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 2022-23 (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

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.

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 2022-23 SEMESTER I

August 2022

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	*2*	*3*	*4*	*5*	*6*
7	*8*	*9*	*10*	***11***	***12***	***13***
14	*15*	*16*	*17*	***18***	***19***	***20***
21	*22*	*23*	*24* *Commencement of Theory lectures for SY / TY/ Final Year*	***25***	***26***	***27***
28	*29*	*30*	*31* *Ganesh chaturthi*			

September 2022

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	***2***	***3***
4	***5*** *Teachers Day*	***6*** *Workshop for students*	***7*** *Workshop for students*	***8*** *Workshop for students*	***9***	***10***
11	***12***	***13***	***14***	***15*** *Engineers day*	***16***	***17***
18	***19***	***20***	***21***	***22*** *DRC Meeting*	***23*** *Field Training presentation for final year*	***24*** *NSS Day*
25	***26*** *Proctor meeting*	***27***	***28*** *ECESA activity*	***29*** *Expert lecture*	***30*** *CMC meeting*	

October 2022

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1 Industrial visit for Btech Commencement of Value added course
2	3	4	5 Dasara	6 CIE-1	7 CIE-1	8
9	10	11	12	13	14 BTech Synopsis Presentation	15 ECESA activity
16	17	18	19	20 Expert lecture	21 Augmentation Program	22
23	24 Diwali	25 Diwali	26 Diwali	27	28 Proctor meeting	29 Industrial visit for TY
30	31 CMC meeting					

November 2022

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4 FDP-Webinar for Teaching (ETC)	5 Parents Meet
6	7 Alumni Interaction	8	9	10	11	12
13	14	15 Augmentation Program	16	17	18 Second assessment of project	19 Industrial visit for SY
20	21 CIE-II	22 CIE-II	23	24 Expert lecture	25 Proctor meeting	26
27	28 Advisory Board meeting	29	30 CMC meeting			

December 2022

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	*2*	*3 Expert lecture*
4	*5 Tentative Final submission for SY/TY/Final Year*	*6*	*7*	*8*	*9*	*10*
11	*12*	*13*	*14*	*15*	*16*	*17*
18	*19*	*20*	*2*	*122*	*23*	*24*
25	*26*	*27*	*28*	*29*	*30*	*31*

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: 2022-23 **Semester:** I

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

Class Room No.:

Class Coordinator: Prof.M.U.Phutane **W.e.f.: 12/9/2022**

TIME	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
09.30 am – 10.30 am	CN(RVK)	EBD(SBP)	CN(RVK)	EBD(SBP)	EBD(SBP)	
10.30 am – 11.30 am	IP(MMK)	CN(RVK)	EBD(SBP)	CN(RVK)	IP(MMK)	
11.30 am – 11.40 am	**Short Break**					
11.40 am – 12.40 pm	SAT(MUP)/ ITC(DUC)	IP(MMK)	IP(MMK)	SAT(MUP)/ ITC(DUC)	PROJECT	
12.40 pm – 01.40 pm	ELECTIVE(THM)	SAT(MUP)/ ITC(DUC)	ELECTIVE(THM)	ELECTIVE(THM)		
01.40 pm – 02.30 pm	**Lunch Break**					
02.30 pm – 03.30 pm	E1-EBD(DUC) E2-CN(RVK)	E1- CN(RVK) E2- EBD(DUC)	E1- IP(MMK) E2-ELECTIVE(THM)/ SAT(MUP)/ ITC(DUC)	E1-ELECTIVE(THM)/ SAT(MUP)/ ITC(DUC) E2- IP(MMK)	PROJECT	
03.30 pm – 04.30 pm						

Name of Subject	Batches	Name of Faculty Member	NAME OF LAB
Embedded systems	E1,E2	Prof.D.U.Chavan	VLSI & Embedded
Computer Network	E1,E2	Prof.R.V.Kaulgud	Programming Language-I
Image processing	E1,E2	Prof.M.M.Kolap	Programming Language-II
Satellite communication(TUT)	E1	Prof.R.V.Kaulgud	
Satellite communication(TUT)	E2	Prof.M.U.Phutane	
Information theory coding &techniques(TUT)	E1	Prof.D.U.Chavan	
Elective-I(TUT)	E1,E2	Prof.T.H.Mohite	

Prof.D.U.Chavan TIME TABLE I/C | Prof.R.V.Kaulgud Academic coordinator | Prof.M.M.Kolap HOD ETC | Prof. A.S.Sajane Dean, Academics | Dr. S.B.Patil Principal | Dr.S.S.Admuthe Campus Director

