B. Tech. (Electronics & Telecommunication)
Curriculum Structure as per NEP 2020
For Students Admitted in Year: 2024-25 Onwards

Institute Vision
To be a leading academic organization, creating Skilled and Ethical Human Resource by leveraging Technical Education for Sustainable Development of Society.

Institute Mission	
M1:	To produce competent technocrats to meet modern societal and industrial challenges.
M2:	To create ethical and skilled human resources through quality education and various extension activities and outreach programs.
M3:	To leverage technical expertise to solve societal issues for its sustainable development.

Department Vision
To be the most preferred department delivering fundamental and advanced knowledge in Electronics& Telecommunication and related engineering fields using state-of-the-art teaching methodologies to transform the students into knowledgeable and skilled graduates with ethical behaviour.

Department Mission	
M1:	To provide high-quality technical education and preparethe students to tackle the complex engineering problems using advanced methods with sound footing on fundamental engineering principles.
M2:	To implement technical and managerial skills with innovative research capabilities for exemplary professional conduct.
M3:	To lead and to apply technology for the progress of mankind.
M4:	To adopt to the constantly changing technological environment with highest ethical values as inner strength

Programme Educational Objectives (PEO):	
PEO1	Exhibit analytical and design skills by providing the optimum solutions to the real time problems associated with Electronics & Telecommunication engineering using modern tools and technology.
PEO2	Demonstrate professional skills like leadership, team spirit, communication, project management to deliver the in-time solutions to the analysed and designed technical problems
PEO3	Display commitment to high standards of professional & personal ethics, and desire for self and long-life learning.

Programme Outcomes (PO)	
PO1:	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineeringproblems.
PO2:	**Problem analysis:** Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles ofmathematics, natural sciences, and engineering sciences.
PO3:	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4:	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5:	**Engineering Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6:	**The Engineer and The World:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7:	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilitiesand norms of the engineering practice.
PO8:	**Individual and Collaborative Teamwork:** Function effectively as an individual, and as a member orleader in diverse teams, and in multidisciplinary settings.
PO9:	**Communication:** Communicate effectively on complex engineering activities with theengineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO10:	**Project management and finance:** Apply knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO11:	**Life-long learning:** Recognize the need for and have the preparation and ability for i. Independent and lifelong learning ii. Adaptability to new and emerging technologies and iii. Critical thinking in the broadest context of technological change.

Program Specific Outcomes (PSO):	
PSO 1	Apply their integrated knowledge of Electronics, Communication and Digital Signal Processing to provide the technical solutions to the problems related with digital communication using simulation tools.
PSO 2	Implement the successfully simulated optimum solutions in hardware using modern tools and test those for the designed specifications.

Key Features of Curriculum		
1	Multiple entry and exit option after every year	
2	Mandatory internship of one semester	
3	Curriculum is framed in compliance with NEP 2020 guideline	
4	Provision for learning in online mode through Swayam / NPTEL courses	
5	Opportunity for learner to choose courses of their interest in all disciplines.	
6	Curriculum focuses on Project Based Learning	
12	Flexibility of various degree options available at our institute	
	Various Degree options	Optional Exit Courses
	B. Tech. in Major discipline with Multidisciplinary Minor	Additional 08 credits in the form of skill-based courses / labs, internship, mini projects shall be offered at various levels.
	B. Tech. in Major discipline, Honors and Multidisciplinary Minor	
	B. Tech. Honors with Research and Multidisciplinary Minor	
	B. Tech. with Double Minor (Multidisciplinary and Specialization Minor)	

Note:

1. Students who earn a minimum of total 174 credits will be awarded "**B. Tech in Engg. with Multidisciplinary Minor**" degree.

2. Students will have the following options to earn B. Tech. in Engg. degree with MDM and Honors / Double Minor.
    a. B. Tech in Engg.. -Honors and Multidisciplinary Minor (with additional 18 credits): 174 +18 Credits
    b. There will be four papers, one in each semester starting from the 4th semester which will be based on special self-study modules mentioned in the syllabus of all core-courses.
    c. B. Tech in Engg, Honors with Research and Multidisciplinary Minor (additional 18 credits by research): Students are expected to complete a 2-months research internship in summer after 2nd year (4 credits), 3rd year (4 credits) and work towards project after 4th year (4 credits). 2 NPTEL courses of FDP level (3 credits each) must be completed in semesters 7 and 8.

Second Year Exit: Teaching Methodology, Assessment and Evaluation

1. The students should complete two online certification courses (NPTEL) related to their programme, each of 3 credits. In addition to this, they will also need to complete 2 credits worth of two Virtual Lab work related to online certification courses. These additional 8 credits earn by students shall be based upon skill based vocational courses or internship/Apprenticeship.
2. The NPTEL courses are likely to be available online and can be completed at the student's own pace. The content will be specific to the student's field of study or programme. The skill based vocational courses shall be analogous to the Baskets/Areas provided by the concerned BoS.
3. The student must complete two virtual lab work that adds 2 credits to simulate practical or experimental learning experiences in a controlled virtual environment.
4. Examination scheme: The marks gained from the two NPTEL Courses (3 credits each) are converted to a total of 100 marks. The report for the two Virtual Lab work of 2 credits will be evaluated for 25 marks. The report should include a detailed write-up and analysis of the virtual lab experiments conducted, encompassing the methodology, results, and conclusions.
5. There may be uncertainty in availability of the NPTEL courses offered by concerned BoS as there is continuous Updation of the NPTEL courses. The students can choose equivalent NPTEL course of the required duration with prior permission from the concerned institute. The concerned institute should communicate to Concerned BoS for their permission. For NPTEL course registration, the students are required to visit to website https://swayam.gov.in and create their account. Log in the account and join the

required course and follow the instructions to compete the course. Similarly, for Virtual Lab, the students are required to visit to website https://www.vlab.co.in and create their account. Log in the account and join the required lab and follow the instructions to compete the course (need to perform all listed experiments under that Lab). To fulfil the requirement of 06 credits, students can go for two courses each of 12 weeks.

Nomenclature

Abbreviation	Title	Code
BSC	Basic Science Courses	BS
ESC	Engineering Science Courses	ES
PCC	Program Core Courses	PC
PEC	Professional Elective Courses	PE
MDM	Multidisciplinary Minor	MD
OE	Open Elective	OE
SC	Skill Courses	SC
LLC	Liberal Learning Courses	--
VSEC	Vocational and Skill Enhancement Course	SE
VEC	Value Education Course	VE
AEC	Ability Enhancement Course	AE
EEMC	Entrepreneurship/Economics/Management Courses	EC
IKS	Indian Knowledge System	IK
RM	Research Methodology	RM
CEP	Community Engagement /Field Project	FP
PRO	Project	PR
OJT	Internship/On Job Training	OJT
CC	Co-curricular Courses	CC
MC	Mandatory Courses	MC
L	Lecture	L
P	Practical	P
T	Tutorial	--
T-I	Test-I	--
T-II	Test-II	--
ISE	In-Semester Evaluation	--
CIE	Continuous Internal Evaluation	--
ESE	End Semester Examination	--

TY-B.Tech - SEM-V

Dr J J Magdum College Of Engineering, Jaysingpur

ELECTRONICS AND TELECOMMUNICATION ENGINEERING
TY- B.Tech -SEM-IV

Course Name-**Microcontrollers**

Course Details:

<table>
<tr><td colspan="2">Class</td><td colspan="2">T.Y</td><td colspan="2">Semester</td><td colspan="2">V</td></tr>
<tr><td colspan="2" rowspan="2">Course Title</td><td colspan="2" rowspan="2">Microcontrollers</td><td colspan="2" rowspan="2">Course Code :1ETCPCL301</td><td colspan="2">Theory:03</td></tr>
<tr><td colspan="2">Practical:02</td></tr>
<tr><td colspan="4">Prerequisites:</td><td colspan="4"></td></tr>
<tr><td colspan="2" rowspan="2">Teaching scheme:</td><td>Theory Hours:</td><td>03</td><td>Practical Hours:</td><td>02</td><td>Tutorial Hours:</td><td>Nil</td></tr>
<tr><td>Credits:</td><td>03</td><td>Credits:</td><td>01</td><td>Credits:</td><td>Nil</td></tr>
<tr><td colspan="8">Evaluation scheme & Marks</td></tr>
<tr><td colspan="4">Theory</td><td colspan="2">Practical</td><td colspan="2">Total</td></tr>
<tr><td>CIE-I</td><td>CIE-II</td><td>ISE</td><td>ESE</td><td>CIE</td><td>ESE</td><td colspan="2"></td></tr>
<tr><td>20</td><td>20</td><td>10</td><td>50</td><td>25</td><td>25</td><td colspan="2">150</td></tr>
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Course Objectives:

The course aims to:

Sr No.	Course Objectives
PCC-ETC0231.01	To provide fundamental knowledge of the 8085 microprocessor, its architecture, pin configuration and assembly language programming
PCC-ETC0231.02	To understand the fundamentals of the MCS-51 family
PCC-ETC0231.03	To introduce addressing modes, instruction set, assembly language programming
PCC-ETC0231.04	To study on-chip hardware resources of the 8051
PCC-ETC0231.05	To introduce Embedded C programming concepts.
PCC-ETC0231.01	To understand Peripheral interfacing with Embedded C programming

Course Outcomes:

Upon successful completion of this course, the student will be able to:

Sr No.	Course Outcomes	Cognitive Levels of Attainment as per Revised Bloom's Taxonomy
PCC-ETC0231.01	Students will be able to understand the architecture of the 8085 microprocessor and develop simple assembly language programs	Understand,Apply
PCC-ETC0231.02	Students will be able to understand the basics of 8051 microcontroller.	Understand
PCC-ETC0231.03	Students will be able to develop and analyze assembly language programs using various addressing modes and instructions of the 8051.	Analyze
PCC-ETC0231.04	Students will be able understand on chip resources of 8051	Understand
PCC-ETC0231.05	Students will be able to understand basic Embedded C programming concepts	Apply
PCC-ETC0231.01	Students will be able to interface peripheral devices with 8051 and write Embedded C programs	Creat

Course Contents

Unit Number	Unit Title	Hours	Course Outcome No.	Cognitive Levels of Attainment as per Revised Bloom's Taxonom
Unit-01	**Introduction to 8085 Microprocessor** **1.1** Functional Pin out	**06**	**01**	**Understand,Apply**

	1.2 CPU Architecture **1.3** Register Organization **1.4** De- multiplexing of Address/Data bus 1.5 Addressing Modes 1.6 Instruction set and programming.			
Unit-02	**Introduction to MCS51 (8051)** 2.1 Introduction to MCS51Family, 2.2 Functional Pin out diagram, 2.3 Architecture, 2.4 Register Organization, 2.5 Memory Organization, 2.6 Input/Output Ports 2.7 Reset Circuit, Oscillator Circuit	**06**	**02**	**Understand**
Unit-03	**8051 Programming in Assembly Language** 3.1 Addressing modes, 3.2 Instruction set, 3.3 Assembler directives, 3.4 Data manipulation, 3.5 Branch related programming, Simple 3.6 I/O Port Programs	**06**	**03**	**Analyse**
Unit-04	**Hardware overview** 4.1Timers/Counters (Configuration, Structure, Related S.F.R), 4.2 Interrupts (Configuration, Structure, Related S.F.R), 4.3 Serial Communication (Mode- 1), (Configuration, Structure, Related S.F.R).	**06**	**04**	**Evaluate**
Unit-05	**8051 Programming in Embedded C:**	**06**	**05**	**Apply**

	5.1 Data Types and Variables in 8051 Embedded C, 5.2 I/O Port Programming, 5.3 Logic and Bitwise Operations , 5.4 Delay generation (without Timer), Delay Generation (Using Timer) , Counter programming , 5.5 Serial Port Programming (Using Embedded C)			

Unit-06	**Peripheral Interfacing and programming (Embedded C)** 6.1 Interfacing simple switch and LED , 6.2 Interfacing LCD, 6.3 Interfacing ADC , 6.4 Interfacing DAC 6.5 Interfacing stepper motor .	**06**	**06**	**Apply**

Text Books/Reference Books:

Sr. No	**Book Type(Text/Reference)**	**Name of the Book**	**Name of the Author**	**Publisher**	**Edition**	**Year of Publication**
1	TextBook	"Microprocessor Architecture, Programming, and Applications with the 8085"	by Ramesh S. Gaonkar			
2	TextBook	The 8051 microcontroller and embedded systems using assembly and c",--By M A Mazidi and J G Mazidi	R D McKinlay-Pearson Education			
3	Reference Book	**The 8051 Microcontroller**	**I Scott Mackenzie and R C W Phan**	**,Pearson education**	**4th edition**	
5	Reference Book	**The 8051Microcontroller -Archictecture, programming & applications**	K. J. Ayala			

Online References: Coursera/NPTL/General websites /MKCL etc)

Sr. No.	**Website Name**	**URL**	**Units Covered**
1.	**NPTL IIT Kharagpur**	**https://www.youtube.com/watch?v=hwwhsNOqqm8**	**01**
2.	**Microprocessor & mIcrocontroller NPTEL**	**https://nptel.ac.in/courses/108105102**	**02-06**

List of Assignments/Tutorials for ISE:

- Minimum 06 Assignments/Tutorials based on the curriculum.

Suggested List of Practical/Experiment for CIE/ESE:

- Minimum 10 Experiments based on the curriculum.

Experiment Number	Type of Experiment (Basic /Design/Advanced/Mini/ Minor Projects/ Seminar/ Case Studies)	Experiment Title	Cognitive levels of attainment as per Bloom's Taxonomy
1.	**Basic**	Arithmetic & Logical operations using 8051	Apply
2	**Basic**	Arithmetic & Logical operations using 8051	Apply
3	**Basic**	Memory related operation using 8051.	Understand
4	**Advanced**	Ascending/ Descending order sorting using 8051	Evaluate
5	**Design**	Generate Square wave form with 50% Duty cycle (Without Timer	Analyse
6	**Design**	Simple programs blinking LED, switch control (Port Handling and Timer operation)	Analyse
7	**Design**	Use of counter operation with 8051 microcontroller	Evaluate
8	**Design**	Interface ADC with 8051 microcontroller	Evaluate
9	**Design**	Interface DAC with 8051 microcontroller	Evaluate
10	**Advanced**	Serial communication with 8051 microcontroller (sending and receiving data)	Advanced
11	**Case**	Interface LCD with 8051 microcontroller	Understand
12	**Advanced**	Interface Stepper motor with 8051 microcontroller	Apply
13	**Advanced**	Interfacing peripherals with 8051 microcontroller (7-Segment, Switches)	Apply

Examination Scheme and Guidelines:

CIE-I **20 Marks**	Examination of 20 marks based on Units 1, 2, and 3 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ‟s compulsory.
CIE-I **20 Marks**	Examination of 20 marks based on Units 4, 5 and 6 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ‟s compulsory.
ISE **10 Marks**	ISE/CA -In Semester Evaluation/Continuous Assessment
CIE (Practical) **(25/50 Marks)**	Continuous Assessment **,**As per institute policy
ESE **50 Marks**	ESE-End Semester Examination
	Que.1: MCQ‟s based on All Units (Carries 06 Marks)
	Que.2: based on Unit 1, 2, 3 (Carries 11 Marks)
	Que.3: based on Unit 1,2,3 (Carries 11 Marks)
	Que.4: based on Unit 4, 5, 6 (Carries 11 Marks)
	Que.5: based on Unit 4, 5, 6 (Carries 11 Marks)

Dr.J.J.Magdum College Of Engineering, Jaysingpur ELECTRONICS AND TELECOMMUNICATION ENGINEERING

TY-B.Tech-SEM-V

Course Name: Electronic Communication System

CourseDetails:

<table>
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<tr><td colspan="2">CourseTitle</td><td colspan="2">Electronic Communication System</td><td colspan="2">Course Code</td><td colspan="2">Theory:1ETCPCL302
Practical:1ETCPCP306</td></tr>
<tr><td colspan="4">Prerequisites:</td><td colspan="4">Basics of communication</td></tr>
<tr><td colspan="2" rowspan="2">Teachingscheme:</td><td>Theory Hours:</td><td>3</td><td>Practical Hours:</td><td>2</td><td>Tutorial Hours:</td><td>--</td></tr>
<tr><td>Credits:</td><td>3</td><td>Credits:</td><td>1</td><td>Credits:</td><td>--</td></tr>
<tr><td colspan="8">Evaluationscheme</td></tr>
<tr><td colspan="4">Theory</td><td colspan="2">Practical</td><td colspan="2">Total</td></tr>
<tr><td>T-I</td><td>T-II</td><td>ISE</td><td>ESE</td><td>CIE</td><td>ESE</td><td colspan="2"></td></tr>
<tr><td>20</td><td>20</td><td>10</td><td>50</td><td>25</td><td>25</td><td colspan="2">150</td></tr>
</table>

Course Objectives:
The course aims to:

SrNo.	Course Objectives
1ETCPCL302.1	To understand the fundamental principles of analog and digital communication systems including modulation, transmission, and reception techniques
1ETCPCL302.2	To analyze amplitude and angle modulation methods, AM/FM transmitters and receivers, and their practical performance characteristics.
1ETCPCL302.3	To study information theory, source coding, and digital carrier communication techniques used in modern communication systems.
1ETCPCL302.4	To develop knowledge of digital modulation schemes, spread spectrum techniques, and signal encoding methods for efficient and reliable communication.

