Dr.J.J.Magdum Trust's

Dr.J.J.Magdum College of Engineering, Jaysingpur

◈ Department of Electronics & Tele-Communication Engineering◈

Student Information Manual (SIM)

Academic Year 2024-25 (Sem.-I)

Index

1. Institute Information

Dr J J Magdum College of Engineering was established by Dr J J Magdum Trust, Jaysingpur in the year 1992 with an objective to promote the cause of higher education. The institute is approved by All India Council of Technical Education (AICTE), New Delhi and Government of Maharashtra, affiliated to Shivaji University, Kolhapur. The college offers B. Tech program in Mechanical, Civil, Computer Science Engineering, Electronics & Tele-Communication, Information Technology and M. Tech program in Civil Engineering-Construction Management.

Our Management extends its fullest support in building the institution as a center of excellence with technically superior, ethically strong and competent engineers. The serene campus vibrant with aesthetic bliss in an exhilarating convenient location, well connected by road, rail and air is easily accessible. The eco-friendly ambience creates and bestows a healthy learning atmosphere.

The institution is meticulous with modern laboratory, workshop facilities and state of art computer center providing an excellent infrastructure.

The institution has spacious library with vast collection of Books, Newspapers, National & International Journals, Magazines, and Reference books, Encyclopedia, World of science, ASM hand books and course materials. E-learning through NPTEL Video course by NIT and IIT Professors are available.

The Teaching and Non-Teaching Staff of the institute is a blend of senior experienced and young dynamic faculty members devoted to the noble cause of education. Qualified, experienced, versatile and efficient faculty members mould the students diligently in ethical, moral and academic aspects.

We imparts technology based experiential learning through industry visits, live projects, expert talks, MOOC's, workshops, case studies, upscale labs, and virtual classroom sessions.

Industry-Institute interaction and real-time projects nurture and craft the budding engineers to bloom and flourish in the field with the prowess guidance in the campus. The college equips the students with the latest skills which make them employable and future ready.

Due to able and proper guidance and motivation, many of our students have topped at University. Our training and placement works meticulously to improve and develop life skills to the students and tries hard to seek good jobs for our students. In addition to the academics, the students are engaged in sports and cultural activities which helps them to develop versatile personality. Various Club activities are conducted to encourage, motivate and inspire students from diverse culture to harness the talent through their perseverance.

The institute is having specious ground and the modern facilities for both indoor and outdoor games and ultra-modern Gymnasium. Due to proper guidance and motivation, many of our students have grabbed prizes at University level and different sport events.

We are committed to stakeholders for best results and produced more than 10000+ engineers getting campus placements.

VISION

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

MISSION

- To promote learnability of all among stakeholders.
- To empower rural youth to be competent in technical education and imbibe ethical values.
- To contribute local social and economic context, leading to satisfied stakeholders.
-

QUALITY POLICY

We strive for continual improvement in our performance through methodical academic monitoring, student participation and use of innovative teaching-learning process.

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

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

PEO's

Graduates will

1.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.

2.Demonstrate professional skills like leadership, team spirit, communication, project management to deliver the in-time solutions to the analyzed and designed technical problems

3.Display commitment to high standards of professional & personal ethics, and desire for self and long-life learning.

PSO's

Graduates will be able to,

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.

2. Implement the successfully simulated optimum solutions in hardware using modern tools and test those for the designed specifications.

Program Outcomes (POs)

At the end of successful completion of program, the graduates will be able to,

1. **Engineering Knowledge**: Apply knowledge of mathematics, science, engineering Fundamentals and an engineering specialization to the solution of complex engineering pr
2. **Problem Analysis**: Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
3. **Design/Development of Solutions**: Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal and environmental
4. **Conduct investigations** of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid
5. **Modern Tool Usage**: Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an under-standing of the limitations.
6. **The Engineer and Society**: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering
7. **Environment and Sustainability**: Understand and the impact of professional engineering solutions in societal and environmental contexts and demonstrates knowledge of and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering
9. **Individual and Teamwork**: Function effectively as in visual, and as a member or leader in diverse teams and in multidisciplinary s
10. **Communication:** Communicate effectively on complex engineering activities with the engineering 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
11. **Project Management and Finance**: Demonstrate knowledge and understanding of engineering and management principles and apply these too noels on work, as a member and leader instead, to manage projects and in multidisciplinary environment.
12. **Lifelong Learning**: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

2. Students role and Responsibilities
Code of Conduct:-

- Every student must carry his/her identity card while being present in the college premises.
- Use of cell phones is strictly prohibited during class/labs hour.
- Without the permission of the Principal, students are not allowed to circulate any printed materials within the college campus.
- Every student is expected to maintain the general cleanliness within the classrooms, laboratories and the campus in general.

- Students should handle the college properties with care. Damage to the furniture or any other materials may lead to penalty or suspension from the college.
- Intoxication or possession of narcotics and other dangerous material is strictly prohibited.
- Playing cards, spitting and loitering are strictly prohibited inside the college campus and shall invite severe punishment/disciplinary action.
- Attempted or actual theft of and or damage to property of the college, or property of a member of the college community, or other personal or public property, on or off campus will be considered as a punishable act.
- Every student will remain answerable to the college authority for his/her activity and conduct on the college premises.
- Any act which obstructs teaching, research, administrative activity and other proceedings of the college is strictly prohibited.
- Indulging, ragging, anti-institutional, anti-national, antisocial, communal, immoral or political expressions and activities within the campus and hostel are strongly prohibited as well as punishable.
- Students are required to check the notice board and also website of the college for important announcements.
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3. Laboratory Instructions:

- Students must present a valid ID card before entering the laboratory.
- Mobiles are strictly restricted in the laboratories.
- Remove your shoes/chappals/sandals outside the lab.
- Handle all the equipment's such as CRO, Signal generator, educational kits with care.
- If any problem arises switch off the supply and inform the technical assistant, Lab on charge immediately.
- Before switching on power supply, get checked the connections from the technical assistant.
- Perform the practical and note the reading in notebook .Get checked with the reading from subject In charge.
- Switch off the mains, while leaving the lab.
- Playing of games on computer in the lab is strictly prohibited.

