onlinecourses.nptel.ac.in/noc21_hs02/	M1 to M6

T.E. Semester –V

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

B. E. (Electronics & Telecommunication Engineering)					T.E. (SEM: V)					
Course Name: Data Structures					Course Code: ESC-ETC501					
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)					
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation					
Hours Per Week					Theory			Practical/Oral	Term Work	Total
Theory	Tutorial	Practical	Contact Hours	Credits	ISE	IE	ESE	PR	TW	150
3	-	2@	5	4	20	20	60	25	25	
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: Basic programming knowledge										

Course Objective:

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

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

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Describe the types and operations of different Data Structures	L1, L2
2	Apply operations like insertion, deletion, searching and traversing on stack and queue data structure	L1, L2, L3
3	Apply operations like insertion, deletion, searching and traversing on linked list data structure.	L1, L2, L3
4	Apply operations like insertion, deletion, searching and traversing on tree data structure.	L1, L2, L3, L
5	Apply operations like insertion, deletion, searching and traversing on graph data structure.	L1, L2, L3, L4
6	Analyze appropriate sorting and searching technique for given problem	L1, L2, L3, L4

Detailed Syllabus:

Module No	Topics	Hrs	Cognitive levels of attainment as per Bloom's Taxonomy
1	Introduction to Data Structure	03	L1, L2
	Introduction Types of data Structures Abstract data type Operations on data structures.		
2	Stacks and Queues	07	L1, L2, L3
	Stack: ADT of stack, operations on stack Array implementation of stack Applications of stack Queue: ADT of queue Operations on queue Array implementation of queue Types of queues: Circular queue Priority queue Double ended queue Applications of queue		
3	Introduction to Non-Linear Data Structure	13	L1, L2, L3, L4
	Trees: Terminologies Binary tree and its types Binary tree operations and implementation Tree traversing techniques Expression tree AVL tree Multiway search tree Application of tree		
4	Linked List	08	L1, L2, L3, L4
	ADT of Linked lists Operations on linked list Types of linked lists: Single linked list Double Linked list Implementation of linked list Stack implementation using linked list Queue implementation using linked list Applications of linked list.		
5	Graphs	06	L1, L2, L3
	Graph: Terminologies Graph representation: Matrix and Adjacency list Graph traversing techniques: BFS and DFS, Spanning Trees, Shortest Path, Minimal Spanning Tree Applications of graph		
6	Searching and Sorting	08	L1, L2, L3, L4
	Searching: Linear search Binary search Sorting:		

	Insertion sort Merge sort Quick sort Heap Sort Hashing: Hash functions Hash table Hashing technique Collision resolution technique		
	Total Hours	45	

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	Data Structures: A Pseudocode Approach with C	Richard F. Gilberg & Behrouz A., Forouzan	CENGAGE Learning	Second Edition	2011
2	Data Structures using C	Reema Thareja	Oxford	Second Edition	2014
3	Data Structures Using C	Aaron M Tenenbaum, Yedidyah Langsam, Moshe J Augenstein	Person	Second Edition	2006
4	Data Structures with C	Seymore Lipschutz	Tata McGraw-Hill	India Special Edition	2011

Online References:

Sr. No.	Website Name	URL	Modules Covered
1	www.geeksforgeeks.org	https://www.geeksforgeeks.org/stack-data-structure/	M1- M6
2	www.studytonight.com	https://www.studytonight.com/data-structures/introduction-to-data-structures	M1-M3, M6
3	http://www.w3schools.in	https://www.w3schools.in/category/data-structures-tutorial/	M1-M4, M6

List of Practical/ Experiments:

Practical Number	Type of Experiment	Practical/Experiment Topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	Basic Experiments	Revision of Python Programming	2	L1, L2, L3
2		Study and evaluation of the time complexity of given programs	2	L1, L2, L3, L4
3		Implementation of Infix to Postfix Transformation using Stack Data Structure	2	L1, L2, L3
4		Implementation of Circular Queue	2	L1, L2, L3
5		Implementation of Singly Linked List	2	L1, L2, L3
6		Implementation of a Doubly Linked List (DLL)	2	L1, L2, L3

7	Advanced Experiments	Implementation of Binary Search Algorithm	2	L1, L2, L3
8		Implementation of a Binary Tree and traversal of the Binary Tree using different Traversal techniques	2	L1, L2, L3
9	Capstone Project	Capstone Project: 1. Build a Snakes & Ladders game 2. Sudoku Solver 3. Maze generator 4. Dictionary implementation 5. Employee Record System 6. Supermarket Billing System	6	L1, L2, L3, L4, L5

