SHIVAJI UNIVERSITY, KOLHAPUR

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Accredited by NAAC 'A' Grade
Syllabus for

Final Year Bachelor of Technology

(B. Tech)

Electronics and Telecommunication Engineering Program

(w. e. f. Academic Year: 2020-21)

Semester VII

Sr. No.	Code No.	Subject	Semester	Credits
1	PCC-ETC701	Satellite Communication	7	4
2	PCC-ETC702	Embedded Systems	7	5
3	PCC-ETC703	Computer Networks	7	5
4	PCC-ETC704	Image Processing	7	5
5	PCE-ETC701	Elective-I	7	4
6	PW-ETC701	Project Phase-I	7	2
Total				**25**

Semester VIII

Sr. No.	Code No.	Subject	Semester	Credits
1	PCC-ETC801	Microwave Engineering	8	5
2	PCC-ETC802	Wireless Communication	8	5
3	PCC-ETC803	Video Engineering	8	5
4	PCE-ETC801	Elective-II	8	4
5	PW-ETC801	Project Phase-II	8	6
Total				**25**

Elective-I	Elective-II
Speech Processing	High Performance Computer Network
Radar and Navigation	Advance Network Security
Java Script	Electrical Automobile
Information Theory And Coding Techniques	Big Data Analysis

*****For Theory CIE 30 Marks,**

Two tests of 30 marks at college should be conducted and best of two marks should be communicated to university.

*****Guidelines to paper setter:**

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

1. First question of 10 marks should be allotted to Objective type questions.
2. In Remaining 60 marks, four questions of 15 marks should be considered.

FINAL YEAR ELECTRONICS & TELECOMMUNICATION ENGINEERING –CBCS PATTERN
Semester Examination

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
SEMESTER –VII																					
1	PCC-ETC701	3	3	3	1	1	1	-	-	-		CIE ESE	30 70	100	40	As per BOS Guidelines	-	-	2	25	10
2	PCC-ETC702	4	4	4	-	-	-	1	2	2		CIE ESE	30 70	100	40		50	20	2	25	10
3	PCC-ETC703	4	4	4	-	-	-	1	2	2		CIE ESE	30 70	100	40		50	20	2	25	10
4	PCC-ETC704	4	4	4	-	-	-	1	2	2		CIE ESE	30 70	100	40		-	-	2	25	10
5	PCE-ETC701	3	3	3	1	1	1	-	-	-		CIE ESE	30 70	100	40		-	-	2	25	10
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 ESE	30 70	100	40	As per BOS Guidelines	50	20	2	25	10
2	PCC-ETC802	4	4	4	-	-	-	1	2	2		CIE ESE	30 70	100	40		-	-	2	25	10
3	PCC-ETC803	4	4	4	-	-	-	1	2	2		CIE ESE	30 70	100	40		50	20	2	25	10
4	PCE-ETC801	3	3	3	1	1	1	-	-	-		CIE ESE	30 70	100	40		-	-	2	25	10
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**	

CIE- Continuous Internal Evaluation
ESE – End Semester Examination

• 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

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

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)

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

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 structure, CPU Registers: Status Word, FSR, INDF, PCLATH, PCL, Instruction set, Addressing modes and Simple assembly language Programming.	**08 Hrs.**
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)

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

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)

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

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)

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SUBJECT NAME: SPEECH PROCESSING (Elective-I)

Course Details

Class	**Final Year B. Tech. Sem-VII**
Course Code and Course Title	**PCE-ETC701: Speech Processing (Elective-I)**
Prerequisites	**Digital Signal Processing**
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	To understand basic acoustic theory and time domain models for speech processing..
2	To Understand sampling, quantization and different modulation techniques.
3	To Understand STFT analysis , Homomorphic Speech processing and speech synthesis
4	To Understand Linear predictive coding to enhance speech quality
5	To Understand different techniques to enhance speech quality