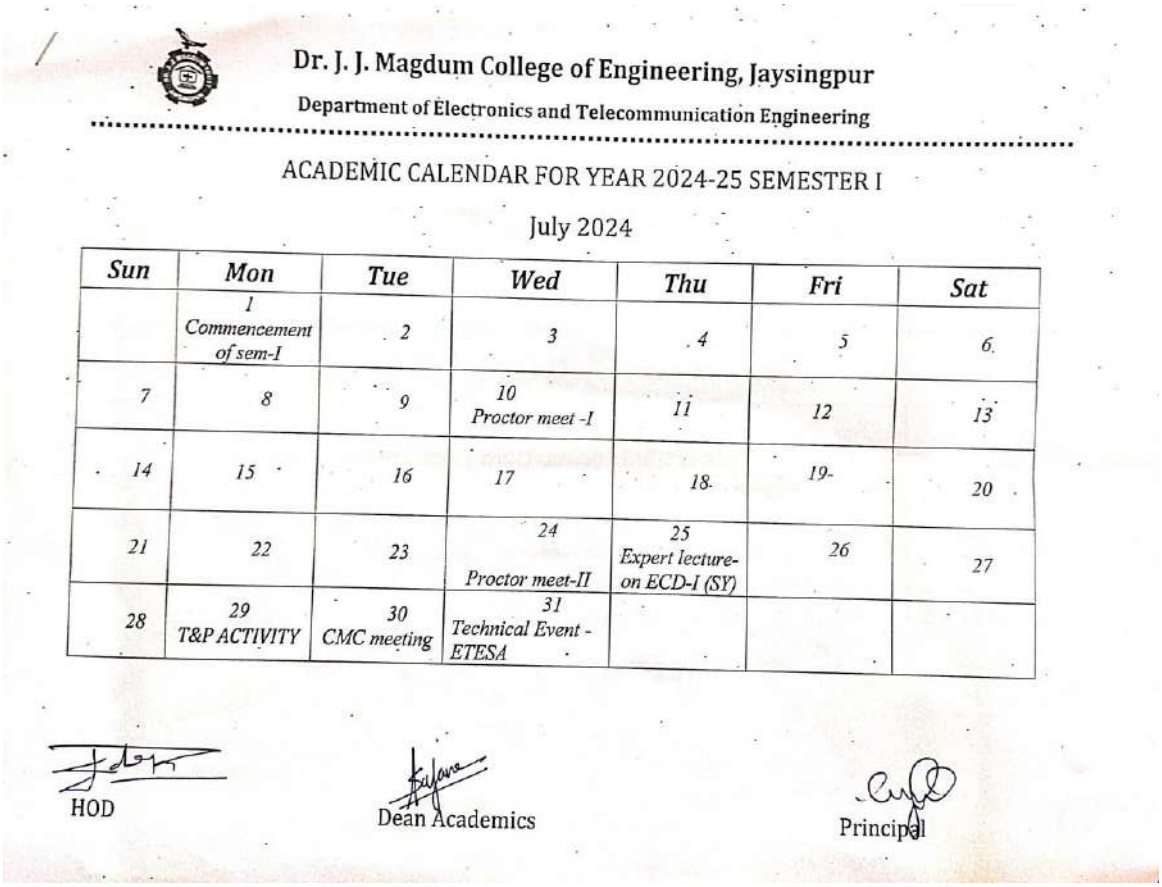
Classroom Instructions:-

- Students should know and obey rules and regulations of department as well as college.
- Mobiles are strictly restricted in the classroom.
- Students strive to meet Academic Expectations.
- Students are expected to take all tests at the scheduled times seriously.
- Maintain discipline in the class.

- A student should maintain at least 75% attendance in the Lectures of every subject and 100% overall performance. Otherwise, he or she will be debarred from the University Examination.
- Latecomers will not be entertained to enter into the classroom.
- Participate in the activities organized in the Department as well as in the College.
- While discussion, students should conduct and express themselves in a way that is respectful of all persons.
- Develop positive attitudes
- Be cooperative and considerate.
- Welcome challenges.
- Be helpful to others
- Be kind, polite, and courteous to others.
- Do the assigned work on time.
- Be prepared for classes with all necessary supplies.
- Be Respectful and Punctual.
- Be in the best of behaviors.

4. Academic Planner

ACADEMIC CALENDAR FOR YEAR 2024-25 SEMESTER I



Dr. J. J. Magdum College of Engineering, Jaysingpur

Department of Electronics and Telecommunication Engineering

ACADEMIC CALENDAR FOR YEAR 2024-25 SEMESTER I

July 2024

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1 Commencement of sem-I	2	3	4	5	6
7	8	9	10 Proctor meet -I	11	12	13
14	15	16	17	18	19	20
21	22	23	24 Proctor meet-II	25 Expert lecture-on ECD-I (SY)	26	27
28	29 T&P ACTIVITY	30 CMC meeting	31 Technical Event - ETESA			

HOD

Dean Academics

Principal

Dr. J. J. Magdum College of Engineering, Jaysingpur

Department of Electronics and Telecommunication Engineering

August 2024

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1 Expert lecture on PLC SCADA -TY	2	3
4	5	6 T&P ACTIVITY	7- Proctor meet -I	8	9	10
11	12 VAC (TY,BTECH)	13 VAC (TY,BTECH)	14 VAC (TY,BTECH)	15 VAC (TY,BTECH)	16 CIE-I	17 CIE-I
18	19	20 Industrial Visit -TY	21 Proctor meet -II	22 MoU –Industry	23	24
25	26	27	28	29	30- CMC meeting	31

HOD Dean Academics Principal

Dr. J. J. Magdum College of Engineering, Jaysingpur

Department of Electronics and Telecommunication Engineering

September 2024

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2 AUGMENTATION SY	3	4 Alumni Expert talk on competitive exams	5	6 T&P ACTIVITY	7 Parents meet-I
8	9	10 Advisory board meeting	11 Parents meet	12 Expert lecture on computer network	13 VAC BTech	14 VAC BTech
15 VAC BTech	16 VAC BTech	17	18 EDC ACTIVITY	19 MoU – Industry	20	21 Industrial Visit -SY
22	23 Advisory board meeting	24	25 Technical Event - ETESA	26	27- CMC meeting	28
29	30 CIE-II					

HOD Dean Academics Principal

Dr. J. J. Magdum College of Engineering, Jaysingpur

Department of Electronics and Telecommunication Engineering

October 2024

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1 CIE-II	2 Alumni Expert talk	3 AUGMENTATION TY	4	5
6	7 DRC presentation	8 Parents meet - II	9 EDC ACTIVITY	10	11 Higher study expert talk	12
13	14 Expert lecture on embedded system	15	16	17 R & D Cell Activity	18	19 Industrial Visit - BTECH
20	21	22 STTP -Faculty	23	24 Expert lecture- III cell	25	26
27	28	29	30	31		

HOD Dean Academics Principal

5. Departmental Time-Table

Dr. J. J. Magdum Trust's (No. E/902)

Dr. J. J. Magdum College of Engineering, Jaysingpur

Department of Electronics & Telecommunication Engineering

◈TIME TABLE◈

Academic Year: 2024-25 **Semester :** I

Department: Electronics & Telecommunication Engineering **Class: TY**

Class Room No.:

Class Coordinator: Prof.M.R. Jadhav **W.e.f.: 08/07/2024**

TIME	Monday	Tuesday	Wednesday	Thursday	Friday	Sat
09.30 am – 10.30 am	OC PROF.P. P. Belagali	VLSI Prof. V. T. Kamble	EME Prof. P.P.Mane	E1- SM (PAM) PL-I LAB E2-SS /EME) (MRJ / PPM)	E1- SS / EME (MRJ / PPM) E2- OC (PPB) DCOM LAB	
10.30 am – 11.30 am	OE-I Prof.P.A.Magdum	OC PROF.P. P. Belagali	VLSI Prof. V. T. Kamble	E3- OC (PPB) DCOM LAB E4- VLSI (VTK) VLSI LAB	E3- VLSI (MUP) VLSI LAB E4-SM (SSK) PL-I LAB	
11.30 am – 11.40 am	**Short Break**					
11.40 am – 12.40 pm	VLSI Prof. V. T. Kamble	E1- VLSI (VTK) VLSI LAB E2-SM (PAM) PL-I LAB E3-SS / EME (MRJ / PPM) E4- OC (PPB) DCOM LAB	SS Prof.M.R.Jadhav	OC PROF.P. P. Belagali	SM Prof.S.S. Karadge	
12.40 pm – 01.40 pm	SS Prof.M.R.Jadhav		OE-I Prof.P.A.Magdum	EME Prof. P.P.Mane	OC Prof P. P. Belagali	
01.40 pm – 02.30 pm	**Lunch Break**					
02.30 pm – 03.30 pm	E1- OC (PPB) DCOM LAB E2-VLSI (VTK) VLSI LAB E3-SM(SSK) PL-I LAB E4-SS / EME (MRJ / PPM)	EME Prof. P.P.Mane	TPO Training	SS Prof.M.R.Jadhav	SS Prof.M.R.Jadhav	
03.30 pm – 04.30 pm		Library Hr.	TPO Training	VLSI Prof. V. T. Kamble	OE-I Prof.P.A.Magdum	

