T.E. Semester –V (E&TC)
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)
TCET Autonomy Scheme (w.e.f. A.Y. 2022-23)

<table>
<tr><td colspan="9">B. E. (Electronics & Telecommunication Engineering)</td><td colspan="4">T.E. (SEM: V)</td></tr>
<tr><td colspan="9">Course Name: Soft Skills and Interpersonal Communication</td><td colspan="4">Course Code: HSMC-ETC501</td></tr>
<tr><td colspan="5">Teaching Scheme (Program Specific)</td><td colspan="8">Examination Scheme (Formative/ Summative)</td></tr>
<tr><td colspan="5">Modes of Teaching / Learning / Weightage</td><td colspan="8">Modes of Continuous Assessment / Evaluation</td></tr>
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<tr><td>3</td><td>-</td><td>-</td><td>3</td><td>3</td><td>20</td><td>20</td><td>60</td><td colspan="2">-</td><td>-</td></tr>
<tr><td colspan="12">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%)</td></tr>
<tr><td colspan="12">Prerequisite: Basic knowledge of English language, Grammar and Vocabulary</td></tr>
</table>

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 level attainment as per revised Bloom Taxonomy
1	Understand basics of soft skills	L1, L2, L3
2	Learn essential life skills	L1, L2, L3
3	Understand and develop self	L1, L2, L3
4	Understand others with empathy	L1, L2, L3
5	Use employment skills for placement and higher studies	L1, L2, L3
6	Incorporate ethics and etiquette in day to day life	L1, L2, L3

Detailed Syllabus:

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

Books and References:

Sr. No.	Name of the Book	Name of the Author	Publisher	Edition	Year
1	Practical English Usage	Michael Swan	OUP	4th Edition	1995
2	Remedial English Grammar	F.T. Wood	Macmillan	2014 Edition	2007
3	Pocket Style Manual	Diane Hacker	Bedford publication, New York	2003 Edition (ISBN 0312406843)	2003
4	You Can Win	Shiv Khera	Macmillan Books,New York	2003 Edition	2003
5	Technical Writing & Professional Communication for non-native speakers of English	Thomas N.Huckin &Leslie A. Olsen	McGraw Hill Education	2011 Edition	2011
6	The 7 Habits of HighlyEffective People	Stephen Covey	Free Press	2016 Edition	2016

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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	Calculate 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 ECG signals analysis. Application of DSP for Dual Tone Multi Frequency signal detection. Application of DSP for Radar Signal Processing.		

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

Suggested List of Tutorial:

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	Split Radix Fast Fourier Transform	2	L1, L2, L3
5	Overlap-Save and Overlap-Add	2	L1, L2, L3
6	FIR Digital Filters Theory	2	L1, L2, L3
7	FIR Digital Filters Design	2	L1, L2, L3, L4
8	FIR Digital Filters Problems	2	L1, L2, L3
9	IIR Digital Filters Theory	2	L1, L2, L3

10	IIR Digital Filters Design	2	L1, L2, L3, L4
11	IIR Digital Filters Problems	2	L1, L2, L3
12	Quantization, truncation and rounding	2	L1, L2, L3
13	Zero-input, Overflow limit cycle oscillations	2	L1, L2, L3
14	Finite word length effects in FIR digital filters.	2	L1, L2
15	Applications of Digital Signal Processing	2	L1, L2

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<tr><td colspan="5">B. E. (Electronics & Telecommunication Engineering)</td><td colspan="5">T.E. (SEM: V)</td></tr>
<tr><td colspan="5">Course Name: Microcontrollers and Applications</td><td colspan="5">Course Code: PCC-ETC502</td></tr>
<tr><td colspan="5">Teaching Scheme (Program Specific)</td><td colspan="5">Examination Scheme (Formative/ Summative)</td></tr>
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<tr><td colspan="10">Prerequisite: Digital Logic Design, Microprocessor peripherals and interfacing</td></tr>
</table>

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 embedded C and write programs using embedded C.	L1, L2, L3, L4, L5, L6

Detailed Syllabus:

Module No	Topics	Hrs	Cognitive levels of attainment as per Bloom's Taxonomy
1	**8051 Microcontroller** 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	08	L1, L2
2	**8051 Programming** Instruction set, Addressing mode, Programs related to: arithmetic, logical, delay, input, output, timer, counters, port, serial communication, and interrupts	10	L1, L2, L3
3	**8051 Interfacing and Applications** Interfacing of Display: LED, LCD and Seven Segment display (SSD), Stepper Motor, Input / Output ports, Interfacing of ADC and DAC, Interfacing of Keyboard	04	L1, L2, L3, L4, L5, L6
4	**ARM7: A 32-bit Microcontroller** 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	08	L1, L2, L3
5	**ARM7 Programming** Data Processing Instructions, Conditional and Branching Instructions, ARM-THUMB Interworking, Single-Register Load-Store Instructions, Stack Instructions, Software Interrupt Instructions	10	L1, L2, L3, L4
6	**ARM Programming with Embedded C** LPC 2148, General Purpose Input Output, Timer / Counter Programming with Embedded C	05	L1, L2, L3, L4, L5, L6
	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 arrange the numbers in i. ascending order ii. descending order	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.	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		To design a microcontroller-based system to interface ARM7 with seven segment display and display 0 to 9 numbers on it.	2	L1, L2, L3, L4, L5, L6
8		Design a microprocessor-based system to write a program to blink LED or to generate square wave as an output using ARM processor.	2	L1, L2, L3, L4, L5, L6
9	Advanced Experiments	To write an assembly language program to add two 64-bit numbers and store the result at given memory location.	2	L1, L2, L3
10		To 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**	1. Design a microprocessor-based system to interface key pad and display pressed key. 2. Design a microprocessor-based system to interface LCD A and display message. 3. Design a microprocessor-based system to transfer data serially on TXD pin. 4. Design a microprocessor-based system to develop RFID and Keypad based security system.	10	L1, L2, L3, L4, L5, L6
		Total Hours	**30**	

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<table>
<tr><td colspan="5">B. E. (Electronics & Telecommunication Engineering)</td><td colspan="5">T.E. (SEM: V)</td></tr>
<tr><td colspan="5">Course Name: Basics of Communication Systems</td><td colspan="5">Course Code: PCC-ETC 503</td></tr>
<tr><td colspan="5">Teaching Scheme (Program Specific)</td><td colspan="5">Examination Scheme (Formative/ Summative)</td></tr>
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<tr><td colspan="10">Prerequisite: Signals and Systems, Electronics devices and circuits-1</td></tr>
</table>

Course Objective: The course intends to introduce the concepts of principles of communication systems and to equip students with various techniques related to analogue communication such as modulation, demodulation, transmitters and receivers and noise performance.

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
2	Understand pulse modulation, demodulation.	L1, L2
3	Analyze different modulation techniques in amplitude modulation and design amplitude modulators.	L1, L2, L3, L4
4	Understand different modulation techniques in angle modulation &design frequency and phase modulators.	L1, L2, L3, L4
5	Identify different demodulation techniques.	L1, L2, L3
6	Understand basic digital pulse modulation and demodulation.	L1

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Basics of Communication System** Block diagram, electromagnetic spectrum, signal bandwidth and power, types of communication channels, types of noise, signal to noise ratio, noise figure, and noise temperature	4	L1
2	**Amplitude Modulation** Basic concept, signal representation, need for modulation, Spectrum, waveforms, modulation index, bandwidth, voltage distribution, and power calculation **DSBFC**: Principles, modulating circuits, low level and high-level transmitters **DSB suppressed carrier**: - Multiplier modulator, nonlinear modulator, and switching modulator. **Single Side Band (SSB): -**Principle, Filter method, phase shift method and third method, ISB, VSB	10	L1, L2, L3, L4
3	**Angle Modulation** Frequency modulation (FM): Basic concept, mathematical analysis, frequency spectrum of FM wave, sensitivity, phase deviation and modulation index, frequency deviation and percent modulated waves, bandwidth requirement of angle modulated waves, deviation ratio, narrow Band FM, and Wide Band FM Varactor diode modulator, FET reactance modulator, pre-emphasis and de-emphasis **Phase modulation (PM):** Principle and working of Transistor direct PM modulator and relationship and comparison between FM and PM Applications of FM and PM	12	L1, L2, L3, L4
4	**Amplitude and Frequency Demodulation** Amplitude demodulation: Diode detector, practical diode detector, and square law detector. FM demodulation: Balance slope detector, Foster-Seely discriminator, ratio detector, Phase lock loop (PLL) FM demodulator, comparison between FM demodulators.	9	L1, L2, L3
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	4	L1, L2

6	**Digital Pulse Modulation and Demodulation**		L1
	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.	6	
	Total Hours	**45**	

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	2008
4	Modern Digital and Analog Communication system	B.P. Lathi, Zhi Ding	Oxford University Press	4th Edition	2009
5	Communication Systems: Analog and Digital	P. Sing and S.D. Sapre	McGraw Hill	3rd Edition	2007
6	Introduction to Analog and Digital Communication	Simon Haykin, Michel Moher	Wiley	2nd Edition	2006
7	Electronic Communication	Dennis Roddy and John Coolen	Prentice Hall	4th Edition	2009

Online Reference:

Sr. No.	Website Name	URL	Modules Covered
1	NPTEL	https://onlinecoursesarchive.nptel.ac.in/noc17_ec11	M1- M4
2	NPTELhrd	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-M6

Suggested list of Practical/ Experiments:

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	RBT Levels
1	**Basic Experiments**	To study about MATLAB & Simulink and run different commands of MATLAB in communication.	2	L1
2		To Study and Calculate Shot Noise Current using MATLAB for reverse saturation current.	2	L1
3	**Design Experiments**	To study and calculate Johnson Noise volt using MATLAB for series resistance and parallel resistance	2	L1, L2, L3
4		To generate and detect DSBFC Amplitude Modulation Wave using Kit.	2	L1, L2, L3
5		To generate and detect Frequency modulation by designing DSBFC AM wave using MATLAB Simulink	2	L1, L2
6		To design FM generation using MATLAB Simulink.	2	L1
7		Study of Line Coding techniques in Communication.	2	L1, L2, L3
8	**Advanced Experiments**	Generation of Analog Pulse code Modulation Techniques PAM	2	L1, L2
9		Generation of Digital Pulse code Modulation Techniques	2	L1
10		Generation of Analog Pulse code Modulation Techniques PPM, PWM	2	L1, L2, L3
12,13,14,15	**Mini/Minor Projects/ Seminar/ Case Studies**	Mini Projects: 1. Intercom Circuit 2. Home Security System 3. Frequency Modulator and demodulator using Simulink 4. FM remote encoder and decoder circuit 5. PWM using IC555 6. Walkie-Talkie Circuit Case Study: 1.Design of Amplitude Modulation	8	L1, L2, L3, L4

		2. Design of Frequency Modulation 3. Design of Phase Modulation		
		Total Hours	**30**	

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B. E. (Electronics & Telecommunication Engineering)								**T.E. (SEM: V)**		
Course Name: Microelectronics								**Course Code:** PEC-ETC5011		
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: EDC-I and EDC-II										

Course Objective: The course intends to develop in students the ability to analyze and design analog MOS integrated circuits, emphasizing fundamentals as well as new techniques that students need to master in today's industry.

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	Identify the fabrication process of NMOS and PMOS along with mask layout diagram.	L1
2	Analyze various constant current source circuit using MOS.	L1, L2, L3
3	Analyze MOS active and advance active load for its Parameters	L1, L2, L3, L4
4	Design and implement active load MOS amplifier.	L1, L2, L3, L4, L5
5	Design and implement active load differential amplifier	L1, L2, L3, L4
6	Explain passive device fabrication in IC, its need and analyze various power amplifiers using MOS.	L1, L2, L3

Detailed Syllabus:

Module No.	**Topics**	**Hrs.**	**Cognitive levels of attainment as per Bloom's Taxonomy**
1	**Basics of MOSFETs** Introduction to various fabrication process (in brief) Fabrication of NMOS and PMOS transistors along with mask layout diagram, Scaling of MOSFET, Various Short channel effects in MOSFET, Second order effects in MOSFET, MOS as controlled resistor, MOS device capacitances.	8	L1

2	**Integrated Circuit Biasing** Current Mirror, cascade current source, Wilson current source, bias independent current source using MOSFET.	6	L1, L2, L3, L4
3	**Active Loads using MOSFET** DC analysis and small signal analysis of MOS active load, DC analysis and small signal analysis of MOS advanced active load.	6	L1, L2, L3, L4
4	**Single Stage MOS Active Load amplifiers** CS amplifier with current source load, CS amplifier with diode connected load, CS amplifier with current source load, Common gate circuit, Cascode amplifier, Double Cascoding, Folded Cascode.	09	L1, L2, L3, L4, L5
5	**Active Load MOSFET Differential Amplifier** Basic MOS Differential Amplifier, DC transfer characteristics, small signal equivalent analysis, MOS differential amplifier with active load, MOS differential amplifier with cascode active load.	09	L1, L2, L3, L4
6	**Power Amplifiers& Passive Device Fabrication in IC** Class A, class B, Class C, Class D, Class E, Class F using MOSFET. Fabrication of inductors, fabrication of transformers, fabrication of capacitors.	7	L1, L2, L3
	Total Hours	**45**	

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	Microelectronic Circuits-Theory and Application Advanced engineering mathematics	Sedra, K. Smith, adapted by A. Chanorkar	Oxford Higher Education	7th	2015
2	Electronic Circuits Analysis and Design	D. Neamen	McGraw Hill Education	3rd	2007
3	Design of Analog Integrated Circuits	B. Razavi	McGraw Hill Education	Indian Edition	2000
4	R F Microelectronics	B. Razavi	Pearson Education	2nd	2011

Online References:

S. No.	Website Name	URL	Modules Covered
1	www.swayam.gov.in	https://swayam.gov.in/nd1_noc19_ee38/preview	M1-M5
2	www.edx.org	https://www.edx.org/course/essentials-of-mosfetshttps://www.studytonight.com/data-structures/introduction-to-data-structures	M1, M6
3	www.swayam.gov.in	https://swayam.gov.in/nd1_noc19_ee54/preview	M1-M4

Suggested List of Practicals:

Practical Number	Type of Experiments	Practical/ Experiment Topic	Hrs.	Cognitive levels as per Bloom's Taxonomy
1.	**Basic Experiments**	PMOS and NMOS layout	2	L1, L2
2.		I-V characteristics of MOSFET	2	L1, L2, L3
3.		Active Loads MOSFET Amplifier	2	L1, L2, L3
4.		Single stage MOSFET amplifier	2	L1, L2, L3
5.		Single Stage MOS Active Load amplifiers	2	L1, L2, L3
6.	**Design Experiments**	Design, Simulate, layout, and test various current-mirror circuit	2	L1, L2, L3, L4, L5, L6
7.		Design of MOS differential amplifier	2	L1, L2, L3, L4, L5, L6
8.	**Advanced Experiments**	MOS differential amplifier with cascode active load	2	L1, L2, L3
9.		MOSFET Differential amplifier	2	L1, L2, L3, L4, L5
10.		Active Load MOSFET Differential Amplifier.	2	L1, L2, L3, L4, L5
11	**Mini Projects/Case Studies**	Case Study on short channel effects of MOSFET	2	L1, L2
12.		Projects: 1. CMOS inverter 2. Design an Op-amp	6	L1, L2, L3, L4, L5, L6
		Total Hours	**30**	

T.E. Semester –V (E&TC)
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)
TCET Autonomy Scheme (w.e.f. A.Y. 2022-23)

<table>
<tr><td colspan="5">B. E. (Electronics & Telecommunication Engineering)</td><td colspan="5">T.E. (SEM: V)</td></tr>
<tr><td colspan="5">Course Name: Satellite Communication</td><td colspan="5">Course Code: PEC-ETC5012</td></tr>
<tr><td colspan="5">Teaching Scheme (Program Specific)</td><td colspan="5">Examination Scheme (Formative/ Summative)</td></tr>
<tr><td colspan="5">Modes of Teaching / Learning / Weightage</td><td colspan="5">Modes of Continuous Assessment / Evaluation</td></tr>
<tr><td colspan="5">Hours Per Week</td><td colspan="3">Theory</td><td>Practical/Oral</td><td>Term Work</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>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="10">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%)</td></tr>
<tr><td colspan="10">Prerequisite: Analog and Digital communication</td></tr>
</table>

Course Objective: The course intends to deliver an in-depth understanding of different concepts used in a satellite communication system like orbital mechanics, launching techniques, satellite link design, earth station technology and different access system towards a satellite. In addition, the frequencies used in different satellite services and the applications of satellite communications are also discussed.

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 and applications of satellite communication	L1, L2, L4
2	Understand the Orbits and Launching mechanisms	L1, L2, L3
3	Explain the various subsystems in a Satellite and Earth Segment.	L1, L2, L4
4	Explain and analyze link budget of satellite signal for proper communication	L1, L2, L3, L4
5	Understand the various access mechanisms used to enhance communication performance of satellite systems	L1, L2, L3, L4
6	Understand the different elements in the design of a Satellite Network	L1, L2, L4

Detailed Syllabus:

Module No	Topics	Hrs	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Introduction to Satellite Communication and its Applications** Introduction: Origins of satellite communications, Space and Ground segments, Development of satellite services, Frequency allocation for various Satellite services, Satellite Applications: ATM service, DTH service, TV broadcast, GPS and VSAT.	05	L1, L2, L4
2	**Satellite Orbits** Various types of Orbits with characteristics, Orbital Parameters, Limits of Visibility, Communication Angles, Kepler's Laws, Orbital perturbations, Orbital Effects in communication performance, Satellite Eclipse, Satellite Launching and Launch Vehicles	08	L1, L2, L3
3	**Space and Ground Segment** Space segment and its subsystems, AOCS, TTC, Transponders, Antenna Subsystem, Power Amplifiers, Equipment Reliability and Space qualifications Design considerations for Ground segment, receive-only home TV systems, outdoor–indoor unit for analog (FM) TV, master antenna TV system, Transmit-receive earth stations, Community antenna TV systems	10	L1, L2, L4
4	**Link Analysis.** Isotropic radiated power, Transmission losses, Free-space transmission, Feeder losses, Antenna misalignment losses, Fixed atmospheric and ionospheric losses, Link Power Budget. **Noise**: System noise, Antenna noise, Amplifier noise temperature, Amplifiers in cascade, Noise factor, Noise temperature of absorptive networks, Overall system noise temperature, Carrier to Noise ratio. **Uplink**: Saturation flux density, Input Back Off, Earth Station HPA. **Downlink**: Output Back Off, Satellite TWTA Output. Combined Uplink and Downlink C/N ratio, Effects of rain, Uplink and Downlink Rain-fade margin, Inter-modulation noise, Satellite Interference	08	L1, L2, L3, L4
5	**The Space Segment Access and Utilization** Space segment access methods. **FDMA**: pre-assigned FDMA, demand assigned FDMA, SPADE system, bandwidth-limited and power-limited TWT amplifier operation, **TDMA**: Reference Burst; Preamble and Post-amble, carrier recovery, network synchronization, unique word detection, traffic date, frame efficiency, channel capacity, preassigned TDMA, demand assigned TDMA, Satellite Switched TDMA, **Code Division Multiple Access**: Direct-sequence spread spectrum–acquisition and tracking, spectrum spreading and dispreading – CDMA throughput	07	L1, L2, L3, L4
6	**Satellite Networks** **Satellite Network**: network reference models and protocols, layering principle, open system interconnection (OSI), reference model, IP reference model, reference architecture for satellite networks, basic characteristics of satellite networks, onboard connectivity with transparent processing, analogue transparent switching,	07	L1, L2, L4