Course Outcomes: Upon successful completion of this course, the students will be able to:	
1	Explain the acoustic theory.
2	To Apply sampling, quantization and different modulation techniques.
3	To perform STFT analysis , Homomorphic Speech processing and speech synthesis
4	To Apply Linear predictive coding to enhance speech quality
5	To Apply different techniques to enhance speech quality

Course Contents		
Unit No.1	**Digital models for the speech signal**: Process of speech production, Acoustic theory of speech production, Lossless tube models, and Digital models for speech signals. Time domain models for speech processing: Time dependent processing of speech, Short time energy and average magnitude, Short time average zero crossing rate, Speech vs silence discrimination using energy & zero crossings, Pitch period estimation, Pitch period estimation using autocorrelation function, Median smoothing.	**6 Hrs.**
Unit No.2	**Digital representations of the speech waveform:** Sampling speech signals, Instantaneous quantization, Adaptive quantization, Differential quantization, Delta Modulation, Differential PCM, Comparison of systems, direct digital code conversion.	**5 Hrs.**
Unit No.3	**Short time Fourier analysis:** Linear Filtering interpretation, Filter bank summation method, Overlap addition method, Design of digital filter banks, Implementation using FFT, Spectrographic displays, Pitch detection, Analysis by synthesis, Analysis synthesis systems.	**6 Hrs.**
Unit No.4	**Homomorphic speech processing**: Homomorphic systems for convolution, complex cepstrum, Pitch detection, Formant estimation, Homomorphic vocoder.	**6 Hrs.**
Unit No.5	**Linear predictive coding of speech:** Basic principles of linear predictive analysis, Solution of LPC equations, Prediction error signal, Frequency domain interpretation, Relation between the various speech parameters, Synthesis of speech from linear predictive parameters, Applications.	**6 Hrs.**
UnitNo:6	**Speech Enhancement:** Spectral subtraction & filtering, Harmonic filtering, parametric re-synthesis, Adaptive noise cancellation. **Speech Synthesis:** Principles of speech synthesis, Synthesizer methods, Synthesis of intonation, Speech synthesis for different speakers, Speech synthesis in other languages, Evaluation, Practical speech synthesis.	**7 Hrs.**

TEXT BOOKS:

1	L. R. Rabiner and R. W. Schafer, “Digital Processing of Speech Signals," Pearson Education (Asia) Pte. Ltd., 2004.
2	Z. Li and M.S. Drew, “Fundamentals of Multimedia,” Pearson Education (Asia) Pvt. Ltd., 2004.
3	L. R. Rabiner and B. Juang, “Fundamentals of Speech Recognition,” Pearson Education (Asia) Pte. Ltd., 2004

REFERENCE BOOKS:

1	C Becchetti& L P Ricotti, “Speech Recognition Theory & C++ Implementation” John Wiley & Sons.
2	Speech and audio processing by Dr. Shaila D. Apte
3	B. Gold & N. Morgan “Speech & Audio Signal Processing”, John Wiley & Sons.
4	D. O’Shaughnessy, “Speech Communication Human & Machine”, Universities Press.

NOTE: Minimum Ten Tutorials 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)

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SUBJECT NAME: RADAR & NAVIGATION (Elective-I)

Course Details

Class	**Final Year B. Tech. Sem-VII**
Course Code and Course Title	**PCE-ETC701: RADAR & NAVIGATION (Elective-I)**
Prerequisites	**Antenna Wave 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: 1 Hr./Week	**TW:25 Marks**

Course Objectives: The course aims :	
1	To gain in depth knowledge about fundamental of radar
2	To study different types of radar and their operations
3	To gain knowledge radar's measurement and tracking
4	To become familiar with radar networking

Course Outcomes: Upon successful completion of this course, the student will be able to:	
1	Acquired knowledge about radar and radar equation
2	Understanding the working principal of Doppler radar
3	Ability to work for measurement and tracking signal
4	Foster ability to work instrument landing system