Prof.M.M.Kolap
HOD ETC Engg

Prof.A.S.Sajane
Dean, Academics

Dr. G.V.Mulgund
Principal

6. Structure of Syllabus:

SEMESTER – V																						
Sr. No	Course (Subject Title)	TEAETCING SETCEME									EXAMINATION SETCEME											
		THEORY			TUTORIAL			PRACTICAL			THEORY					PRACTICAL			TERM		
		Credits	No. of Lectur	Hours	Credits	No. of Lectur	Hours	Credits	No. of Lecture	Hours	Hours	Mode	Marks	Total Marks	Min	Hours	Max	Min	Hours	Max	Min
1	PCC-ETC501	4	4	4	1	1	1	-	-	-		CIE	30	100	12	As per BOS Guidelines	-	-	2	25	10
												ESE	70		28						
2	PCC-ETC502	3	3	3	1	1	1	-	-	-		CIE	30	100	12		-	-	2	25	10
												ESE	70		28						
3	PCC-ETC503	4	4	4	-	-	-	1	2	2		CIE	30	100	12		50	20	2	25	10
												ESE	70		28						
4	PCC-ETC504	4	4	4	-	-	-	1	2	2		CIE	30	100	12		50	20	2	25	10
												ESE	70		28						
5	OEC-ETC501	3	3	3	1	1	1	-	-	-		CIE	30	100	12		-	-	2	25	10
												ESE	70		28						
6	PCC-ETC505	1	1	1	-	-	-	1	2	2							50	20	2	25	10
	TOTAL	**19**	**19**	**19**	**3**	**3**	**3**	**3**	**6**	**6**				**500**			**150**			**150**	
SEMESTER –VI																						
1	PCC-ETC601	4	4	4	-	-	-	1	2	2		CIE	30	100	12	As per BOS Guidelines	-	-	2	25	10
												ESE	70		28						
2	PCC-ETC602	4	4	4	-	-	-	1	2	2		CIE	30	100	12		50	20	2	25	10
												ESE	70		28						
3	PCC-ETC603	4	4	4	-	-	-	1	2	2		CIE	30	100	12		-	-	2	25	10
												ESE	70		28						
4	PCC-ETC604	4	4	4	-	-	-	1	2	2		CIE	30	100	12		50	20	2	25	10
												ESE	70		28						
5	OEC-ETC601	3	3	3	1	1	1	-	-	-		CIE	30	100	12		-	-	2	25	10
												ESE	70		28						
6	PCC-ETC605	-	-	-	-	-	-	1	2	2							50	20	2	25	10
	TOTAL	**19**	**19**	**19**	1	1	1	**5**	**10**	**10**				**500**			**150**			**150**	
	TOTAL	**38**	**38**	**38**	**4**	**4**	**4**	**8**	**16**	**16**				**1000**			**300**			**300**	

CIE- Continuous Internal
EvaluationESE – End
Semester Examination

Note:

PCC-ETC: Professional Core course –Electronics & Telecommunication Engineering are compulsory.

OCE-ETC: Open Elective Course – Electronics & Telecommunication Engineering:

Winter/Summer Internship/Industrial Training of minimum 15 day's compulsory and evaluation of the same will be carried out in Final year Project Phase internal assessment by respective Guide.

Candidate contact hours per week : 30 Hours	Total Marks for T.Y. Sem V& VI:
Theory and Practical Lectures : 60 Minutes	Total Credits for T.Y. Sem V & VI :
There shall be separate passing for theory and practical (term work)	
(A) Non-Credit Self Study Course : Compulsory Civic Courses For Sem I: CCC – I : Democracy, Elections and Good **(B) Non-Credit Self Study Course : Skill Development Courses For Sem II: SDC – I :** Any one from following (i) to (v) i) Business Communication & Presentation ii) Event management iii) Personality Development, iv) Yoga &Management v) Resume, Report & proposal writing	

7. Subject Details

SUBJECT NAME: SIGNALS AND SYSTEMS

Course Details

Class	**T. Y. B. Tech. Sem - V**
Course Code and Course Title	**PCC-ETC 501: Signals and Systems**
Prerequisites	**Engineering Mathematics**
Teaching scheme :Lectures + Tutorial	**4 Hrs. + 1 Hr.**
Credits	**4 + 1**
Evaluation Scheme ESE + CIE for Theory	**70 (ESE) + 30 (CIE)**

Teaching scheme	**Examination scheme**
Lectures : 4 Hrs. / Week	**Theory : 100 Marks,** **70 (ESE) + 30 (CIE)**
Tutorial : 1 Hr. / Week	**TW: 25 Marks**

Course Objectives:	
The course aims to :	
1	To understand basic of CT & DT signals and their representation.
2	To understand basic of CT & DT system and their representation
3	To analyze CT & DT signals using Fourier transform
4	To compute DFT and IDFT
5	To analyze signals using Z-transform
6	To apply realization techniques for systems

Course Outcomes:	
Upon successful completion of this course, the students will be able to:	
1	Demonstrate use of signals and their representation.
2	Represent CT & DT system
3	Use Fourier transform for analysis of CT & DT signals
4	Compute DFT and IDFT
5	Analyze signals using Z-transform
6	Realize the systems

Course Contents		
Unit No: 1	**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	**8 Hrs.**
Unit No: 2	**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 .	**8 Hrs.**
Unit No: 3	**Fourier Transform** Fourier Transform , Fourier Transform of CT and DT signals, Properties of Fourier Transform, Fourier transform using properties, Limitations of Fourier Transform	**8 Hrs.**
Unit No: 4	**Discrete Fourier Transform** Discrete Time Fourier Transform , Discrete Fourier Transform , Inverse Discrete Fourier Transform(IDFT): Direct method, DFT using Twiddle factor, Properties,	**7 Hrs.**
Unit No: 5	**Z transform:** Introduction of Z-transform, ROC, properties of ROC, Unilateral Z-transform, properties of Z transform, Inverse Z-transform: long division method, PFE method, residue method.	**7 Hrs.**

Unit No: 6	**System Realization** Continuous time system representation by differential equation, discrete time system representation by difference equation , transfer function in Z-domain, Realization of discrete time systems by Direct from I and Direct Form II	**6 Hrs.**

TEXT BOOKS:

1	S. Palani, " Signals and Systems", Ane Books Pvt. Ltd
2	P. Ramesh Babu, R. Anandanatarajan, " Signals and Systems " 4th Edition, SCITECH publication
3	A.Anand Kumar, "Signals and Systems", PHI publication

REFERENCE BOOKS:

1	S. Palani, " Signals and Systems", Ane Books Pvt. Ltd
2	P. Ramesh Babu, R. Anandanatarajan, " Signals and Systems " 4th Edition, SCITECH publication
3	A.Anand Kumar, "Signals and Systems", PHI publication

Note: Minimum Ten Tutorials based on above syllabus.

Guidelines to paper setter:

In theory ESE examination of 70 marks following points should be considered:

Question paper should contain 70% numerical and 30% theory.

Q.1 MCQ's based on complete syllabus. (14 Marks)

Q.2 Based on unit no 1, 2, 3 (Carries 14 marks)

Q.3 Based on unit no 1, 2, 3 (Carries 14 marks)

Q.4 Based on unit no 4, 5, 6 (Carries 14 marks)

Q.5 Based on unit no 4, 5, 6 (Carries 14 marks)

Lecture plan

Sub: Signal & Systems

Chapter No.	Lect No.	Details of syllabus planned
Ch.1		**Signals and Classification of Signals**
	01	Introduction to definition and classification of signals
	02	Continuous and Discrete Time signals
	03	Even and Odd signals
	04	Periodic and Non periodic signals
	05	Deterministic and Nondeterministic signals
	06	Energyand Power signals
	07	Elementarysignals unit step, unit impulse, unit ramp, exponential & sinusoidal
	08	Basic operations on signals, Sampling & reconstruction of signal
Ch 2		**System and Classification of Systems**
	09	System Representation, properties of systems : continuous time Systems & discrete Systems
	10	System with and without memory
	11	Causal and non-causal system
	12	Linear and nonlinear system, Time invariant and time variant system,
	13	Stability of system, Impulse response representation
	14	Convolution integral
	15	Convolution sum
	16	Properties of convolution
Ch3		**Fourier Transform**
	17	Fourier Transform introduction
	18	Fourier Transform of CT and DT signals
	19	Properties of Fourier Transform

	20	Fourier transform using properties
	21	Limitations of Fourier Transform
	22	Numerical on Fourier Transform
	23	Numerical on Fourier Transform
	24	Numerical on Fourier Transform
Ch 4	**Discrete Fourier Transform**	
	25	Discrete Time Fourie26r Transform introduction
	26	Discrete Fourier Transf27orm
	27	Inverse Discrete Fourier Transform(IDFT): Direct method
	28	DFT using Twiddle factor
	29	DFT Properties
	30	DFT and DTFT Numerical
	31	DFT and DTFT Numerical
Ch 5	**Z transform**	
	32	Introduction of Z-transform
	33	ROC, properties of ROC
	34	Unilateral Z-transform
	35	Properties of Z transform
	36	Inverse Z-transform: long division method
	37	PFE method
	38	Residue method
	System Realization	

	39	Continuous time system representation by differential equation
	40	Discrete time system representation by difference equation