	Frame organization, Window organization, On board connectivity with beam scanning		
	Total Hours	**48**	

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	Satellite Communication	Dennis Roddy	Mc. Graw-Hill International Ed.	3rd Edition	2001
2	Satellite Communication systems Engineering	Wilbur L. Pritchard, Henri G. Suyderehoud, and Robert A. Nelson	Pearson	4th Edition	2014
3	Satellite Communication Systems	Gerard Maral and Michel Bousquet Wakerly J.F.	Wiley Publication	4thEdition	2008
4	Satellite Communications	Timothy Pratt, Charles Bostian, and Jeremy Allmuti	John Willy & Sons (Asia)	4thEdition	2004
5	Satellite Communication Systems Design Principles	M. Richharia	Macmillan Press Ltd McGraw Hill	2nd Edition	2003

Online References:

Sr. No.	Website Name	URL	Modules Covered
1	www.tutorialspoint.com	https://www.tutorialspoint.com/principles_of_communication/principles_of_satellite_communications.htm	M1-M3
2	YouTube	https://www.tutorvista.com/	M1-M6

Suggested List of Practical:

Experiment Number	Experiment Type	Title of Experiments	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Basic Experiments**	Create a map using Vector data set in QGIS.	2	L1, L2, L3
2		Analysis of Raster data in QGIS and represent data in three dimensions	2	L1, L2, L3
3		Create a False colour composite of a given location using the data set from Bhuvan Website in QGIS.	2	L1, L2, L3
4	**Design Experiments**	Arithmetic and logical analysis of vector data using analysis tools in QGIS for given data set.	2	L1, L2, L3, L4
5		Analysis of vector data using Geoprocessing tools in QGIS for data set downloaded from google earth.	2	L1, L2, L3, L4
6		Digitize an old toposheet into a map representation using georeferencing in QGIS.	2	L1, L2, L3, L4
7		Design a story map in ESRI	2	L1, L2, L3, L4
8	**Advanced Experiments**	Algorithm to perform a set of instructions on given dataset (Vector or Raster) using model builder in QGIS.	2	L1, L2, L3
9		Make a data set for the problem by collecting data from distinctly located users using Open data kit.	2	L1, L2
10	**Mini Project**	Build a decision maker map for any given data set to identify the best location for a home/restaurant/business outlet as per the distance from school, hospital and restaurant in QGIS.	1	L1, L2, L3

T.E. Semester –V (E&TC)
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)
TCET Autonomy Scheme (w.e.f. A.Y. 2022-23)

<table>
<tr><td colspan="8">B. E. (Electronics & Telecommunication Engineering)</td><td colspan="3">T.E. (SEM: V)</td></tr>
<tr><td colspan="8">Course Name: Data Structures</td><td colspan="3">Course Code: PEC-ETC5013</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</td><td>Practical/Oral</td><td>Term Work</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>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="10">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%)</td></tr>
<tr><td colspan="10">Prerequisite: Basic programming knowledge</td></tr>
</table>

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** Introduction Types of data Structures Abstract data type Operations on data structures.	03	L1, L2
2	**Stacks and Queues** **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	07	L1, L2, L3
3	**Introduction to Non-Linear Data Structure** 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	13	L1, L2, L3, L4
4	**Linked List** 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.	08	L1, L2, L3, L4
5	**Graphs** Graph: Terminologies Graph representation: Matrix and Adjacency list Graph traversing techniques: BFS DFS, Spanning Trees, Shortest Path, Minimal Spanning Tree	06	L1, L2, L3

	Applications of graph		
6	**Searching and Sorting** **Searching:** Linear search Binary search **Sorting:** Insertion sort Merge sort Quick sort Heap Sort **Hashing:** Hash functions Hash table Hashing technique Collision resolution technique	08	L1, L2, L3, L4
	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

Suggested 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**	Build a Program for stack using an array (Menu driven program)	2	L1, L2, L3