T.E. Semester –V

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

B. E. (Electronics & Telecommunication Engineering)					T.E. (SEM: V)					
Course Name: Discrete Time Signal Processing					Course Code: PCC-ETC501					
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)					
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation					
Hours Per Week					Theory			Practical/Oral	Term Work	Total
Theory	Tutorial	Practical	Contact Hours	Credits	ISE	IE	ESE	PR	TW	125
3	1	-	4	4	20	20	60	-	25	
ISE: In-Semester Examination - Paper Duration – 1 Hours IE: Innovative Examination ESE: End Semester Examination - Paper Duration - 3 Hours The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance / Learning Attitude (20%)										
Prerequisite: Signals & Systems										

Course Objectives: Course should be able to develop an understanding of DFT and FFT, design techniques and performance analysis of digital filters and introduce the students to digital signal processors and its applications

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	Determine DFT and IDFT of the given signal.	L1, L2, L3
2	Calculate DFT and IDFT of the given signal using FFT	L1, L2, L3
3	Design FIR filter using window technique	L1, L2, L3, L4
4	Design IIR digital filters from the analog filters	L1, L2, L3, L4
5	Describe the effect of finite word length on digital filters	L1, L2, L3, L4
6	Explain DSP applications.	L1, L2

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive Levels as per Bloom's Taxonomy
1	Discrete Fourier Transform	5	L1, L2, L3
	Definition and Properties of DFT, IDFT, Circular convolution of sequences using DFT and IDFT. Filtering of long data sequences: Overlap-Save and Overlap-Add Method for computation of DFT		
2	Fast Fourier Transform	5	L1, L2, L3
	Fast Fourier Transforms (FFT), Radix-2 decimation in time and decimation in frequency FFT algorithms, inverse FFT, and introduction to composite FFT.		
3	FIR Digital Filters	10	L1, L2, L3, L4
	Characteristics of FIR digital filters, Minimum Phase, Maximum Phase, Mixed Phase and Linear Phase Filters. Frequency response, location of the zeros of linear phase FIR filters. Design of FIR filters using Window techniques (Rectangular, Hamming, Hanning, Blackmann, and Kaiser), Comparison of IIR and FIR filters.		
4	IIR Digital Filters	10	L1, L2, L3, L4
	Types of IIR Filters (Low Pass, High Pass, Band Pass, Band Stop and All Pass), Analog filter approximations: Butterworth, Chebyshev I. Mapping of S-plane to Z-plane, impulse invariance method, bilinear transformation method, Design of IIR digital filters (Butterworth and Chebyshev-I) from Analog filters with examples.		
5	Finite Word Length effects in Digital Filter	8	L1, L2, L3, L4
	Quantization, truncation and rounding, Effects due to truncation and rounding, Input quantization error, Product quantization error, Coefficient quantization error, Zero-input limit cycle oscillations, Overflow limit cycle oscillations, Scaling. Finite word length effects in FIR digital filters.		
6	Applications of Digital Signal Processing	7	L1, L2
	Application of DSP for EEG signals analysis. Application of DSP for Echo cancellation. Application of DSP for Sub-band coding. Application of DFT to determine frequency components.		

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1.	Digital Signal Processing	Proakis J., Manolakis D.	Pearson Education	Fourth Edition	2007
2.	Discrete Time Signal Processing	Oppenheim A., Schafer R., Buck J.	Pearson Education	Second Edition	1999
3.	Digital Signal Processing: A Practical Approach	Emmanuel C. Ifeachor, Barrie W. Jervis	Pearson Education	Fourth Edition	2002

4.	Digital Signal Processing: A Computer Based Approach	Sanjit K. Mitra	McGraw Hill Education (India) Private Limited	Fourth Edition	2013
5.	Digital Signal Processing	Tarun Kumar Rawat	Oxford University Press	First Edition	2015
6.	Digital Signal Processors, Architecture, Programming and Applications	B. Venkata Ramani and M. Bhaskar	Tata McGraw Hill	First Edition	2004
7.	Theory and Applications of Digital Signal Processing	L. R. Rabiner and B. Gold	Prentice-Hall of India	Third Edition	2006