Ch 6	41	Transfer function in Z-domain
	42	Realization of discrete time systems by Direct from I
	43	Realization of discrete time systems by Direct Form II
	44	Numerical

Tutorial List

TutNo.	Name of Tutorial
01	Signals and Classification of Signals
02	System and Classification of Systems
03	Fourier Transform
04	Discrete Fourier Transform
05	Z transform
06	System Realization
07	On section I
08	On section II
09	Plot basic elementary signals in MATLAB
10	Sampling & Reconstruction of signal in MATLAB

SUBJECT NAME: ELECTROMAGNETIC ENGINEERING

Course Details

Class	**T. Y. B. Tech. Sem - V**
Course Code and Course Title	**PCC-ETC502: Electromagnetic Engineering**
Prerequisites	**Engg. Mathematics, Physics**
Teaching scheme :Lectures + Tutorial	**3 Hrs.+ 1 Hr.**
Credits	**3 + 1**
Evaluation Scheme ESE + CIE for Theory	**70 (ESE) + 30 (CIE)**

Teaching scheme	**Examination scheme**
Lectures : 3 Hrs. / Week	**Theory : 100 Marks,** **70 (ESE) + 30 (CIE)**
Tutorial : 1 Hr. / Week	**TW: 25 Marks**

Course Objectives: The course aims to :	
1	Explain basic of Vector calculus & co-ordinate systems.
2	Define & derive different laws in steady electric & magnetic fields.
3	Apply Maxwell‟s equations in different forms to Develop wave equations.
4	Explain concepts of transmission lines

Course Outcomes: Upon successful completion of this course, the students will be able to:	
1	Explain the fundamentals of mathematical skills related with differential, integral and vector calculus.
2	Apply and analyze the concepts of steady electric & magnetic fields.
3	Develop field equations from understanding of Maxwell‟s Equations.

4.	Extend the knowledge of basic properties of transmission lines to analyze electromagnetic wave propagation in generic transmission line geometries.

Course Contents		
Unit No: 1	**Vector Algebra** Review of vector Analysis and coordinate systems, Basic vector algebra, Dot product, Cross product, curl, divergence, Gradient	**4 Hrs.**
Unit No: 2	**Electrostatics** Coulomb‟s law & electric field (Numerical Expected) , field due to distributed charges (Numerical Expected), Flux density (Numerical Expected), Gauss‟s law, divergence theorem, Electrostatic potential, potential gradient, electric dipole, Electrostatic energy density, Boundary conditions for electrostatic field.	**6 Hrs.**
Unit No: 3	**Steady Magnetic Field** Biot Savarts law (Numerical Expected), Ampere‟s circuital law (Numerical Expected), Stoke‟s Theorem, Magnetic flux density & Vector magnetic potential ,Current carrying conductors in magnetic fields, Torque on loop, Energy stored in magnetic field, Boundary conditions for magneto static field.	**7 Hrs.**
Unit No: 4	**Maxwell's Equations** Inconsistency of Ampere‟s law, Faraday‟s law, Maxwell‟s equations for static field, time varying field & harmonically varying fields, Comparison of field & circuit theory.	**3 Hrs.**
Unit No: 5	**Electromagnetic Waves** Wave equation for free space and conducting medium, uniform plane wave equation ,general solution of uniform plane wave equation, intrinsic impedance, wave equation in phasor form, wave propagation in lossless medium, propagation characteristics of EM waves in free space ,conducting medium, good dielectrics and good conductors.	**8 Hrs.**
Unit No: 6	**Transmission Lines** Transmission line equations, Transmission line parameters, Infinite line, terminated uniform transmission line, Reflection coefficient, VSWR, group velocity, phase velocity, Smith chart (Numerical expected on Reflection coefficient, VSWR and impedance matching using Smith chart)	**8 Hrs.**

TEXT BOOKS:

1	John D. Kraus, “Electromagnetics”, Tata Mc Graw Hill
2	William Hayt, Buck, “Engineering Electromagnetics”, Tata Mc Graw Hill.
3	G.S.N. Raju, “Antenna and Wave Propagation”, Pearson Education.
4	Sadiku, “Elements of Electromagnetics”, 4th edition, Oxford University Press

REFERENCEBOOKS:

1	Jordan & Balmain, “Electromagnetic Fields & Radiation Systems”, 2nd edition, PHI
2	G.S.N. Raju, “Electromagnetic field theory & Transmission lines”, 1st edition, Pearson Education.

Note: Minimum Eight Tutorials based on above syllabus.

Guidelines to paper setter:

1. In theory ESE examination of 70 marks following points should be considered,

Q.1 MCQ’s based on complete syllabus. (14 Marks)

Q.2 Based on unit no 1, 2, 3 (Carries 14 marks)

Q.3 Based on unit no 1, 2, 3 (Carries 14 marks)

Q.4 Based on unit no 4, 5, 6 (Carries 14 marks)

Q.5 Based on unit no 4, 5, 6 (Carries 14 marks)

2. Question paper should include 70% theory and 30% numerical.

Lecture plan

Sub- Electromagnetic Engineering

Chapter No.	Lect No.	Details of syllabus planned
Ch.1		**Vector Algebra**
	01	Review of vector Analysis and coordinate systems
	02	Basic of vector algebra
	03	Dot product and Cross product
	04	Curl, divergence, Gradient
Ch.2		**Electrostatics**
	05	Coulomb‟s law & electric field (Numerical Expected)
	06	Field due to distributed charges (Numerical Expected)
	07	Flux density (Numerical Expected)
	08	Gauss's law, divergence theorem
	09	Electrostatic potential, potential gradient, electric dipole
	10	Electrostatic energy density.
	11	Boundary conditions for electrostatic field
Ch.3		**Steady magnetic field**
	12	Biot Savarts law (Numerical Expected),
	13	Ampere's circuital law (Numerical Expected)
	14	Stoke‟s Theorem, Magnetic flux density & Vector magnetic potential
	15	,Current carrying conductors in magnetic fields
	16	Torque on loop
	17	Energy stored in magnetic field
	18	Boundary conditions for magneto static field.
		Maxwell's equations
	19	Inconsistency of Ampere's law, Faraday's law

Ch.4	20	Maxwell‟s equations for static field, time varying field & harmonically varying fields
	21	Comparison of field & circuit theory
Ch.5		**Electromagnetic waves**
	22	Wave equation for free space and conducting medium
	23	Uniform plane wave equation
	24	General solution of uniform plane wave equation
	25	Intrinsic impedance, wave equation in phasor form
	26	Wave propagation in lossless medium
	27	Propagation characteristics of EM waves in free space
	28	Propagation characteristics of EM waves inconducting medium
	29	Propagation characteristics of EM waves in good dielectrics and good conductors.
Ch.6		**Transmission line**
	30	Transmission line equations
	31	Transmission line parameters
	32	Infinite line, terminated uniform transmission line
	33	Reflection coefficient,
	34	VSWR
	35	Group velocity, phase velocity
	36	Smith chart
	37	(Numerical expected on Reflection coefficient, VSWR and impedance matchingusing Smith chart)

Tutorial List

Tut No.	Name of Tutorial
01	Examples on Vector Analysis and Transformation of system
02	Derive an equation for Coulombs law and its examples
03	Derive an equation of Electric field intensity and ChargeDistribution
04	Examples on Electric Field intensity and charge distribution
05	Derive an equation of Work done and potential
06	Examples on Electric Dipole and its examples
07	Derive an equation of VSWR, Reflection Coefficient
08	Examples on Smith Chart

SUBJECT: DIGITAL AND VLSI DESIGN

Course Details

Class	**T. Y. B. Tech. Sem - V**
Course Code and Course Title	**PCC-ETC503 : Digital and VLSI Design**
Prerequisites	**Fundamentals of Electronics**
Teaching scheme : Lectures + Practical	**4 Hrs. + 2 Hrs.**
Credits	**4 + 1**
Evaluation Scheme ESE + CIE for Theory	**70 (ESE) + 30 (CIE)**

Teaching scheme	Examination scheme
Lectures : 4 Hrs. / Week	**Theory : 100 Marks,** **70 (ESE) + 30 (CIE)**
Practical : 2 Hrs. / Week	**TW: 25 Marks** **POE: 50 Marks**

Course Objectives:	
The course aims to :	
1	Understand principles and operations of combinational & sequential logic circuits.
2	Design & implement digital circuits (combinational & sequential) using VHDL
3	Explain students the fundamental concepts of Hardware Description Language and design flow of digital system design.