CourseOutcomes:

Uponsuccessfulcompletionofthiscourse,the studentwillbeableto:

SrNo.	Course Outcomes	CognitiveLevelsof Attainmentas per Revised Bloom's Taxonomy
1ETCPCL302.1	Explain the principles of amplitude modulation, AM transmitters, SSB generation techniques, and vestigial sideband modulation used in electronic communication systems.	Understand (K2)
1ETCPCL302.2	Explain the concepts of angle modulation, frequency modulation generation methods, bandwidth requirements, and phase modulation characteristics in communication systems.	Understand (K2)
1ETCPCL302.3	Explain and analyze the operation of AM and FM receivers, receiver parameters, detection techniques, FM demodulators, and noise suppression methods used in communication systems.	Understand (K2)
1ETCPCL302.4	Apply information theory concepts and source coding techniques for efficient data transmission. Compare different digital line coding and bandpass modulation techniques for suitable communication applications.	Apply (K3)
1ETCPCL302.5	Analyze various band pass digital modulation techniques and spread spectrum methods used for reliable digital communication systems.	Analyze (K4)

CourseContents

Unit Number	UnitTitle	Hours	Course Outcomes No.	CognitiveLevels of Attainment as per Revised Bloom's Taxonomy
Unit-01	**Amplitude Modulation** Elements of electronic communication systems, Need for modulation, channel, frequency spectrum, time and frequency domain signals, Amplitude Modulation principles, AM envelope, frequency spectrum & BW, Modulation index, % modulation, AM transmitters: Block of low level DSBFC, High level DSBFC, Trapezoidal patterns Evolution and descriptions of SSB, Suppression of carrier using balanced modulator, Suppression of unwanted sideband, Methods: Filter system, phase shift & third method Vestigial sideband (VSB).	6	1ETCPCL 303.1	Understand (K2)
Unit-02	**Angle Modulation** Instantaneous frequency, Concept of angle modulation, frequency spectrum, Narrowband & Wide Band FM, Modulation Index, Bandwidth, Phase modulation, Bessel's Function and it's mathematical Analysis, Generation of FM (Direct and Indirect Method)	6	1ETCPCL 303.2	Understand (K2)
Unit-03	**AM and FM Receiver** Simplified block diagram of AM receiver, receiver parameters Sensitivity, Selectivity, dynamic range, Tracking, fidelity, Types of AM receiver: TRF and	6	1ETCPCL 303.3	Understand (K2)

	Super heterodyne (block diagram), AM detection types: using diode detector, distortion in diode detector. Negative peak clipping & diagonal clipping. Double conversion FM receivers, block diagram, FM demodulator, tuned circuit frequency discriminators, slope detectors, fosters seeley discriminator, ratio detectors, PLL-FM demodulators, FM noise suppression			
Unit-04	**Information Theory** Measure of Information, Entropy, Information Rate, Shannon's encoding theorem, communication channels –Discrete & Continuous, Shannon–Hartley theorem, Entropy Coding: Huffman's coding & Shannon-Fanno Coding techniques.	6	1ETCPCL 303.4	Apply (K3)
Unit-05	**Source Coding** Quantization–Uniform, Non-Uniform. Study of PCM, DM, ADM DPCM, ADPCM **Digital Carrier Line Encoding** Line codes: Unipolar, Bipolar, NRZ, RZ, RZ-AMI, Manchester Baseband pulse Shaping, Duo binary	6	1ETCPCL 303.5	Apply (K3)
Unit-06	**Band Pass Modulation Techniques** ASK, FSK, PSK, DPSK, QPSK, & QAM. Coherent, Non- Coherent detection. Introduction to Spread Spectrum techniques: DSSS, FHSS.	6	1ETCPCL 303.6	Analyze (K4)

TextBooks / Reference Books:

Sr. No	**Book Type(Text/Reference)**	**Name of theBook**	**Nameofthe Author**	**Publisher**	**Edition**	**Year of Publication**
1.	Textbook	Electronic Communications	George Kennedy	McGraw Hill.	5th editions	1999
2.	Textbook	Electronics Communication System Fundamentals through Advanced	Wayne Tomasi	Pearson Education	5th Edition	2004
3.	Textbook	Digital & Analog Communication	K. Sam Shanmugam	John Wiley India	1st Edition	1979
4.	Textbook	Digital Communication	Simon Haykin	Wiley India.	1st Edition	1988
5.	Textbook	Communication Systems: Analog and Digital	Singh and Sapre,	Tata McGraw-Hill (TMH).	2nd Edition	2004

Online References: Coursera / NPTEL / General websites etc)

Sr.No.	WebsiteName	URL	UnitsCovered
1	Coursera	https://nptel.ac.in/courses/108104098	06
2	Udemy	https://www.udemy.com/course/modern-communication-systems/?srsltid=AfmBOoobFU65OuiAGZ56Lsb8BlbdJ19mZh_YfHAIU3Sn9FatHg4WGBc-	04, 05

Suggested List of Practical / Experiment for CIE / ESE:

- Minimum 08 Experiments based on the curriculum.

Experiment Number	Type of Experiment (Basic / Design / Advanced / Mini / Minor Projects / Seminar / Case Studies)	Experiment Title	Cognitive levels of attainment as per Bloom's Taxonomy
1.	Basic	Practical implementation of Amplitude modulation and demodulation	Understand (K2)
2.	Basic	Practical implementation of frequency modulation and demodulation.	Understand (K2)
3.	Basic	Practical implementation of PAM, PAM-TDM system	Understand (K2)
4.	Basic	Practical implementation of PWM, PPM system	Understand (K2)
5.	Basic	Experiment on Pre-emphasis and De-emphasis	Understand (K2)
6.	Basic	Study of Delta Modulation & Adaptive Delta Modulation	Understand (K2)
7.	Basic	Study of Amplitude Shift Keying	Understand (K2)
8.	Basic	Study of Frequency Shift Keying	Understand (K2)
9.	Basic	Study of Phase Shift Keying	Understand (K2)
10.	Basic	Study of Quadrature Phase Shift Keying	Understand (K2)
11.	Basic	Study of Any Modulation Technique using MATLAB/SCILAB	Analyze (K4)
12.	Basic	Visit to AIR	

ExaminationSchemeandGuidelines:

T-I **20 Marks**	Examination of 20marks based on Units1, 2, and 3 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05Marks based on MCQ's compulsory.
T-I **20 Marks**	Examination of 20marks based on Units 4, 5 and 6 should be conducted, and marks should be communicated to the ExamCell. • One question of 05Marks based on MCQ's compulsory.
ISE **10 Marks**	ISE/CA-In Semester Evaluation / Continuous Assessment
CIE(Practical) **(25 Marks)**	Continuous Assessment**, a**s per institute policy

ESE **50 Marks**	ESE-EndSemesterExamination(Sample)
	Que.1:MCQ'sbasedonAllUnits(Carries06Marks)
	Que.2:basedonUnit1,2,3(Carries11Marks)
	Que.3:basedonUnit1,2,3(Carries11 Marks)
	Que.4:basedonUnit4,5,6(Carries11Marks)
	Que.5:basedonUnit4,5,6(Carries11Marks)

Dr. J.J.Magdum College Of Engineering, Jaysingpur ELECTRONICS AND TELECOMMUNICATION ENGINEERING
TY-B.Tech - SEM-V

Course Name: Digital Signal Processing

Course Details:

<table>
<tr><td colspan="2">Class</td><td colspan="2">TY</td><td colspan="2">Semester</td><td colspan="2">V</td></tr>
<tr><td colspan="2">CourseTitle</td><td colspan="2">Digital Signal Processing</td><td colspan="2">Course Code</td><td colspan="2">Theory:1ETCPCL303
Practical:1ETCPCP307</td></tr>
<tr><td colspan="3">Prerequisites:</td><td colspan="5">Signals and Systems</td></tr>
<tr><td colspan="2" rowspan="2">Teachingscheme:</td><td>Theory Hours:</td><td>3</td><td>Practical Hours:</td><td>2</td><td>Tutorial Hours:</td><td>--</td></tr>
<tr><td>Credits:</td><td>3</td><td>Credits:</td><td>1</td><td>Credits:</td><td>--</td></tr>
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<tr><td>20</td><td>20</td><td>10</td><td>50</td><td>25</td><td>25</td><td colspan="2">150</td></tr>
</table>

Course Objectives:
The course aims to:

SrNo.	Course Objectives
1ETCPCL303.1	To understand basic of CT & DT signals and their representation
1ETCPCL303.2	To understand basic of CT & DT system and their representation
1ETCPCL303.3	To understand Fast Fourier Transform and Fast Convolution
1ETCPCL303.4	To understand design of digital FIR filters using various methods
1ETCPCL303.5	To understand design of digital IIR filters using various methods
1ETCPCL303.6	To understand the key architectural features of DSP Processor

Course Outcomes:

Upon successful completion of this course, the student will be able to:

SrNo.	Course Outcomes	CognitiveLevelsofAttainment as per Revised Bloom's Taxonomy
1ETCPCL303.1	Demonstrate use of signals and their representation	Understand (K2)
1ETCPCL303.2	Represent CT & DT system	Understand (K2)
1ETCPCL303.3	Make use of FFT algorithm for filtering of long duration sequences	Analyze (K4)
1ETCPCL303.4	Design digital FIR filters	Create (K6)
1ETCPCL303.5	Design digital IIR filters	Create (K6)
1ETCPCL303.6	Implement FIR and IIR filters using DSP Processor	Create (K6)

	Course Contents			
Unit Number	**Unit Title**	**Hours**	**Course Outcomes No.**	**Cognitive Levels of Attainment as per Revised Bloom's Taxonomy**
Unit-01	**Signals and Classification of Signals** Continuous time signals & discrete time, analog & digital, even &odd signals, periodic &non-periodic, deterministic &non-deterministic, energy & power, Basic CT & DT signals: unit impulse, unit step, unit ramp, complex exponential & sinusoidal, Basic operations on signals, sampling and reconstruction of signal	6	1ETCPCL 303.1	Understand (K2)
Unit-02	**System and Classification of Systems** System Representation, properties of systems : continuous time Systems & discrete Systems, system with and without memory, causal and non-causal system, linear and nonlinear system, Time invariant and time variant system, Stability of system, Impulse response representation, convolution integral , convolution sum, properties of convolution .	6	1ETCPCL 303.2	Understand (K2)
Unit-03	**Fourier Transform ,Discrete Fourier Transform & FFT Algorithms** Properties of Fourier Transform, Discrete Fourier Transform , Inverse Discrete Fourier Transform(IDFT): Direct method, DFT using Twiddle factor, Fast Fourier transform algorithms – Radix -2 DIT and DIF for DFT and IDFT computations, Fast Convolution: Overlap-Add and Overlap-save algorithm.	6	1ETCPCL 303.3	Analyze (K4)

Unit-04	**FIR Filter Design** Characteristic of FIR filter, properties of FIR filter, type of FIR filter Fourier series method, frequency sampling, Fourier series & windowing method.	6	1ETCPCL 303.4	Create (K6)
Unit-05	**IIR Filter Design** Analog filters approximations, mapping of S-plane to Z-plane, Design of IIR using Impulse Invariance Method, Bilinear Transformation method, Frequency Transformation, Filter design methods: Butterworth filters, Chebyshev filters and its conversion to digital filter.	6	1ETCPCL 303.5	Create (K6)
Unit-06	**Realization of Digital filters** FIR and IIR filter realization in cascade form and parallel form .Effect of finite word length on realization. Introduction to DSP processors: TMS320C67XX, Architecture, Functional Units, pipelining, Registers, Addressing modes.	6	1ETCPCL 303.6	Create (K6)

Text Books / Reference Books:

Sr. No	**Book Type(Text/Reference)**	**Name of theBook**	**Nameofthe Author**	**Publisher**	**Edition**	**Year of Publication**
1.	Textbook	" Signals and Systems", Ane Books Pvt. Ltd	S. Palani	Ane Books Pvt. Ltd.	1st	2009
2.	Textbook	" Signals and Systems "	P. Ramesh Babu, R. Anandanatarajan,	SCITECH publication	4th	2010
3.	Textbook	"Digital Signal Processing Principles, Algorithms and Application"	John G Prokis, Manolakis	Pearson Education publication	4th	2007
4.	Textbook	"Digital Signal Processing"	Salivahanam, A Vallavaraj, C. Guanapriya	Tata McGraw Hill Publication.	2nd	2007
5.	Textbook	"Digital Signal Processing"	A. Anand Kumar	PHI Publications	1st	2013

Online References: Coursera / NPTEL / General websites etc)

Sr.No.	**WebsiteName**	**URL**	**Units Covered**
1	Coursera	https://www.coursera.org/learn/dsp	03

		1	
2	Udemy	https://www.udemy.com/course/learn-digital-signal-processing/?srsltid=AfmBOoqNk4q4pR6rJkNJ1x1OI4rlLrEFJ1njlF45o4pWqltmJ5qWFHB5	04

Suggested List of Practical / Experiment for CIE / ESE:

- Minimum 08 Experiments based on the curriculum.

Experiment Number	**Type of Experiment (Basic / Design / Advanced / Mini / Minor Projects / Seminar / Case Studies)**	**Experiment Title**	**Cognitive levels of attainment as per Bloom's Taxonomy**
1.	Basic	Generation of DT signals a) Study of Unit impulse sequence b) Study of Unit step sequence c) Study of Exponential sequence d) Study of Sinusoidal sequence	Apply (K3)
2.	Basic	Convolution and correlation of signals	Apply (K3)
3.	Basic	Computation of DFT & IDFT using standard formula	Apply (K3)
4.	Basic	Computation of DFT using FFT algorithms	Apply (K3)
5.	Design	Design of FIR LPF, HPF, BPF, BRF filter using Kaiser window	Create (K6)
6.	Design	Design of FIR filter using frequency sampling method	Create (K6)
7.	Design	Design of IIR LPF, HPF, BPF, BRF filter using impulse invariance method	Create (K6)
8.	Design	Design of IIR LPF, HPF, BPF, BRF filter using bilinear transformation method	Create (K6)
9.	Design	Computation of DCT	Analyze (K4)
10.	Design	Computation of DWT	Analyze (K4)
11.	Design	To implement FIR & IIR filter using TMS320C67XX processor	Create (K6)

Examination Scheme and Guidelines:

T-I **20Marks**	Examination of 20 marks based on Units1, 2, and3 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ's compulsory.
T-I **20Marks**	Examination of 20 marks based on Units 4,5 and6 should be conducted, and marks should be communicated to the ExamCell. • One question of 05 Marks based on MCQ's compulsory.
ISE **10Marks**	ISE/CA-In Semester Evaluation/ Continuous Assessment
CIE(Practical) (25 Marks)	Continuous Assessment**,** As per institute policy

ESE **50 Marks**	ESE-End Semester Examination(Sample)
	Que.1:MCQ's based on All Units (Carries 06 Marks)
	Que.2:based on Unit1,2,3 (Carries11Marks)
	Que.3:based on Unit1,2,3 (Carries11 Marks)
	Que.4:based on Unit4,5,6 (Carries11Marks)
	Que.5:based on Unit4,5,6 (Carries11Marks)

Dr J J Magdum College Of Engineering, Jaysingpur ELECTRONICS AND TELECOMMUNICATION ENGINEERING

TY- B.Tech -SEM-V

Program Elective Courses 1 - 1.Power Electronics and Drives

Course Details:

<table>
<tr><td colspan="2">Class</td><td colspan="2">TY</td><td colspan="2">Semester</td><td colspan="2">VI</td></tr>
<tr><td colspan="2" rowspan="2">Course Title</td><td colspan="2" rowspan="2">Power Electronics and Drives</td><td colspan="2" rowspan="2">Course Code
1ETCPEL304 & 1ETCPEL308</td><td colspan="2">Theory: 3 L/Week</td></tr>
<tr><td colspan="2">Practical: - 2 Hr./Week</td></tr>
<tr><td colspan="4">Prerequisites:</td><td colspan="4">1. Basics of electrical & electronics engineering.
2. Electronics devices and circuits & Fundamentals of mathematics</td></tr>
<tr><td colspan="2" rowspan="2">Teaching scheme:</td><td>Theory Hours:</td><td>3</td><td>Practical Hours:</td><td>-2</td><td>Tutorial Hours:</td><td>-</td></tr>
<tr><td>Credits:</td><td>3</td><td>Credits:</td><td>1</td><td>Credits:</td><td>4</td></tr>
<tr><td colspan="8">Evaluation scheme</td></tr>
<tr><td colspan="4">Theory</td><td colspan="2">Practical</td><td colspan="2">Total</td></tr>
<tr><td>T-I</td><td>T-II</td><td colspan="2">ISE</td><td>ESE</td><td>CIE</td><td>ESE</td><td></td></tr>
<tr><td>20</td><td>20</td><td colspan="2">10</td><td>50</td><td>25</td><td>---</td><td>125</td></tr>
</table>

Course Objectives:
The course aims to:

Sr No.	Course Objectives
1ETCPEL-304.01	To introduce students to different power devices with construction, V-I characteristics, device ratings and typical triggering/driver circuits.
1ETCPEL-304.02	To make students understand working, performance analysis of various power converter circuits such as ac to dc converters, inverter, DC chopper, and AC voltage controllers.
1ETCPEL-304.03	To introduce various applications of power converters.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

Sr No.	Course Outcomes	Revised Bloom's Taxonomy
1ETCPEL-304.01	Understand the construction, V-I characteristics, device ratings and typical triggering/driver circuits of different Power Devices..	II
1ETCPEL-304.02	Analyze AC to DC power converters.	IV
1ETCPEL-304.03	Analyze DC to AC power converters	IV
1ETCPEL-304.04	Analyze DC to DC power converters & AC Voltage Controllers.	IV

Course Contents

Unit No.	Unit Title	Hours	CO	BL
Unit-01	Study of Power Devices Construction, VI characteristics, switching characteristics of SCR, D GTO, Power MOSFET and IGBT, Device ratings of SCR, Power M IGBT and their significance, requirement of a typical triggering / dri (such as Opto-isolator) circuits for various power devices, importan and parallel operations of various power devices (no derivation and Protections to power devices.	**6**	**CO1**	II
Unit-02	AC to DC Power Converters Concept of line & forced commutation, Single phase Semi & Full converters using SCR for R and R-L loads, its performance analysis and numerical. Effect of source inductance and freewheeling diode, Single Phase PWM Rectifier using IGBT, Difference between SCR based conventional rectifiers and IGBT based rectifiers. Application of AC to DC converters in DC motor drive for single phase separately excited dc motor..	**6**	**CO2**	IV
Unit-03	DC to AC Power Converters Single phase half and full bridge square wave inverter for R and R-L load using MOSFET / IGBT and its performance analysis and numerical, Cross conduction in inverter, need of voltage control and harmonic elimination / reduction in inverters, Control of voltage using various PWM techniques and their advantages, Applications of Inverter in Electronic Ballast, BLDC motor drive, Variable voltage & variable frequency three phase induction motor drive, On-line and Off- line UPS.	**6**	**CO3**	IV

Unit-04	DC to DC Power Converters : Choppers DC to DC Power Converters: Classification of choppers, Step down chopper for R and RL load and its performance analysis, Step up chopper, various control strategies for choppers, types of choppers (isolated and non-isolated). Applications of DC Chopper in DC Motor drive.	**6**	**CO4**	IV
Unit-05	AC to AC Power Converter: Cyclo-Converters : Introduction to cyclo-converters, 1-phase to 1-phase, 3-phase to 1-phase, 3-phase to 3- phase: bridge configuration and circulating and non-circulating mode of operation for 1 phase midpoint configuration. Harmonic reduction techniques.	**6**	**CO4**	IV
Unit-06	Fundamentals of electric drives Block diagram of an electric drive, parts of electric drive, and selection criteria of electric drives, comparison of D.C. and A.C. drive, adjustable speed drive. D.C. motor: starting and breaking, conventional speed control methods. A.C. Motor: starters for 3 phase induction motor –D.O.L., star-delta starter, autotransformer starter, rotor resistance starter, speed control methods..	**6**	**CO4**	IV

Text Books/Reference Books:

Sr. No	**Book Type(Text/Reference)**	**Name of the Book**	**Name of the Author**	**Publisher**	**Edition**
1	**Reference**	Power Electronics,	M.H. Rashid	Pearson	3rd Edition
2	**Reference**	Power Electronics	Ned Mohan	Wiely Publication	
3	**Reference**	Power Electonics & motor Control	V.R.Moorthi, Shephard	Cambridge publication	2nd Editio n
4	**Text**	Power Electronics. .	P.C.Sen	McGraw Hill	
5	**Text**	Power Electronics,	M.D. Singh, K.B. Khanchandani	McGraw Hill	2nd Edition
6	**Text**	Fundamentals of Electrical Drives	G.K.Dubey		

Online References: Coursera/NPTL/General websites etc)

Sr. No.	**Website Name**	**URL**	**Units Covered**
1	NPTEL Courses Link https://nptel.ac.in/courses/108105066	NPTEL	All

Suggested List of Practical' s/Experiments for CIE/ ESE:

- Minimum 08 Experiments based on the curriculum.