6. Structure of Syllabus:

SEMESTER –VII																								
Sr. No	Course (Subject Title)	TEAETING SETEME									EXAMINATION SETEME													
		THEORY			TUTORIAL			PRACTICAL			THEORY					PRACTICAL			TERM WORK				
		Credits	No. of Lecture	Hours	Credits	No. of Lecture	Hours	Credits	No. of Lecture	Hours	Hours	Mode	Marks	Total Marks	Min	Hours	Max	Min	Hours	Max	Min		
1	PCC-ETC701	3	3	3	1	1	1	-	-	-		CIE	30	100	40	As per BOS Guidelines	-	-	2	25	10		
												ESE	70										
2	PCC-ETC702	4	4	4	-	-	-	1	2	2		CIE	30	100	40		50	20	2	25	10		
												ESE	70										
3	PCC-ETC703	4	4	4	-	-	-	1	2	2		CIE	30	100	40		50	20	2	25	10		
												ESE	70										
4	PCC-ETC704	4	4	4	-	-	-	1	2	2		CIE	30	100	40		-	-	2	25	10		
												ESE	70										
5	PCE-ETC701	3	3	3	1	1	1	-	-	-		CIE	30	100	40		-	-	2	25	10		
												ESE	70										
6	PW-ETC701	-	-	-	-	-	-	2	4	4		-	-	-	-		25	10	2	50	10		
	TOTAL	**18**	**18**	**18**	**2**	**2**	**2**	**5**	**10**	**10**				**500**			**125**			**175**			
SEMESTER –VIII																								
1	PCC-ETC801	4	4	4	-	-	-	1	2	2		CIE	30	100	40	As per BOS Guidelines	50	20	2	25	10		
												ESE	70										
2	PCC-ETC802	4	4	4	-	-	-	1	2	2		CIE	30	100	40		-	-	2	25	10		
												ESE	70										
3	PCC-ETC803	4	4	4	-	-	-	1	2	2		CIE	30	100	40		50	20	2	25	10		
												ESE	70										
4	PCE-ETC801	3	3	3	1	1	1	-	-	-		CIE	30	100	40		-	-	2	25	10		
												ESE	70										
5	PW-ET801	-	-	-	-	-	-	6	8	8		-	-	-	-		150	60	2	50	20		
	TOTAL	**15**	**15**	**15**	**1**	**1**	**1**	**9**	**14**	**14**				**400**			**250**			**150**			
	TOTAL	**33**	**33**	**33**	**3**	**3**	**3**	**14**	**24**	**24**				**900**			**375**			**325**			

• Candidate contact hours per week : 30 Hours (Minimum)	• Total Marks for B.E. Sem VII & VIII : **1600**
• Theory and Practical Lectures : 60 Minutes Each	• Total Credits for B.E. Sem VII & VIII : **50**
• In theory examination there will be a passing based on separate head of passing for examination of CIE and ESE.	
• There shall be separate passing for theory and practical (term work) courses.	

Note:

1. **PCC-ET:** Professional Core course –Electronics & Telecommunication Engineering is compulsory.
2. **PCE-ET:** Professional Core Elective –Electronics & Telecommunication Engineering is compulsory.
3. **SI-ET:** Summer Internship-Electronics & Telecommunication Engineering is compulsory.
4. **PW-ET**: Project work- Electronics & Telecommunication Engineering is compulsory.
5. **MC-ET:** Mandatory Course- Electronics & Telecommunication Engineering is compulsory

7. Subject Details

SUBJECT NAME: COMPUTER NETWORK

Course Details

Class	**Final Year B. Tech. Sem-VII**
Course Code and Course Title	**PCC-EN703:Computer Networks**
Prerequisites	**Digital Communication**
Teaching scheme: Lectures + Practical	**4 Hrs. + 2 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)
Practical: 2 Hrs./Week	**TW: 25 Marks, OE: 50 Marks**

Course Objectives: The course aims to :	
1	To provide students with an overview of the concepts and fundamentals of data communication and computer networks
2	Review the state of art in open research area such as LAN, MAN, WLAN & applications Computer Networking
3	Acquire the required skill to design simple computer networks.
4	Describe various functions and protocols at each layer of OSI and TCP/IP reference models.

Course Outcomes: Upon successful completion of this course, the students will be able to:	
1	State the evolution of Computer network, classifies different types of Computer Networks.
2	Design, implements, and analyzes simple computer networks.

3	Identify, formulate, and solve network engineering problems.
4	Illustrate different OSI and TCP/IP protocols.

COURSE CONTENTS

Unit No.1	**INTRODUCTION TO COMPUTER NETWORK** History and development of computer network, network application, network software and hardware components, reference models: layer details of OSI,TCP/IP models., Network topology, Transmission media and types, Network Devices: Network Connectors, Hubs, Switches, Routers, Bridges.	**6 Hrs.**
Unit No.2	**DATA LINK LAYER** Design issues, sliding window protocols. HDLC – types of stations, modes of operation & frame formats, Random access Protocols, IEEE 802.3 frame formats.	**6 Hrs.**
Unit No.3	**NETWORK LAYER** Design issues, Routing algorithms – shortest path, distance vector routing, link state routing. Routing protocols - RIP, OSPF, IP Addressing, Subnetting/super netting, IPv4, IPv6 header format and basic address mode, DHCP, Congestion control, traffic shaping algorithms.	**8 Hrs.**
Unit No.4	**TRANSPORT LAYER** Transport layer-Process to process delivery, UDP, TCP, TCP services, TCP Segment, TCP Timers, Flow control, congestion control and Quality of Service.	**7 Hrs.**
Unit No:5	**APPLICATION LAYER** DNS, HTTP, SMTP, Telnet, FTP	**7 Hrs.**
Unit No.6	**MULTIMEDIA IN INTERNET** Streaming stored audio/video, Real-time interactive audio/video, Real-time transport protocol (RTP),Real-time transport control protocol (RTCP), Voice over IP (VoIP)	**6 Hrs.**

TEXT BOOKS:

1	Forouzan, , **"Data Communication and Networking"** IIndedition,TataMc-Graw Hill, Publication
2	Tanenbaum, **"Computer Neworks",** IVth Edition, pearson Education

REFERENCE BOOKS:

1	Wayne Tomasi, **"Introduction to Data communications and Networking"** Pearson Education.
2	Forouzan, **"TCP/IP Protocol Suite",** IIIrd Edition Tata Mc-Graw Hill publication.

NOTE: Minimum Ten Practical's based on above syllabus.