Course Outcomes:	
Upon successful completion of this course, the students will be able to:	
1	Apply Boolean laws/K-Map-method, to reduce a given Boolean function
2	Design & realize combinational logic circuits using logic gates.
3	Demonstrate the operation of flip-flops, counters , shift registers Synchronous sequential machine using Moore and Mealy machine
4	Design combinational and sequential logic circuits using various description techniques in VHDL

Course Contents		
Unit No: 1	**Basics of digital systems:** Generation of Switching Equations from Truth Table , Canonical forms ,K-map(Karnaugh map) 2,3,4 and 5 variables, K map with Don‟t care terms - Quine Mc-Cluskey minimization technique, Quine Mc-Cluskey using Don‟t Care Terms ,Binary codes, Code Conversion.	**7 Hrs.**

Unit No: 2	**Introduction to VHDL:** Level of abstraction. Need of HDL,VLSI Design flow, Features and capabilities of VHDL, Elements of VHDL (Entity Architecture, Library, Package, and Configuration), Modeling styles in VHDL, Identifiers, operators , Data objects, data types, literals, Delay Models, Concurrent and sequential statement.	**7 Hrs.**
Unit No: 3	**Combinational logic Design :** Adder, Subtractor, Code converters (binary to gray & gray to binary, BCD to Excess 3 and vice versa, BCD to 7 segment display),Multiplexer and Demultiplexer , Encoder, Priority encoder, Decoder, Comparator , ALU, Barrel shifter. VHDL coding for combinational circuits.	**7 Hrs.**
Unit No: 4	**Sequential logic Design:** 1-Bit Memory Cell, Latches (SR, JK, D and T), Clocked latches (SR, JK, D and T), flips flop (SR, JK, T and D). Use of preset and clear, Excitation Table for flip flops, and Conversion of flip flops, Timing parameters of FF, Shift registers (SISO, SIPO, PIPO, and PISO). VHDL coding for Sequential circuits.	**7 Hrs.**
Unit No: 5	**Counters and Finite State Machines:** Counter – ripple counters ,synchronous counters , Up/down counters, Ring counters, Johnson Counter, MOD-N counter, FSM, Moore/Mealy machines, state diagram, state table, state assignment and state reduction, Sequence detector. VHDL coding for Counters and FSM.	**7 Hrs.**
Unit No: 6	**Semiconductor Memories and Programmable Logic Devices** Memory devices: ROM, PROM, EPROM, EEPROM, RAM, SRAM, DRAM, NVRAM, Programmable logic devices: PAL ,PLA,CPLD and FPGA .Logic implementation using Programmable Devices (ROM, PLA)	**7 Hrs.**

Text Books:

1	A. Anand Kumar, "Fundamentals of digital circuits", 4th edition, PHI publication, 2016
2	Stephen Brown and ZvonkoVranesic, "Fundamentals of Digital Logic with VHDL design", Tata Mc-graw Hill

Reference Books:

1	Wakerly, "Digital Design Principles and Application", Pearson Education

2	M. Morris Mano, " Digital Design", 3rd Edition , Pearson Education
3	Roth John, "Principals of Digital System Design using VHDL", Cengage Learning.
4	R. P. Jain, "Modern digital electronics", 3rd edition, 12th reprint TATA Tata McGraw Hill Publication, 2007

Note:

1. **Guidelines to paper setter: (30 % weightage to VHDL codes and 70% theory)**

2. **In theory ESE examination of 70 marks following points should be considered,**

   Q.1 MCQ's based on complete syllabus. (14 Marks)

   Q.2 Based on unit no 1, 2, 3 (Carries 14 marks)

   Q.3 Based on unit no 1, 2, 3 (Carries 14 marks)

   Q.4 Based on unit no 4, 5, 6 (Carries 14 marks)

   Q.5 Based on unit no 4, 5, 6 (Carries 14 marks)

LECTURE PLAN

Sub: Digital & VLSI Design

Chapter No	No. of Lecture	Topics to be covered in each Lecture
	Basics of digital systems	
1	1	Binary codes, Code Conversion.
	2	Generation of Switching Equations from Truth Table
	3	Canonical forms
	4	K-map(Karnaugh map) 2,3,4 and 5 variables
	5	K-map(Karnaugh map) 2,3,4 and 5 variables K map with Don"t care terms
	6	QuineMc-Cluskey minimization technique,
	7	QuineMc-Cluskey minimization technique, QuineMc-Cluskey using Don"t Care Terms

	Introduction to VHDL	
2	8	Level of abstraction. Need of HDL
	9	VLSI Design flow, Features and capabilities of VHDL
	10	Elements of VHDL (Entity Architecture, Library, Package, and Configuration)
	11	Elements of VHDL (Entity Architecture, Library, Package, and Configuration)
	12	Modeling styles in VHDL ,Identifiers, operators
	13	Data objects, data types, literals, Delay Models,
	14	Concurrent and sequential statement
	Combinational logic Design	
3	15	Adder, Subtractor
	16	Code converters (binary to gray & gray to binary
	17	BCD to Excess 3 and vice versa, BCD to 7 segment display
	18	Multiplexer and Demultiplexer , Encoder, Priority encoder, Decoder
	19	Priority encoder, Decoder
	20	Comparator , ALU, Barrel shifter. VHDL coding for combinationalcircuits.
	21	Comparator , ALU, Barrel shifter. VHDL coding for combinationalcircuits.
	Sequential logic Design	
4	22	1-Bit Memory Cell, Latches (SR, JK, D and T)
	23	1-Bit Memory Cell, Latches (SR, JK, D and T)
	24	Clocked latches (SR, JK, D and T),
	25	flips flop (SR, JK, T and D).
	26	Use of preset and clear, Excitation Table for flip flops, and Conversion of flip flops
	27	Timing parameters of FF, Shift registers (SISO, SIPO, PIPO, andPISO). VHDL coding for Sequential circuits.
	28	Timing parameters of FF, Shift registers (SISO, SIPO, PIPO, andPISO). VHDL coding for Sequential circuits.
	Counters and Finite State Machines	
5	29	Counter – ripple counters
	30	synchronous counters , Up/down counters
	31	Ring counters, Johnson Counter MOD-N counter
	32	FSM, Moore/Mealy machines
	33	Network Addressing – Physical, Logical, and Port.

	34	state diagram, state table, state assignment
	35	state reduction, Sequence detector. VHDL coding for Counters andFSM.
	Semiconductor Memories and Programmable Logic Devices	
6	36	Memory devices: ROM, PROM, EPROM
	37	EEPROM, RAM, SRAM DRAM, NVRAM
	38	EEPROM, RAM, SRAM DRAM, NVRAM
	39	Programmable logic devices: PAL ,PLA
	40	CPLD and FPGA
	41	Logic implementation using Programmable Devices (ROM, PLA)
	42	Logic implementation using Programmable Devices (ROM, PLA)

Experiment List

01	Implementation of Boolean function using IC
02	Design and simulate half adder and full adder using VHDL.
03	Design and simulate half subtractor and full subtractor using VHDL.
04	Design and simulate BCD to seven segment display using VHDL.
05	Design and simulate 3to8 decoder using VHDL.
06	Design and simulate 8to3 encoder using VHDL.
07	Design and simulate Multiplexer and Demultiplexer using VHDL.
08	Design and simulate Comparator using VHDL
09	Design and simulate counter using VHDL.
10	Mini project based on above syllabus.

Assignment No.1

1. Explain in details Boolean laws?
2. Explain in details Boolean algebra rules.
3. Explain in detail different logic gate with logic dig. & truth table?