Ex.No.	Type of Experiment(Basic, Design, Advanced, Mini/MinorProjects/Seminar/Case Studies)	Experiment Title	Cognitive Levels
1.	**Basic**	V-I Characteristics of SCR or TRIAC,or DIAC.	II
2.	**Basic**	V-I Characteristics of Power MOSFET	II
3.	**Basic**	V-I Characteristics of IGBT	II
4.	**Basic**	Single phase Semi and Full Converter using SCR with R & R-L load	IV
5.	**Basic**	Single-Phase PWM Power MOSFET / IGBT based bridge inverter for R and motor load	IV
6.	**Basic**	Step down / Step up chopper using power MOSFET / IGBT	IV
7.	**Basic**	Light dimmer using Diac/Triac.	IV
8.	**Advanced**	Performance of Jones chopper or Morgan‟s chopper..	IV
9.	**Advanced**	Performance evaluation of 3 Phase Converter/Rectifier using PSIM.	IV
10.	**Advanced**	Performance evaluation of Single Phase Inverter using PSIM.	IV
11.	**Advanced**	Performance evaluation of Single Phase Cyclo- Converter using PSIM.	IV

Examination Scheme and Guidelines:(Sample)

CIE-I 20 Marks	Examination of 20 marks based on Units 1, 2, and 3 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ‟s compulsory.
CIE-I 20 Marks	Examination of 20 marks based on Units 4, 5 and 6 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ‟s compulsory.
ISE 10 Marks	ISE/CA -In Semester Evaluation/Continuous Assessment
CIE (Practical) (25/50 Marks)	Continuous Assessment **,**As per institute policy

ESE **50 Marks**	ESE-End Semester Examination (Sample)
	Que.1: MCQ's based on All Units (Carries 6 Marks)
	Que.2: Solve Any Two based on Unit 1, 2, 3 (Carries 16 Marks)
	Que.3: Solve Any Two based on Unit 1,2,3 (Carries 16 Marks)
	Que.4: Solve Any Two based on Unit 4, 5, 6 (Carries 16 Marks)
	Que.5: Solve Any Two based on Unit 4, 5, 6 (Carries 16 Marks)

Dr. J.J.Magdum College Of Engineering, Jaysingpur ELECTRONICS AND TELECOMMUNICATION ENGINEERING

TY-B.Tech - SEM-V

Program Elective Courses 1 - **2.** Speech Processing

CourseDetails:

Class	TY		**Semester**	VI		
CourseTitle	Speech Processing		**Course Code**	Theory:1ETCPEL304		
				Practical:1ETCPEP308		
Prerequisites:			Digital Signal Processing			
Teaching scheme:	**Theory Hours:**	3	**Practical Hours:**	2	**Tutorial Hours:**	--
	Credits:	3	**Credits:**	1	**Credits:**	--

Evaluationscheme						
Theory				**Practical**		**Total**
T-I	**T-II**	**ISE**	**ESE**	**CIE**	**ESE**	
20	20	10	50	25	-	125

Course Objectives:
The course aims to:

SrNo.	**Course Objectives**
1ETCPEL304.1	To understand basic acoustic theory and time domain models for speech processing..
1ETCPEL304.2	To Understand sampling, quantization and different modulation techniques.
1ETCPEL304.3	To Understand STFT analysis , Homomorphic Speech processing and speech synthesis
1ETCPEL304.4	To Understand Linear predictive coding to enhance speech quality
1ETCPEL304.5	To Understand different techniques to enhance speech quality

Course Outcomes:

Upon successful completion of this course, the student will be able to:

SrNo.	Course Outcomes	CognitiveLevelsofAttainmentas per Revised Bloom's Taxonomy
1ETCPEL304.1	Explain the acoustic theory.	Understand (K2)
1ETCPEL304.2	Apply sampling, quantization and different modulation techniques.	Apply (K3)
1ETCPEL304.3	To perform STFT analysis , Homomorphic Speech processing and speech synthesis	Apply (K3)
1ETCPEL304.4	Apply Linear predictive coding to enhance speech quality	Apply (K3)
1ETCPEL304.5	Apply different techniques to enhance speech quality	Apply (K3)

Course Contents

Unit Number	Unit Title	Hours	Course Outcomes No.	Cognitive Levels of Attainment as per Revised Bloom's Taxonomy
Unit No.1	**DIGITAL MODELS FOR THE SPEECH SIGNAL:** Process of speech production, Acoustic theory of speech production, Lossless tube models, and Digital models for speech signals. Time domain models for speech processing: Time dependent processing of speech, Short time energy and average magnitude, Short time average zero crossing rate, Speech vs silence discrimination using energy & zero crossings, Pitch period estimation, Pitch period estimation using autocorrelation function, Median smoothing.	**6 Hrs.**	1ETCPEL304.1	Understand (K2)
Unit No.2	**DIGITAL REPRESENTATIONS OF THE SPEECH WAVEFORM:** Sampling speech signals, Instantaneous quantization, Adaptive quantization, Differential quantization, Delta Modulation, Differential PCM, Comparison of systems, direct digital code conversion.	**5 Hrs.**	1ETCPEL304.2	Apply (K3)
Unit No.3	**SHORT TIME FOURIER ANALYSIS:** Linear Filtering interpretation, Filter bank summation method, Overlap addition method, Design of digital filter banks, Implementation using FFT, Spectrographic displays, Pitch detection, Analysis by synthesis, Analysis synthesis systems.	**6 Hrs.**	1ETCPEL304.3	Apply (K3)
Unit No.4	**HOMOMORPHIC SPEECH PROCESSING:** Homomorphic systems for convolution,	**6 Hrs.**	1ETCPEL304.3	Apply (K3)

	complex cepstrum, Pitch detection, Formant estimation, Homomorphic vocoder.			
Unit No.5	**LINEAR PREDICTIVE CODING OF SPEECH:** Basic principles of linear predictive analysis, Solution of LPC equations, Prediction error signal, Frequency domain interpretation, Relation between the various speech parameters, Synthesis of speech from linear predictive parameters, Applications.	**6 Hrs.**	1ETCPEL304.4	Apply (K3)
Unit No.6	**SPEECH ENHANCEMENT:** Spectral subtraction & filtering, Harmonic filtering, parametric re-synthesis, Adaptive noise cancellation. **SPEECH SYNTHESIS:** Principles of speech synthesis, Synthesizer methods, Synthesis of intonation, Speech synthesis for different speakers, Speech synthesis in other languages, Evaluation, Practical speech synthesis.	**7 Hrs.**	1ETCPEL304.5	Apply (K3)

Text Books / Reference Books:

Sr. No	Book Type (Text/Reference)	Name of the Book	Name of the Author	Publisher	Edition	Year of Publication
1.	Textbook	"Digital Processing of Speech Signals"	L. R. Rabiner and R. W. Schafer,	Pearson Education (Asia) Pte. Ltd.,	1st Edition	2004.
2.	Textbook	"Fundamentals of Speech Recognition"	L. R. Rabiner and B. Juang,	Pearson Education (Asia) Pte. Ltd.,	1st Edition	2004
3.	Reference book	Speech and audio processing	by Dr. Shaila D. Apte	Wiley India Pvt. Ltd.	1st Edition	2019
4.		"Speech & Audio Signal Processing",	B. Gold & N. Morgan John	John Wiley & Sons.	1st Edition	2000
5.	Reference book	"Speech Communication Human & Machine"	D. O'Shaughnessy	Universities Press	2nd Edition	2001

Online References: Coursera / NPTEL / General websites etc)

Sr.No.	WebsiteName	URL	Units Covered
1	**NPTEL**	https://onlinecourses.nptel.ac.in/e-learning/preview/noc22_ee117	03 and 05
2	**Udemy**		

Suggested List of Practical / Experiment for CIE / ESE:

- Minimum 08 Experiments based on the curriculum.

Experiment Number	Type of Experiment (Basic / Design / Advanced / Mini / Minor Projects / Seminar / Case Studies)	Experiment Title	Cognitive levels of attainment as per Bloom's Taxonomy
1.	Basic	To understand the process of speech production and vocal tract modeling.	Understand (K2)
2.	Basic	To record speech signals and observe waveform characteristics in time domain.	Understand (K2)
3.	Basic	To compute Short Time Energy (STE) and Zero Crossing Rate (ZCR) of speech signals.	Apply (K3)
4.	Basic	To detect beginning and ending points of speech using energy and ZCR methods	Understand (K2)
5.	Basic	To estimate pitch period and pitch frequency of voiced speech signals.	Understand (K2)
6.	Basic	To perform short-time spectral analysis of speech using STFT.	Apply (K3)
7.	Basic	To compute and analyze speech spectrum using FFT.	Analyze(K4)
8.	Basic	To compute cepstrum for pitch and formant estimation.	Apply (K3)
9.	Basic	To estimate formant frequencies of vowels using cepstral/LPC analysis	Apply (K3)
10.	Basic	To obtain LPC coefficients and analyze speech parameters	Analyze(K4)
11.	Basic	To synthesize speech signals using LPC parameters.	Analyze(K4)

Examination Scheme and Guidelines:

T-I 20Marks	Examination of 20 marks based on Units1, 2, and3 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ's compulsory.
T-I 20Marks	Examination of 20 marks based on Units 4,5 and6 should be conducted, and marks should be communicated to the ExamCell. • One question of 05 Marks based on MCQ's compulsory.
ISE 10Marks	ISE/CA-In Semester Evaluation/ Continuous Assessment
CIE(Practical) (25 Marks)	Continuous Assessment**,** As per institute policy

ESE **50 Marks**	ESE-End Semester Examination(Sample)
	Que.1:MCQ's based on All Units (Carries 06 Marks)
	Que.2:based on Unit1,2,3 (Carries11Marks)
	Que.3:based on Unit1,2,3 (Carries11 Marks)
	Que.4:based on Unit4,5,6 (Carries11Marks)
	Que.5:based on Unit4,5,6 (Carries11Marks)

Dr J J Magdum College Of Engineering, Jaysingpur ELECTRONICS AND TELECOMMUNICATION ENGINEERING

TY- B.Tech -SEM-V

Program Elective Courses 1 - 3. Satellite Communication

Course Details:

Class	**TY**		**Semester**		**VI**		
Course Title	**Satellite Communication**		**Course Code**		**Theory: 3 L 1ETCPEL304**		
					Practical: - 2P 1ETCPEL308		
Prerequisites:			Basics of Analog Communication, Digital Communication & EME.				
Teaching scheme:	**Theory Hours:**	**3**	**Practical Hours:**	**2**	**Tutorial Hours:**		
	Credits:	**3**	**Credits:**	**1**	**Credits:**		

Evaluation scheme						
Theory				**Practical**		**Total**
CIE-I	**CIE-II**	**ISE**	**ESE**	**CIE**	**ESE**	
20	20	10	50	25	-	125

Course Objectives:

The course aims to:

Sr No.	**Course Objectives**
1ETCPEL-3O4.01	1. To introduce the fundamental concept in the field of satellite communication.
1ETCPEL-3O4.02	To provide understanding of satellite communication system operation, launching Techniques.
1ETCPEL-3O4.03	To analyze, design and evaluate satellite communication subsystem.
1ETCPEL-3O4.04	To examine concept of satellite networking.
1ETCPEL-3O4.05	To outline applications of Satellite Systems in various fields

Course Outcomes:

Upon successful completion of this course, the student will be able to:

Sr No.	Course Outcomes	Cognitive Levels of Attainment as per Revised Bloom's Taxonomy
1ETCPEL-3O4.01	Explain Orbital aspects, various subsystems involved in satellite communication.	II
1ETCPEL-3O4.02	Demonstrate Satellite Network System.	III
1ETCPEL-3O4.03	Classify Non Geostationary Satellite Systems and different applications of Satellite Systems.	IV
1ETCPEL-3O4.04	Evaluate Link budget calculation.	V

Course Contents				
Unit No.	**Unit Title**	**Hours**	**CO**	**Cognitive Levels of Attainment as per Revised Bloom's Taxonomy**
Unit-01	**INTRODUCTION OF SATELLITE COMMUNICATION:** Introduction, basic concept of satellite communication, Orbital Mechanics, Look angle determination, Orbital perturbation, Orbital determination Launchers and Launch vehicles, Orbital effects in communication system performance..	**7**	**CO1**	**II**
Unit-02	**SATELLITE SUBSYSTEM:** Introduction, Attitude and control system(AOCS), Telemetry, Tracking, Command and Monitoring, Power systems, Communication subsystem, Satellite antennas, Equipment reliability and space qualification.	**7**	**CO1**	**II**
Unit-03	**SATELLITE LINK DESIGN:** Introduction, Basic transmission Theory, System Noise Temperature and G/T Ration, Design of Downlinks, Uplink Design, Design of specified C/N : Combining C/N and C/I values in Satellite Links. **(Numerical Expected)**	**6**	**CO4**	**V**
Unit-04	**SATELLITE NETWORKS**: Reference architecture for satellite networks, basic	**6**	**CO2**	**III**

	characteristics of satellite networks, Onboard connectivity with transparent processing, analogue transparent switching, Frame organization, Window organization, On board connectivity with beam scanning.			
Unit-05	**LOW EARTH ORBIT AND NON GEO-STATIONARY SATELLITE SYSTEM:** Introduction, Orbit considerations, Coverage and Frequency Consideration, Delay and Throughput Consideration, Operational NGSO constellation design: Iridium, Teledesic	**4**	**CO3**	**IV**
Unit-06	**SATELLITE APPLICATIONS:** Communication Satellite-Digital DBS TV, Satellite Radio Broadcasting, Navigation Satellite, GPS Position Location Principles, GPS Receivers and codes. Military Satellite- Directed Energy Laser Weapons, Weather Forecasting Satellite Application	**6**	**CO3**	**IV**

Text Books/Reference Books

Sr. No	**Book Type(Text/ Reference)**	**Name of the Book**	**Name of the Author**	**Publisher**	**Edition**
1	**Reference**	Satellite Communications-	Dennis Roody	McGraw Hill	Fourth Edition
2	**Reference**	Satellite Communications-,	Gerard Maral and Michel Bousquet	Wiley India.	
3	**Reference**	Satellite Communications systems Engineering,	Wilbur L. Pritchard, Henri G. Suyderhoud and Robert A. Nelson.		2nd edition
4	**Text**	Satellite Communications-	Timothy Pratt, Charles Bostian, Jeremy Allnut John	Wiley &Sons	II Edition
5	**Text**	Satellite Communications-,	Anil k. Maine and Varsha Agaraval	Wiley Publications	
6	**Text**	Satellite Technology Principles and Applications, ,	Anil K. Maini and Varsha Agarawal	Wiley Publications	Third Edition

e-Resources and Digital Material:

1. https://nptel.ac.in/courses/117105131
2. http://nptel.iitm.ac.in/course.php
3. http://ocw.mit.edu
4. www.radio-electronics.com

Suggested List of Practical's/Experiments for CIE/ESE:

- Minimum 08 Experiments based on the curriculum.

Ex.No.	Type of Experiment(Basic, Design, Advanced, Mini/MinorProjects/Seminar/Case Studies)	Experiment Title	Cognitive Levels
1.	**Basic**	Understanding the basic concepts of satellite communication	II
2.	**Basic**	To setup a communication link between uplink transmitter and downlink receiver using Satellite	III
3.	**Basic**	To setup an Active satellite communication link and demonstrate link fail operation	III
4.	**Basic**	To communicate voice & Video signal through satellite link	IV
5.	**Advanced**	Observe the effect of Different combinations of uplink and downlink frequencies on satellite link	IV
6.	**Advanced**	To transmit and receive three separate signals (Audio, Video , Tone) simultaneously through satellite link	IV
7.	**Advanced**	To transmit and receive function generator signals through satellite link	IV
8.	**Advanced**	To measure the signal parameters in an analog FM/FDM TV satellite link	IV
9.	**Advanced**	To transmit digital waveforms through a satellite communication link	IV
10.	**Advanced**	To Calculate Bit Error Rate in a satellite communication link	V

Or

Ex.No.	Type of Experiment(Basic, Design, Advanced, Mini/MinorProjects/Seminar/Case Studies)	Experiment Title	Cognitive Levels
1.	Design	To write a program to observe the variations in the antenna look angles for the earth station antennas.	
2.	Design	To write a program to calculate to determine the limits of visibility for an earth station.	
3.	Design	To obtain the plot of Orbital altitude versus	

		satellite antenna diameter	
4.	Design	To write a Program for Estimated topospheric attenuation due to Oxygen and water.	
5.	Design	To write a Program for plot of Semi major axis versus rate of change of argument of perigee.	
6.	Design	To write program to calculate the rain attenuation(in dB) for horizontal polarization, vertical polarization and circular polarization for satellite wave propagation.	
7.	Design	To write a program to determine the combined carrier to noise power spectral density ratio for satellite link budget.	
8.	Design	To determine the degradation in the downlink C/I ratio when satellite orbital spacing is reduced.	
9.	Design	To write a program to plot the degradation in downlink C/I.	
10.	Design	To plot the variation in Carrier to Noise power spectral density ratio(uplink ,downlink and combined)for changes in the input SFD for uplink and EIRP for downlink.	