COURSE CONTENTS		
Unit No. 1	**Elementary Concepts:** Fundamental Elements of Radar, Function Performed by Radar, Overall System Considerations, Types of Radar Targets, Radar Waveform, Power and Energy, Some Basic Principles, Some Definitions	**6 Hrs.**
Unit No. 2	**Antennas:** Aperture Antennas, Radiation Intensity Pattern, Pattern Function Relationship, Fundamental Pattern Parameters, Apertures with constant Polarization, Factorable Illumination Function, Side lobe Control in One-Dimensional Apertures, Cirularly Symmetric Illumations, Some Example Antennas, Of The Reflector, Array Antennas, Rectangular Planner Array, Linear Array	**8 Hrs.**
Unit No. 3	**Radar Equation:** Radar Equation, Important Networks Definition, Incremental Modeling Of Noise Sources, Incremental Modeling Of Noisy Networks, Practical Modeling Of Noisy Sources and Networks	**6 Hrs.**
Unit No. 4	**Radar Signals and Networks:** Real Radar Signals, Complex Radar Signals, Analytic Radar Signals, Frequency and Bandwidth Of Signals, Transmission Of Signals through Networks, Matched Filter For Nonwhite and white Noise, Ambiguity Function, Examples Of Uncertainty Functions.	**6 Hrs.**
Unit No. 5	**Radar Resolution:** Range Resolution, Doppler Frequency Resolution, Simultaneous Range and Doppler Resolution, Resolution and RMS Uncertainty, Overall Radar and Angle Resolution.	**5 Hrs.**
Unit No. 6	**Frequency Measurement and Tracking:** Definition Of Optimum Frequency Measurement, Optimum Filter For Doppler Measurement, Some Practical Considerations, Practical Noncoherent Implementation For Doppler, Optimum Coherent Doppler Measurement	**6 Hrs.**

REFERENCE BOOKS:

1	"Radar Principles" By Peyton Z., Peebles, Jr. Wiley India
2	Introduction of Radar system By Skolnik (McGraw Hill)

Note: Minimum Eight Tutorials based on above syllabus.

GUIDELINES TO PAPER SETTER:

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

Q.1 MCQ's based on complete syllabus.(14Marks)
Q.2 Based on unit no1,2,3 (Carries14marks)
Q.3 Based on unit no1,2,3 (Carries14 marks)
Q.4 Based on unit no 4,5,6 (Carries14 marks)
Q.5 Based on unit no 4,5,6 (Carries14 marks)

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SUBJECT NAME: JAVA SCRIPT (ELECTIVE-I)

Course Details

Class	**Final Year B. Tech. Sem-VII**
Course Code and Course Title	**PCE-ETC701: JAVA SCRIPT (ELECTIVE-I)**
Prerequisites	**C, C++ and Python Programming**
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	To introduce students to emerging web technologies.
2	To enable students to use and apply JS objects in web applications.
3	To introduced students to create and demonstrate user define functions.
4	To teach students to understand and perform user – browser interactions.
5	To teach principles of object oriented programming paradigm.
6	To facilitate students to learns events, cookies and exceptions handling.

Course Outcomes: Upon successful completion of this course, the students will be able to:	
1	Identity and apply JS objects in web applications.
2	Articulate and write user define functions.
3	Describe and develop user – browser interactions.
4	Explain the principles of object oriented programming paradigm.
5	Use and illustrate the events, cookies and handling exceptions.