GUIDELINES TO PAPER SETTER:

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

Q.1 MCQ's based on complete syllabus. (Carries14 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

Subject :- Computer Networks

Lec . no	Delivery contents
1	Introduction to computer networks History and development of computer network
2	reference models: layer details of OSI,TCP/IP models
3	Network topology
4	network software and hardware components
5	Transmission media and types

6	Network Devices: Network Connectors, Hubs, Switches, Routers, Bridge
7	Design issues, sliding window protocols, ,
8	HDLC – types of stations
9	Random access Protocols,
10	IEEE.802.3 frame formats
11	modes of operation & frame formats
12	Design issues
13	distance vector routing, link state routing.
14	Routing algorithms – shortest path
15	Routing protocols - RIP, OSPF
16	IP Addressing, Subnetting/super netting
17	IPv4, IPv6 header format and basic address mode
18	DHCP, Congestion control, traffic shaping algorithms
19	Transport layer-Process to process delivery
20	UDP
21	TCP
22	TCP services, TCP Segment, TCP Timers
23	Flow control
24	congestion control and Quality of Service
25	DNS
26	HTTP
27	SMTP
28	Telnet
29	FTP
30	Streaming stored audio/video, ,
31	Real-time interactive audio/video
32	Real-time transport protocol (RTP)
33	Real-time transport control protocol (RTCP)
34	Voice over IP (VoIP)

List of the experiments

Year: - 2022-23 ` Class: - BTech

Subject:-Computer Networks

Sr.No.	Title of the experiments	CO
1.	Study of Networking	1
2.	Study and Installation of LAN	2
3.	Character Transfer using simplex method	2

4.	Character Transfer using Half duplex method	2
5.	Simulation and implementation of Shortest path Algorithm	2
6.	Study of Installation of Widows 2003 Server & introduction to DHCP	4
7.	Framing Method – Bit Stuffing and De stuffing	1
8.	Cyclic redundancy code(CRC)	1
9.	Study of Token Bucket Algorithm	3
10.	Introduction to Network Simulator	2

Assignment No-1

1. Explain in detail ISO OSI reference model.

2. Explain TCP/IP reference model with design issues.

3.Write a note on types of networks.

4. Explain different topologies with advantages and disadvantages.

Assignment No-2

1. Explain CDMA Technique.

2. Explain in detail contention protocol.

3. Explain error correction and detection codes.

4. Write a note on HDLC frame format.

5. Explain sliding window protocol.

Assignment No-3

1. Explain in detail resource reservation protocol for eliminating congestion in network.

2. Explain leaky n token bucket algorithm.

3. Explain flow based routing.

4. Explain hierarchical routing.

5. Explain IPV4 header format.

Assignment No-4

1. Explain congestion prevention policies.

2. Difference between TCP and UDP.

Assignment No-5

1. Write a note on Telnet.

2. Write a note on DNS

Assignment No-6

1. Explain Real-time transport protocol (RTP),Real-time transport control protocol(RTCP)

2. Write a note on voice over IP.

SUBJECT NAME: IMAGE PROCESSING

Course Details

Class	**Final Year B. Tech. Sem-VII**
Course Code and Course Title	**PCC-ETC704: Image processing**
Prerequisites	**Digital Signal processing**
Teaching scheme: Lectures + practical	**4 Hrs. + 2 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)**
Practical: 2 Hr./Week	**TW: 25 Marks**

Course Objectives: The course aims :	
1	To study fundamentals of Digital Image Processing.

2	To acquaint students with mathematical transforms for image processing.
3	To familiarize students with image filtering techniques.
4	To understand different morphological operations.
5	To introduce various image segmentation techniques.
6	To explain different image compression techniques and color image processing.

Course Outcomes:	
Upon successful completion of this course, the students will be able to:	
1	List fundamental steps involved in Digital Image Processing.
2	Apply different transforms and filtering techniques on an image.
3	Apply morphological operations
4	Perform image segmentation
5	Apply compression techniques.
6	Perform various operations on color image.

COURSE CONTENTS

Unit No.1	**Digital Image Fundamentals** Fundamentals steps in DIP, Components of image processing system, Elements of Visual Perception, Image sensing and acquisition, image sampling and quantization, basic relations between pixels	**8 Hrs.**
Unit No.2	**Image Transforms** Basic intensity transformation: image negation, Log transformation, power law transformation, Piecewise linear transformation functions, arithmetic and Logic operation, Histogram processing (equalization and matching), sine cosine, Hadamard, Haar, Slant transform .	**8 Hrs.**
Unit No.3	**Image filtering** Fundamentals of spatial filtering, smoothening and Sharpening in spatial domain, smoothening and Sharpening in frequency domain.	**7 Hrs.**

Unit No.4	**Morphological image processing** Dilation & erosion, opening and closing operation, Hit- or – miss transformation. Basic morphological algorithms: Boundary extraction, region filling, thinning and thickening, skeletons	**8 Hrs.**
UnitNo.5	**Image segmentation** Detection of discontinuities: Point detection, line detection, edge detection, (Sobel, Prewitt, Laplacian), global and adaptive thresholding, Region based segmentation (region growing, region splitting and merging).	**8Hrs.**
Unit No.6	**Image Compression** Fundamentals, Coding redundancy , interpixel redundancy, fidelity criteria , image compression model, lossless predictive coding, Lossy predictive coding **Color Image Processing** Color fundamentals, Color models , psudocolor, image processing, full color image processing, Color transformations	**9 Hrs.**

TEXT BOOKS:

1	Digital image processing : Rafael C Gonzalez , Richard E. Woods: Pearson Publication
2	Digital image processing and Analysis- B. Chanda , D. Datta , majnudar
3	Fundamentals of digital Image Processing- Anil K.Jain.