Examination Scheme and Guidelines :(Sample)

CIE-I **20 Marks**	Examination of 20 marks based on Units 1, 2, and 3 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ"s compulsory.
CIE-II **20 Marks**	Examination of 20 marks based on Units 4, 5 and 6 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ"s compulsory.
ISE **10 Marks**	ISE/CA -In Semester Evaluation/Continuous Assessment
CIE (Practical) **(25/50 Marks)**	Continuous Assessment **,**As per institute policy
ESE **70 Marks**	ESE-End Semester Examination (Sample)
	Que.1: MCQ's based on All Units (Carries 6 Marks)
	Que.2: Solve Any Two based on Unit 1, 2, 3 (Carries 16 Marks)
	Que.3: Solve Any Two based on Unit 1,2,3 (Carries 16 Marks)
	Que.4: Solve Any Two based on Unit 4, 5, 6 (Carries 16 Marks)
	Que.5: Solve Any Two based on Unit 4, 5, 6 (Carries 16 Marks)

Dr J J Magdum College Of Engineering, Jaysingpur ELECTRONICS AND TELECOMMUNICATION ENGINEERING
TY- B.Tech -SEM-V

MDM-III 1. Introduction to Embedded System

Course Details:

Class	**TY**		**Semester**		**VI**		
Course Title	**Introduction to Embedded System**		**Course Code 1ETCMDL1301**		**Theory: 3 L**		
					Practical: - Nil		
	Prerequisites:		Basic knowledge of Microprocessor and Microcontrollers				
Teaching scheme:	**Theory Hours:**	**3**	**Practical Hours:**	**-NA**	**Tutorial Hours:**		
	Credits:	**3**	**Credits:**	**-NA**	**Credits:**		

Evaluation scheme						
Theory				**Practical**		**Total**
CIE-I	**CIE-II**	**ISE**	**ESE**	**CIE**	**ESE**	
20	20	10	50	-	-	100

Course Objectives:

The course aims to:

Sr No.	**Course Objectives**
1ETCMDL-3O1.01	To understand the basics of an embedded system with developed applications
1ETCMDL-3O1.02	To design different types of devices using advanced techniques
1ETCMDL-3O1.03	To understand the concepts of serial communication interfaces
1ETCMDL-3O1.04	To analyze the concept of In-circuit Emulators.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

Sr No.	Course Outcomes	Cognitive Levels of Attainment as per Revised Bloom's Taxonomy
1ETCMDL-3O1.01	Understand the basics of embedded system, its quality attributes and embedded firmware design efficient approaches.	II
1ETCMDL-3O1.02	Apply different types of serial communication buses in embedded applications.	IV
1ETCMDL-3O1.03	Analyze embedded simulators and in-circuit Emulators.	IV
1ETCMDL-3O1.04	Analyze the embedded system's real-time operating system and its application.	IV

Course Contents				
Unit No.	**Unit Title**	**Hours**	**CO**	**Cognitive Levels of Attainment as per Revised Bloom's Taxonomy**
Unit-01	Introduction to Embedded System: What is an Embedded Systems? Embedded systems Vs General computing systems, History of Embedded Systems, Classification of Embedded systems, Major Application Areas of Embedded Systems. Purpose of Embedded Systems, The Typical Embedded System, Microprocessor Vs Microcontroller, Differences between RISC and CISC, Harvard V/s Von Neumann Processor/Controller Architecture, Big-endian V/s Little-endian processors,	**6**	**CO1**	**II**
Unit-02	Embedded System Components: Memory (ROM and RAM types), Sensors :Temperature Sensor, Light Sensor, Proximity/range Sensors, Actuators, The I/O Subsystem – I/O Devices, Light Emitting Diode (LED), 7 Segment LED Display, Opto-coupler,/ Opto - isolators , Relay, Piezo - buzzer, Push button switch, , Motors , ADCs : Analog to digital converters: ADC Interfacing , Embedded Firmware, Other System Components ,	**6**	**CO1 ,CO 2**	**II,IV**
Unit-03	Embedded System Design Concepts: Characteristics and Quality Attributes of Embedded Systems, Operational and non-operational quality attributes, Embedded Systems- Application and Domain specific, Hardware Software Co-Design and Program Modeling (excluding UML), Embedded firmware design and development (excluding C	**6**	**CO1 ,CO 3**	**II,IV**

	language).			
Unit-04	RTOS and IDE for Embedded System Design: Operating System basics, Types of operating systems, Task, process and threads (Only POSIX Threads with an example program), Thread preemption, Preemptive Task scheduling techniques, Task Communication, Task synchronization issues – Racing and Deadlock. How to choose an RTOS	**6**	**CO4**	**IV**
Unit-05	Integration and testing of Embedded hardware and firmware, Embedded system Development Environment – Block diagram (excluding Keil). Types of files generated on cross-compilation, Disassembler/ De-compiler, Simulators ,Emulators, and debugging, Target hardware and debugging, Boundary scan	**6**	**CO1 ,CO 3**	**II,IV**
Unit-06	Communication Interface - Device and communication buses for Device Network : Communication interface- (Board level communication interfaces- Product level communication interfaces)- I/O Types and Examples- Serial Communication Devices(I2C,SPI,CAN,One wire bus)- Parallel Device-Ports.	**6**	**CO2**	**IV**

Sr. No	**Book Type(Text/ Reference)**	**Name of the Book**	**Name of the Author**	**Publisher**	**Edition**
1	**Reference**	"Micro - Controllers(theory and applications)	Ajay V. Deshmukh	Tata McGraw Hill.New Delhi, 2005.	1/e
2	**Reference**	"An Embedded Software Primer,	David E. Simon	Pearson Education private limited ,New Delhi, 2007	1/e
3	**Reference**	"Microcontrollers architecture, programming and design"	Raj kamal	Pearson Education, NewDelhi. 2007.	1/e
4	**Text**	"Introduction to Embedded Systems"	Shibu K V	Tata McGraw Hill Education	
5	**Text**	Embedded systems: An Integrated	Lyla B Das	Pearson, 2013	1st Ed

		Approach			
6	**Text**	Embedded system architecture“, programming and design	Rajkamal	Tata McGraw Hill. New Delhi. 2005	

List of Assignments/Tutorials for ISE:

- Minimum 06 Assignments/Tutorials based on the curriculum.

Examination Scheme and Guidelines:(Sample)

CIE-I **20 Marks**	Examination of 20 marks based on Units 1, 2, and 3 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ“s compulsory.
CIE-I **20 Marks**	Examination of 20 marks based on Units 4, 5 and 6 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ“s compulsory.
ISE **10 Marks**	ISE/CA -In Semester Evaluation/Continuous Assessment
ESE **70 Marks**	ESE-End Semester Examination (Sample)
	Que.1: MCQ’s based on All Units (Carries 6 Marks)
	Que.2: Solve Any Two based on Unit 1, 2, 3 (Carries 16 Marks)
	Que.3: Solve Any Two based on Unit 1,2,3 (Carries 16 Marks)
	Que.4: Solve Any Two based on Unit 4, 5, 6 (Carries 16 Marks)
	Que.5: Solve Any Two based on Unit 4, 5, 6 (Carries 16 Marks)

Dr J J Magdum College Of Engineering, Jaysingpur
ELECTRONICS AND TELECOMMUNICATION ENGINEERING
TY- B.Tech -SEM-IV

MDM-III 2.Introduction to Microcontroller

Course Details:

Class	**T.Y**		**Semester**		V	
Course Title	**Introduction to Microcontrollers**		**Course Code : 1ETCMDL2301**		**Theory**:02 Practical: Nil	
Prerequisites:			Knowledge of Digital Electronics			
Teaching scheme:	**Theory Hours:**	**03**	**Practical Hours:**	**00**	**Tutorial Hours:**	Nil
	Credits:	**02**	**Credits:**	**00**	**Credits:**	Nil

Evaluation scheme & Marks						
Theory				**Practical**		**Total**
CIE-I	**CIE-II**	**ISE**	**ESE**	**CIE**	**ESE**	
20	**20**	10	50			100

Course Objectives:

The course aims to:

Sr No.	**Course Objectives**
PCC-ETC0231.01	To provide fundamental knowledge of the 8085 microprocessor, its architecture, pin configuration and assembly language programming
PCC-ETC0231.02	To understand the fundamentals of the MCS-51 family
PCC-ETC0231.03	To introduce addressing modes, instruction set, assembly language programming
PCC-ETC0231.04	To study on-chip hardware resources of the 8051
PCC-ETC0231.05	To introduce Embedded C programming concepts.
PCC-ETC0231.01	To understand Peripheral interfacing with Embedded C programming

Course Outcomes:

Upon successful completion of this course, the student will be able to:

Sr No.	Course Outcomes	Cognitive Levels of Attainment as per Revised Bloom's Taxonomy
PCC-ETC0231.01	Students will be able to understand the architecture of the 8085 microprocessor and develop simple assembly language programs	Understand, Apply
PCC-ETC0231.02	Students will be able to understand the basics of 8051 microcontroller.	Understand
PCC-ETC0231.03	Students will be able to develop and analyze assembly language programs using various addressing modes and instructions of the 8051.	Analyze
PCC-ETC0231.04	Students will be able understand on chip resources of 8051	Understand
PCC-ETC0231.05	Students will be able to understand basic Embedded C programming concepts	Apply
PCC-ETC0231.01	Students will be able to interface peripheral devices with 8051 and write Embedded C programs .	Creat

Course Contents

Unit Number	Unit Title	Hours	Course Outcome No.	Bloom's Taxonomy
Unit-01	**Introduction to 8085 Microprocessor** **1.1** Functional Pin out **1.2** CPU Architecture **1.3** Register Organization **1.4** De- multiplexing of Address/Data bus 1.5 Addressing Modes 1.6 Instruction set and programming.	**06**	**01**	**Understand, Apply**
Unit-02	**Introduction to MCS51 (8051)** 2.1 Introduction to MCS51Family, 2.2 Functional Pin out diagram, 2.3 Architecture, 2.4 Register Organization, 2.5 Memory Organization, 2.6 Input/Output Ports 2.7 Reset Circuit, Oscillator Circuit	**06**	**02**	**Understand**
Unit-03	**8051 Programming in Assembly Language** 3.1 Addressing modes, 3.2 Instruction set, 3.3 Assembler directives 3.4 Data manipulation, 3.5 Branch related programming, Simple 3.6 I/O Port Programs	**06**	**03**	**Analyze**
Unit-04	**Hardware overview** 4.1Timers/Counters (Configuration, Structure,	**06**	**04**	**Evaluate**

	Related S.F.R), 4.2 Interrupts (Configuration, Structure, Related S.F.R), 4.3 Serial Communication (Mode-1), (Configuration, Structure, Related S.F.R).			
Unit-05	**8051 Programming in Embedded C:** 5.1 Data Types and Variables in 8051 Embedded C, 5.2 I/O Port Programming, 5.3 Logic and Bitwise Operations , 5.4 Delay generation (without Timer), Delay Generation (Using Timer) , Counter programming , 5.5 Serial Port Programming Mode 1(Using Embedded C)	**06**	**05**	**Apply**
Unit-06	**Peripheral Interfacing and programming (Embedded C)** 6.1 Interfacing simple switch and LED , 6.2 Interfacing ADC , 6.3 Interfacing DAC.	**06**	**06**	**Apply**

Text Books/Reference Books:

Sr. No	Book Type(Text/ Reference)	Name of the Book	Name of the Author	Publisher	Edition
1	TextBook	"Microprocessor Architecture, Programming, and Applications with the 8085"	by Ramesh S. Gaonkar		
2	TextBook	The 8051 microcontroller and embedded systems using assembly and c",--By M A Mazidi and J G Mazidi	R D McKinlay-Pearson Education		
3	Reference Book	The 8051 Microcontroller	I Scott Mackenzie and R C W Phan	,Pearson education	4th
5	Reference Book	The 8051Microcontroller-Archictecture, programming & applications	K. J. Ayala		

Online References: Coursera/NPTL/General websites /MKCL etc)

Sr. No.	**Website Name**	**URL**	**Units Covered**
1.	**NPTL IIT Kharagpur**	**https://www.youtube.com/watch?v=hwwhsNOqqm8**	**01**
2.	**Microprocessor & mIcrocontroller NPTEL**	**https://nptel.ac.in/courses/108105102**	**02-06**

List of Assignments/Tutorials for ISE:

- Minimum 06 Assignments/Tutorials based on the curriculum.

Examination Scheme and Guidelines:

CIE-I **20 Marks**	Examination of 20 marks based on Units 1, 2, and 3 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ‟s compulsory.
CIE-I **20 Marks**	Examination of 20 marks based on Units 4, 5 and 6 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ‟s compulsory.
ISE **10 Marks**	ISE/CA -In Semester Evaluation/Continuous Assessment
ESE **50 Marks**	ESE-End Semester Examination
	Que.1: MCQ‟s based on All Units (Carries 06 Marks)
	Que.2: based on Unit 1, 2, 3 (Carries 11 Marks)
	Que.3: based on Unit 1,2,3 (Carries 11 Marks)
	Que.4: based on Unit 4, 5, 6 (Carries 11 Marks)
	Que.5: based on Unit 4, 5, 6 (Carries 11 Marks)

Dr. J. J. Magdum College of Engineering, Jaysingpur
ELECTRONICS AND TELECOMMUNICATION ENGINEERING
TY-B.Tech-SEM-V

Open Elective –III Digital Marketing

Course Details:

<table>
<tr><td colspan="2">Class</td><td colspan="2">TY-B.Tech</td><td colspan="2">Semester</td><td colspan="2">V</td></tr>
<tr><td colspan="2">Course Title</td><td colspan="2">Digital Marketing</td><td colspan="2" rowspan="2">Course Code
01OEL3303</td><td colspan="2">Theory: 03 Hr/week</td></tr>
<tr><td colspan="2"></td><td colspan="2"></td><td colspan="2">Practical: --NA</td></tr>
<tr><td colspan="4">Prerequisites:</td><td colspan="4">Computer and Software skill.</td></tr>
<tr><td colspan="2" rowspan="2">Teaching scheme:</td><td>Theory Hours:</td><td>03Hr /week</td><td>Practical Hours:</td><td>NA</td><td>Tutorial Hours:</td><td>NA</td></tr>
<tr><td>Credits:</td><td>03</td><td>Credits:</td><td>NA</td><td>Credits:</td><td>NA</td></tr>
<tr><td colspan="8">Evaluationscheme</td></tr>
<tr><td colspan="4">Theory</td><td colspan="2">Practical</td><td colspan="2">Total</td></tr>
<tr><td>CIE-I</td><td>CIE-II</td><td>ISE</td><td>ESE</td><td>CIE</td><td>ESE</td><td colspan="2"></td></tr>
<tr><td>20</td><td>20</td><td>10</td><td>50</td><td>-</td><td>-</td><td colspan="2">100</td></tr>
</table>

Course Objectives:

The course aims to:

Sr No.	Course Objectives
01OEL3303.1	Understand the fundamental concepts, scope, and various types of digital marketing including mobile, online, and email marketing.
01OEL3303.2	Analyze the role and impact of social media platforms in digital marketing and evaluate their effectiveness for business communication and branding.
01OEL3303.3	Develop digital marketing strategies and apply relationship marketing concepts for customer engagement and lifecycle management.
01OEL3303.4	Understand the fundamentals of Search Engine Optimization (SEO), keyword research, and SEO tools for improving online visibility and website traffic.

01OEL3303.5	Explain different e-commerce business models and evaluate the significance of e-marketing in modern business practices.
01OEL3303.6	Recognize legal, ethical, and security issues in digital marketing including data privacy, cyber laws, GDPR, intellectual property rights, and online reputation management.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

Sr. No.	Course Outcomes	Cognitive Levels of Attainmentas per Revised Bloom's Taxonomy
01OEL3303.1	Explain the concepts, scope, and various forms of digital marketing including mobile, online, and email marketing.	Understand (K2)
01OEL3303.1	Analyze the impact, advantages, disadvantages, and applications of social media platforms in digital marketing campaigns.	Analyze (K4)
01OEL3303.1	Develop and implement digital marketing strategies and relationship marketing practices for customer engagement and lifecycle management.	Create (K6)
01OEL3303.1	Apply SEO techniques, keyword research methods, and SEO tools such as SEMrush to improve website ranking and traffic.	Apply (K3)
01OEL3303.1	Compare and evaluate various e-commerce business models and the role of e-marketing in business growth.	Evaluate (K5)
01OEL3303.1	Discuss ethical, legal, privacy, and security aspects related to digital marketing and online business practices.	Understand (K2)

Course Contents

Unit Number	Unit Title	Hours	Cognitive Levels of Attainment as per Revised Bloom's Taxonomy
Unit-01	**Introduction to Digital Marketing** Digital Marketing – The concept, Digital Marketing Types : Mobile Marketing, Online Marketing, Email Marketing	6	K2
Unit-02	**Digital marketing using social media** Consumer Generated Contents (CGC), Impact of Social Media,	6	K4

	Advantages and Disadvantages of Social Media, Types of Social Media, Social Media Marketing using Instagram, Snap Chat, Twitter and LinkedIn		
Unit-03	**Digital Marketing Strategy and relationship marketing** Digital Marketing strategy development: how to structure digital marketing strategy, strategy implementation Relationship marketing using digital platforms: Introduction, the challenge of customer engagement, customer lifecycle management.	6	K6
Unit-04	**Search Engine Optimization (SEO)** Search Engine Optimization Basics, Keyword Research, SEO Tool-SEMrush: Overview and Features, Top Search Engine Ranking Factors. Case Study: Dominos India: Building Traffic through content propagation	6	K3
Unit-05	**commerce Business Models & E-marketing** E-commerce: Meaning, Benefits and limitations, Business Models for E-commerce: Business-to-Consumer (B2C), Business-to-Business (B2B), Consumer-to-Consumer (C2C), Consumer To-Business (C2B).	6	K5
Unit-06	**Legal, Ethical & Security Aspects** Digital Marketing Ethics Data Privacy and Protection Cyber Laws & Regulations GDPR Basics Intellectual Property Rights Online Reputation Management	6	K2

Text Books and Reference Books:	
1.	Digital Marketing Dave Chaffey, Fiona Ellis-Chadwick
2.	Digital Marketing Essentials:- Jeff Larson, Stuart Draper
3.	Social Media Marketing:- Tracy L. Tuten, Michael R. Solomon
4	SEO 2024:- Adam Clarke
5	E-Commerce:- Kenneth C. Laudon, Carol Guercio Traver
6	Cyber Laws and Information Technology:- Talat Fatima
Web References	
1.	https://www.coursera.org/courses?query=digital+marketing&utm_source=chatgpt.com
2.	**https://www.canva.com/designschool/?utm_source=chatgpt.com**

Course Level Gap (if any): Practical Exposure Gap:- Live project work

Content Beyond Syllabus: AI Tools in Digital Marketing

Examination Scheme and Guidelines: (Sample)

CIE-I 20Marks	Examination of 20marks based on Units 1,2, and 3 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05Marks based on MCQ‟s compulsory.
CIE-II 20Marks	Examination of 20marks based on Units 4,5and 6 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05Marks based on MCQ‟s compulsory.
ISE 10Marks	ISE/CA-In Semester Evaluation/Continuous Assessment

ESE 50Marks	ESE-End Semester Examination(Sample)
	Que.1:MCQ‟s based on All Units(Carries 14 Marks)
	Que.2:based on Unit1,2,3(Carries14 Marks)
	Que.3:based on Unit1,2,3(Carries14 Marks)
	Que.4:based on Unit4,5,6(Carries14 Marks)
	Que.5:based on Unit4,5,6(Carries14Marks)

Dr. J. J. Magdum College of Engineering, Jaysingpur ELECTRONICS AND TELECOMMUNICATIONENGINEERING
TY-B.Tech-SEM-V

Course Details: Mini Project

Class	TY-B.Tech		**Semester**	V			
Course Title	Mini Project		**Course Code 1ETCPCP309**	Theory: NA			
				Practical: --02 Hr/week			
Prerequisites:			PCB Simulation				
Teaching scheme:	**Theory Hours:**	03Hr /week	**Practical Hours:**	02 Hr/week	**Tutorial Hours:**	NA	
	Credits:	NA	**Credits:**	-	**Credits:**	NA	
Evaluation scheme							
Theory				**Practical**		**Total**	
CIE-I	**CIE-II**	**ISE**	**ESE**	**CIE**	**ESE**		
-	-	-	-	-	25	25	

Course Objectives:

The course aims to:

Sr No.	Course Objectives
1ETCPCP309.1	Identify and analyze real-world problems in Electronics & Telecommunication Engineering using engineering concepts and modern tools.
1ETCPCP309.2	Apply theoretical knowledge of electronics, communication, embedded systems, and programming to design and develop a working prototype/system.
1ETCPCP309.3	Develop skills in project planning, teamwork, technical documentation, and effective communication.
1ETCPCP309.4	Demonstrate problem-solving, innovation, and ethical practices while executing engineering projects.
1ETCPCP309.5	Enhance self-learning ability and project management skills through independent and collaborative work.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

Sr. No.	Course Outcomes	Cognitive Levels of Attainmentas per Revised Bloom's Taxonomy
1ETCPCP309.1	Identify and define a real-world engineering problem related to Electronics & Telecommunication systems.	Understand (K2)
1ETCPCP309.2	Apply engineering principles, software, and hardware tools to design and implement a mini project prototype.	Apply (K3)
1ETCPCP309.3	Analyze system performance, experimental results, and limitations of the developed project.	Analyze (K4)
1ETCPCP309.4	Design and evaluate innovative solutions considering technical, economic, and societal aspects.	Evaluate (K5)
1ETCPCP309.5	Prepare technical reports and deliver effective presentations demonstrating teamwork and communication skills.	Apply (K3)

Guidelines:-

- The mini project is a team activity having 3-4 students in a team. This is electronic product design work with a focus on electronic circuit design.
- The mini project may be a complete hardware or a combination of hardware and software.
- Mini Project should cater to a small system required in laboratory or real life.
- It should encompass components, devices, analog or digital ICs, micro controller with which functional familiarity is introduced.
- After interactions with course coordinator and based on comprehensive literature survey/ Industry requirements analysis, the student shall identify the title and define the aim and objectives of mini project.
- Student is expected to detail out specifications, methodology, resources required, critical issues involved in design and implementation and submit the proposal within first week of the semester.
- The student is expected to exert on design, development, and testing of the proposed work as per the schedule.
- Layout should be made using CAD based PCB simulation software. Due considerations should be given for power requirement of the system, mechanical aspects for enclosure and control panel design.
- Completed mini project and documentation in the form of mini project report is to be submitted at the end of semester.
- The Practical sessions should be used for discussion on standard practices used for electronic circuits/product design, converting the circuit design into a complete electronic product, PCB design using suitable simulation software, estimation of power budget analysis of the product, front panel design and mechanical aspects of the product, and guidelines for documentation /report writing.