COURSE CONTENTS		
Unit No.1	**Introduction to JavaScript** Overview of JS, Client-Side JS, Advantages and Limitation of JS, JS development tools, Keywords, Syntax, Comments, Variables, Global variable, Data types(Primitive and Non-primitive), Operators, if, if...else, if...else if...statements, Switch, Break, Continue statements, For loop, For-in loop, While loop, do...while loop.	**6 Hrs.**
Unit No.2	**Objects of JavaScript** Methods for creating objects, Object properties, JS Objects-Events, Date, Math, Number, Boolean, String and Array.	**6 Hrs.**
Unit No.3	**JavaScript Function** Function definition, Syntax, Parameters, Arguments, Invocation function, Function with return value, Function objects. Function Methods, Nested Functions, Function Constructor.	**6 Hrs.**
Unit No.4	**JavaScript BOM, DOM and Validation** **Browser objects**- Methods of browser objects, Window, History, Navigator, Screen objects. **Documents objects**-Properties, Methods of document objects, DOM Compatibility. **JS Validation-** JS form validation and JS email validation.	**6 Hrs.**
Unit No.5	**JavaScript Object Oriented Programming** JS class, Objects, Objects methods, Prototype, Constructor methods, Static method, Encapsulation, Inheritance, Polymorphism and Abstraction.	**5 Hrs.**
Unit No.6	**JavaScript Event, Cookies and Exception Handling** Types of events, operations using events, cookies and its fields, cookies operations, Page redirection, Exception handling, Types of errors, Debugging, Hoisting, JS Strict Mode.	**7 Hrs.**

TEXT BOOKS:

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

REFERENCE BOOKS:

1.	The Principles of Object-Oriented JavaScript –by Nicholas C. Zakas.
2.	JavaScript and JQuery: Interactive Front-End Web Development 1st Edition- by Jon Duckett.
3.	HTML, CSS, and JavaScript- by Meloni Julie C.Person Publication.

TUTORIALS: Minimum 08 tutorials to be conducted out of 12, each tutorial should demonstrate at-least 3-4 different programs to the concern statement.

Sr. No.	Tutorials
1.	Write a program to use and demonstrate the operators.
2.	Write a program using looping statements (For, While, do-While, For-In).
3.	Write a program to demonstrate the applications of Array.
4.	Write a program to demonstrate the use of Boolean and Math objects.
5.	Write a program using user define functions.
6.	Write a program to create registration form and perform Validation.
7.	Write a program to create class with Objects.
8.	Write a program to perform Constructers.
9.	Write a program to demonstrate Inheritance.
10.	Write a program to demonstrate the Exception handling.
11.	Write a program to demonstrate Cookies.
12.	Write a program to perform Event handling.

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)

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SUBJECT NAME: INFORMATION THEORY AND CODING TECHNIQUES

(Elective-I)

Course Details

Class	**Final Year B. Tech. Sem-VII**
Course Code and Course Title	**PCE-ETC701: INFORMATION THEORY AND CODING TECHNIQUES (Elective-I)**
Prerequisites	**Digital Communication, Probability, Mathematics**
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	To understand information theory, estimate information content of a random variable from its probability distribution.
2	To understand the types of communication channels, their capacities and construct efficient codes for data on imperfect communication channels.
3	To understand the need & objective of error control coding with encoding & decoding procedure to analyze error detecting & correcting capability of different codes.

Course Outcomes: After the completion of the course the student should be able to:	
1	Explain basic concepts of information theory and entropy coding.
2	Mathematically analyze communication channel models & Channel capacity.
3	Analyze the error detecting and correcting capability of different coding schemes.
4	Design encoder and decoder for various coding techniques as per the need and Specifications.