REFERENCE BOOKS:

1	Digital image processing- S. Jayraman, S Esakkiarajan , Veerakumar:MGH
2	Digital image processing and Analysis- B. Chanda , D. Datta, majnudar:PHI
3	Digital image processing using Matlab- Rafael C Gonzalez
4	Fundamentals of Digital Image Processing-S.Annadurai, R. Shanmugalaxmi : Pearson Publication
5	Digital Image Processing- S.Shridhar 6 Digital Image Processing – Pratt

Practical based on MATLAB/Scilab programs: Any 8 experiments based on above syllabus

1	Reading and displaying of image (Various image file format) and to understand the notion of connectivity and neighborhood defined for a point in an image.
2	Simple gray level transformation
3	Histogram processing
4	Image transforms
5	Image arithmetic operations
6	Image smoothening operation
7	Edge detection
8	Morphological operation
9	Segmentation using thresholding
10	image compression
11	Color image Processing

GUIDELINES TO PAPER SETTER:

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

Q.1 MCQ's based on complete syllabus. (Carries 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

Subject :- **Image Processing**

Lec . no	Delivery contents
1	Fundamentals steps in DIP, Components of image processing system, ,
2	Elements of Visual Perception, Image sensing and acquisition
3	image sampling and quantization
4	basic relations between pixels
5	Basic intensity transformation: image negation
6	Log transformation, power law transformation
7	Piecewise linear transformation functions, arithmetic and Logic operation
8	Histogram processing (equalization and matching)

9	sine cosine, Hadamard, Haar, Slant transform .
10	Fundamentals of spatial filtering
11	smoothening and Sharpening in spatial domain
12	smoothening and Sharpening in frequency domain
13	Dilation & erosion
14	opening and closing operation
15	Hit- or –miss transformation
16	Basic morphological algorithms: Boundary extraction, region filling
17	thinning and thickening, skeletons
18	Detection of discontinuities: Point detection, line detection, edge detection, (Sobel, Prewitt, Laplacian)
19	global and adaptive thresholding
20	Region based segmentation (region growing, region splitting and merging)
21	Fundamentals, Coding redundancy
22	interpixel redundancy, fidelity criteria
23	image compression model, lossless predictive coding, Lossy predictive coding
24	Color Image Processing Color fundamentals, Color models
25	psudocolor
26	image processing, full color image processing
27	Color transformations

List of the experiments

Subject :- **Image Processing (22-23)**

Exp . no	Details	CO
1	Reading and displaying of image (Various image file format) and to understand the notion of connectivity and neighborhood defined for a point in an image.	1
2	Simple gray level transformation	2
3	Histogram processing	2
4	Image transforms	2
5	Image arithmetic operations	2
6	Image smoothening operation	2
7	Edge detection	4
8	Morphological operation	3
9	Segmentation using thresholding	4
10	image compression	5
11	Color image Processing	6

ASSIGNMENTS

Chapter no: 1 Digital Image Fundamentals

1. With the help of block diagram explain steps of digital image processing.

2. With the help of block diagram explain components of image processing system.

3.Explain the structure of human eye in detail.

4.Explain image formation model in human eye

5.Write note on brightness adaptation and discrimination.

6.Explain the image acquisition techniques using image sensors.

7. Explain sampling and quantization of image to convert in digital form

8. Explain some basic relationships between pixels

9. Explain applications of image processing in various fields.

Chapter no: 2 Image Transforms:

1. Explain following gray level transformations.

a) Image Negatives

b) Log

c) Power Law

d) Piecewise linear transformation

2. Explain use of arithmetic and logical operations for image enhancement

3. What is histogram? What is need of histogram equalization and derive equation for histogram equalization

4. Explain histogram matching for image enhancement.

5. Write note on:

1. Sine transform

2. Cosine transform

3. Hadamard transform

4. Haar transform

5. Slant transform

Chapter no: 3 Image filtering`:

1. Explain fundamental mechanics of spatial filtering

2. Write note on Spatial correlation and convolution.

3. Explain vector representation of linear filtering and generating spatial filter masks.

4. Explain smoothing Spatial linear and non linear filters

5. Explain sharpening linear filters using first order and second order derivatives

6. Explain Unsharp Masking and Highboost filtering in spatial domain

7. Explain sharpening non linear image using first order derivatives

8. Explain Ideal, Butterworth and Guassian Iow pass filter in frequency domain for image smoothing.

9. Explain Ideal, Butterworth and Guassian high pass filter in frequency domain for image sharpening

10. Explain Laplacian in the frequency domain

11. Explain Unsharp Masking and Highboost filtering in frequency domain

12. Explain Homomorphic filtering.

Chapter no: 4 Morphological image processing:

1.Explain dilation and erosion in image processing.

2. Discuss opening and closing operation in detail.

3. Explain boundary extraction and region filling algorithms.

4 .Discuss thinning and thickening operation in morphological image processing.

Chapter no: 5: Image segmentation

1 .Discuss point detection and line detection in image segmentation.

2. Explain different operators used for edge detection.

3. Discuss adaptive and global thresholding.

4. Explain region based segmentation in detail.

Chapter no:6: Image Compression

1.Discuss image compression model in detail.

2. Explain coding redundancy and inter pixel redundancy.

3. Explain different color models.

4 .Discuss Color transformations.