2		Build a Program for Queue using an array. (Menu driven program)	2	L1, L2, L3
3	**Design Experiments**	Develop a code for circular queue. (Menu driven)	2	L1, L2, L3
4		Develop a code for Single Linked List. (Menu driven program)	2	L1, L2, L3
5		Develop a code for Doubly linked list. (Menu driven program)	2	L1, L2, L3
6		Develop a code for Binary Search Tree (Menu driven program)	2	L1, L2, L3
7		Develop a code for BFS. (Menu driven program)	2	L1, L2, L3
8		Develop a code for DFS. (Menu driven program)	2	L1, L2, L3
9		Develop a code for Binary search technique.	2	L1, L2, L3
10		Develop a code for Quick Sort.	2	L1, L2, L3
11	**Advanced Experiments**	Develop a code for circularly linked doubly linked list.	2	L1, L2, L3,L4,L5,L6
12		Develop a code for hashing technique with collision resolution.	2	L1, L2, L3
		IA of Practical/ Oral		---
13	**Mini/Minor Projects/ Seminar/ Case Studies**	**Case study:** 1. Red-Black tree 2. Binomial heap **Mini Project:** 1. Build a Snakes & Ladders game 2. Sudoku Solver 3. Maze generator 4. Dictionary implementation 5. Employee Record System 6. Super market Billing System	6	L1, L2, L3, L4, L5, L6
		Total Hours	**30**	

T.E. Semester –V (E&TC)
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)
TCET Autonomy Scheme (w.e.f. A.Y. 2022-23)

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					**Theory**			**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 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%)

Course Objective: The objective of this course is to give knowledge of Indian Constitution to students in order to ensure that the rules and regulations under which Central & State Govt function. Students would also be acquainted with various provisions, articles, important autonomous Govt bodies, Judiciary and the rights of every citizen of India. An engineer must have general idea of 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 featuresand importance of Indian Constitution	L1, L2
2	Understand the fundamental rights and duties	L1, L2
3	Learn about election methods and powers of Government of the Union	L1, L2
4	Learn about election methods and powers of Government of the State	L1, L2
5	Understand 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	**Constitution – Structure and Principles** 1.1: Meaning and importance of Constitution 1.2: Making of Indian Constitution – Sources 1.3: Salient features of Indian Constitution	2	L1, L2

2	**Fundamental Rights and Directive Principles** 2.1: Fundamental Rights 2.2: Fundamental Duties 2.3: Directive Principles 2.4: Union List& State List 2.5: Concurrent List	2	L1, L2
3	**Government of the Union** 3.1: President of India – Election and Powers 3.2: Prime Minister and Council of Ministers 3.3: Lok Sabha – Composition and Powers 3.4: Rajya Sabha – Composition and Powers	3	L1, L2
4	**Government of the States** 4.1: Governor – Powers 4.2: Chief Minister and Council of Ministers 4.3: Legislative Assembly – Composition and powers 4.4: Legislative Council – Composition and powers 4.5: Local Govt & Panchayati Raj	3	L1, L2
5	**The Judiciary** 5.1: Features of judicial system in India 5.2: Supreme Court –Structure and jurisdiction 5.3: High Court – Structure and jurisdiction	2	L1, L2
6	**Administrative organization and constitution** 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: Comptroller & Auditor General of India (CAG) 6.5: Attorney General of India& Advocate General of State 6.6: Central Vigilance Commission (CVC) 6.7: Citizen oriented measures – RTI and PIL – Provisions and significance 6.8: 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/npi/files/coi_part_full.pdf	All

T.E. Semester –V (E&TC)
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TCET Autonomy Scheme (w.e.f. A.Y. 2022-23)

<table>
<tr><td colspan="5">B.E. (Electronics & Telecommunication Engineering)</td><td colspan="3">T.E. (SEM: V)</td></tr>
<tr><td colspan="5">Course Name: Professional Skills V (Web Technology)</td><td colspan="3">Course Code: HME-ETCPS501</td></tr>
<tr><td colspan="5">Teaching Scheme (Holistic Student Development – HSD)
(Conducted in the beginning of Semester during first 3 Weeks)</td><td colspan="3">Examination Scheme (Formative/ Summative)</td></tr>
<tr><td colspan="5">Modes of Teaching / Learning / Weightage</td><td colspan="3">Assessment/Evaluation Scheme</td></tr>
<tr><td colspan="5">Hours Per Week</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>TW</td></tr>
<tr><td>15</td><td>-</td><td>30</td><td>45</td><td>2</td><td>50</td><td>25</td><td>75</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/Learning Attitude (20%)</td></tr>
<tr><td colspan="8">Prerequisite: Computer Basics, Java</td></tr>
</table>

Course Objective: The objective of the course is to give an understanding of Web Technology by describing HTTP protocol and markup languages HTML, XHTML and XML standards for formatting and transforming web content, interactive graphics and multimedia content on the web, client-side programming using Javascript and PHP

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

Sr. No.	Course Outcomes	Cognitive level attainment as per revised Bloom's Taxonomy
1	Understand different components in web technology and to know about web servers.	L1, L2
2	Develop an interactive Web page using HTML/XHTML.	L1, L2, L3, L4
3	Present a professional document using Cascaded Style Sheets.	L1, L2, L3, L4
4	Construct websites for user interactions using JavaScript and JQuery.	L1, L2, L3, L4, L5
5	Know the different information interchange formats like XML.	L1, L2, L3, L4
6	Develop Web applications using PHP.	L1, L2, L3, L4, L5

Detailed Syllabus:

Module No.	Topics	Hrs.	RBT Levels
1	**Introduction to the Internet**	2	L1, L2
	The World Wide Web, Web Browsers, Uniform Resource Locators, WWW Architecture – SMTP – POP3 – File Transfer Protocol. The Hypertext Transfer Protocol, HTTP request –Setting up the environment		
2	**HTML/XHTML**	4	L1, L2, L3, L4
	Basics of HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables Images, forms, XHTML, Meta tags, Character entities, frames and frame sets, Browser architecture and Web site structure. Overview and features of HTML5, Syntactic Differences between HTML and XHTML		
3	**Introduction to Cascading Style Sheets**	2	L1, L2, L3, L4
	Cascading Style Sheets: Levels of Style Sheets - Style Specification Formats, Selector Forms, Property-Value Forms, Font Properties, List Properties, Alignment of Text, Color, The Box Model, Background Images, The span and div Tags.		
4	**Introduction to JavaScript and jQuery**	3	L1, L2, L3, L4, L5
	The Basics of JavaScript: Overview of JavaScript, Object Orientation and JavaScript, General Syntactic Characteristics- Primitives, Operations, and Expressions, Screen Output and Keyboard Input, Control Statements, Object Creation and Modification, Arrays, Functions. Callback Functions, Java Script HTML DOM.		
5	**Introduction to JSON Data & XML**	2	L1, L2, L3, L4
	Basics of JSON: Syntax, Data Types, Objects, Schemas, Comparison with XML		
6	**Introduction to PHP**		

	Introduction-Simple PHP Program-Converting Between Data Types-Arithmetic Operators-Initializing and Manipulating Arrays-String Processing-Form Processing and Business Logic: Super global Arrays	2	L1, L2, L3, L4, L5
	Total Hours	**15**	

Books & References:

SN	Title	Authors	Publisher	Edition	Year
1	Internet &World Wide Web How to Program	P. J. Deitel, H.M. Deitel	Pearson education	4th Edition,	2010
2	Programming the World Wide Web	Robert W Sebesta	Pearson education	7th Edition,	2014
3	HTML 5	DT Editorial services	Dreamtech Press	2nd Edition	2016
4	Web Technologies Black Book	Kogent Learning Solutions	Dreamtech Press	2nd Edition	2016

Online References:

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

Suggested List of Practical / Experiment:

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive levels as per Bloom's
1.	**Basic Experiments**	Write an HTML code to display your education details in a tabular format.	2	L1, L2, L3
2.		Write an HTML code to display your CV on a web page.	2	L1,L2,L3
3.		Use of CSS on HTML Form	2	L1,L2,L3
4.	**Design Experiments**	Write a Java script on web forms to prompt for users name & display it on the screen and and Use of Dynamic HTML Page	2	L1,L2,L3
5.		Demonstration to learn JSON format and converting JSON to javascript and viceversa .	2	L1,L2,L3
6.		Write a program in XML and create a style sheet in CSS & display the document in internet explorer	2	L1,L2,L3
7.		Write an XML program to display products.	2	L1,L2,L3,L4
8.	**Advanced Experiments**	Use HTML form to accept the two numbers N1 and N2 and using PHP program display only prime numbers in between N1 and N2.	2	L1,L2,L3,L4
9.		Write a program using PHP and HTML to create a form and display the details entered by the user	2	L1,L2,L3,L4
10.	**Mini/Minor Projects/ Seminar/ Case Studies**	1. Shoutit Shoutbox 2. PHP Quizzer 3. Online Discussion Forum 4. Online Examination system 5. Creation of Web page with the help of Quanta Plus /Aptana /Kompozer	4	L1,L2,L3,L4,L5,L6

T.E. Semester –V (E&TC)
Choice Based Credit Grading Scheme with Holistic and Multidisciplinary Education (CBCGS-HME 2020)
TCET Autonomy Scheme (w.e.f. A.Y. 2022-23)

<table>
<tr><td colspan="5">B.E. (Electronics & Telecommunication Engineering)</td><td colspan="3">T.E. (SEM: V)</td></tr>
<tr><td colspan="5">Course Name: Project Based Learning III</td><td colspan="3">Course Code: HME-ETCPBL501</td></tr>
<tr><td colspan="5">Teaching Scheme (Holistic Student Development – HSD)
(Conducted in the beginning of Semester during first 3 Weeks)</td><td colspan="3">Examination Scheme (Formative/ Summative)</td></tr>
<tr><td colspan="5">Modes of Teaching / Learning / Weightage</td><td colspan="3">Assessment/Evaluation Scheme</td></tr>
<tr><td colspan="5">Hours Per Week</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>TW</td></tr>
<tr><td>-</td><td>-</td><td>30</td><td>30</td><td>1</td><td>25</td><td>-</td><td>25</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/Learning Attitude (20%)</td></tr>
<tr><td colspan="8">Prerequisite: Subject knowledge, Domain knowledge</td></tr>
</table>

Course Objectives: The course intends to develop the ability to integrate knowledge and skills from various areas through more complex and multidisciplinary projects. The course also aims to build 21st century success skills such as critical thinking, problem solving, communication, collaboration and creativity/innovation.