Examination Scheme and Guidelines: (Sample)

ESE 25Marks	Mini Project Hardware (Mini Project report)

TY-B.Tech - SEM-VI

Dr J J Magdum College Of Engineering, Jaysingpur ELECTRONICS AND TELECOMMUNICATION ENGINEERING

TY- B.Tech -SEM-VI

Embedded System

Course Details:

Class	**TY**		**Semester**		**VI**	
Course Title	**Embedded System**		**Course Code 1ETCPCL310**		**Theory: 3 L/Week**	
					Practical: - 2 Hr./Week	
Prerequisites:			**Fundamentals of Microprocessor and Microcontroller and 'C' Programming**			
Teaching scheme:	**Theory Hours:**	**3**	**Practical Hours:**	**-2**	**Tutorial Hours:**	**-**
	Credits:	**3**	**Credits:**	**1**	**Credits:**	**4**

Evaluation scheme						
Theory				**Practical**		**Total**
T-I	**T-II**	**ISE**	**ESE**	**CIE**	**ESE**	
20	20	10	50	25	25	150

Course Objectives:

The course aims to:

Sr No.	**Course Objectives**
1ETCPCL-310.01	Study different concepts , programming and different on-chip resources of PIC 16F877
1ETCPCL-310.02	Study different concepts , Programming of ARM7 and different on chip resources of LPC 2148
1ETCPCL-310.03	Understand basic concepts of RTOS

Course Outcomes:

Upon successful completion of this course, the student will be able to:

Sr No.	Course Outcomes	Revised Bloom's Taxonomy
1ETCPCL-310.01	Develop programs and Apply on-chip resource facility of PIC 16F877.	III
1ETCPCL-310.02	Understand Embedded systems, concepts of ARM7 and develop programs using ARM7.	II
1ETCPCL-310.03	Apply on chip resource facility of LPC 2148.	III
1ETCPCL-310.04	Understand RTOS concept.	II

Course Contents

Unit No.	Unit Title	Hours	CO	BL
Unit -01	**Introduction to PIC Microcontroller** Difference between RISC and CISC architecture, Features of PIC 16F877, Functional Pinout, CPU Architecture, Memory organization, Register file structure, CPU Registers: Status Word, FSR, INDF, PCLATH, PCL, Instruction set, Addressing modes and Simple assembly language Programming.	**6**	**CO1**	III
Unit -02	**On-Chip Resources of PIC 16F877** I/O Ports, Timers, CCP Module, ADC, I2C, SPI, Associate registers and programming, Interrupt structure, Configuration word, Oscillator configuration, Reset alternatives.	**6**	**CO1**	III
Unit -03	**Introduction to Embedded System and ARM Processor** **Embedded System:** Embedded System definition, Types of Embedded System, Characteristics and Design issues of Embedded systems. **ARM:** Embedded system Hardware, ARM data flow model, Register set, CPSR, Pipelining, Exceptions Interrupts & Vector Table, Cache and Tightly coupled memory, ARM Nomenclature.	**6**	**CO2**	II
Unit -04	**Instruction Set and Programming** ARM Instruction set, Thumb Instruction set, Simple assembly language programming.	**6**	**CO2**	II
Unit -05	**LPC 2148 Microcontroller** Features, Architecture details, Port structure, Timer/Counter, UART**,** ADC module, Embedded 'C' programming for interfacing LED's, LCD, Keyboard.	**6**	**CO3**	III
Unit -06	**Real Time Operating System (RTOS)** Introduction to RTOS concept, Embedded software architectures: Round robin, Round robin with interrupts, Function queue scheduling and Real time operating system, Tasks and Task states, Task scheduling, Shared data and Reentrancy, Semaphores and shared data using semaphores, Protecting shared data.	**6**	**CO4**	II

Text Books/Reference Books:

Sr. No	Book Type(Text/Reference)	Name of the Book	Name of the Author	Publisher	Edition
1	**Reference**	Embedded systems,	Raj Kamal	McGraw Hill	
2	**Reference**	Real- Time Systems Design and Analysis	Phillips A. Laplante	Wiley insia Edition	
3	**Reference**	Embedded/ Real-Time Systems: Concepts, Design & Programming	Dr. K V K K Prasad	Dreamtech Press	
4	**Reference**	Embedded Systems (A contemporary design tool)	James K Peckol	Wiley Publication	
5	**Text**	Design with PIC Microcontrollers	John B. Peatman	Pearson	
6	**Text**	Embedded System Design	Frank Vahid / Tony Givargis	Wiley Publication	
7	**Text**	An Embedded Software Primer,	David E. Simon	Pearson Education,	
8	**Text**	ARM System Developers Guide Designing & Optimizing System Software	Andrew N., Dominic Sloss, and Chris Wright		
9	**Text**	Datasheet of PIC16F877 and LPC 2148			

Suggested List of Practical's/Experiments for CIE/ESE:

- Minimum 08 Experiments based on the curriculum.

Ex.No.	Type of Experiment	Experiment Title	Cognitive Levels
1.	**Basic**	To study Arithmetic and Logical instructions in PIC 16F877.	III
2.	**Basic**	To study Indirect Addressing mode in PIC 16F877.	III
3.	**Basic**	To Flash LED connected to Port using Timer delay in PIC 16F877	III
4.	**Basic**	To study any application using CCP Module in PIC 16F877	III
5.	**Basic**	To demonstrate serial communication in PIC 16F877	III
6.	**Basic**	To study Arithmetic and Logical instructions in LPC 2148	III
7.	**Basic**	To study Load and Store instructions in LPC 2148	III
8.	**Advanced**	To flash the Port pin of LPC 2148 using Embedded 'C'.	IV
9.	**Advanced**	To demonstrate input/ output device interfacing related programs in LPC 2148 using Embedded 'C'.	IV
10.	**Advanced**	To demonstrate serial communication in LPC 2148 using Embedded 'C'.	IV

Examination Scheme and Guidelines :(Sample)

CIE-I **20 Marks**	Examination of 20 marks based on Units 1, 2, and 3 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ‟s compulsory.
CIE-I **20 Marks**	Examination of 20 marks based on Units 4, 5 and 6 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ‟s compulsory.
ISE **10 Marks**	ISE/CA -In Semester Evaluation/Continuous Assessment
CIE (Practical) **(25/50 Marks)**	Continuous Assessment **,**As per institute policy
ESE **50 Marks**	ESE-End Semester Examination (Sample)
	Que.1: MCQ’s based on All Units (Carries 6 Marks)
	Que.2: Solve Any Two based on Unit 1, 2, 3 (Carries 16 Marks)
	Que.3: Solve Any Two based on Unit 1,2,3 (Carries 16 Marks)
	Que.4: Solve Any Two based on Unit 4, 5, 6 (Carries 16 Marks)
	Que.5: Solve Any Two based on Unit 4, 5, 6 (Carries 16 Marks)

Dr J J Magdum College Of Engineering, Jaysingpur ELECTRONICS AND TELECOMMUNICATION ENGINEERING

TY- B.Tech -SEM-VI

CONTROL SYSTEM

Course Details:

Class	**TY**		**Semester**		**VI**	
Course Title	**Control System**		**Course Code 1ETCPCL-311**		**Theory: 2 L**	
					Practical: - Nil	
Prerequisites:						
Teaching scheme:	**Theory Hours:**	**2**	**Practical Hours:**	**-NA**	**Tutorial Hours:**	
	Credits:	**2**	**Credits:**	**-NA**	**Credits:**	**2**

Evaluation scheme						
Theory				**Practical**		**Total**
CIE-I	**CIE-II**	**ISE**	**ESE**	**CIE**	**ESE**	
20	20	10	50	-	-	100

Course Objectives:

The course aims to:

Sr No.	**Course Objectives**
1ETCPCL-311.01	To provide an introduction and basic understanding of Control System
1ETCPCL-311.02	To develop time & frequency domain analysis
1ETCPCL-311.03	To analyze & compare different control systems
1ETCPCL-311.04	To understand the concept of stability.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

Sr No.	Course Outcomes	Cognitive Levels of Attainment as per Revised Bloom's Taxonomy
1ETCPCL-311.01	Model a physical system and express its internal dynamics and input-output relationships by means of block diagrams, mathematical model and transfer functions.	K3
1ETCPCL-311.02	Explain the relationships between the parameters of a control system and its stability, accuracy, transient behavior.	K2
1ETCPCL-311.03	Determine the stability of a system and parameter ranges for a desired degree of stability.	K4
1ETCPCL-311.04	Plot the Bode, Nyquist, Root Locus diagrams for a given control system and identify the parameters and carry out the stability analysis.	K4

Course Contents				
Unit No.	**Unit Title**	**Hours**	**CO**	**Cognitive Levels of Attainment as per Revised Bloom's Taxonomy**
Unit-01	**System modeling** Need & classification of control system, Effects of feedback, Mathematical model (Mechanical & Electrical systems) Differential equations, Transfer function, Block diagram algebra, Block diagram reduction, Representation by Signal flow graph, Reduction using Mason's gain Formula.	**6**	**CO1**	**K3**
Unit-02	**Time Domain Analysis** Type and Order of the Control Systems, Types of Standard Inputs , Response of First Order System to Step, Ramp and Parabolic Inputs , Second order system – step response analysis- steady state error – generalized error coefficients , Effect of adding a zero to system- Principle of PI, PD and PID compensation. Practical Applications	**6**	**CO2**	**K3**
Unit-03	**Stability** Concept of Stability, Absolute, Relative , Marginal and	**6**	**CO3**	**K4**

	Unstable Stability analysis in S Plane , Dominant Poles and Zeros , Routh-Hurwitz Criterion , Concept of Root Locus, Applications in Practical systems.			
Unit-04	**Frequency Domain Analysis** Introduction, Determination of Frequency domain specifications and transfer function from the Bode Plot, Phase margin and Gain margin-Stability Analysis from Bode Plots, Polar Plots, Nyquist Stability Criterion, Nyquist plot & stability analysis.	**6**	**CO4**	**K4**

Text Books/Reference Books

Sr. No	Book Type(Text/ Reference)	Name of the Book	Name of the Author	Publisher	Edition	Year of Publication
1	**Reference**	Control Systems Engineering.	R.Anandanatarajan, P. Ramesh Babu	Scitech Publications Pvt. (India) Ltd	IInd edition	2008
2	**Reference**	Control System Engineering	Norman S Nise	Wiley India.	VIIIth edition	
3	**Text**	Control Systems Engineering	I .J. Nagrath and M. Gopal	New Age International, New Delhi	Vth Edition	2007.
4	**Text**	Control System Engineering	A. Anandkumar	PHI Publication	IInd edition	

Online References: Coursera/NPTL/General websites etc)

Sr. No.	Website Name	URL	Units Covered
1	http://www.digimat.in/nptel/courses/video/108102043/L03.html	NPTEL	1,2
2	https://youtu.be/Cl23xQrvFhk	NPTEL	3

List of Assignments/Tutorials for ISE:

- Minimum 06 Assignments/Tutorials based on the curriculum.

Examination Scheme and Guidelines:(Sample)

CIE-I **20 Marks**	Examination of 20 marks based on Units 1, 2, and 3 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ‟s compulsory.
CIE-I **20 Marks**	Examination of 20 marks based on Units 4, 5 and 6 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ‟s compulsory.
ISE **10 Marks**	ISE/CA -In Semester Evaluation/Continuous Assessment
ESE **70 Marks**	ESE-End Semester Examination (Sample)
	Que.1: MCQ’s based on All Units (Carries 6 Marks)
	Que.2: Solve Any Two based on Unit 1, 2, 3 (Carries 16 Marks)
	Que.3: Solve Any Two based on Unit 1,2,3 (Carries 16 Marks)
	Que.4: Solve Any Two based on Unit 4, 5, 6 (Carries 16 Marks)
	Que.5: Solve Any Two based on Unit 4, 5, 6 (Carries 16 Marks)

Dr J J Magdum College of Engineering, Jaysingpur ELECTRONICS AND TELECOMMUNICATION ENGINEERING

TY- B.Tech -SEM-VI

Antenna & Wave Propagation

Course Details:

Class	**TY**		**Semester**		**VI**	
Course Title	**Antenna & Wave Propagation**		**Course Code 1ETCPCL312**		**Theory: 3 L**	
			1ETCPCP319		**Practical: - 2hr**	
Prerequisites:			Basics of Electromagnetic theory, Maxwell's equations and concepts of transmission lines			
Teaching scheme:	**Theory Hours:**	**3**	**Practical Hours:**	**2hr**	**Tutorial Hours:**	**-**
	Credits:	**3**	**Credits:**	**1**	**Credits:**	**-**

Evaluation scheme						
Theory				**Practical**		**Total**
CIE-I	**CIE-II**	**ISE**	**ESE**	**CIE**	**ESE**	
20	20	10	50	25	25	150

Course Objectives:

The course aims to:

Sr No.	**Course Objectives**
1ETCPCL312.01	Basic parameters of antennas and their principle of operation
1ETCPCL312.02	Different Antenna types to know their applications in various domains.
1ETCPCL312.03	Different types of wave propagation Techniques

Course Outcomes:

Upon successful completion of this course, the student will be able to:

Sr No.	Course Outcomes	Cognitive Levels of Attainment as per Revised Bloom's Taxonomy
1ETCPCL312.01	Realize the importance of basics of antenna systems to differentiate the applicability of each type of antenna	K2, k4
1ETCPCL312.02	Analyze the utilization of Antenna systems in wide areas like wireless communication, fixed line communication, computer communication etc.	K4
1ETCPCL312.03	Discuss radio wave propagation	K2, k4

Course Contents				
Unit No.	**Unit Title**	**Hours**	**CO**	**Cognitive Levels of Attainment as per Revised Bloom's Taxonomy**
01	**Fundamentals of Antenna** Basic Antenna parameters, pattern , beam area, radiation intensity, beam efficiency, directivity, gain and resolution, antenna aperture, effective height, radio communication link, field from oscillating dipole, field zones. Linear, Elliptical and Circular polarization, Front to back ratio, Antenna impedance.	**5**	**1ETCPCL312.01**	K2
02	**Antenna array and Frequency independent antenna** Array of two isotropic point sources, non-isotropic but similar point source and the principle of pattern multiplication, examples of pattern synthesis by pattern multiplication, non-isotropic and dissimilar point sources, linear array of isotropic point source of equal amplitude and spacing. Broadband basics, frequency-independent concept: Rumsey"s principle, the frequency independent planner log-spiral antenna, frequency independent conical-spiral antenna, the log periodic antenna.	**7**	**1ETCPCL312.01, 1ETCPCL312.02**	**K2,k4**
03	**Antenna Measurement and Microstrip Antenna:**	**6**	**1ETCPCL312.02**	**K4**

	Antenna measurement: Antenna ranges, Radiation pattern, Gain measurements, Directivity measurements **Microstrip Antenna:** Introduction, Basic characteristics, Feeding methods, Rectangular patch, Circular patch			
04	**Ground Wave Propagation** Plane earth reflection, space wave and the surface wave, elevated dipole antennas above a plane earth, wave tilt of the surface wave, spherical earth propagation	**5**	**1ETCPCL312.03**	**k4**
05	**Ionospheric Wave Propagation** The ionosphere, effective permittivity and conductivity of an ionized gas, reflection and refraction of the waves by the ionosphere, regular and irregular variations of ionosphere, attenuation factor, effect of earth magnetic field, wave propagation in ionosphere, Faraday rotation and measurement of total electron content, other ionosphere phenomena.	**7**	**1ETCPCL312.03**	**K4**
06	**Radar System:** Fundamentals, RADAR performance factors, basic pulsed radar system, antennas and scanning, display methods, pulsed radar systems, moving target indication, radar beacons, CW Doppler radar, frequency modulated CW radar, phase array radars, planar array radars	**6**	**1ETCPCL312.02, 1ETCPCL312.03**	**K2,k4**

Sr. No	**Book Type(Text/Reference)**	**Name of theBook**	**Nameofthe Author**	**Publisher**	**Edition**
1.	Textbook	Antenna for all Application	John D Kraus	Tata McGraw Hill Publication	3rd edition
2.	Textbook	Antenna Theory	Constantine A. Balanis	Wiley Publication.	3rd edition,

3.	Textbook	Electromagnetic Waves and Radiation Systems	Jordan and Balmain	PHI Publications	2nd edition
4	Textbook	Electronics Communication System	Kennedy Davis	Tata McGraw Hill Publication	5th edition
5	Reference	Antennas and Wave Propagation	G. S. N. Raju	Pearson publication	4th edition
6	Reference	Antennas and Wave Propagation	K.D. Prasad	Satya prakashan publication	3rd edition

Online References: Coursera / NPTEL / General websites etc)

Sr. No.	Website Name	URL	Units Covered
1	NPTEL	https://nptel.ac.in/courses/108101092	1,2

Suggested list of practical's for CIE/ESE :
Minimum 8 experiments based on curriculum

Experiment Number	Type of Experiment (Basic / Design / Advanced / Mini / Minor Projects / Seminar / Case Studies)	Experiment Title	Cognitive levels of attainment as per Bloom's Taxonomy
1.	Basic	a) Calculation of beam width, front to back ratio & gain of simple dipole antenna..	K4
2.	Basic	Calculation of beam width, front to back ratio & gain of log periodic antenna	K4
3.	Basic	Calculation of beam width, front to back ratio & gain of Yagi-Uda antenna.	K4
4.	Basic	Calculation of beam width, front to back ratio & gain of Horn antenna	K4
5.	Basic	Calculation of beam width, front to back ratio & gain of micro strip /patch antenna.	K4
6.	Basic	To determine effect of varying distance between transmitter & receiver on received power	K4

7.	Basic	Calculation of angle of reflection for varying angle of incidences	K4
8.	Basic	Calculation of angle of refraction for varying angle of incidences	K4
9.	Basic	Observe standing waves and measure the wavelength of microwave	K4
10.	Basic	Determination of velocity of object moving in RADAR range.	K4
11.	Basic	Measurement of time & frequency of RADAR using moving pendulum	K4
12	Design	Write a program to find radiation pattern of Broadside array antenna using MATLAB	K4
13	Design	Write a program to find radiation pattern of End fire array antenna using MATLAB	K4
14	Design	Write a program to compare radiation pattern of uniform linear array and non-uniform linear array using MATLAB	K4

Examination Scheme and Guidelines:

T-I 20Marks	Examination of 20 marks based on Units1, 2, and3 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ's compulsory.
T-I 20Marks	Examination of 20 marks based on Units 4,5 and6 should be conducted, and marks should be communicated to the ExamCell. • One question of 05 Marks based on MCQ's compulsory.
ISE 10Marks	ISE/CA-In Semester Evaluation/ Continuous Assessment
CIE(Practical) (25 Marks)	Continuous Assessment**,** As per institute policy

ESE 50 Marks	ESE-End Semester Examination(Sample)
	Que.1:MCQ's based on All Units (Carries 06 Marks)
	Que.2:based on Unit1,2,3 (Carries11Marks)
	Que.3:based on Unit1,2,3 (Carries11 Marks)
	Que.4:based on Unit4,5,6 (Carries11Marks)
	Que.5:based on Unit4,5,6 (Carries11Marks)

Dr J J Magdum College Of Engineering, Jaysingpur ELECTRONICS AND TELECOMMUNICATION ENGINEERING

TY- B.Tech -SEM-VI

Program Elective Course 2 - 1. Mechatronics

Course Name:

Course Details:

Class	TY		**Semester**		VI		
Course Title	**Mechatronics**		**Course Code**		Theory: **1ETCPEL313**		
					Practical:--		
Prerequisites:			-				
Teaching scheme:	**Theory Hours:**	3 Hrs./ week	**Practical Hours:**	-	**Tutorial Hours:**	-	
	Credits:	3	**Credits:**	-	**Credits:**	-	

Evaluation scheme

Theory				**Practical**		**Total**
CIE-I	**CIE-II**	**ISE**	**ESE**	**CIE**	**ESE**	
20	20	10	50	-	-	100

Course Objectives:

The course aims to **Sr No.**	**Course Objectives**
1ETCPEL313.01	Understand the fundamentals of mechatronics systems and interdisciplinary engineering concepts.
1ETCPEL313.02	Develop knowledge of sensors, actuators, and signal conditioning circuits used in mechatronic applications.
1ETCPEL313.03	Analyze control systems and automation techniques used in industrial applications.
1ETCPEL313.4	Apply microcontroller and PLC-based systems for automation and embedded applicati s.
1ETCPEL313.5	Design and develop basic mechatronic systems for real-world engineering problems.