Online Resources:

Sr. No	Website Name	URL	Modules Covered
1	https://swayam.gov.in	https://swayam.gov.in/nd1_noc19_ee50/preview	M1-M6
2	https://nptel.ac.in	https://nptel.ac.in/courses/117104070/	M1-M6

List of Tutorials:

Tutorial No.	Tutorial Topic	Hrs	Cognitive levels of attainment as per Bloom's Taxonomy
1	Discrete Fourier Transform and Inverse Discrete Fourier using Formula.	2	L1, L2, L3
2	Discrete Fourier Transform and Inverse Discrete Fourier using Matrix method	2	L1, L2, L3
3	DIT and DIF Fast Fourier Transform	2	L1, L2, L3
4	FIR Digital Filters Theory	2	L1, L2, L3
5	FIR Digital Filters Problems	2	L1, L2, L3
6	IIR Digital Filters Theory	2	L1, L2, L3
7	IIR Digital Filters Design problems	2	L1, L2, L3, L4
8	Quantization, truncation and rounding	2	L1, L2, L3
9	Finite word length effects in FIR digital filters.	2	L1, L2
10	Applications of Digital Signal Processing	2	L1, L2

T.E. Semester –V

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

B. E. (Electronics & Telecommunication Engineering)					S.E. (SEM: V)					
Course Name: Analog & Digital communication					Course Code: PCC-ETC502					
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)					
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation					
Hours Per Week					Theory			Practical/Oral	Term Work	Total
Theory	Tutorial	Practical	Contact Hours	Credits	ISE	IE	ESE	PR	TW	150
3	-	2	5	4	20	20	60	25	25	
ISE: In-Semester Examination - Paper Duration – 1 Hours IE: Innovative Examination ESE: End Semester Examination - Paper Duration - 3 Hours The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance / Learning Attitude (20%)										
Prerequisite: Signals and Systems, Electronics devices and circuits-1										

Course Objectives: The course intends to introduce the concepts of principles of communication systems and to equip students with various techniques related to analog communication such as analog and digital modulation & learn about theoretical aspects of digital communication system and error control codes, to learn about error detection and correction techniques.

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

Sr. No.	Course Outcomes	Cognitive Levels of attainment as per Bloom's Taxonomy
1	Understand the fundamentals of basic communication system.	L1, L2, L3
2	Analyze different modulation techniques in analog modulation & demodulation.	L1, L2, L3, L4
3	Understand analog pulse modulation and demodulation.	L1, L2, L3
4	Compare different digital modulation & demodulation techniques.	L1, L2, L3, L4
5	Apply the concepts of Information Theory in source coding	L1, L2
6	Evaluate performance of different error control codes	L1, L2, L3, L4

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive Levels as per Bloom's Taxonomy
1	Basics of Communication System	6	L1, L2, L3
	Block diagram, electromagnetic spectrum, signal bandwidth and power, types of communication channels, Simplex and duplex systems, Modes of communication: Broadcast and point to point communication, Necessity of modulation, Classification of modulation.		

2	Analog Modulation & Demodulation	9	L1, L2, L3, L4
	Amplitude Modulation: Introduction, Mathematical analysis and expression for AM, Modulation index, Frequency spectrum and bandwidth of AM, Power calculations, Generation of AM. Amplitude Demodulation, Introduction to FM & PM.		
3	Analog Pulse Modulation and Demodulation	6	L1, L2, L3
	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.		
4	Digital Modulation & Demodulation	10	L1, L2, L3, L4
	Band-pass digital transmitter and receiver model, digital modulation schemes Generation, detection, signal space diagram, spectrum, bandwidth efficiency, and probability of error analysis of: Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK)Modulations, Binary Phase Shift Keying (BPSK) Modulation.		
5	Information Theory and Source Coding	7	L1, L2
	Block diagram and sub-system description of a digital communication system, measure of information and properties, entropy and it's properties, Shannon-Fano Source Coding, Huffman Source Coding, Differential Entropy, joint and conditional entropy, mutual information and channel capacity.		
6	Error Control Codes	8	L1, L2, L3,L4
	Types of error control, error control codes, linear block codes, systematic linear block codes, generator matrix, parity check matrix, syndrome testing, error correction Cyclic codes: Systematic & non-systematic cyclic code, error detection and correction.		