Assignment No.2

1. Find 1's compliment& 2's compliment for binary addition, subtraction, multiplication,division of following group.

   1) 26 &12 2) 48 & 16 3) 64 & 28 4) 84 & 24 5) 96 & 28

2. Minimize the given logical expression
   $F(A,B,C,D)=\sum m(1,2,3,5,7,8,9,11,14)$

3. Minimize the 4 variable using K-Map
4. Find out the expression in POS form as
   $F(A,B,C,D)=\pi m(4,6,10,12,13,15)$

Assignment No.3

1. Explain in details levels of abstraction
2. Explain Features & Capabilities of VHDL.
3. Explain VLSI Design Flow.
4. Explain in details elements of VHDL

Assignment No.4

1. Write a program in VHDL for Half & Full Adder & explain in detail.
2. Write a program in VHDL for BCD to Seven Segment Display& explain in detail.
3. Write a program in VHDL for Encoder & Decoder & explain in detail.
4. Write a program in VHDL for Comparator & Barrel shifter& explain in detail.

Assignment No.5

1. Write a program in VHDL for JK Flip Flop,D Flip flop,SR Flip flop,T Flip Flop& explain indetail.
2. Explain in detail 1)SISO 2)SIPO 3)PIPO 4)PISO
3. Write a program in VHDL for counter& explain in detail.
4. Explain in detail FSM.

Subject: OPTICAL COMMUNICATION

Course Details

Class	**T. Y. B. Tech. Sem - V**
Course Code and Course Title	**PCC-ETC504:Optical Communication**
Prerequisites	**Physics, Optoelectronics**
Teaching scheme : Lectures + Practical	**4 Hrs. + 2 Hrs.**
Credits	**4 + 1**
Evaluation Scheme ESE + CIE for Theory	**70 (ESE) + 30 (CIE)**

Teaching scheme	**Examination scheme**
Lectures : 4 Hrs. / Week	**Theory : 100 Marks,** **70 (ESE) + 30 (CIE)**
Practical : 2 Hrs. / Week	**TW: 25 Marks** **POE: 50 Marks**

Course Objectives:	
The course aims to :	
1	Describe the basics optical communication along with optical fiber structure and light propagating mechanisms in detail.
2	Analyze the signal degradation mechanisms
3	Explain the construction and working of optical sources and detectors.

Course Outcomes:	
Upon successful completion of this course, the students will be able to:	
1	Differentiate the different types of optical fiber structures and light propagating mechanisms.
2	Acquire knowledge of signal degradation mechanism in optical fiber.

3	Understand the construction of and working of optical sources and detectors.

Course Contents		
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.**
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.**
Unit No: 3	**Transmission characteristics of optical fibers.** Attenuation, material absorption losses, Scattering losses, bending losses, dispersion, polarization, nonlinear effects.	**8 Hrs.**
Unit No: 4	**Optical Sources** Attenuation, material absorption losses, Scattering losses, bending losses, dispersion, polarization, nonlinear effects.	**7 Hrs.**
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 Receiver Operation, Digital Receiver Performance	**7 Hrs.**
Unit No: 6	**Advances in Optical Fiber System** Operational Principles of WDM, Passive Components, Tunable Sources, Tunable Filters, optical switching, SONET/SDH, Performance of WDM+EDFA Systems, optical CDMA	**8 Hrs.**

Text Books:

1	Gerd Keiser, "Optical Fiber Communication", 5th Edition, Tata Mcgraw Hill Publication.

Reference Books:

1	Senior, "Optical Communication", 3rd Edition, Pearson Education.
2	Agarwal, "Optical Fiber Communication", 3rd edition, Wiley India.
3	Ramaswamy, "Optical Networks" , Elsevier India
4	R. P. Khare, "Fiber optics and optoelectronics", Oxford University Press
5	Anuradha, "Optical fiber and laser principles and applications", New Age Publications.
6	Dr .R .K .Singh "Fiber optic communication systems", Willey India.

Lecture Plan

Sr.No.	Chapter No: - 1. Overview of Optical Fiber Communication
1.	Motivation for light wave communication
2.	Basic Network Information Rates, The evolution of Optic System,
3.	Elements of Optical Fiber Transmission Link, optical spectral band,
4.	The nature of Light, Basic Optical Laws and Definitions,
5.	Single Mode Fibers, Graded Index fiber structures.
Sr.No.	**Chapter No: - 2. Optical Fibers: Structures and Wave guiding:**
6.	Optical Fiber Modes,
7.	Optical Fiber Configurations
8.	Mode theory for waveguides.
9.	Fiber Materials
10.	Fiber Optic cables.
Sr.No.	**Chapter No: - 3. Transmission characteristics of optical fibers:**
11.	Attenuation
12.	Material absorption losses
13.	Scattering losses, Bending losses
14.	Dispersion
15.	Polarization
16.	Nonlinear effects
Sr.No.	**Chapter No: - 4. Optical Sources:**
17.	Semiconductor Physics,
18.	Light-Emitting Diodes (LEDs), LED structures

19.	SLED, ELED.Quantum efficiency and LED Power .
20.	Laser Diodes, Laser diode structures and radiation patterns
21.	Light Source Linearity
Sr.No.	**Chapter No: - 5. Optical Receiver:**
22.	Physical Principle of Photodiodes,
23.	Photo detector Noise, Detectors Response Time
24.	Structure for InGaAsAPDs, Temperature effect of Avalanche Gain
25.	Comparison of Photo detectors , Fundamental Receiver Operation,
26.	Digital Receiver Performance
Sr.No.	**Chapter No: - 6 Advances in Optical Fiber System**
27.	Operational Principles of WDM,
28.	Passive Components,
29.	Tunable Sources, Tunable Filters,
30.	optical switching, SONET/SDH,
31.	Performance of WDM+EDFA Systems, optical CDMA
32.	Overall revision

Experiment List

Sr. No	Name of Experiment	Performing /Study type	CO
1.	Study of optic fiber communication system.	Study	CO1
2.	Transmission and reception of analog signal using optical fiber.	Performing	CO1
3.	Transmission and reception of digital signal using optical fiber.	Performing	CO1
4.	Frequency modulation using optic fiber link.	Performing	CO1
5.	Calculation of bending loss in the optic fiber link.	Performing	CO2
6.	Study of Pulse width modulation using optic fiber	Performing	CO1
7.	Study of characteristics of LED.	Performing	CO3
8.	Experiment based on simulation. Calculation of Numerical Aperture	Performing	CO1

9.	Experiment based on simulation. Calculation of losses	Performing	CO2

ASSIGNMENTS

Chapter No: - 1. Overview of Optical Fiber Communication

1.	With the help of block diagram explain the optical communication system. List the advantages of optical fiber communication
2.	Briefly explain the names and designation of spectral bands used for optical communication.
3.	Explain with neat diagram the phenomenon of light propagation through opticalfiber by total internal reflection? Write down the definition of critical and acceptance angle.
4.	Define numerical aperture? Show that the NA = $n_1\sqrt{2\Delta}$

Chapter No: - 2. Optical Fibers: Structures and Wave guiding:

1.	Classify optical fibers on the basis of modes
2.	With the help of neat diagram explain step index and graded index glass fiber? Give their comparison.
3.	Explain in detail glass fiber, active glass fiber and plastic optical fiber. Give comparison of glass and plastic fiber
4.	Explain in detail optical fiber cable structures
5.	Explain different indoor and outdoor fiber optic cables
6.	Explain Mode field Diameter(MFD) and propagation modes in single mode fibers

Chapter No: - 3. Transmission characteristics of optical fibers:

1.	Explain in detail scattering and bending losses in optical fiber
2.	What do you mean by signal dispersion in optical fibers? What are the factorsresponsible for dispersion? Briefly explain each of them?
3.	Explain the effect of pulse Broadening in graded index waveguide.
4.	Explain different material absorption losses.
5.	Explain the following terms in detail:

	1. Fiber Birefringence 2. Polarization mode dispersion 3. Non linear effects in optical fiber

Chapter No: - 4. Optical Sources

1.	Explain structure of dome LED with neat diagram.
2.	Explain concept of population inversion and write a note on laser diodes.
3.	Explain laser rate equations
4.	With the help of neat diagram explain modal, partition and reflection noise wrt LASER diode
5.	Compare LED and LASER

Chapter No: - 5. Optical Detector

1.	Explain the structure of InGaAs APD
2.	Write note on PIN photodiode
3.	Draw Digital optical Receiver and explain performance parameters?
4.	Compare various Photo Detectors?