COURSE CONTENTS		
Unit No.1	**INFORMATION THEORY** Introduction, Concept of information: Unit, Properties, Entropy (Average Information) : Definition, Mathematical expression of Entropy, Entropy of Binary Source, Properties and Information Rate, Joint Entropy, Conditional entropy, relation between Joint & Conditional Entropies, Mutual Information: Average Mutual Information, Expression for Mutual information, Relation between Mutual Information & Entropy	**6 Hrs.**
Unit No.2	**CHANNAL CAPACITY AND CODING** Channel Capacity, Redundancy and Efficiency of channel, Discrete memory less channel – Channel Matrix, Classification of channels: lossless Channel, Deterministic Channel, Noise free channel, Binary Symmetric Channel (BSC), Cascaded Channels and Binary Erasure Channel (BEC), Calculation of channel capacity of all channels, Shannon's fundamental theorem, Entropy Coding: Shannon Fano Coding, Huffman's Coding, Coding Efficiency Calculations.	**6 Hrs.**
Unit No.3	**LINEAR BLOCK CODES** Introduction: Error Control Coding: Need, Objectives & Approaches of Error Control Coding Classification, Error Detection and Error Correction Techniques, Linear Block Code: Structure, Terms Related to Block Code, Matrix Description of Linear Block Code, Generator and Parity Check Matrices, Encoder and Syndrome decoder for (n, k) block Code.	**6 Hrs.**
Unit No.4	**CYCLIC CODES** Algebraic structure, Properties, Polynomial representation of Codeword, Generator Polynomial, Generation of Code Vector in Nonsystematic and Systematic form, Generator and Parity check matrices in Systematic form, Encoding of Cyclic Code, Syndrome decoding for Cyclic code, Hardware Representation of (n, k) cyclic code. Cyclic Redundancy Check Code.	**6 Hrs.**
Unit No.5	**BCH & RS CODE** Binary Field Arithmetic, BCH Code: Properties, Primitive element and primitive polynomial, Primitive BCH Code, Construction of Galois Field GF (2^m), Addition & Multiplication of GF (2^m), Properties of Galois Field GF (2^m), Minimal & Generator Polynomial for BCH Code, Decoding of BCH Code, Reed-Solomon code: Introduction, Error correction capability of RS code, RS code in Nonsystematic & Systematic form, Decoding of RS code.	**6 Hrs.**

Unit No.6	**CONVOLUTIONAL CODE** Introduction, Encoding of Convolutional Codes, Generation of Output code sequence : Time Domain Approach, Transform Domain Approach, Generator Matrix, Graphical Approach – Code Tree, State diagram and Trellis Diagram, Decoding of Codes : Maximum Likelihood Decoding -Viterbi Algorithm, Sequential Decoding .	**6 Hrs.**

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.

Reference Books:

1	Simon Haykin, "Communication Systems ", John Wiley & Sons, Inc, IVth Edition
2	Ranjan Bose, "Information Theory Coding & Cryptography", Tata McGraw-Hill Publishing Company Ltd, IInd Edition 2008
3	Salvatore Gravano, "Introduction to Error Control Codes", Oxford University Press, I st Edition, 2001

TERM WORK: (Minimum 8 tutorials/ Assignments)

Minimum 8 tutorials / assignments based on above syllabus covering all units.

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)

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SUBJECT NAME: PROJECT PHASE-I

Course Details

Class	**Final Year B. Tech. Sem-VII**
Course Code and Course Title	**PW-ETC701 : Project Phase-I**
Prerequisites	
Teaching scheme: Lectures +Tutorial/Practical	**0 Hrs. + 4 Hr.**
Credits	**0 + 2**
Evaluation Scheme ESE + CIE for Theory	**-**

Teaching scheme	**Examination scheme**
Practical: 4 Hrs. /Week	**-**
-	**TW: 25 Marks POE: 50 Marks**

Course Objectives: The course aims to :	
1	Allow students to demonstrate a wide range of the skills learned at the College of Engineering during their course of study by asking them to deliver a product that has passed through the design, analysis, testing and evaluation
2	Encourage multidisciplinary research through the integration learned in a number of courses.
3	Provide a student the opportunities to apply and integrate his/her knowledge acquired throughout the undergraduate study.

Course Outcomes: After the completion of the course the student should be able to:	
1	Identify the problem statement through literature survey for project work.
2	Develop design strategy for the project work.
3	Develop presentation and interpersonal communication skills through project work.
4	Develop the ability to learn independently and to find/integrate information from different sources required in solving real-life problems.
5	enhance technical report writing skills with proper organization of materials;

1. The project is to be carried out in two semester of Final Year B. Tech (Electronics and Tele communications) Part-I and Part-II.
2. The practical batch size for project will be of 15 students. The project batch will be preferably divided into groups each consisting of not more than 3 students.
3. In semester one, group will select a project with the approval of guide and submit the synopsis of project in the month of August. The group is expected to complete detail system design, layout etc. in semester one, as a part of the term work in the form of joint report.
4. In addition all students of project groups will deliver the seminar on the proposed project only.
5. Hardcopy of project diary should be maintained GroupWise, where report of every week activity should be maintained. This should be presented at the time of examination.
6. Guide of the project batch should take presentation and report of Project Phase –I. They should consider marks of the same in term work of project phase-I. and give marks our of 50.