Elective 1 (Java Script)

Chapter No	No. of Lecture	Topics to be covered in each Lecture
	INTRODUCTION TO JAVA	
1	1	Overview of JS,Client side JS Advantage & limitation of JS
	2	JS development tools, keywords syntax comments
	3	Variables, global variables
	4	Data Types(primitive & Non primitive) operators
	5	If…else if …else if statements switch, break, continue statements
	6	For loop, For-in loop, while loop, do while loop
	OBJECTS OF JAVA	
2	7	Methods of creating objects
	8	Objects properties
	9	JS objects events
	10	Date, math number
	11	Boolean ,string ,array
	12	Boolean ,string ,array
3	**JAVA SCRIPT FUNCTION**	
	13	Function definition
	14	Syntax, parameters, Arguments
	15	Invocation function
	16	Function with return value
	17	Function objects, methods
	18	Nested function, function constructor
	JAVA SCRIPT BOM DOM AND VALIDATION	
4	19	Browser objects:-methods of browser objects
	20	Window,Histroy, Navigator,Screen objects
	21	Documents objects:- properties,
	22	Methods of documents objects, DOM Compatibility
	23	JS Validation:- form validation
	24	JS Email Validation
	JAVA SCRIPT OBJECT ORIENTED PROGRAMMING	
5	25	JS class,objects,
	26	Objects methods,protype.
	27	Constructor method, static method
	28	Encapsulation & inhertance
	29	Polymorphism & Abstraction.
	JAVA SCRIPT EVENTS COOKIES,EXCEPTION HANDLING	

6	30	Types of events
	31	Operation using events, cookies & its fields
	32	Cookies operation, page redirection
	33	Exception handling
	34	Types of errors
	35	Debugging,hosting,JS Strict mode
	36	Debugging,hosting,JS Strict mode

Recommended Books:

Text Books:

1. Javascript for Beginners- by Mark Lassoff 's
2. JavaScript: The Definitive Guide- by David Flanagan, Kindle Edition
3. Eloquent JavaScript-by Marijn Haverbeke

Reference Books:

1.The Principles of Objects-Oriented JAVASCRIPT- by NiCholas C.Zakas
2.Java Script and JQuery: Interactive Front-End web Developmet 1st Edition- by JON Duckett
3 HTML, CSS, and JavaScript- by Meloni Julie C.Person Publication

Sr.No.	**Tutorials**	CO
1	Write a program to use and demonstrate the operators	**CO1**
2	Write a program using looping statements (For, While, do-While, For-In).	**CO1**
3	Write a program to demonstrate the applications of Array	**CO3**
4	Write a program to demonstrate the use of Boolean and Math objects	**CO4**
5	Write a program using user define functions	**CO3**
6	Write a program to create registration form and perform Validation	**CO2**
7	Write a program to create class with Objects	**CO2**
8	Write a program to perform Constructers	**CO2**

Subject: INFORMATION THEORY & CODING TECHNIQUES

Chapter No.	Lect No.	Details of syllabus planned
Ch.1	**UNIT I: INFORMATION THEORY**	
	1	Introduction, Concept of information: Unit, Properties, Entropy (Average Information)
	2	Definition, Mathematical expression of Entropy, Entropy of Binary Source, Properties and Information Rate
	3	Joint Entropy, Conditional entropy, relation between Joint & Conditional Entropies
	4	Mutual Information: Average Mutual Information,
	5	Expression for Mutual information and properties,
	6	Relation between Mutual Information & Entropy
Ch 2	**UNIT II: CHANNAL CAPACITY AND CODING**	
	7	Channel Capacity, Redundancy and Efficiency of channel, Discrete memory less channel – Channel Matrix,
	8	Classification of channels: lossless Channel, Deterministic Channel, Noise free channel, Binary Symmetric Channel (BSC),
	9	Cascaded Channels and Binary Erasure Channel (BEC), Calculation of channel capacity of all channels,
	10	Shannon's fundamental theorem,
	11	Entropy Coding: Shannon Fano Coding,
	12	Huffman's Coding, Coding Efficiency Calculations.
Ch3	**UNIT III: LINEAR BLOCK CODES**	
	13	Introduction: Error Control Coding: Need, Objectives & Approaches of Error Control Coding Classification
	14	Error Detection and Error Correction Techniques, Linear Block Code: Structure
	15	Terms Related to Block Code,
	16	Matrix Description of Linear Block Code,
	17	Generator and Parity Check Matrices,
	18	Encoder and Syndrome decoder for (n, k) block Code.
Ch 4	**UNIT IV: CYCLIC CODES**	
	19	Algebraic structure, Properties, Polynomial representation of Codeword,
	20	Generator Polynomial, Generation of Code Vector in Nonsystematic and Systematic form,
	21	Generator and Parity check matrices in Systematic form,
	22	Encoding of Cyclic Code,

	23	Syndrome decoding for Cyclic code, Hardware Representation of (n, k) cyclic code.
	24	Cyclic Redundancy Check Code
Ch 5	**UNIT V: BCH & RS CODE**	
	25	Binary Field Arithmetic, BCH Code: Properties, Primitive element and primitive polynomial,
	26	Primitive BCH Code, Construction of Galois Field GF (2^m), Addition & Multiplication of GF (2^m)
	27	Properties of Galois Field GF(2^m), Minimal & Generator Polynomial for BCH Code
	28	Decoding of BCH Code, Reed-Solomon code: Introduction
	29	Error correction capability of RS code,
	30	RS code in Nonsystematic & Systematic form, Decoding of RS & Nonbinary BCH code.
Ch 6	**UNIT VI: CONVOLUTIONAL CODE**	
	31	Introduction, Encoding of Convolutional Codes,
	32	Generation of Output code sequence : Time Domain Approach,
	33	Transform Domain Approach, Generator matrix ,
	34	Graphical Approach – Code Tree, State diagram and Trellis Diagram,
	35	Decoding of Codes : Maximum Likelihood Decoding -Viterbi Algorithm,
	36	Sequential Decoding

Recommended Books:

TEXT BOOKS:

1. R.P Singh &S.D.Sapre , "Communication Systems Analog & Digital", Mc-Graw Hill, IInd Edition, 2001.

2. Muralidhar Kulkarni, K.S. Shivprakasha , "Information Theory & Coding", Wiley (India) Publication 2014

3. Arijit Saha,Surajit Mandal, "Information Theory,Coding& Cryptography", Pearson Education, Ist Edition, 2013. Page 6 of 56 Revised Syllabus of B.E.(Electronics Engg.) w.e.f. academic year 2016-17 Shivaji University, Kolhapur.