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1.	Electronics Communication Systems	Wayne Tomasi	Pearson education.	5th Edition,	2009
2.	Electronics Communication System	Kennedy and Davis	McGraw Hill	4th Edition,	2010
3.	Principles of Communication systems	Taub, Schilling and Saha	McGraw Hill	3rd Edition	2018
4.	Modern Digital and Analog Communication system	B.P. Lathi, ZhiDing	Oxford University Press	4th Edition	2017
5.	Communication Systems: Analog and Digital	P. Sing and S.D. Sapre	McGraw Hill	3rd Edition	2017
6.	Introduction to Analog and Digital Communication	Simon Haykin, Michel Moher	Wiley	2nd Edition	2023
7.	Electronic Communication	Dennis Roddy and John Coolen	Prentice Hall	4th Edition	2019

Online Resources:

Sr. No	Website Name	URL	Modules Covered
1	NPTEL	https://onlinecoursesarchive.nptel.ac.in/noc17_ec11	M1- M3
2	NPTEL hrd	Lecture Series on Communication Engineering by Prof.Surendra Prasad, Department of Electrical Engineering, IIT Delhi. For more details on NPTEL visit http://nptel.iitm.ac.in	M1-M3
3	NPTEL	https://archive.nptel.ac.in/courses/108/102/108102096/	M4-M6

Suggested list of Practical/ Experiments:

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	RBT Levels
1	Basic Experiments	To generate and detect DSBFC Amplitude Modulation Wave using Kit.	2	L1
2		To generate and detect Frequency modulation by designing DSBFC AM wave using MATLAB Simulink.	2	L1
3	Design Experiments	Generation of Pulse code Modulation Techniques PAM.	2	L1, L2, L3
4		Generation of Pulse code Modulation Techniques PWM.	2	L1, L2, L3
5		Generation of Pulse code Modulation Techniques PPM.	2	L1, L2
6		To generate and observe the performance of Return to Zero (RZ) & Non-Return to Zero (NRZ) types of line code	2	L1
7		To generate Linear Block codes using scilab.	2	L1, L2, L3
8	Advanced Experiments	Analyse cyclic codes using scilab.	2	L1, L2
9		Generate & analyze modulated and demodulated waves of Binary Amplitude Shift Keying and analyse the waves	2	L1
10		Generate & analyze modulated and demodulated waves of Binary Frequency Shift Keying and analyse the waves.	2	L1, L2

T.E. Semester –V

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

B. E. (Electronics & Telecommunication Engineering)					T.E. (SEM: V)					
Course Name: Microcontrollers and Applications					Course Code: PCC-ETC503					
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)					
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation					
Hours Per Week					Theory			Practical/Oral	Term Work	Total
Theory	Tutorial	Practical	Contact Hours	Credits	ISE	IE	ESE	PR	TW	150
3	-	2	5	4	20	20	60	25	25	
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: Digital Logic Design, Microprocessor peripherals and interfacing										

Course Objective: The course intends to deliver the systematic study of the Architecture and Programming of 8051 Microcontroller and interfacing with other peripheral ICs in addition, advance microcontroller ARM 7 is introduced. The aim of this course is to develop background knowledge and core expertise in microcontrollers, needed to develop the systems using it.

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

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Understand the basic concepts of microcontroller and detailed architecture and software aspects of 8051	L1, L2
2	Study the in-depth working of the microcontrollers and their Instruction set and write assembly language program in 8051	L1, L2, L3
3	Interface peripherals with 8051 and develop applications	L1, L2, L3, L4, L5, L6
4	Understand the detailed architecture and software aspects of advance Microcontroller ARM7	L1, L2, L3
5	Study the in-depth Instruction set and write Assembly language program in ARM-7	L1, L2, L3, L4
6	Know the Concepts of Embedded Systems and its programming	L1, L2, L3, L4, L5, L6

Detailed Syllabus:

Module No.	Topics	Hrs	Cognitive levels of attainment as per Bloom's Taxonomy
1	8051 Microcontroller	08	L1, L2
	Comparison between Microprocessor and Microcontroller, Features, architecture and pin configurations, CPU timing and machine cycle, Memory organization, Counters and timers, Interrupts, Serial data input and output		
2	8051 Programming	10	L1, L2, L3
	Instruction set, Addressing mode, Programs related to: arithmetic, logical, delay, input, output, timer, counters, port, serial communication, and interrupts		