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SUBJECT NAME: MICROWAVE ENGINEERING

Course Details

Class	**Final Year B. Tech. Sem-VIII**
Course Code and Course Title	**PCC-EN801:Microwave Engineering**
Prerequisites	**Electromagnetic Engg., Communication Engg.**
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	**Term Work :25 Marks, OE: 50 Marks**

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

Course Outcomes: Upon successful completion of this course ,the students will be able to:	
1	Analyze the microwave waveguides and passive circuit components.
2	Identify and differentiate the state of art in microwave tubes and their uses in real life
3	Identify materials used in MMIC and microwave hazards
4	Differentiate solid state devices used in microwave based on their characteristics and operations
5	Measure the output power, VSWR, impedance, frequency and wavelength of microwave signal

6	Apply the microwave antenna knowledge for industrial and scientific purposes

COURSE CONTENTS		
Unit No.1	**WAVE GUIDES AND MICROWAVE COMPONENTS** Rectangular wave guides: TE and TM mode wave, power transmission in wave guide, power losses in wave guide, excitation of modes in wave guide. Microwave cavities, microwave hybrid circuits, directional coupler, Circulators and Isolators, microwave attenuators. **(Numerical Expected)**	**7 Hrs.**
Unit No.2	**MICROWAVE TUBES** Microwave linear beam Tubes: Klystrons, Reentrant Cavities, Velocity-Modulation Process, Bunching Process in Klystrons, reflex klystron, slow wave structures, principle of operation of Helix Traveling-Wave Tubes (TWTs).Microwave CROSSED-FIELD TUBES: Magnetron Oscillators, Cylindrical Magnetron ,Forward and backward wave crossed field amplifier(CFA),.	**7 Hrs.**
Unit No.3	**MONOLITHIC MICROWAVE INTEGRATED CIRCUITS AND HAZARDS** Materials: substrate, conductor dielectric & resistive MMIC growth, thin film formation,hybrid microwave I.C. fabrication, Electromagnetic compatibility, plane wave propagation in shielded rooms, anechoic chambers, microwave clean rooms, microwave hazards.	**6 Hrs.**
Unit No. 4	**UNIT IV: MICROWAVE SOLID STATE DEVICES** Microwave bipolar transistor, microwave FETs, Microwave tunnel diodes, Gunn Effect diodes, RWH Theory, LSA diodes, InP diodes, CdTe diodes, IMPATT diodes, PIN diodes, MESFETs and HEMT**.**	**7 Hrs.**
Unit No. 5	**MICROWAVE MEASUREMENTS** Rectangular wave guides: TE and TM mode wave, power transmission in wave guide, power losses in wave guide, excitation of modes in wave guide. Microwave cavities, microwave hybrid circuits, directional coupler, Circulators and Isolators, microwave attenuators. **(Numerical Expected).**	**7 Hrs.**
Unit No: 6	**MICROWAVE ANTENNAS (6 Hrs.)** Antenna parameters: antenna gain, directivity and beam width, Horn antenna, parabolic reflector with all types of feeding methods, slotted antenna, Lens antenna, Microstrip antennas, Corner reflector. Equations for antenna gain, directivity and beam width of all above antenna types. **(Numerical Expected)**	**6 Hrs.**

TEXT BOOKS:

1	Samuel Liao, “Microwave Devices and Circuit”, Prentice Hall of India
2	Annapurna Das &Sisir K Das, “Microwave Engineering”, Tata Mc-Graw Hill.

3	G.S.N. Raju, "Antennas and wave propagation", Pearson Education

REFERENCE BOOKS:

1	K. T. Matthew, "Microwave Engineering", Wiley India, 2011
2	Shrushut Das, "Microwave Engineering", Oxford Press.
3	M. Kulkarni, "Microwave and Radar Engineering", Umesh Publications.