4. Salvatore Gravano, "Introduction to Error Control Codes", Oxford University Press, I st Edition, 2001

REFERENCE BOOKS:

1. Simon Haykin, "Communication Systems ", John Wiley & Sons, Inc, IVth Edition

2. Sam Shanmugam, “Digital and Analog Communication Systems”, John Wiley Publication , 2005.

3. Martin Roden, “ Analog & Digital Communication Systems”, Prentice Hall India, IIIrd Edition.

4. Ranjan Bose, “Information Theory Coding & Cryptography”, Tata McGraw-Hill Publishing Company Ltd, IInd Edition 2008

TUTORIALS

TUTORIAL NO.1

Q.1 a) Explain joint entropy; conditional entropy. Derive the relation between joint entropy; Conditional entropy.
Q.2 a) Explain mutual information and entropy; state its properties.
Q.3 a) Define information, its unit & state its properties.
Q.4 a) A message signal mk is transmitted by a transmitter .The probability of occurrence of this signal is ¼.Calculate the information conveyed by it in terms of bits ,nats, decit.
Q.5 a) Derive an expression for entropy.

TUTORIAL NO.2

Q.1 a) A discrete memoryless source has five symbols x1,x2,x3,x4,x5 with probabilities 0.4,0.19,0.16,0.15,0.15 resp.attached to every symbol.
1) construct Shannon-fanocode& calculate code efficiency.
2)repeat for Huffman code & compare two techniques.
Q.2 Generate all code words of [7,4] linear block code (LBC) forfollowing generator matrix
G= 1000110
0100011
0010111
0001101
OR
Write a short note on-
1) RS code
2) GOLAY code
Q.3 a) Consider following generator matrix over GF(2)
G= 10100
10011
01010
1)Generate all possible code words.
2)find parity check matrix.
3)find generator matrix of an equivalent systematic code.
4)construct standard array for this code.
5)what is the min distance of this code
6)write down set of error patterns for this code can detect.
7)what is the symbol error probability if we use this encoding scheme?compare it with encoded probability.
8)is this linear code?

Q.4 a) For a systematic LBC the three parity check bits are
C1= m1 O m2 O m3
C2= m2 O m3 O m4

5.What is Channel Capacity?

6.Explain Redundancy and Efficiency of channel,

7 Write a note on Discrete memory less channel – Channel Matrix,

8 Explain Classification of channels: lossless Channel, Deterministic Channel, Noise free channel, Binary Symmetric Channel (BSC),

TUTORIAL NO.3

1. What is Error Control Coding? Approaches of Error Control Coding .
2. Classify Error Detection and Error Correction Techniques.
3. Explain Linear Block Code: StructureTerms Related to Block Code.
4. Note on Matrix Description of Linear Block Code.

TUTORIAL NO.4

1.Write Algebraic structure, Properties, Polynomial representation of Codeword.
2. Explain Generator Polynomial, Generation of Code Vector in Nonsystematic and Systematic form.
3. NOTE ON Generator and Parity check matrices in Systematic form, Encoding of Cyclic Code.
4. Syndrome decoding for Cyclic code, Hardware Representation of (n, k) cyclic code.
5. Cyclic Redundancy Check Code

TUTORIAL NO.5

1. WRITE A NOTE ON - Binary Field Arithmetic, BCH Code: Properties, Primitive element and primitive polynomial,
2. Primitive BCH Code, Construction of Galois Field GF (2 m), Addition & Multiplication of GF (2 m)
3. Explain Properties of Galois Field GF (2 m), Minimal & Generator Polynomial for BCH Code
4. Decoding of BCH Code, Reed-Solomon code: Introduction, Error correction capability of RS code,
5 .Explain in detail RS code in Nonsystematic & Systematic form, Decoding of RS & Nonbinary BCH code.

TUTORIAL NO.6

1.Write in detail Encoding of Convolutional Codes.
2.Explain Graphical Approach – Code Tree, State diagram and Trellis Diagram.
3.Decoding of Codes : Maximum Likelihood Decoding -Viterbi Algorithm.
4. Sequential Decoding . Structural & Distance properties of Convolutional codes.

SUBJECT NAME: SATELLITE COMMUNICATION

Course Details

Class	**Final Year B.Tech. Sem-VII**
Course Code and Course Title	**PCC-ETC701: Satellite Communication**
Prerequisites	**Analog Communication & Digital Communication**
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: 1Hr./Week	**TW: 25 Marks**

Course Objectives: The course aims to :	
1	To introduce the fundamental concept in the field of satellite communication.
2	To provide understanding of satellite communication system operation, launching Techniques.
3	To analyse, design and evaluate satellite communication subsystem.
4	To examine concept of satellite networking.
5	To outline applications of Satellite Systems in various fields

Course Outcomes: Upon successful completion of this course, the students will be able to:	
1	Understand Orbital aspects involved in satellite communication.
2	Understand various subsystems in satellite communication system
3	Explain and Analyse Link budget calculation.
4	Understand Satellite Network System
5	Explain Non Geostationary Satellite Systems
6	Explain different applications of Satellite Systems

COURSE CONTENTS		
Unit No.1	**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 Hrs.**
Unit No.2	**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 Hrs.**
Unit No.3	**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 Hrs.**
Unit No.4	**SATELLITE NETWORKS**: Reference architecture for satellite networks, basic characteristics of satellite networks, Onboard connectivity with transparent processing, analogue transparent switching, Frame organization, Window organization, On board connectivity with beam scanning.	**6 Hrs.**
Unit No.5	**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 Hrs.**
Unit No.6	**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 Hrs.**