3	8051 Interfacing and Applications	04	L1, L2, L3, L4, L5, L6
	Interfacing of Display: LED, LCD and Seven Segment display (SSD), Stepper Motor, Input / Output ports, Interfacing of ADC and DAC, Interfacing of Keyboard		
4	ARM7: A 32-bit Microcontroller	08	L1, L2, L3
	The RISC and the CISC design philosophy, Concept of Cortex-A, the Cortex-R and the Cortex-M, Features of ARM Microcontroller, Data Flow Model, Pipeline Architecture, Registers, Exceptions, Interrupt and Vector Table, Memory Management		
5	ARM7 Programming	08	L1, L2, L3, L4
	Data Processing Instructions, Conditional and Branching Instructions, ARM-THUMB Interworking, Single-Register Load-Store Instructions, Stack Instructions, Software Interrupt Instructions		
6	Introduction to Embedded System	07	L1, L2, L3, L4, L5, L6
	LPC 2148, General Purpose Input Output, Timer / Counter, Programming with Embedded C Concepts of Embedded Systems Applications characteristics classification of Embedded system Processors used in Embedded systems Optimizing Design Metrics and common Design Matrics		
Total Hours		45	

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	The 8051 Microcontroller & Embedded systems	M. A. Mazidi, J. G. Mazidi and R. D. Mckinlay	Pearson Publications	Second Edition	2006
2	The 8051 Microcontroller & Embedded systems using assembly and C language Learning	C. Kenneth J. Ayala and D. V. Gadre	Pearson Publications	Second Edition	2016
3	The 8051 Microcontrollers	Satish Shah	Oxford Publications	First Edition	2010
4	ARM System Developer's Guide	Andrew Sloss, Dominic Symes, and Chris Wright	Morgan Kaufmann Publishers	First Edition	2004
5	Embedded Systems: An Integrated Approach	Lyla Das	Pearson Publication	First Edition	2013
6	Professional Embedded Arm Development	James A. Langbridge	Wrox - John Wiley Brand & Sons Inc	First Edition	2014

Online References:

Sr. No.	Website Name	URL	Modules Covered
1	Swayam	https://swayam.gov.in/nd1_noc20_ee42/preview	M1, M2, M4
2	NPTEL	https://nptel.ac.in/courses/117/104/117104072/	M1. M2
3	NPTEL	https://nptel.ac.in/courses/108/105/108105102/	M1, M2, M3, M4
4	Swayam	https://swayam.gov.in/nd1_noc20_cs15/preview	M4, M5, M6

List of Practical/ Experiments:

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	Basic Experiments	Write assembly language program in 8051 to add and subtract two 8-bit numbers.	2	L1, L2, L3
2		Write assembly language program in 8051 to multiply and divide two 8-bit numbers.	2	L1, L2, L3
3		Write assembly language program in 8051 to find largest and smallest number	2	L1, L2, L3
4		Write assembly language program in 8051 to exchange the contents of two memory blocks.	2	L1, L2, L3
5	Design Experiments	Design a microcontroller-based system using 8051 to generate a square wave of any desired frequency using built-in timer.	2	L1, L2, L3, L4, L5, L6
6		Design a microcontroller-based system to interface 8051 and stepper motor and run the motor in clockwise and antilock wise direction.	2	L1, L2, L3, L4, L5, L6
7		Design a microcontroller-based system to interface ARM7 with seven segment display Write a program using embedded C to display up counter on 7-seg display	2	L1, L2, L3, L4, L5, L6
8		Design a microprocessor-based system blink LED. Write a program using embedded C to blink 2 LEDs alternately.	2	L1, L2, L3, L4, L5, L6
9	Advanced Experiments	Write an assembly language program to add two 64-bit numbers and store the result at given memory location.	2	L1, L2, L3
10		Write an assembly language program of arm processor to find the largest no. among the array of 10 numbers.	2	L1, L2, L3
11 - 15	Mini/Minor Projects/ Seminar/ Case Studies	<ol style="list-style-type: none"> Design a microprocessor-based system to interface key pad and display pressed key using Arduino/8051microcontroleer Design a microprocessor-based system to interface LCD A and display message Arduino/8051microcontroleer Design a microprocessor-based system to transfer data serially on TXD pin. Arduino/8051microcontroleer Design a microprocessor-based system to develop RFID and Keypad based security system. Arduino/8051microcontroleer 	10	L1, L2, L3, L4, L5, L6
Total Hours			30	