Course Outcomes:

Upon successful comp leti ɔn of this course, the student will be able to:

Sr No.	**Course Outcomes**	**Levels of Attainment as per Revised Bloom's Taxonomy**
1ETCPEL313.1	**Understand the fundamentals and architecture of mechatronic systems.**	L2
1ETCPEL313.2	**Analyze various sensors and actuators used i n automation systems.**	L4

1ETCPEL313.3	**Apply control system principles in industrial automation applications.**	L3
1ETCPEL313.4	**Develop PLC and microcontroller-based mechatronic applications.**	L3
1ETCPEL313.5	Design simple automation systems using mechatronic components.	L5
1ETCPEL313.6	Evaluate industrial mechatronic systems and their performance.	L5

Course Contents				
Unit Number	**Details**	**Hours**	**Mapping with COs**	**Levels of Attainment as per Revised Bloom's Taxonomy**
Unit-01	Introduction to Mechatronics 1.1 Definition and scope of mechatronics 1.2 Mechatronic system architecture 1.3 Traditional vs Mechatronic systems 1.4 Applications of mechatronics in industry 1.5 Measurement systems and signal conditioning	06 hrs	01	L2
Unit-02	Sensors and Transducers 2.1 Classification of sensors 2.2 Position, displacement and proximity sensors 2.3 Temperature, pressure and flow sensors 2.4 Optical and smart sensors 2.5 Signal conditioning and data acquisition systems 2.1	07 hrs	02	L4
Unit-03	Actuators and Drives 3.1 Mechanical, electrical and hydraulic actuators 3.2 Pneumatic systems and components 3.3 DC and AC servo motors 3.4 Stepper motors and applications 3.5 Selection criteria for actuators	06 hrs	03	L3
Unit-04	Control Systems and PLC 4.1 Open loop and closed loop control systems 4.2 Transfer functions and block diagrams 4.3 Introduction to PLC architecture 4.4 Ladder programming basics 4.5 Industrial automation using PLC 4.1	07 hrs	04	L3
Unit-05	Microcontroller and Embedded Systems 5.1 Introduction to embedded systems 5.2 Microcontroller architecture 5.3 Interfacing sensors and actuators 5.4 Data acquisition and communication interfaces 5.5 Applications in automation and robotics	06 hrs	05	L5
Unit-06	Industrial Mechatronics Applications 6.1 CNC machines and robotics	06 hrs	06	L5

	6.2 Automated manufacturing systems 6.3 AGV and flexible manufacturing systems 6.4 IoT in mechatronics 6.5 Case studies of industrial mechatronic systems 6.1			

Text Books/Reference Books:

Sr. No	Book Type(Text/Reference)	Name of the Book	Name of the Author	Publisher	Year of Publication
1	Text Book	Mechatronics: Electronic Control Systems in Mechanical Engineering	W. Bolton	Pearson Education	Latest
2	Text Book	Mechatronics System Design	Devdas Shetty & Richard Kolk	Cengage Learning	Latest

Examination Scheme and Guidelines :

CIE (Practical) (25 Marks)	Continuous assessment as per institute policy

Dr J J Magdum College Of Engineering, Jaysingpur
ELECTRONICS AND TELECOMMUNICATION ENGINEERING
TY- B.Tech -SEM-VI
Program Elective Course 2 2. Java Programming

Course Details:

Class	**TY**		**Semester**		**VI**		
Course Title	**Java Programming**		**Course Code**		Theory: 1ETCPEL313		
					Practical:		
Prerequisites:							
Teaching scheme:	**Theory Hours:**	**03**	**Practical Hours:**	**-**	**Tutorial Hours:**	**-**	
	Credits:	**03**	**Credits:**		**Credits:**		
Evaluation scheme							
Theory				**Practical**		**Total**	
CIE-I	**CIE-II**	**ISE**	**ESE**	**CIE**	**ESE**		
20	**20**	**10**	**50**	**-**	**-**	**100**	

Course Objectives:
The course aims to:

Sr No.	Course Objectives
PEC ETCPEL313.01	To understand Java programming fundamentals
PEC ETCPEL313.02	To apply object-oriented programming concepts
PEC-ETCPEL313.03	To develop platform-independent applications

PEC-ETCPEL313.04	To understand exception handling, multithreading, and file handling

Course Outcomes:

Upon successful completion of this course, the student will be able to:

Sr No.	Course Outcomes	Cognitive Levels of Attainment as per Revised Bloom's Taxonomy
PEC-ETCPEL313.01	Explain features of Java and its execution environment	
PEC-ETCPEL313.02	Understand basic programming concepts	
PCC-ETC0231.03	Apply basic programming constructs to solve problems using Java	
PCC-ETC0231.04	Implement object-oriented concepts such as inheritance	
PCC-ETC0231.05	Use exception handling and multithreading mechanisms effectively	

Course Contents

Unit Number	Unit Title	Hours	Cognitive Levels of Attainment as per Revised Bloom's Taxonomy
Unit-01	**Introduction to Object-Oriented Programming and Java** Introduction to Object Oriented Programming, basic concepts of OOP. History and evolution of Java, Features of Java, JVM, JRE and JDK Structure of Java program Compilation and execution process	**07**	**K2 Understand**
Unit-02	**Basic Programming Concepts** Data types and variables, Operators and expressions, Control statements Arrays	**05**	**K3 Apply**
Unit-03	**Classes and Objects** Class and object concepts, Constructors, this keyword, Methods, Creating Objects, Garbage collection	**06**	**K2/K3 Understand / Apply**

Unit-04	**Inheritance** overview, super and sub classes, member access rules, types of inheritance, super uses, method overriding,	**06**	**K3** **Apply**
Unit-05	**Exception handling and Multithreading** Exception handling: fundamentals, exception types, usage of try, catch, throw, throws and finally, built in exceptions. Multithreading : overview, main thread, creating threads, thread life cycle.	**07**	**K3** **Apply**
Unit-06	**Input-Output Handling in Java** Console I/O, streams (byte & character), file handling	**05**	**K2/K3** **Understand/Apply**

Text Books/Reference Books:

Sr. No	Book Type(Text/Reference)	Name of the Book	Name of the Author	Publisher		Year of Publication
1.	Text	Java: *The Complete Reference*	Herbert Schildt	Mc Graw Hill		
2.	Text	Understanding Object-Oriented Programming with Java	T. Budd			

Online References: Coursera/NPTL/General websites etc)

Sr. No.	Website Name	URL	Units Covered
1	NPTEL	https://onlinecourses.nptel.ac.in/noc25_cs110/preview?utm_source=chatgpt.com	
2.	GeeksForGeeks	https://www.geeksforgeeks.org/free-java-course-for-beginners/	

List of Assignments/Tutorials for ISE:

- Minimum 06 Assignments/Tutorials based on the curriculum.
- One mini project

Examination Scheme and Guidelines:(Sample)

CIE-I **20 Marks**	Examination of 20 marks based on Units 1, 2, and 3 should be conducted, and marks should be communicated to the Exam Cell. · One question of 05 Marks based on MCQ‟s compulsory.
CIE-II **20 Marks**	Examination of 20 marks based on Units 4, 5 and 6 should be conducted, and marks should be communicated to the Exam Cell. · One question of 05 Marks based on MCQ‟s compulsory.
ISE **10 Marks**	ISE/CA -In Semester Evaluation/Continuous Assessment
CIE (Practical) **(25/50 Marks)**	Continuous Assessment **,**As per institute policy

ESE **50 Marks**	ESE-End Semester Examination (Sample)
	Que.1: MCQ‟s based on All Units (Carries 06 Marks)
	Que.2: based on Unit 1, 2, 3 (Carries 11 Marks)
	Que.3: based on Unit 1,2,3 (Carries 11 Marks)
	Que.4: based on Unit 4, 5, 6 (Carries 11 Marks)
	Que.5: based on Unit 4, 5, 6 (Carries 11 Marks)

Dr. J.J. Magdum College Of Engineering, Jaysingpur ELECTRONICS AND TELECOMMUNICATION ENGINEERING

TY- B.Tech - SEM-V

Program Elective Course 2 3. Optical Communication

Course Details:

Class	TY		**Semester**	V		
CourseTitle	Optical Communication		**Course Code**	Theory:1ETCPEL313		
				Practical:1ETCPEP317		
Prerequisites:			Physics, Optoelectronics			
Teaching scheme:	**Theory Hours:**	3	**Practical Hours:**	2	**Tutorial Hours:**	--
	Credits:	3	**Credits:**	1	**Credits:**	--

Evaluation scheme						
Theory				**Practical**		**Total**
T-I	**T-II**	**ISE**	**ESE**	**CIE**	**ESE**	
20	20	10	50	25	-	125

Course Objectives:
The course aims to:

Sr. No.	**Course Objectives**
1ETCPEL313.1	Describe the basics optical communication along with optical fiber structure and light propagating mechanisms in detail.
1ETCPEL313.2	Analyze the signal degradation mechanisms
1ETCPEL313.3	Explain the construction and working of optical sources and detectors

Course Outcomes:

Upon successful completion of this course, the student will be able to:

SrNo.	Course Outcomes	CognitiveLevelsofAttainmentas per Revised Bloom's Taxonomy
1ETCPEL313.1	Differentiate the different types of optical fiber structures and light propagating mechanisms.	Apply (K3)
1ETCPEL313.2	Analyze the causes of signal degradation in an optical communication system	Analyze (K4)
1ETCPEL313.3	Understand the construction of and working of optical sources and detectors.	Understand (K2)
1ETCPEL313.4	Explain the operational principles of WDM, SONET/SDH, and optical CDMA used in optical communication systems.	Understand (K2)

	Course Contents			
Unit Number	**Unit Title**	**Hours**	**Course Outcomes No.**	**Cognitive Levels of Attainment as per Revised Bloom's Taxonomy**
Unit No: 1	**Overview of Optical Fiber Communication** Motivation for light wave communication, Basic Network Information Rates, The evolution of Optic System, Elements of Optical Fiber Transmission Link, optical spectral band, The nature of Light, Basic Optical Laws and Definitions, Single Mode Fibers, Graded Index fiber structures.	**6 Hrs.**	1ETCPEL313.1	Apply (K3)
Unit No: 2	**Optical Fibers: Structures and Wave guiding** Optical Fiber Modes and Configurations, Mode theory for waveguides, Fiber Materials, Fiber Optic cables.	**6 Hrs.**	1ETCPEL313.1	Apply (K3)
Unit No: 3	**Transmission characteristics of optical fibers**. Attenuation, material absorption losses, Scattering losses, bending losses, dispersion, polarization, nonlinear effects.	**6 Hrs.**	1ETCPEL313.2	Analyze (K4)
Unit No: 4	**Optical Sources** Semiconductor Physics, Light-Emitting Diodes (LEDs), LED structures SLED, ELED. Quantum efficiency and LED Power .Laser Diodes, Laser diode structures and radiation patterns, Light Source Linearity.	**6 Hrs.**	1ETCPEL313.3	Understand (K2)
Unit No: 5	**Optical Receiver** Physical Principal of Photodiodes, Photo detector Noise, Detectors Response Time, Structure for InGaAsAPDs, Temperature effect of Avalanche Gain, Comparison of Photo detectors , Fundamental	**6 Hrs.**	1ETCPEL313.3	Understand (K2)
Unit No: 6	**Advances in Optical Fiber System** Operational Principles of WDM, Passive	**6 Hrs.**	1ETCPEL313.4	Understand (K2)

	Components, Tunable Sources, Tunable Filters, optical switching, SONET/SDH, Performance of WDM+EDFA Systems, optical CDMA			

Text Books / Reference Books:

Sr. No	Book Type (Text/Reference)	Name of the Book	Name of the Author	Publisher	Edition	Year of Publication
1.	Textbook	"Optical Fiber Communication"	Gerd Keiser	Tata Mcgraw Hill Publication.	5th Edition	2019
2.	Textbook	"Optical Communication"	John Senior	Pearson Education.	3rd Edition	2009
3.	Reference book	Fiber Optic Communication Systems –	Dr .R .K .Singh	Wiley India	1st Edition,	2008,

Online References: Coursera / NPTEL / General websites etc)

Sr.No.	WebsiteName	URL	Units Covered
1	**https://nptel.ac.in**	https://nptel.ac.in/courses/106/106/106106131/	All Units
2	**https://swayam.gov.in**	https://swayam.gov.in/nd1_noc19_cs47/preview	03

Suggested List of Practical / Experiment for CIE / ESE:

- Minimum 08 Experiments based on the curriculum.

Experiment Number	Type of Experiment (Basic / Design / Advanced / Mini / Minor Projects / Seminar / Case Studies)	Experiment Title	Cognitive levels of attainment as per Bloom's Taxonomy
1.	Basic	Study of optic fiber communication system.	Understand (K2)
2.	Basic	Transmission and reception of analog signal using optical fiber.	Understand (K2)
3.	Basic	Transmission and reception of digital signal using optical fiber.	Understand (K2)
4.	Basic	Frequency modulation using optic fiber link.	Understand (K2)
5.	Basic	Calculation of bending loss in the optic fiber link.	Apply (K3)
6.	Basic	Study of numerical aperture.	Apply (K3)
7.	Basic	Study & calculation of attenuation loss in optic fiber link.	Apply (K3)
8.	Basic	Study of characteristics of LED.	Understand (K2)
9.	Basic	Study of characteristics of LASER.	Understand (K2)
10.	Basic	Study of Pulse width modulation using optic fiber.	Understand (K2)
11.	Basic	Two experiment based on simulation.	Apply (K3)

Examination Scheme and Guidelines:

T-I 20Marks	Examination of 20 marks based on Units1, 2, and3 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ's compulsory.
T-I 20Marks	Examination of 20 marks based on Units 4,5 and6 should be conducted, and marks should be communicated to the ExamCell. • One question of 05 Marks based on MCQ's compulsory.
ISE 10Marks	ISE/CA-In Semester Evaluation/ Continuous Assessment
CIE(Practical) (25 Marks)	Continuous Assessment**,** As per institute policy

ESE **50 Marks**	ESE-End Semester Examination(Sample)
	Que.1:MCQ's based on All Units (Carries 06 Marks)
	Que.2:based on Unit1,2,3 (Carries11Marks)
	Que.3:based on Unit1,2,3 (Carries11 Marks)
	Que.4:based on Unit4,5,6 (Carries11Marks)
	Que.5:based on Unit4,5,6 (Carries11Marks)

Dr J J Magdum College Of Engineering, Jaysingpur

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

TY- B.Tech -SEM-VI

Program Elective Course—3 1. BIOMEDICAL AUTOMATION

Course Details:

Class	**TY**		**Semester**		**VI**	
Course Title	**Biomedical Automation**		**Course Code 1ETCPEL-314**		**Theory: 3 L/Week**	
					Practical: - 2 Hr./Week	
Prerequisites:						
Teaching scheme:	**Theory Hours:**	**3**	**Practical Hours:**	**-2**	**Tutorial Hours:**	**-**
	Credits:	**3**	**Credits:**	**1**	**Credits:**	**4**

Evaluation scheme						
Theory				**Practical**		**Total**
CIE-I	**CIE-II**	**ISE**	**ESE**	**CIE**	**ESE**	
20	20	10	50	25	50	175

Course Objectives:

The course aims to:

Sr No.	**Course Objectives**
1ETCPEL-314.01	To understand the origin of bio-potentials and the role of various electrodes in sensing and conditioning bio-signals.
1ETCPEL-314.02	To comprehend the principles of medical instrumentation systems, including physiological signal sources, system components, performance requirements, design constraints, and regulatory standards.
1ETCPEL-314.03	To develop the ability to interpret and illustrate the working of biomedical instruments used for measuring physiological parameters.
1ETCPEL-314.04	To understand the working principles and applications of cardiac monitoring systems, defibrillators, pacemakers, hemodialysis machines, and biotelemetry, along with electrical safety measures in medical instrumentation.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

Sr No.	Course Outcomes	Cognitive Levels of Attainment as per Revised Bloom's Taxonomy
1ETCPEL-314.01	Explain the origin of bio-potentials and various electrodes for sensing and conditioning bio signals.	K3
1ETCPEL-314.02	Explain the principles of medical instrumentation systems, including physiological signal sources, system components, performance requirements, design constraints, and regulatory standards.	K2
1ETCPEL-314.03	Explain with sketches the working of the given biomedical instrument for measuring the given parameter	K2
1ETCPEL-314.04	Explain the working principles and applications of cardiac monitoring systems, defibrillators, pacemakers, hemodialysis machines, and biotelemetry, along with electrical safety measures in medical instrumentation.	K2