TEXT BOOKS:

1	Satellite Communications-Timothy Pratt, Charles Bostian, Jeremy Allnut John Wiley &Sons (II Edition)(For Unit 1,2,3,5)
2	Satellite Communications-Anil k. Maine and VarshaAgaraval, Wiley Publications (All Units)
3	Satellite Technology Principles and ApplicationsAnil K. Maini and VarshaAgarawal, Wiley Publications, Third Edition (Unit 6)

REFERENCE BOOKS:

1	Satellite Communications- Dennis Roody McGraw Hill Fourth Edition (All Units)
2	Satellite Communications- Gerard Maral and Michel Bousquet, Wiley Publication (5th Edition For Unit 4)
3	Satellite Communications systems Engineering, 2nd edition- Wilbur L. Pritchard, Henri G.Suyderhoud and Robert A. Nelson. (Unit I)

NOTE:

1. Students, as a part of their term work, should visit satellite earth station and submit a report of visit.

2. Minimum 8 tutorials / assignment based on above syllabus.

Note for question paper setter: 62 marks theory + 6 marks problem.

GUIDELINES TO PAPER SETTER:

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

Q.1 MCQ's based on complete syllabus. (Carries14 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)

Teaching Plan

Class: B.E. ETC. Year: 2022-23

Sub:-Satellite Communication Lecture:3/week

Faculty Name: Mrs. Phutane M.U.

Lecture No.	Content Of Lecture
	UNIT 1
1.	Introduction, basic concept of satellite communication
2.	Orbital Mechanics
3.	Look angle determination
4.	Orbital perturbation
5.	Orbital determination
6.	Launchers and Launch vehicles
7.	Orbital effects in communication system performance.

	UNIT 2
8.	Introduction, Attitude and control system
9.	Telemetry
10.	Tracking
11.	Command and Monitoring, Power systems
12.	Communication subsystem
13.	Satellite antennas
14.	Equipmentreliability and space qualification
	UNIT 3
15.	Introduction, , System Noise
16.	Basic transmission Theory
17.	Temperature and G/T Ration
18.	Design of Downlinks
19.	Uplink Design
20.	Design of specified C/N : Combining C/N and C/I values in Satellite Links. **(Numerical Expected)**
	UNIT 4
21.	Reference architecture for satellite networks, basic characteristics of satellite networks
22.	Onboard connectivity with transparent processing
23.	analogue transparent switching
24.	Frame organization
25.	Window organization
26.	On board connectivity with beam scanning
	UNIT 5
27.	Introduction, Orbit considerations
28.	Coverage and FrequencyConsideration
29.	Delay and Throughput Consideration
30.	Operational NGSO constellation design: Iridium, Teledesic
	UNIT 6
31.	Communication Satellite-Digital DBS TV
32.	Satellite Radio Broadcasting
33.	Navigation Satellite
34.	GPSPosition Location Principles ,GPS Receivers and codes
35.	Military Satellite- Directed Energy Laser Weapons
36.	Weather Forecasting Satellite Application

TEXT BOOKS

1	Satellite Communications-Timothy Pratt, Charles Bostian, Jeremy Allnut John Wiley &Sons (II Edition)(For Unit 1,2,3,5)
2	Satellite Communications-Anil k. Maine and Varsha Agaraval, Wiley Publications (All Units)
3	Satellite Technology Principles and ApplicationsAnil K. Maini and Varsha Agarawal, Wiley Publications, Third Edition (Unit 6)

REFERENCE BOOKS

1	Satellite Communications- Dennis Roody McGraw Hill Fourth Edition (All Units)
2	Satellite Communications- Gerard Maral and Michel Bousquet, Wiley Publication (5thEdition For Unit 4)
3	Satellite Communications systems Engineering, 2nd edition- Wilbur L. Pritchard, Henri G.Suyderhoud and Robert A. Nelson. (Unit I)

Tutorial 1

1. What are Kepler's laws of planetary motion? Also explain the parameters to describe satellite orbit.
2. Explain elevation angle calculation and azimuth angle calculation for antenna at receiving earth station.
3. Write short note on Satellite Communication.
4. Write short note on Orbital perturbations.

Tutorial 2

1. Write short note on Orbital Determination.
2. Write short note on Launch Vehicles.
3. Write short note on Orbital effects in communication system Performance.
4. Write short note on Altitude and orbit control system.

Tutorial 3

1. With suitable diagram explain tracking, telemetry, command and monitoring system.
2. Write short note on Power System.
3. Write short note on communication system.

Tutorial 4

1. Write short note on Satellite antennas.
2. Explain in detail space qualification, Reliability, and Redundancy in case of communication satellite system.

SUBJECT NAME: EMBEDDED SYSTEMS

Course Details

Class	**Final Year B. Tech. Semester - VII**
Course Code and Course Title	**PCC-ETC 702: Embedded Systems**
Prerequisites	**Fundamentals of Microprocessor and Microcontroller and 'C' Programming**
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.	Study different concepts and programming of PIC 16F877
2.	Study different on-chip resources of PIC 16F877
3.	Study different concepts of ARM7
4.	Study Programming of ARM7
5.	Study different on chip resources of LPC 2148
6.	Understand basic concepts of RTOS

Outcomes: Upon successful completion of this course, the students will be able to:	
1.	Develop programs using PIC 16F877
2.	Apply on-chip resource facility of PIC 16F877.
3.	Understand Embedded systems and concepts of ARM7.
4.	Develop programs using ARM7
5.	Apply on chip resource facility of LPC 2148.
6.	Understand RTOS concept