T.E. Semester –V

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

B. E. (Electronics & Telecommunication Engineering)					T.E. (SEM: V)					
Course Name: Indian Constitution					Course Code: MC-ETC 501					
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)					
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation					
Hours Per Week					IA (40)		Theory (60)	Practical/Oral	Term Work	Total
Theory	Tutorial	Practical	Contact Hours	Credits	ISE	IE	ESE	PR	TW	25
1	-	-	1	-	-	-	-	-	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 practical (40%) and Attendance / Learning Attitude (20%)										

Course Objective: The objective of this course is to give knowledge of the Indian Constitution to students to ensure that the rules and regulations under which Central & State governments function. Students would also be acquainted with various provisions, articles, important autonomous Govt bodies, the Judiciary, and the rights of every citizen of India. An engineer must have a general idea of the Constitution of India.

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	Learn the salient features and importance of the Indian Constitution	L1, L2
2	Understand the fundamental rights and duties	L1, L2
3	Learn about election methods and powers of the Government of the Union	L1, L2
4	Learn about election methods and powers of the Government of the State	L1, L2
5	Understand the Indian Judiciary system	L1, L2
6	Understand about various Govt bodies and establishments of India	L1, L2

Detailed Syllabus:

Module No.	Topics	Hrs	Cognitive levels of attainment as per Bloom's Taxonomy
1	Introduction to the Indian Constitution		
	1.1 : Historical background 1.2 : Making of the Constitution – 1.3 : Salient Features of the Indian Constitution	2	L1, L2
	Fundamental Rights and Directive Principles		

2	2.1 : Fundamental Rights 2.2 : Fundamental Duties 2.3 : Directive Principles 2.4 : Understanding the directive principles and their relationship with fundamental rights 2.5 : Union List, State List, and Concurrent List	2	L1, L2
Structure of the Government			
3	3.1 : Union Government President, Vice-President, Prime Minister, Council of Ministers 3.2 State Government Governor, Chief Minister, Council of Ministers	3	L1, L2
Parliamentary System			
4	4.1 Lok Sabha and Rajya Sabha 4.2 Legislative Procedures 4.3 Parliamentary Committees	3	L1, L2
The Judiciary			
5	5.1 : Features of the judicial system in India 5.2 : Supreme Court –Structure and Jurisdiction 5.3 : High Court – Structure and Jurisdiction	2	L1, L2
Administrative organization and constitution			
6	6.1 : Federalism in India – Features 6.2 : Local Government-Panchayats Powers and functions; 73rd and 74th amendments 6.3 : Election Commission – Organisation and functions 6.4 : Constitution challenges, : Constitution Amendments and Current Affairs, : Central Vigilance Commission (CVC) 6.5 : Citizen-oriented measures RTI and PIL Provisions and significance 6.6 : UPSC & State PSC	3	L1, L2
Total Hours		15	

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	India's Constitution	M. V. Pylee	New Delhi; S. Chand Pub	16	2017
2	Indian Polity	M Laxmikanth	McGraw Hill Chennai	05	2017
3	The Constitutional Law of India	J.N. Pandey	Allahabad; Central Law Agency	55	2018
4	Introduction to the Constitution of India	Durga Das Basu	Gurgaon; LexisNexis	23	2018

Online References:

Sr. No.	Website Name	URL	Modules Covered
1	India.gov.in.	https://www.india.gov.in/sites/upload_files/mpi/files/coi_part_full.pdf	All

T.E. Semester –V

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

B.E. (Electronics and Telecommunication)					S.E. SEM: V			
Course Name: Summer Internship					Course Code: SI-ETC501			
Teaching scheme (during Week End / Semester Break/ End of Semester(Between 21st and 25th Week))					Assessment/Evaluation Scheme			
					Presentation		Report	
Theory	AC	Practical	Contact Hours	Credits	AC		AC	TW
-	-	-	160*	-	-		-	-
AC- Activity evaluation TW – Term Work Examination Total weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely Completion of Practical (40%) and Attendance/Learning Attitude (20%).								
Prerequisite: Fundamental knowledge of Information Technology related tools								
<p>* This is part of Summer Internship but can start in winter. Students may go up to 160 hrs. to acquire maximum 4 credits in Semester 6.</p> <p>Total hrs. mentioned should be completed till end of Semester 6. Credits will be awarded at the end of 6th Semester and will be reflected in the Grade Card of 6th Semester.</p> <p>Student will get 1 year span to acquire the credits. Students should collectively acquire total contact hrs. in below given activities in a span of 1 year. Student will submit a report to earn term work marks in internship.</p>								