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

Sr. No.	Course outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Think divergently to solve real time problem through project management and with knowledge of different domains to implement a unique solution.	L1, L2, L3, L4, L5, L6

A) Guidelines:

1. Project Topic: To proceed with the project work it is very important to select a right topic. Project can be undertaken on any domain of electronics and telecommunication Programme.
   Department has six domains namely i) Electronic Devices and Modeling ii) Communications Engineering iii) Antenna and Microwave Engineering iv) Signal processing v) Information Technology and vi) Embedded System.
2. Student must consult internal guide in selection of topic.
3. Project work must be carried out by a group of at least two students and maximum four. Students can continue their previous projects and can add new dimension to it.
4. Students should carry out project work every week according to time table and report to the internal guide regarding the progress of the project.
5. Internal guide has to keep track on the progress of the project and also has to maintain attendance report. This progress report can be used for awarding the term work marks.

6. At the end of the term students should demonstrate the working of the project with the help of a working model.

B) Project Report Format:

At the end of semester, a project report should preferably contain at least following details.

1. Abstract
2. Introduction
3. Literature Survey a) Survey Existing system b) Limitation of the Existing system or research gap c) Problem Statement and Objectives) Scope
4. Proposed System a) Analysis/Framework/ Algorithm b) Details of Hardware & Software c) Design details d) Methodology (your approach to solve the problem)
5. Results/Output (photograph of working model)
6. Conclusion
7. Reference

C) Term Work:

Distribution of marks for term work shall be as follows:

a) Weekly Attendance as per time table
b) Contribution in the Project work
c) Project Report (Spiral Bound)
d) Term End Presentation

D) Oral & demonstration:

Oral & Practical examination of Project should be conducted by Internal and External examiners.

T.E. Semester –V

TE (ALL BRANCHES)					**SEM: V**		
Course Name: Research Based Learning 1					**Course Code:** HSD-ETCRBL501		
Teaching Scheme (Program Specific)					**Examination Scheme (Formative/ Summative)**		
Modes of Teaching / Learning / Weightage					**Assessment/Evaluation Scheme**		
Hours Per Week					**Presentation**	**Report**	**Term Work**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**AC**	**AC**	**TW**
-	-	2	2	1	25	25	50
Assessment for Term work will be on continuous basis							
Prerequisite: Subject knowledge, Domain knowledge							

Course Objectives: This course is focused to engage the learner in research by upgrading domain knowledge by participation in technical quiz and debate, critical thinking, innovative idea generation and technical writing.

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

S.N.	Course Outcome	Cognitive level attainment as per revised Bloom Taxonomy
1	Upgrade the knowledge of latest technologies in their discipline in a competitive environment.	L1, L2
2	Create new idea for problem solving related to industry or societal issues.	L1, L2, L3
3	Develop skills of competitive programming/development.	L1, L2, L3, L4
4	Students will be able to understand research methodologies and write a technical paper.	L1, L2, L3, L4, L5

Detailed Syllabus:

Module No.	Topics	Cognitive level attainment as per revised Bloom Taxonomy
1	**Technical Quiz (Latest Technologies under various Domains in the dept.)** **I. Introduction to Quiz**: Quiz competition on Technical topics including all the domains in the dept. with 50 MCQ. (Questions will be based on various domains of the dept. and branch) **II. Quiz competition/Debate on Latest Technologies** with 50 MCQ. **Evaluation by faculty as per format.**	L1, L2
2	**Idea Generation** I. **Introduction to idea Generation**: Introduction to invention and innovation, managing creativity, Techniques for generating ideas, Steps for Idea generation to implementation. Transforming Idea into project with implementation II. **Idea validation**: Discussion on tools of Idea validation. Brainstorming session with peers for idea generation and assessment, Experience sharing by entrepreneurs or Hackathon Winners.	L1, L2, L3

	(Project group formation: Idea must be such that it should be converted into research outcome such as Product, Start-up, Patent etc., it can be multidisciplinary projects also) **Idea competition and evaluation**	
3	**Competitive Attitude Development** I. Introduction to competitive programming, benefits, Tips for good programming performance, logic development (Problem Solving strategies, loops) II. Mock Evaluation/Experience sharing by good coders **Coding competition and evaluation** **(Activities may be different as per dept. and branch)**	L1, L2, L3,L4
4	**Introduction to Research and Development** I. **Introduction to Research** Motivation and objectives of Research, Characteristics of research, Basic methods of research, types of research, review of literature, research process formulating research hypothesis, evaluation of research results, writing reports. II **Research Paper Writing** Formation of groups as per the domain interest, formulation of topic for research, Allocation of faculty for two topics, Identification of appropriate journal or conference for submission and Preparation of a review paper. **Evaluation of research review paper/poster.**	L1, L2, L3,L4,L5

References:

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

Online References:

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