Chapter No: - 6. Advances in Optical Fiber System

1.	Explain operating principles of WDM, Write different WDM standards?
2.	Explain in detail WDM+EDFA performance?
3.	Explain in detail transmission formats and speeds in SONET?
4.	Write note on Tunable filters
5.	Write note on Optical CDMA

Subject Name: Industrial Automation (OE 1)

Course Details

Class	**T. Y. B. Tech. Sem - V**
Course Code and Course Title	**OEC-ETC 501: Biomedical Instrumentation**
Prerequisites	**Fundamentals of Anatomy & Physiology, Scientific Knowledge of Sensors & Actuators**
Teaching scheme: Lectures + Tutorial	**3 Hrs. + 1 Hr.**
Credits	**3 + 1**
Evaluation Scheme ESE + CIE for Theory	**70 (ESE) + 30 (CIE)**

Teaching Scheme

Teaching scheme	**Examination scheme**
Lectures : 3 Hrs. / Week	**Theory : 100 Marks,** **70 (ESE) + 30 (CIE)**
Tutorial : 1 Hr. / Week	**TW: 25 Marks**

Course Objectives: **The course aim to,**	
1	Understand the anatomy and physiology of human body.
2	Study biomedical and physiological information.
3	Implement the application of electronics in diagnostic and therapeutic processes by considering all safety measures.

Course Outcomes: **Upon successful completion of this course, the students will be able to,**	
1	Express the anatomy and physiology of human body.
2	Explain the process to capture Bioelectric signal.
3	Apply knowledge of Diagnostic and Therapeutic equipment‟s.
4	State medical safety aspects

Course Content		
Unit No:1	**Anatomy And Physiology** Human Anatomy & Physiology: Anatomy & Physiology Of Heart And Brain. Principles Of Generation And Propagation Of Bioelectric Potentials. Electrical Activity Of Heart, Propagation Of Action Potential. Study Of Bioelectric Signals ECG,EMG, ERG,EOG, EEG	**7 Hrs.**
Unit No:2	**Medical Instrumentation System** Generalized Medical Instrumentation System, Basic Requirements Of Bio Potential Amplifiers, Bio Potential Amplifiers For ECG, EMG AndEEG. Biopotential Electrodes: Polarizable & Non Polarizable Electrodes, Body Surface Recording Electrodes, Internal Electrodes, Microelectrodes, Electrodes For Electric Stimulation Of Tissue, Ph-Electrodes Theory Of Electrode-Skin Interface And Motion Artifact, Transducers: Classification, Transducers For Biomedical Applications.	**7 Hrs.**
Unit No:3	**Bioelectric Signal Capture Process** ECG: working principles, electrode systems and clinical applications: EEG: working principles lead systems and clinical applications EMG: working principles and clinical applications. Evoked potential systems, Phono cardiology graph – principle and clinical applications, bio potential recording- noise, motion artifact.	**7 Hrs.**

Unit No:4	**Diagnostic Equipment** Diagnosis and therapeutic equipment‟s: diagnostic equipment- electronic BP monitors, pulse monitors, electro cardio scope , Spiro meter, pulse oxy-meter, ECG machine, EEG machine, EMG machine, EOG machine, ERG machine, PH meter, auto analyzer, gas analyzer.	**6 Hrs.**
Unit No:5	**Therapeutic Equipment** Therapeutic equipment‟s- pacemakers, defibrillator, heart- lung machine, nerve and muscle stimulators, dialysis machines surgical diathermy equipment, micro wave- short wave and ultrasound diathermy equipment‟s, nebulous, inhalator, aspirator humidifier and ventilators.	**6 Hrs.**
Unit No:6	**Safety Aspects of Patient** Electric shock hazards, leakage currents, Testing of Biomedical Equipment, biological effects of X-rays and precautions	**6 Hrs.**

Text Books:

1	Leslie Cromwell, “Biomedical instrumentation and Measurements”, 2nd Edition, Pearson Prentice Hall.
2	RS Khandpur, “Handbook of Biomedical Instrumentation”, 3nd Edition, Tata McGraw Hill Publication.
3	John G. Webster , “Medical Instrumentation Application and Design”, 3rd Edition, Wiley

Reference Books:

1	Tatsuo Togawa, Toshiyo Tamura, P.Ake Oberg, “Biomedical Transducers and Instruments”, CRC.
2	Jacob Klime, “Handbook of Biomedical Engineering”, Academic press Inc.

Note:

Guidelines to paper setter:

In theory ESE examination of 70 marks following points should be considered,

Q.1 MCQ's based on complete syllabus. (14 Marks)

Q.2 Based on unit no 1, 2, 3 (Carries 14 marks)

Q.3 Based on unit no 1, 2, 3 (Carries 14 marks)

Q.4 Based on unit no 4, 5, 6 (Carries 14 marks)

Q.5 Based on unit no 4, 5, 6 (Carries 14 marks)

Lecture Plan

Chapter No.	Lect No.	Details of syllabus planned
Ch.1		**Introduction to PLC**
	01	Automation: fundamentals of industrial automation, need and role of automation,evolution of automation.
	02	PLC introduction :types of processes, comparison, evolution of PLC, definition, functions, advantages, Architecture
	03	DI-DO-AI-AO examples and ratings, I/O module
	04	working of PLC, scan time
	05	Installation of PLC, Rack installation
	06	Grounding and shielding, physical, electrical, maintenance requirements, planning, verifying. Troubleshooting, Fault diagnosis techniques.
	07	Choosing PLC for application
	08	Types and Specifications of PLC
Ch 2		**PLC Programming and Interfacing**
	09	PLC programming: Development of Relay Logic Ladder Diagram
	10	Introduction to PLC Programming, Programming devices and languages as per IEC61131-3 like IL, ST, FBD, CFC, SFC, PLC Timers and Counters
	11	Installation and Troubleshooting. PLC Interfacing: PID Control usingPLC,PIDinstruction.
	12	PLC Interface to Hydraulic/Pneumatic circuits

	13	Solid-state devices
	14	Need of interfacing
	15	PLC Selection, PLC interface to temperature control loop
Ch3	**SCADA System**	
	16	SCADA Concept of SCADA systems
	17	Programming techniques for : Creation of pages, Sequencing of pages, Creatinggraphics & animation
	18	Dynamos programming with variables, Trending, Historical data storage & Reporting
	19	Alarm management
	20	Reporting of events and parameters.
	21	Comparison of different SCADA packages.
	22	Comparison of different SCADA packages
Ch 4	**Introduction to DCS**	
	23	DCS Introduction, Location of DCS in Plant
	24	Functions, advantages and limitations, Comparison of DCS with PLC.
	25	DCS components/ block diagram
	26	DCS Architecture
	27	Functional requirements at each level
	28	Database management
	29	Latest trends and developments of DCS and its specifications
Ch 5	**DCS Hardware**	
	30	Layout of DCS, Controller Details
	31	Redundancy, I/O Card Details, Junction Box and Marshalling Cabinets, OperatorInterface
	32	Workstation Layout, different types of control panels
	33	Types of Operating Station,.Programming as per IEC 61131-3
	34	Advantages, Overview of Programming Languages

	35	Device Signal Tags, Configuration, Programming for Live Process
	36	Power supply cards details, various display configurations

Tutorial List

Tut No.	Name of Tutorial
01	Chapter no 1
02	Chapter no 2
03	Chapter no 3
04	Chapter no 4
05	Chapter no 5

SUBJECT NAME: SIMULATION & MODELING

Course Details

Class	**T. Y. B. Tech. Sem - V**
Course Code and Course Title	**PCC-ETC505:Simulation and Modeling**
Prerequisites	**C, C++ Programming**
Teaching scheme : Lectures + Practical	**1 Hr. + 2 Hrs.**
Credits	**1 + 1**
Evaluation Scheme ESE + CIE for Theory	**NIL**

Teaching scheme	Examination scheme
Lectures : 1 Hr. / Week	**Theory :NIL**
Practical: 2 Hrs. / Week	**TW: 25 Marks** **OE: 50 Marks**

Course Objectives:	
The course aims to :	
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 students will be able to:	
1	Understand the python programming basics
2	Able to solve programs on decision making & looping statements in python
3	Understand python list, tuple, and dictionary collection concepts
4	Understand simulation programs using SimPy Library
5	Design & Apply Simpy library functions to model real time problems.