Course Objectives:

- To get industry like exposure in the college laboratories by carrying out projects using subject studied till 6th 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 subjects knowledge in the college laboratories for carrying out projects	L1, L2,L3
2	Able to developed 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:

Mo du le 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 (EXTC, ELEX, MECH and CIVIL) Design , develop and deploy cost effective products using multidisciplinary approach	
3	Industry Specific Internship	L1, L2, L3
	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	L1, L2, L3
	To develop interpersonal skills such as leadership, marketing ,publicity and corporate ethics and communication To get competence in problem solving , presentation , negotiation skills	
5	Social Internship	L1, L2, L3
	Identify and study different real life issues in the society Identify societal problems and provide engineering solutions to solve these problems	
6	Academic Internship	L1, L2, L3
	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.	

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

T.E. Semester –V

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

B.E. (Electronics and Telecommunication)					T.E. SEM: V					
Course Name: Professional Skills IV (AI-Machine Learning Engineer)							Course Code: HME - ETCPS501			
Teaching Scheme (Program Specific)					Examination Scheme (Academic)					
Modes of Teaching/ Learning/ Weightage					Modes of Continuous Assessment/ Evaluation					
Hours Per Week					Theory (100)		Presentation	Report	Term Work	
Theory	Tutorial	Practical	Contact Hours	Credits	1A	ESE	AC	AC	25	
-	-	2	2	1	-	-	15	10	25	
The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance/ Learning Attitude (20%)										
Prerequisite: Basic Probability and Statistics, Algebra and Calculus, Linear Algebra										

Course Objective: This course will introduce the field of Machine Learning, in particular focusing on the core concepts of supervised and unsupervised learning. In supervised learning we will discuss algorithms which are trained on input data labelled with a desired output, for instance an image of a face and the name of the person whose face it is, and learn a function mapping from the input to the output.

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

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy	PO Mapping	PSO Mapping
1	Apply fundamental machine learning concept	L1,L2	1,2,5,6	1,3
2	To study Google Colab	L1,L2,L3	1,2	1,2,3
3	Experiment with Infrastructure as Code	L1,L2	1,2,5,6	1,2,3
4	Relate the fundamentals and importance of Machine Learning algorithm	L1,L2,L3	1,2,4,5,9	1,2
5	Understand Machine Learning algorithm	L1,L2,L3,U	1,2,5,6	1,3
6	Apply and Understand Machine Learning algorithm	L1,L2,L3,L5	1,2,3,5,9	1,2,3

Online References:

Sr. No.	Website Name	URL
1	NPTel	https://nptel.ac.in/courses/106/106/106106139/
2	Coursera	https://www.coursera.org/learn/machine-learning
3	https://www.geeksforgeeks.com	geeksforgeeks.org/cloud-cost-optimization-and-its-best-practices/

List of Practical/ Experiments;

Practical Number	Practical/ Experiment Topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	Write a code to the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file	2	L1, L2, L3
2	For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate- Elimination algorithm to output a description of the set of all hypotheses consistent with the training example	2	L1, L2, L3
3	Write a program to implement Linear Regression and Multiple Linear Regression	2	L1, L2
4	Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample	2	LI, L2
5	Write a program to demonstrate the working of Decision Tree using Pruning	2	L1, L2
6	Write a program to demonstrate the working of Random Forest	2	LI, L2
7	Implement Naïve Bayes theorem to classify the English text.	2	L1, L2, L3
8	Write a program to demonstrate the working of Support vector Machine	2	L1, L2
9	Fitting Logistic and Multinomial Logistic regression model on real data set for classification problem	2	L1, L2
10	Perform PCA in dimension reduction of numerical data	2	L1, L2, L3, L4
11	Implement Hierarchical Clustering	2	L1, L2, L3, L4
12	Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets	2	L1, L2, L3, L4
13	Implement the finite words classification system using Back-propagation algorithm	2	LI, L2, L3, L4
14	Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.	2	L1, L2, L3, L5
15	Mini Project	2	L1, L2, L3, L4, L5
	Total Hours	30	