Course Contents				
Unit No.	**Unit Title**	**Hours**	**CO**	**Cognitive Levels of Attainment as per Revised Bloom's Taxonomy**
Unit-01	Cell structure, basic cell functions, origin of bio-potentials, electrical activity of cells, Acquisition, types of bio-signals, Study of diagnostically significant bio-signal parameters, Electrodes for bio-physiological sensing and conditioning, Electrode-electrolyte interface	**6**	**CO1**	**K3**
Unit-02	**Medical Instrumentation** Physiological System of Human Body, Sources of Biomedical Signals, Basic Medical Instrumentation System, Performance Requirements of Medical Instrumentation Systems, Intelligent Medical Instrumentation Systems, General Constraints in Design of Medical Instrumentation Systems, Regulation of Medical Devices.	**6**	**CO2**	**K3**
Unit-03	**Biomedical Parameters Measurement** Measurement of heart sound: Phonocardiograph- Block diagram, working.	**6**	**CO3**	**K4**

	Blood Pressure measurement construction and working – Plethysmograph,electromagnetic,ultrasonic method. Respiration rate measurement: Diagram,construction: Principle,List the type of direct & indirect method of blood pressure measurement. Sphygmomanometer : Construction, working ,blood pressure measurement using Sphygmomanometer. Blood flow measurement : Diagram, and working of spirometer. Audiometer: construction ,working & applications.			
Unit-04	Basic Recording System, General Considerations for Signal Conditioners, Preamplifiers, Main Amplifier and Driver Stage, Writing Systems, Electrocardiograph (ECG), Phonocardiograph (PCG), Electroencephalograph (EEG), Electromyograph (EMG), Biofeedback Instrumentation.	**6**	**CO4**	**K4**
Unit-05	Cardiac Monitor, Bedside Patient Monitoring Systems, Central Monitors, Measurement of Heart Rate and Pulse Rate, Blood Pressure Measurement, Measurement of Respiration Rate.	**4**	**CO4**	
Unit-06	Defibrillator: Concept of fibrillation, defibrillation. Types of defibrillators. DC defibrillation – diagram, working, output waveforms. Electrodes used – Paddle electrodes. Pacemaker: Concept of Pacemaker. Types of Pacemaker – internal and external. Working of various pacing modes. Block diagram of Pacemaker and its working. Hemodialysis machine: Need, function, block diagram, working. Biotelemetry: Block diagram, working. Micro shock and macro shock: Effects of leakage current on human body. Types of leakage current. Precaution to minimize electric shock hazards and leakage current.	**8**	**CO4**	

Text Books/Reference Books:
Laboratory / Practical (Suggested)

Sr. No	**Book Type(Text/ Reference)**	**Name of the Book**	**Name of the Author**	**Publisher**	**Edition**	**Year of Publication**
1	**Reference**	Medical Instrumentation, application and design	John G. Webster	John Wiley Sons	3rd Edition	2009 ISBN:978-0-471-67600-3
2	**Reference**	Human Physiology– The Mechanism of Body Functions	Vander, Shermen	TMH,	13th edition,	2013
3	**Text**	Hand-book of Biomedical Instrumentation.	R.S. Khandpur	McGraw Hill	2nd Edition,	2003.ISBN:9789339205430
4	**Text**	Biomedical Instrumentation and Measurements	Leslie Cromwell	Pearson	2nd Edition,	2004

Online References: Coursera/NPTL/General websites etc)

Sr. No.	Website Name	URL	Units Covered
1	102106669.htm, Biomedical Instrumentation,IIT Madras,Prof.Vardhan SKM	NPTEL	All

Suggested List of Practicals/Experiments for CIE/ESE:

- Minimum 10 Experiments based on the curriculum.

Experiment Number	Type of Experiment(Basic, Design, Advanced, Mini/MinorProjects/Seminar/Case Studies)	Experiment Title	Cognitive Levels of Attainment as per Revised Bloom's Taxonomy
1.	**Basic**	Study of Biomedical Sensors	**K2**
2.	**Basic**	Identify the parts and working of cardiovascular system using video programs	**K2**
3.	**Basic**	ECG Signal Acquisition and Analysis	**K3**
4.	**Basic**	Safely measure the electrocardiogram using ECG machine	**K3**
5.	**Basic**	Measurement of Blood Pressure using Automated System	**K3**
6.	**Basic**	Pulse Oximeter Study	**K2**
7.		Temperature Measurement using Biomedical Sensors	**K3**
8.	**Advanced**	Simulation of 12 lead electrocardiogram signals using virtual lab.	**K3**
9.	**Advanced**	Simulation of Closed-Loop Biomedical Control System	**K3**
10.	**Advanced**	Identify the parts and working of MRI machine using video programs	**K4**
11.	**Advanced**	Identify the parts and working of X-RAY machine using video programs	**K4**
12.	**Mini-Project**	Mini-Project on Biomedical Automation Application	**K6**

Examination Scheme and Guidelines:(Sample)

CIE-I **20 Marks**	Examination of 20 marks based on Units 1, 2, and 3 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ"s compulsory.
CIE-I **20 Marks**	Examination of 20 marks based on Units 4, 5 and 6 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ"s compulsory.
ISE **10 Marks**	ISE/CA -In Semester Evaluation/Continuous Assessment
CIE (Practical) **(25/50 Marks)**	Continuous Assessment **,**As per institute policy
ESE **50 Marks**	ESE-End Semester Examination (Sample)
	Que.1: MCQ's based on All Units (Carries 6 Marks)
	Que.2: Solve Any Two based on Unit 1, 2, 3 (Carries 16 Marks)
	Que.3: Solve Any Two based on Unit 1,2,3 (Carries 16 Marks)
	Que.4: Solve Any Two based on Unit 4, 5, 6 (Carries 16 Marks)
	Que.5: Solve Any Two based on Unit 4, 5, 6 (Carries 16 Marks)

Dr J J Magdum College Of Engineering, Jaysingpur
ELECTRONICS AND TELECOMMUNICATION ENGINEERING
SY- B.Tech -SEM-III
Program Elective Course—3 1. Artificial Intelligence & Machine Learning

Course Details:

Class	T.Y. B.Tech		**Semester**		VI	
Course Title	Artificial Intelligence& Machine Learning		**Course Code**		Theory: 1ETCPEL314	
					Practical:	
Prerequisites:						
Teaching scheme:	**Theory Hours:**	**02**	**Practical Hours:**	**-**	**Tutorial Hours:**	**-**
	Credits:	**02**	**Credits:**	**-**	**Credits:**	**-**

Evaluation scheme						
Theory				**Practical**		**Total**
CIE-I	**CIE-II**	**ISE**	**ESE**	**CIE**	**ESE**	
20	**20**	**10**	**50**	**-**	**-**	**100**

Course Objectives:

The course aims to:

Sr No.	**Course Objectives**
PEC-ETC0314.01	To Introduce fundamental concepts of Artificial Intelligence and Machine Learning.
PEC-ETC0314.02	To Familiarize students with AI/ML techniques
PEC-ETC0314.03	To Develop understanding of data preprocessing, training/testing processes, and performance-related issues in machine learning systems.

PEC-ETC0314.04	To Familiarize students with basic supervised and unsupervised learning algorithms used in intelligent systems.
PEC-ETC0314.05	To study neural networks, recent trends in AI, and AI applications in wireless communication and AIoT systems.
PEC-ETC0314.06	To create awareness about ethical concerns, data privacy, security issues, and emerging technologies.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

Sr No.	Course Outcomes	Cognitive Levels of Attainment as per Revised Bloom's Taxonomy
PEC-ETC0314.01	Explain concepts of AI, ML, and intelligent systems.	K2
PEC-ETC0314.02	Describe data preprocessing and learning techniques used in ML.	K2
PEC-ETC0314.03	Illustrate working principles of basic supervised learning algorithms.	K2
PEC-ETC0314.04	Illustrate working principles of basic unsupervised learning algorithms.	K2
PEC-ETC0314.05	Analyz applications of AI/ML in communication and embedded systems.	K4
PEC-ETC0314.01	Evaluate challenges and future trends of AI in telecommunication engineering.	K5

Course Contents

Unit Number	Unit Title	Hours	Cognitive Levels of Attainment as per Revised Bloom's Taxonomy
Unit-01	**Introduction to Artificial Intelligence** Introduction to AI , History and evolution of AI , AI vs ML vs Deep	**04**	**K2**

	Learning, Types of AI, Intelligent systems and data-driven systems		
Unit-02	**Fundamentals of Machine Learning** Introduction to Machine Learning, Types of Machine Learning • Supervised learning • Unsupervised learning • Reinforcement learning Training and testing concepts, Features and datasets , Data preprocessing concepts , Overfitting and underfitting .	**06**	**K2**
Unit-03	**Supervised Learning Techniques** Regression vs classification**,** Linear regression (concepts)**,** Logistic regression**,** k-Nearest Neighbors (k-NN) **,** Decision trees (basic idea)	**03**	**K3**
Unit-04	**Unsupervised Learning Techniques** Clustering concepts, k-Means clustering Introduction to Neural Networks	**04**	**K3**
Unit-05	**Trends in AI:** Recent trends in AI, AI in wireless communication, Artificial Intelligence of Things (AIoT), AI-based automation systems,	**04**	**K2**
Unit-06	**AI and Ethical Concerns,** Ethics in AI , limitations of AI, Data privacy and security, Generative AI overview	**03**	**K4**

Text Books/Reference Books:

Sr. No	Book Type(Text/ Reference)	Name of the Book	Name of the Author	Publisher		Year of Publication
1.	**Text**	**Artificial Intelligence: Beyond Classical AI**	**Reema Thareja**	**Pearson Education**		**2023**

2.	**Text**	**AI for Everyone – A Beginner's Handbook for Artificial Intelligence**	**Saptarsi Goswami, Amit Kumar Das and Amlan Chakrabarti**	**Pearson**		**2024**
3.	**Reference**	**Artificial Intelligence: A Modern Approach**	**Stuart Russell and Peter Norvig**	**Pearson**	**4th Edition**	**2023**

Online References: Coursera/NPTL/General websites etc)

Sr. No.	Website Name	URL	Units Covered
1.	**Google AI – Learn with Google AI**	**https://ai.google/education/**	
2.	**Google Machine Learning Crash Course**	**https://developers.google.com/machine-learning/crash-course**	

List of Assignments/Tutorials for ISE:

· Minimum 06 Assignments/Tutorials based on the curriculum.

Examination Scheme and Guidelines:(Sample)

CIE-I **20 Marks**	Examination of 20 marks based on Units 1, 2, and 3 should be conducted, and marks should be communicated to the Exam Cell. · One question of 05 Marks based on MCQ"s compulsory.
CIE-I **20 Marks**	Examination of 20 marks based on Units 4, 5 and 6 should be conducted, and marks should be communicated to the Exam Cell. · One question of 05 Marks based on MCQ"s compulsory.
ISE **10 Marks**	ISE/CA -In Semester Evaluation/Continuous Assessment

ESE **50 Marks**	ESE-End Semester Examination (Sample)
	Que.1: MCQ"s based on All Units (Carries 06 Marks)

	Que.2: based on Unit 1, 2, 3 (Carries 11 Marks)
	Que.3: based on Unit 1,2,3 (Carries 11 Marks)
	Que.4: based on Unit 4, 5, 6 (Carries 11 Marks)
	Que.5: based on Unit 4, 5, 6 (Carries 11 Marks)

Dr. J.J.Magdum College Of Engineering, Jaysingpur ELECTRONICS AND TELECOMMUNICATION ENGINEERING
TY-B.Tech - SEM-VI

Course Name: RF & Microwave Communication CourseDetails:

<table>
<tr><td colspan="2">Class</td><td colspan="2">TY</td><td colspan="2">Semester</td><td colspan="2">VI</td></tr>
<tr><td colspan="2" rowspan="2">CourseTitle</td><td colspan="2" rowspan="2">RF & Microwave Communication</td><td colspan="2" rowspan="2">CourseCode</td><td colspan="2">Theory:1ETCPEL314</td></tr>
<tr><td colspan="2">Practical:1ETCPEP318</td></tr>
<tr><td colspan="4">Prerequisites:</td><td colspan="4">Knowledge of wave propagation & power transmission</td></tr>
<tr><td colspan="2" rowspan="2">Teaching scheme:</td><td>Theory Hours:</td><td>2</td><td>Practical Hours:</td><td>2</td><td>Tutorial Hours:</td><td>--</td></tr>
<tr><td>Credits:</td><td>2</td><td>Credits:</td><td>1</td><td>Credits:</td><td>--</td></tr>
<tr><td colspan="8">Evaluationscheme</td></tr>
<tr><td colspan="4">Theory</td><td colspan="2">Practical</td><td colspan="2">Total</td></tr>
<tr><td>T-I</td><td>T-II</td><td>ISE</td><td>ESE</td><td>CIE</td><td>ESE</td><td colspan="2"></td></tr>
<tr><td>20</td><td>20</td><td>10</td><td>50</td><td>-</td><td>-</td><td colspan="2">100</td></tr>
</table>

Course Objectives:
The course aims to:

SrNo.	Course Objectives
1ETCPEL314.1	Understand the basic concept of microwave engineering, and apply EM wave theory to understand the nature of microwave signal.
1ETCPEL314.2	Understand the theoretical and experimental design and analysis of microwave tube devices and circuits
1ETCPEL314.3	Learn the basics of Monolithic Microwave Integrated Circuits (MMIC).
1ETCPEL314.4	Study Microwave semiconductor devices & applications
1ETCPEL314.5	To understand various microwave measurement techniques
1ETCPEL314.6	Expose students to different microwave antennas.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

SrNo.	Course Outcomes	Cognitive Levels of Attainment as per Revised Bloom's Taxonomy
1ETCPEL314.1	Understand the microwave waveguides and passive circuit components.	Understand (K2)
1ETCPEL314.2	Identify microwave tubes and their uses in real life	Understand (K2)
1ETCPEL314.3	Identify materials used in MMIC and microwave hazards.	Understand (K2)
1ETCPEL314.4	Differentiate solid state devices used in microwave based on their characteristics and operations.	Understand (K2)
1ETCPEL314.5	Measure the output power, VSWR, impedance, frequency and wavelength of microwave signal	Analyze(K4)
1ETCPEL314.6	Apply the microwave antenna knowledge for industrial and scientific purposes	Apply(K3)

	Course Contents			
Unit Number	**Unit Title**	**Hours**	**Course Outcomes No.**	**Cognitive Levels of Attainment as per Revised Bloom's Taxonomy**
Unit No.1	**WAVE GUIDES AND MICROWAVE COMPONENTS** Rectangular wave guides: TE and TM mode wave, power transmission in wave guide, power losses in wave guide, excitation of modes in wave guide. Microwave cavities, microwave hybrid circuits, directional coupler, Circulators and Isolators, microwave attenuators	4 Hrs.	1ETCPEL313.1	Understand (K2)
Unit No.2	**MICROWAVE TUBES** Microwave linear beam Tubes: Klystrons, Reentrant Cavities, Velocity-Modulation Process, Bunching Process in Klystrons, reflex klystron, slow wave structures, principle of operation of Helix Traveling-Wave Tubes TWTs).	4 Hrs.	1ETCPEL313.1	Understand (K2)
Unit No.3	**MONOLITHIC MICROWAVE INTEGRATED CIRCUITS AND HAZARDS** Materials: substrate, conductor dielectric & resistive MMIC growth, thin film formation, hybrid microwave I.C. fabrication, microwave hazards.	4 Hrs.	1ETCPEL313.2	Understand (K2)
Unit No. 4	**MICROWAVE SOLID STATE DEVICES** Microwave bipolar transistor, microwave FETs, Microwave tunnel diodes, Gunn Effect diodes, RWH Theory, LSA diodes, IMPATT diodes, PIN diodes, MESFETs and HEMT**.**	4 Hrs.	1ETCPEL313.3	Understand (K2)
Unit No. 5	**MICROWAVE MEASUREMENTS AND MICROWAVE APPLICATIONS**	4 Hrs.	1ETCPEL313.3	Analyze(K4)

	Detection of microwave power: measurement of microwave power bridge circuit, thermistor parameters, waveguide thermistor mounts, barraters, theory of operation of barraters, direct reading barraters bridges, Measurement of wavelengths: single line cavity coupling system, Transmission cavity wavemeter & reaction wavemeter, measurement of VSWR, measurements of attenuation			
Unit No: 6	**MICROWAVE ANTENNAS** Antenna parameters: antenna gain, directivity and beam width, Horn antenna, parabolic reflector with all types of feeding methods, slotted antenna, Lens antenna, Microstrip antennas, Corner reflector.	4 Hrs.	1ETCPEL313.4	Apply(K3)

Text Books / Reference Books:

Sr. No	Book Type (Text/Reference)	Name of the Book	Name of the Author	Publisher	Edition	Year of Publication
1.	Textbook	"Microwave and Radar Engineering"	M. Kulkarni	Umesh Publications	4th	2009
2.	Textbook	"Microwave Engineering"	Annapurna Das &Sisir K Das	Tata Mc-Graw Hill.	2nd Edition,	2009.
3.	Textbook	"Antennas and wave propagation"	G.S.N. Raju	Pearson Education	1st Edition	2005
4.	Reference book	"Microwave Engineering"	K. T. Matthew	Wiley India	1st Edition	2013
5.	Reference book	"Microwave Engineering"	Shrushut Das	Oxford Press	2nd Edition	2014
6.		"Microwave Devices and Circuit"	Samuel Liao	Prentice Hall of India	3rd Edition	2003

Online References: Coursera / NPTEL / General websites etc)

Sr.No.	WebsiteName	URL	Units Covered
1	https://ocw.mit.edu	https://ocw.mit.edu/courses/6-661-receivers-antennas-and-signals-spring-2003/pages/lecture-notes/	06
2	Udemy	https://www.udemy.com/course/microwaverf-engineering-microwave-design-and-applications/?srsltid=AfmBOoqCw-BYnYgezVaowq6jxtFm-tTAYhkAo4pTpnVqw_IA8vLLSbgH	04

Suggested List of Practical / Experiment for CIE / ESE:

- Minimum 08 Experiments based on the curriculum.