Course Contents		
Unit No: 1	**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.	**2Hrs.**
Unit No: 2	**Conditional and Looping** if - else statement and nested if – else while, for, use of range function in for, Nested loops, break, continue, pass statement Use of compound expression in conditional constructs, Nested conditional statements, Nested Looping structures	**2Hrs.**

Unit No: 3	**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	**2Hrs.**
Unit No: 4	**List:** Lists Concept of mutable lists, creating, initializing and accessing the elements of list, List operations, Concatenation, Membership, list slices, List comprehensions List functions & methods: len, insert, append, extend, sort, remove, reverse, pop functions	**2Hrs.**
Unit No: 5	**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 of Sets 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	**2Hrs.**
Unit No: 6	**Simulations using Simpy** Basic Concepts, understanding of SimPy‟s capabilities, Process Interaction, Waiting for a Process, Interrupting Another Process, Real-time simulations.	**2Hrs.**

Text Books:

1	Martin C. Brown , “Python: The Complete Reference”, Tata McGraw Hill Publication, 2018
2	Mark Lutz, “Learning Python” , O‟Reilly Publication edition 2013
3	Michael Dawson, “Python Programming for Absolute Beginner”, Cengage Learning edition 2010

Reference Books:

1	David Beazley, “Python Essential Reference”, 4th edition, Developers library.
2	Web reference SimPy: https://simpy.readthedocs.io/

Lecture Plan

Unit No: - 1 . Introduction to Python	
1	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
2	Operator precedence, Taking input using raw_input() and input() method and displaying output – print statement, Comments in Python.
Unit No: - 2. Conditional and Looping	
3	if - else statement and nested if – else while, for, use of range function in for, Nested loops, break, continue, pass statement
4	Use of compound expression in conditional constructs, Nested conditional statements, Nested Looping structures
Unit No: - 3. Functions	
5	Built-In Function, Functions from math, random, time & date module. Composition
6	User Define Function : Defining , invoking functions, passing parameters, Intra-package References, Packages in Multiple Directories
Unit No: - 4. List	
7	Lists Concept of mutable lists, creating, initializing and accessing the elements of list, List operations Concatenation, Membership, list slices
8	List comprehensions List functions & methods: len, insert, append, extend, sort, remove, reverse, pop functions
Unit No: - 5.Tuples&sets	
9	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 of Sets operation Membership, union, intersection, difference, and symmetric difference
10	Dictionaries Concept of key-value pair, creating, initializing and accessing the elements in a dictionary, Traversing, appending, updating and deleting elements
Unit No: - 6.SimulationsusingSimpy	
11	Basic Concepts, understanding of SimPy's capabilities, Process Interaction
12	Waiting for a Process, Interrupting another Process, Real-time simulations

Experiments List

Sr. No	Experiment Name	CO
1.	Write a python program to demonstrate basic data type in python	CO 1
2.	Write python program to study Arithmetic, relational and logical operators and Operands in Python.	CO 1
3.	Write python programs to study if, if else, if else if statements	CO 2
4.	Write python programs to study looping statements while &for	CO 3
5.	Write python programs to study built in functions of string and math packages	CO 4
6.	Write python programs to study list access using membership operators.	CO 4
7.	Write python programs to study tuple using in built functions	CO 4
8.	Write python programs to study set operations and dictionary traversing	CO 5
9.	Write python programs to study Discrete event simulation using SimPy	CO 5

1. Seminar Evaluation Sheet

Name of Student:-
Class: Roll No.:
Name of Seminar Topic:
Name of Guide:
Academic Year: Semester:
Marking Scheme:

Sr. No.	Details	Max. Marks		Valuated Marks
		For 25 Marks	For 50 Marks	
1.	Selection of Seminar Topic (Scope, Relevance)	2	5	
2.	Literature Survey	3	10	
3.	Presentation	5	10	
4.	Understanding of Subject	3	5	
5.	Seminar Report	4	5	
6.	Question Answer	3	5	
7.	Interaction with Guide	5	10	

Total:
Sign of Guide:
Date:

Sr. No.	Details	Max. Marks		Valuated Marks
		For 25 Marks	For 50 Marks	
1.	Selection of Seminar Topic (Scope, Relevance)	2	5	
2.	Literature Survey	3	10	
3.	Presentation	5	10	
4.	Understanding of Subject	3	5	
5.	Seminar Report	4	5	
6.	Question Answer	3	5	

Total:
Name and Sign of Judge:

Sr. No.	Details	Max. Marks		Valuated Marks
		For 25 Marks	For 50 Marks	
1.	Selection of Seminar Topic (Scope, Relevance)	2	5	
2.	Literature Survey	3	10	
3.	Presentation	5	10	
4.	Understanding of Subject	3	5	
5.	Seminar Report	4	5	
6.	Question Answer	3	5	

Total:
Name and Sign of Judge:
Total Marks: Details of sr. no. 7+ Average of sr.no.1 to 6

Total Marks	Details of sr.no. 7	Average of sr.no.1 to 6

RUBRICS B. TECH PROJECT EVALUATION

PROJECT MARKING SCHEME (Semester-I)

Activity	Nature of Activity	Total Marks for Activity	Rubric for Activity			
			Unsatisfactory	Developing	Satisfactory	Excellent
A1	Submission of Project Topic with names of group member	A1= 0.08* TM1	0.00*A1	0.40*A1	0.80*A1	1.00*A1
A2	Presentation of Synopsis in front of DRC	A2= 0.08* TM1	0.00*A2	0.40*A2	0.80*A2	1.00*A2
A3	Introduction and literature Review presentation	A3= 0.24* TM1	0.25*A3	0.60*A3	0.85*A3	1.00*A3
A4	Methodology and future work presentation	A4= 0.30* TM1	0.25*A4	0.60*A4	0.90*A4	1.00*A4
A5	Guide Marks	A5= 0.30* TM1	0.25*A5	0.60*A5	0.90*A5	1.00*A5

PROJECT MARKING SCHEME (Semester-II)

Activity	Nature of Activity	Total Marks for Activity	Rubric for Activity			
			Unsatisfactory	Developing	Satisfactory	Excellent
A6	Progress presentation 1	A6= 0.20* TM2	0.20*A6	0.65*A6	0.90*A6	1.00*A6
A7	Progress presentation 2	A7= 0.20* TM2	0.20*A7	0.65*A7	0.90*A7	1.00*A7
A8	Final presentation in front of DRC along with submission of spiral bound copy	A8= 0.30* TM2	0.25*A8	0.70*A8	0.95*A8	1.00*A8
A9	Guide Marks	A9= 0.30* TM2	0.25*A9	0.70*A9	0.95*A9	1.00*A9

***TM1:- Term Work Marks in Sem-I for Project**

***TM2:- Term Work Marks in Sem-II for Project**

10. Departmental Faculty Details

Sr. No.	Name of Faculty
1	Dr. (Mrs.) S. B. Patil
2	Mr. M. M. Kolap
3	Mrs. P. P. Belagali
4	Mrs. M. U. Phutane
5	Mrs. T. H. Mohite
6	Mr.V.T. Kamble
7	Mrs.S.S.Karadge
9	Ms. M.R. Jadhav
10	Mrs. P.A. Magdum
11	Mrs. S.B. Holkar

Department Staff

Sr. No.	Name of Faculty
1	Mr. P. K. Upadhye
2	Mr. K. M. Kulkarni
3	Mrs. H. S. Swami

11. Activity Record:

2024-2025		
Sr. No.	Name of Event/Activity	Planned / Conducted
1	Teachers Day	Conducted for Teachers
2023-2024		
1	Engineers day	SY, TY, Btech ETC
2	TECHNOVISION 2K22	SY, TY, Btech ETC
3	Coded Electronics	SY, TY, Btech ETC
4	Quizika 2k23	SY
5	Freshers and Inauguration	College level
6	Ashwamedh 2k23	SY, TY, Btech ETC
2022-2023		
1	Engineers day	SY, TY, Btech ETC
2	Quizika 2k22	SY, TY, Btech ETC

3	ETESA FEST 2K22	SY, TY, Btech ETC
4	Coded Electronics	SY
5	HORIZON 2K22	College level
6	Freshers and Inauguration	SY, TY, Btech ETC
7	Ashwamedh 2k23	National level