COURSE CONTENTS		
Unit No: 1	**Introduction to PIC Microcontroller** Difference between RISC and CISC architecture, Features of PIC 16F877, Functional Pinout, CPU Architecture, Memory organization, Register file	**08 Hrs.**

	structure, CPU Registers: Status Word, FSR, INDF, PCLATH, PCL, Instruction set, Addressing modes and Simple assembly language Programming.	
Unit No: 2	**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.	**08 Hrs.**
Unit No: 3	**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.	**08 Hrs.**
Unit No: 4	**Instruction Set and Programming** ARM Instruction set, Thumb Instruction set, Simple assembly language programming.	**07 Hrs.**
Unit No: 5	**LPC 2148 Microcontroller** Features, Architecture details, Port structure, Timer/Counter, UART**,** ADC module, Embedded 'C' programming for interfacing LED's, LCD, Keyboard.	**09 Hrs.**
Unit No: 6	**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.	**08 Hrs.**

Text Books:

1.	Design with PIC Microcontrollers by John B. Peatman, Pearson
2.	Embedded System Design By Frank Vahid / Tony Givargis, Wiley Publication
3.	An Embedded Software Primer, David E. Simon Pearson Education, Asia Publication
4.	ARM System Developers Guide Designing & Optimizing System Software by Andrew N., Dominic Sloss, and Chris Wright.
5.	Datasheet of PIC16F877 and LPC 2148

REFERENCE BOOKS:

1.	Embedded systems by Raj Kamal, McGraw Hill
2.	Real- Time Systems Design and Analysis by Phillips A. Laplante, Wiley insia Edition.
3.	Embedded/ Real-Time Systems: Concepts, Design & Programming By Dr. K V K K Prasad, Dreamtech Press
4.	Embedded Systems (A contemporary design tool) by James K Peckol, Wiley Publication.

LIST OF EXPERIMENTS (Minimum 08 experiments):

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

GUIDELINES TO PAPER SETTER:

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

Question paper should contain 30% programming and 70% 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)

Teaching Plan

Class: B.E. ETC. Year: 2022-23

Sub:- Embedded System Design Lecture:4/week

Faculty Name:

Lecture No.	Content Of Lecture
	UNIT 3
1.	Embedded System definition, Types of Embedded System
2.	Characteristics and Design issues of Embedded systems.
3.	Embedded system Hardware
4.	ARM data flow model
5.	Register set, CPSR
6.	Pipelining
7.	Exceptions Interrupts & Vector Table
8.	Cache and Tightly coupled memory, ARM Nomenclature
	UNIT 4
9.	ARM Instruction set
10.	ARM Instruction set
11.	ARM Instruction set,
12.	Thumb Instruction set
13.	Thumb Instruction set
14.	Simple assembly language programming.
15.	Simple assembly language programming.
	UNIT 5
16.	Features
17.	Architecture details
18.	Port structure
19.	Timer/Counter
20.	UART
21.	ADC module
22.	Embedded ‘C’ programming for interfacing LED’s
23.	Embedded ‘C’ programming for interfacing LCD
24.	Embedded ‘C’ programming for interfacing Keyboard
	UNIT 1
25.	Difference between RISC and CISC architecture, Features of PIC 16F877
26.	Functional Pin out, CPU Architecture
27.	Memory organization, Register file structure
28.	CPU Registers
29.	Instruction set
30.	Instruction set
31.	Addressing modes
32.	Simple assembly language Programming
	UNIT 2

33.	I/O Ports Associate registers and programming
34.	Timers Associate registers and programming
35.	CCP Module Associate registers and programming
36.	ADC Associate registers and programming
37.	I2C Associate registers and programming
38.	SPI, Associate registers and programming
39.	Interrupt structure, Configuration word
40.	Oscillator configuration, Reset alternatives.
	UNIT 6
41.	Introduction to RTOS concept
42.	Embedded software architectures: Round robin, Round robin with interrupts
43.	Function queue scheduling and Real time operating system
44.	Tasks and Task states
45.	Task scheduling
46.	Shared data and Reentrancy
47.	Semaphores and shared data using semaphores
48.	Protecting shared data

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

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	Dr. (Mrs.) S. R. Mahadik
4	Mrs. P. P. Belagali
5	Mrs. M. U. Phutane
6	Mrs. T. H. Mohite
7	Mrs. R. V. Kaulgud
9	Mr.V.T.kamble
10	Mrs. D. U. Chavan
11	Mr. A. S. Sutar
12	Mrs.S.S.Karadge

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:

2021-2022		
Sr. No.	**Name of Event/Activity**	**Planned / Conducted**
1	IGNITION 2k22	Conducted for Diploma students
2	Junior College Activity	Conducted
2020-2021		
1	Vande Matram(video making contest	Conducted for all
2	SUBH-AARAMBH(Paper presentation contest)	Conducted for all
3	NTD 2k21 Quiz contest	Conducted for all
4	Farewell Party BE students	Conducted for BE
2019-2020		
1	VLSI Back End Programming	Conducted TE
2	Python Programming	Conducted SE
3	Arts Club Inauguration (Kalavishkar 2k19)	Conducted for all
4	GD Club Inauguration	Conducted for all
5	BOX Cricket	Conducted for all
6	IGNITION 2k19	Conducted for Degree & Diploma students
7	Colour code Activity	Conducted for SE
8	English Spelling Activity	Conducted for TE
9	Drishti Online Context By Texas Instrument Bangalore.	Conducted for all
10	Inauguration of EESA and IOE 2019-20	Conducted for all
11	Industry 4.0.Workshop	Conducted for all
12	Fresher's Party	Conducted for all