Experiment Number	Type of Experiment (Basic / Design / Advanced / Mini / Minor Projects / Seminar / Case Studies)	Experiment Title	Cognitive levels of attainment as per Bloom's Taxonomy
1.	Basic	Study of Reflex Klystron Characteristics.	Understand (K2)
2.	Basic	Study of GUNN Diode Characteristics.	Understand (K2)
3.	Basic	Study of VSWR Measurement (Using Vmax / Vmin Method).	Analyze(K4)
4.	Basic	Study of Frequency and wavelength measurement.	Analyze(K4)
5.	Basic	Study of Input impedance measurement.	Analyze(K4)
6.	Basic	Study of E plane /H plane and magic Tee.	Understand (K2)
7.	Basic	Study of Directional coupler, coupling factor.	Understand (K2)
8.	Basic	Study of Horn Antenna (Gain, Radiation Pattern and beam width).	Apply(K3)
9.	Basic	Study of Parabolic Antenna (Gain, Radiation Pattern and beam width).	Apply(K3)
10.	Basic	Study of Measurement of attenuation (Fixed and variable)	Analyze(K4)

Examination Scheme and Guidelines:

T-I 20Marks	Examination of 20 marks based on Units1, 2, and3 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ's compulsory.
T-I 20Marks	Examination of 20 marks based on Units 4,5 and6 should be conducted, and marks should be communicated to the ExamCell. • One question of 05 Marks based on MCQ's compulsory.
ISE 10Marks	ISE/CA-In Semester Evaluation/ Continuous Assessment

ESE **50 Marks**	ESE-End Semester Examination(Sample)
	Que.1:MCQ’s based on All Units (Carries 06 Marks)
	Que.2:based on Unit1,2,3 (Carries11Marks)
	Que.3:based on Unit1,2,3 (Carries11 Marks)
	Que.4:based on Unit4,5,6 (Carries11Marks)
	Que.5:based on Unit4,5,6 (Carries11Marks)

Dr J J Magdum College Of Engineering, Jaysingpur

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

TY- B.Tech -SEM-VI

MDM-IV 1. Electronics Communication I

Course Details:

Class	T. Y.		**Semester**		V	
Course Title	Electronics Communication I		**Course Code**		1ETCMDL1302	
Prerequisites:						
Teaching scheme:	**Theory Hours:**	2 Hrs./ week	**Practical Hours:**	-	**Tutorial Hours:**	-
	Credits:	2	**Credits:**	-	**Credits:**	-

Evaluation scheme						
Theory				**Practical**		**Total**
T-I	**T-II**	**ISE**	**ESE**	**CIE**	**ESE**	
20	20	10	50	-	-	100

Course Objectives:

The course aims to:

Sr No.	Course Objectives
01	Understand the concept of analog communication systems and its types.
02	Understand basic concepts of analog modulation and demodulation schemes
03	Study the concept of information theory
04	Elaborate the different source coding techniques with the help of their block diagrams and function.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

Sr. No.	Course Outcomes	Cognitive Levels of Attainment as per Revised Bloom's Taxonomy
1ETCMDL1302.1	Explain and identify the fundamental concepts and components of analog communication systems.	L2
1ETCMDL1302.2	Compare and analyze various analog modulation techniques such as AM, FM	L4
1ETCMDL1302.3	Solve the problem based on information theory	L3
1ETCMDL1302.4	Classify different source coding & line coding techniques.	L3

	Course Contents			
Unit Number	**Unit Title**	**Hours**	**Course Outcome Number**	**Cognitive Levels of Attainment as per Revised Bloom's Taxonomy**
Unit-01	**Fundamentals of Amplitude Modulation-** Basic block diagram of communication system, Need for modulation, channel, frequency spectrum, time and frequency domain signals, Am principles, AM envelope, frequency spectrum & BW, Modulation index, % modulation	6	CO1	L2
Unit-02	**Principles of Angle Modulation-** Instantaneous frequency, Concept of angle modulation, frequency spectrum, Narrowband & Wide Band FM, Modulation Index, Bandwidth, Phase modulation	6	CO2	L4
Unit-03	**Information Theory** Measure of Information, Entropy, Information Rate, Shannon's encoding theorem, communication channels –Discrete & Continuous, Shannon–Hartley theorem, Entropy Coding: Huffman's coding & Shannon-Fanno Coding techniques.	6	CO3	L3
Unit-04	**Source Coding** Quantization–Uniform, Non-Uniform. Study of PCM, DM, ADM, Introduction of line code, Line codes: Unipolar, Bipolar	6	CO4	L3

Text Books/Reference Books:

Sr. No	Book Type(Text/Reference)	Name of the Book	Name of the Author	Publisher	Edition
1.	**Textbook**	Electronic Communication	George Kennedy	McGraw Hill Kennedy	
2.	**Textbook**	Digital & Analog Communication	K. Sam Shanmugam	John Wiley India	II
2.	**Reference Book**	Communication System- Analog & Digital	R P Singh, S D Sapre	TMH	II
5.	**Reference Book**	Electronic Communications Systems	Wayne Tomasi	Pearson	V

Online References: Coursera/NPTL/General websites etc)

Sr. No.	Website Name	URL	Units Covered
1	**You Tube**	https://www.youtube.com/watch?v=s_vmLqT_6NQ&list=PLPeKeikHHWGfaHVBYrqxRk2Wl8uYSjRWM	I and II

List of Assignments/Tutorials for ISE:

- Minimum 06 Assignments/Tutorials based on the curriculum.

Examination Scheme and Guidelines :(Sample)

T-I 20 Marks	Examination of 20 marks based on Units 1 and 2 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ‟s compulsory.
T-I 20 Marks	Examination of 20 marks based on Units 4 and 5 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ‟s compulsory.
ISE 10 Marks	ISE/CA -In Semester Evaluation/Continuous Assessment

	ESE-End Semester Examination (Sample)
ESE	Que.1: MCQ‟s based on All Units (Carries 06 Marks)

50 Marks	
	Que.2: based on Unit 1, 2 (Carries 11 Marks)
	Que.3: based on Unit 1,2 (Carries 11 Marks)
	Que.4: based on Unit 4, 5 (Carries 11 Marks)
	Que.5: based on Unit 4, 5 (Carries 11 Marks)

Note:

For Question Nos. 2, 3, 4, and 5, the subject expert should provide a minimum of one and a maximum of two internal options during paper setting.

Dr J J Magdum College Of Engineering, Jaysingpur ELECTRONICS AND TELECOMMUNICATION ENGINEERING

TY- B.Tech -SEM-VI

MDM-IV 2. Architecture & Protocols of IOT

Course Details:

Class	**TY**		**Semester**		**VI**	
Course Title	Architecture & Protocols of IOT		**Course Code 1ETCMDL2302**		**Theory: 2L**	
					Practical: - Nil	
Prerequisites:			IoT Basics			
Teaching scheme:	**Theory Hours:**	**2**	**Practical Hours:**	**-NA**	**Tutorial Hours:**	
	Credits:	**2**	**Credits:**	**-NA**	**Credits:**	
Evaluation scheme						
Theory				**Practical**		**Total**
CIE-I	**CIE-II**	**ISE**	**ESE**	**CIE**	**ESE**	
20	20	10	50	-	-	100

Course Objectives:

The course aims to:

Sr No.	**Course Objectives**
1ETCMDLX-3O2.01	Understand IoT applications and IoT Architectures. .
1ETCMDLX-3O2.02	Learn about IoT devices and event driven analysis
1ETCMDLX-3O2.03	Understand and analyze IoT.
1ETCMDLX-3O2.04	Understand safety and security testing of IoT systems

Course Outcomes:

Upon successful completion of this course, the student will be able to:

Sr No.	Course Outcomes	Cognitive Levels of Attainment as per Revised Bloom's Taxonomy
1ETCMDLX-3O2.01	Demonstrate the revolution of internet in mobile and cloud.	II
1ETCMDLX-3O2.02	Examine the architecture and operation of IoT.	IV
1ETCMDLX-3O2.03	Experiment with various tools and programming paradigms for IoT applications.	III
1ETCMDLX-3O2.04	Develop an IoT prototype for real time scenario.	III
1ETCMDLX-3O2.05	Test for IoT Data Link Layer, Network Layer IoT, Transport & Session Layer Protocols.	IV

Course Contents				
Unit No.	**Unit Title**	**Hours**	**CO**	**Cognitive Levels of Attainment as per Revised Bloom's Taxonomy**
Unit-01	Unit 1: --- The IoT Landscape : Definition of IoT, Applications, Architectures, Wireless Networks, Devices, Security and Privacy, Event Driven Systems. IoT System Architectures: Introduction, Protocols Concepts, IoT ooriented Protocols, Databases, Time Bases, Security.	**4**	**CO1**	**II**
Unit-02	Unit 2:--- IoT-An Architectural Overview: Building architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.	**4**	**CO2**	**IV**
Unit-03	Unit 3:--- IoT Architecture-State of the Art: Introduction, State of the art, Reference Model and architecture, IoT reference Model - IoT Reference Architecture Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.	**4**	**CO2**	**IV**
Unit-04	Unit 4:--- Industrial Internet of Things &Security and Safety : Introduction, Industry 4.0, Industrial Internet of Things (IIoT), IIoT Architecture, Basic Technologies, Applications and Challenges. Security and Safety: Introduction, Systems Security, Network Security, Generic Application Security, Application Process Security and Safety,	**4**	**CO3 ,CO 4**	**III**

Unit-05	Unit 5:--- IoT Data Link Layer : IoT Data Link Layer: PHY/MAC Layer (3GPP MTC, IEEE 802.11, IEEE 802.15), Wireless HART, ZWave, Bluetooth Low Energy, Zigbee Smart Energy, DASH7	**4**	**CO5**	**IV**
Unit-06	Unit 6:--- Network Layer Protocols &IOT Transport & Session Layer Protocols : Network Layer Protocols: Network Layer-IPv4, IPv6, 6LoWPAN, 6TiSCH, ND, DHCP, ICMP IOT Transport & Session Layer Protocols: Transport Layer (TCP, MPTCP, UDP, DCCP, SCTP)-(TLS, DTLS) – Session Layer-HTTP, CoAP	**4**	**CO5**	**IV**

Sr. No	Book Type(Text/ Reference)	Name of the Book	Name of the Author	Publisher	Edition
1	**Reference**	Architecting the Internet of Things	Bernd Scholz-Reiter, Florian Michahelles	ISBN 978-3- 642-19156- 5 e-ISBN 978-3-642-19157-2, Springer, 2016.	
2	**Reference**	Sensors, Actuators and Their Interfaces	N. Ida	Scitech Publishers, 2014	
3	**Reference**	Internet of Things – A hands-on approach	Arshdeep Bahga, Vijay Madisetti,	Universities Press, 2015.	
4	**Reference**	The Internet of Things – Key applications and Protocols,	Olivier Hersent, David Boswarthick, Omar Elloumi	Wiley, 2012	
5	**Text**	Internet-of-Things (IoT) Systems Architectures, Algorithms, Methodologies,	Dimitrios Serpanos, Marilyn Wol	ISBN 978-3-319-69714-7.	
6	**Text**	Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications	Danial Minoli	ISBN: 978-1-118-47347-4, Willy Publications ,2016	
7	**Text**	From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence",	Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle	, Academic Press, 2015.	1st Edition

List of Assignments/Tutorials for ISE:

- Minimum 06 Assignments/Tutorials based on the curriculum.

Examination Scheme and Guidelines :(Sample)

CIE-I **20 Marks**	Examination of 20 marks based on Units 1, 2, and 3 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ"s compulsory.
CIE-I **20 Marks**	Examination of 20 marks based on Units 4, 5 and 6 should be conducted, and marks should be communicated to the Exam Cell. • One question of 05 Marks based on MCQ"s compulsory.
ISE **10 Marks**	ISE/CA -In Semester Evaluation/Continuous Assessment
ESE **70 Marks**	ESE-End Semester Examination (Sample)
	Que.1: MCQ's based on All Units (Carries 6 Marks)
	Que.2: Solve Any Two based on Unit 1, 2, 3 (Carries 16 Marks)
	Que.3: Solve Any Two based on Unit 1,2,3 (Carries 16 Marks)
	Que.4: Solve Any Two based on Unit 4, 5, 6 (Carries 16 Marks)
	Que.5: Solve Any Two based on Unit 4, 5, 6 (Carries 16 Marks)

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TY-B.Tech-SEM-VI

Course Details: Python Programming

<table>
<tr><td colspan="2">Class</td><td colspan="2">TY-B.Tech</td><td colspan="2">Semester</td><td colspan="2">VI</td></tr>
<tr><td colspan="2" rowspan="2">Course Title</td><td colspan="2" rowspan="2">Python Programming</td><td colspan="2" rowspan="2">Course Code-
1ETCVSE315</td><td colspan="2">Theory: 01 Hr/week</td></tr>
<tr><td colspan="2">Practical: 02 Hr/ week</td></tr>
<tr><td colspan="4">Prerequisites:</td><td colspan="4">C, C++ Programming</td></tr>
<tr><td colspan="2" rowspan="2">Teaching scheme:</td><td>Theory Hours:</td><td>01 Hr/week</td><td>Practical Hours:</td><td>02 Hr/week</td><td>Tutorial Hours:</td><td>00</td></tr>
<tr><td>Credits:</td><td>01</td><td>Credits:</td><td>01</td><td>Credits:</td><td>00</td></tr>
<tr><td colspan="8">Evaluation scheme</td></tr>
<tr><td colspan="4">Theory</td><td colspan="2">Practical</td><td colspan="2">Total</td></tr>
<tr><td>CIE-I</td><td>CIE-II</td><td>ISE</td><td>ESE</td><td>CIE</td><td>ESE</td><td colspan="2"></td></tr>
<tr><td></td><td></td><td></td><td></td><td>25</td><td></td><td colspan="2">25</td></tr>
</table>

Course Objectives:

The course aims to:

Sr No.	Course Objectives
1	To develop problem solving skills and their implementation through basic Python
2	To understand and implement concepts of decision making statements
3	To implement programs based on looping statements
4	To understand & implement programs based on built in functions
5	To develop simulations using python Simpy package

Course Outcomes:

Upon successful completion of this course, the student will be able to:

Sr No.	Course Outcomes	Cognitive Levels of Attainment as per Revised Bloom's Taxonomy
1ETCVSE315.1	Understand the python programming basics	K1
1ETCVSE315.2	Able to solve programs on decision making & looping statements in python	K2
1ETCVSE315.3	Understand python list, tuple, and dictionary collection concepts	K3
1ETCVSE315.4	Understand simulation programs using SimPy Library	K4
1ETCVSE315.5	Design & Apply Simpy library functions to model real time problems	K5

Course Contents

Unit Number	Unit Title	Hours	Cognitive Levels of Attainment as per Revised Bloom's Taxonomy
Unit-01	**Introduction to Python** Introduction to Python: Why high level language, Scope of python, interactive mode and script mode. Variables, Operators and Operands in Python. Arithmetic, relational and logical operators, Operator precedence, Taking input using raw_input() and input() method and displaying output - print statement, Comments in Python.	2	K2
Unit-02	**Conditional and Looping** If - else statement and nested if – else while, for, use of range function infor, Nested loops, break, continue, pass statement Use of compound expression in conditional constructs, Nested conditional statements, Nested Looping structures	2	K2
Unit-03	**Functions** Built-In Function, Functions from math, random, time & date module. Composition User Define Function : Defining , invoking functions, passing parameters, Intra-package References, Packages in Multiple Directories	2	K2
Unit-04	**List:** Lists Concept of mutable lists, creating, initializing	2	K3

	and accessing theelements of list, List operations, Concatenation, Membership, list slices, List comprehensions List functions & methods: len, insert, append, extend, sort, remove, reverse, pop functions		
Unit-05	**Tuples& sets**: Immutable concept, creating, initializing and accessing the elements in a tuple; Tuple functions: cmp(), len(), max(), min(), tuple(),Sets Concept of Sets , creating, initializing and accessing the elements ofSets operation Membership, union, intersection, difference, and symmetric difference Dictionaries Concept of key-value pair, creating, initializing and accessing the elements in a dictionary, Traversing,appending, updating and deleting elements	2	K3
Unit-06	**Simulations using Simpy** Basic Concepts, understanding of SimPy's capabilities, ProcessInteraction, Waiting for a Process, Interrupting Another Process,Real-time simulations.	2	K5

Text Books/Reference Books:

Sr. No	**Book Type(Text/ Reference)**	**Name of the Book**	**Name of the Author**	**Publisher**
1.	Text Book	"Python: The Complete Reference"	Martin C. Brown	Tata McGraw Hill Publication, 2018
2.	Text Book	"Learning Python"	Mark Lutz	O"Reilly Publication edition 2013
3.	Text Book	"Python Programming for Absolute Beginner"	Michael Dawson	CengageLearning edition 2010
4.	Reference Books	"Python Essential Reference"	David Beazley	4th edition, Developers library

Online References: Coursera /NPTL/General websites etc)

Sr.No.	**Website Name**	**URL**	**Units Covered**
1	Online courses swayam		All

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TY-B.Tech-SEM-VI

Course Details: Project Phase I

Class	TY-B.Tech		**Semester**	VI		
Course Title	Project Phase-I		**Course Code 1ETCPRP320**	Theory: NA		
				Practical: --04 Hr/week		
Prerequisites:			PCB Simulation			
Teaching scheme:	**Theory Hours:**	NA	**Practical Hours:**	04 Hr/week	**Tutorial Hours:**	NA
	Credits:	NA	**Credits:**	02	**Credits:**	NA

Evaluation scheme						
Theory				**Practical**		**Total**
CIE-I	**CIE-II**	**ISE**	**ESE**	**CIE**	**ESE**	
-	-	-	-	25	25	50

Course Objectives:

The course aims to:

Sr No.	Course Objectives
1ETCPRP320.1	Identify and define a real-world engineering problem relevant to Electronics and Telecommunication Engineering.
1ETCPRP320.2	Conduct a literature survey and analyze existing technologies, research papers, standards, and methodologies related to the selected project.
1ETCPRP320.3	Apply engineering knowledge to formulate project requirements, specifications, and feasible technical solutions.
1ETCPRP320.4	Design and plan the project architecture, methodology, hardware/software requirements, and implementation strategy
1ETCPRP320.5	Develop skills in teamwork, project management, and technical documentation through collaborative project activities.
1ETCPRP320.6	Prepare and present a comprehensive project proposal, including objectives, scope, feasibility analysis, and expected outcomes.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

Sr. No.	Course Outcomes	Cognitive Levels of Attainmentas per Revised Bloom's Taxonomy
1ETCPRP320.1	Identify and analyze a real-world problem in the domain of Electronics and Telecommunication Engineering through a detailed literature survey.	Analyze(K4)
1ETCPRP320.2	Evaluate existing methodologies, technologies, and research findings to select an appropriate solution approach for the proposed project.	Evaluate (K5)
1ETCPRP320.3	Design the system architecture, functional modules, and methodology to address the identified engineering problem.	Create (K6)
1ETCPRP320.4	Develop a comprehensive project plan including specifications, hardware/software requirements, feasibility analysis, and implementation strategy.	Create (K6)
1ETCPRP320.5	Prepare and present a technical project proposal and report demonstrating effective communication, teamwork, and project management skills.	Create (K6)

Project phase 1 is an integral part of the project work. The project work shall be based on the knowledge acquired by the student during the graduation and preferably it should meet and contribute towards the needs of the society. The project aims to provide an opportunity of designing and building complete system or subsystems in the field of Electronics and communication where the student likes to acquire specialized skills. The student shall prepare the duly certified Fourth report of project work in standard format for satisfactory completion of the work by the concerned guide and head of the Department/Institute.

Guidelines:-

- Group Size: The student shall carry the project work by a group of students. Optimum group size shall be 3 students. The project committee should be convinced about such complexity and scope of the work. Projects selected should meet and contribute

towards the needs of the society.

- Selection and approval of topic: Topic should be related to real life application in the field of Electronics and Telecommunication engineering.
- The topic may be based on: Investigation of the latest development in a specific field of Electronics or Communication / The investigation of practical problem in manufacture and / or testing of electronics or communication equipment/ Software based projects related to VHDL, Communication, Instrumentation, Signal Processing agriculture Engineering, AI and IOT based etc. with the justification for techniques used / any topic in the field of E&TC may be allowed.
- The term work assessment of project phase 1 shall be based on Innovative Idea of selected project, literature survey, Depth of understanding, Applications, Individual contributions, presentation, project report, timely completion of work Completed.
- The department should prepare project planner and should follow accordingly
- A log book of work carried out during the semester should be maintained with weekly review remarks by the guide and committee.
- A certified copy of report is required to be presented to external examiner at the time of Fourth examination.
- The project report must undergo by plagiarism check and the similarity index must be less than 10%. The plagiarism report should be included in the project report.

Examination Scheme and Guidelines: (Sample)

CIE 25Marks	Project Phase I Work (Project Phase I report)
ESE 25Marks	External Exam (POE)
Total 50 Marks	