T.E. Semester –V

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

B.E. (Electronics and Telecommunication)					SEM: V				
Course Name: Project Based Learning					Course Code: HME –PBL501				
Contact Hours Per Week: 02					Credits: 01				
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)				
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation				
Hours Per Week					Theory (25)	Presentations (25)	Reports (25)	Total	
Theory	Tutorial	Practical	Contact Hours	Credits	IA	(AC)	(AC)		
-	-	2	2	1	-	15	10	25	
IA-In Semester Assessment -Paper Duration -1.5 Hours. ESC- End Semester Exam- Duration - 3 Hours. AC: Activity The weightage of marks for continuous evaluation of Term work: Formative (40%), Timely completion of practical (40%), and Attendance / Learning Attitude (20%).									
Prerequisite: TV 2035 Challenges									

Course Objectives:

To provide students with the mindset, skills, and tools necessary to lead successful projects, drive innovation, and solve complex problems in a variety of contexts.

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

SN	Course Outcome	Cognitive level attainment as per revised Bloom Taxonomy
1.	Students will be able to understand and apply the principles of design thinking, including empathy, ideation, prototyping, and iteration, to solve complex problems effectively.	L1, L2, L3
2.	Students will be able to demonstrate proficiency in project management methodologies, including project planning, scheduling, budgeting, risk management, and stakeholder communication.	L1, L2, L3
3.	Students will be able to integrate design thinking and project management approaches to plan, execute, and implement projects that address real-world challenges.	L1, L2, L3, L4, L5
4.	Students will be able to communicate their ideas, project plans, and findings effectively through written, verbal, and visual means, both within their teams and to external.	
5.	Prepared to participate in PAN India competition with innovative technical (Software /Hardware based) Product meeting the needs of users along with value addition.	L1, L2, L3, L4, L5, L6

Detailed Syllabus:

Module No.	Topics	Hrs	Cognitive level attainment as per revised Bloom Taxonomy
1	INSPIRATION: Explore	5	L1, L2, L3

	Strategic Priorities, Activity System, Stakeholder Mapping, Opportunity Framing		
2	RESEARCH: Empathize and IDEATION: Experiment and Engage	5	L1, L2, L3
	EMPATHISE: METHODS & TOOLS: Secondary research, Observation, interview, Empathy map, Pain points and needs, Persona Development, Correlate Secondary research, Mapping of idea, Mind maps and Affinity maps. TRIZ principles for solution, Testing.		
3	IMPLEMENTATION: Evolve	2	L1, L2, L3, L4
	Strategic requirements and Activity system.		
4	Introduction to 7 Cs for Project Success	4	L1, L2, L3
	Introduction to 7Cs for Project success: Communication, Commitment, Cash, Control, Cooperation, Culture, Coaching		
5	Project Planning	4	L1, L2, L3
	Conception & Initiation, to design project charter, Project Definition & Project Planning: To revisit the prototype design and identify Constraints, include a risk management plan, Human resources requirements, Project schedule and key milestones, Budget/cost estimates for final Product design. Overall project performance monitoring NOISE estimation: five qualitative parameters: Needs, Opportunities, Improvements, Strengths, and Exceptions		
6	Implementation, Presentation and Report	10	L1, L2, L3
	I. Presentation will be an amalgamation of five modules, Case study, Brainstorming understanding, Survey and Prototype II. Report writing in format. Evaluation by faculty as per format Based on Prototype, Presentation and report written by students		
	Total Hours (15 hrs. conduct in class in 15-week semester +Self learning 15 hours)	30	

Books and References:

SN	Title	Authors	Publisher	Edition	Year
1	NASA's Journey to Project Management Excellence	Edward J. Hoffman and Matt Kohut	National Aeronautics and Space Administration,	E Book	2012
2	97 Things Every Project Manager Should Know: Collective Wisdom from the Experts	Barbee Davis	O'Reilly Media, Inc.	E book	2009
3	The Practical Guide to Project Management	Cristine Peterson	Bookboon	E book	2013
4	Launch: Using Design Thinking to Boost Creativity and Bring Out the Maker in Every Student	John Spencer and A.J. Juliani	Dave Burgess Consulting, Inc.	E book	2016
5	Design Thinking in the Classroom: Easy-to-Use Teaching Tools to Foster Creativity, Encourage Innovation, and Unleash Potential in Every Student" by David Lee and Mark D. Churchill	David Lee and Mark D. Churchill	Corwin	E book	2015