TERM WORK: (Minimum 8 Experiments)

Minimum 8 experiments based on above syllabus covering all units.

LIST OF EXPERIMENTS:

1	Study of Reflex Klystron Characteristics.
2	Study of GUNN Diode Characteristics.
3	Study of VSWR Measurement (Using Vmax / Vmin Method).
4	Study of Frequency and wavelength measurement.
5	Study of Input impedance measurement.
6	Study of E plane /H plane and magic Tee.
7	Study of Directional coupler, coupling factor.
8	Study of Horn Antenna (Gain, Radiation Pattern and beam width).
9	Study of Parabolic Antenna (Gain, Radiation Pattern and beam width).
10	Study of Measurement of attenuation (Fixed and variable).

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)

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SUBJECT NAME: WIRELESS COMMUNICATION

Course Details

Class	**Final Year B. Tech. Sem-VIII**
Course Code and Course Title	**PCC-ETC 802:Wireless Communication**
Prerequisites	**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**

Course Objectives: The course aim is to :	
1	Focus on basic fundamentals of wireless communication.
2	Explain large & small scale radio wave propagation
3	Understand basic wireless technology
4	Understand various wireless protocols

Course Outcomes: Upon successful completion of this course ,the students will be able to:	
1	List basic fundamentals of wireless communication
2	Analyze large & small scale radio wave propagation
3	Able to understand basic wireless technologies
4	Able to understand and analyze wireless concepts

Course Contents		
Unit No.1	**FUNDAMENTALS OF WIRELESS COMMUNICATION:** Wireless communication system, wireless media, Frequency spectrum, Technologies in digital wireless communication, WCOM channel specifications, Types of wireless communication, challenges in WC. Cellular concept: Introduction, frequency reuse ,Channel Assignment strategies, Handoff strategies, interface and system capacity, Trunking &grade of service, Improving coverage & capacity in cellular system	**7 Hrs.**
Unit No.2	**MOBILE RADIO PROPAGATION. LARGE SCALE PATH LOSS:** Introduction to Radio Wave propagation, Free Space propagation model, Relating Power to Electric Field, The three Basic Propagation Mechanisms, Reflection, Ground Reflection (Two-Ray) Model, Diffraction, Scattering, Outdoor Propagation Models, Indoor Propagation Models.	**8 Hrs.**
Unit No.3	**MOBILE RADIO PROPAGATION SMALL-SCALE FADING AND MULTIPATH :** Small-Scale Multipath Propagation, Impulse Response Model of a Multipath Channel, Small-Scale Multipath Measurements, Parameters of Mobile Multipath Channels, Types of small-Scale Fading.	**8 Hrs.**
Unit No.4	**WIRELESS NETWORKING: INTRODUCTION TO WIRELESS NETWORKS** Difference Between Wireless and Fixed Telephone Networks, Development of Wireless Networks, Fixed Network Transmission Hierarchy, Traffic Routing in Wireless Networks, Common Channel Signaling (CCS),Architecture of B-ISDN & services,	**9 Hrs.**
Unit No.5	**WIRELESS LAN & BLUETOOTH** Introduction, Infrared radio transmission infrastructure and adhoc networks, Detailed study of IEEE 802.11, Bluetooth, Wireless ATM.	**7 Hrs.**
Unit No.6	**WIRELESS ACCESS PROTOCOL** WAP (Wireless Application Protocol) architecture, Wireless Datagram, Wireless Transport layer security, wireless transaction, Wireless Session, Wireless Application Environment ,WML	**6 Hrs.**

TEXT BOOKS:

1	Wireless Communications Principals & Practice- Theodore S. Rappaport, (P.E.)
2	Mobile Communications: Jachen Schiller (Addison Westy)

3	Wireless and Mobile Networks Concept and protocols – Dr. Sunil kumar S Manvi Wiley India

REFERENCE BOOKS:

1	Wireless Networks by P. Nicopolitidis, M. S. Obaidat, G. I. Papadimitriou, A. S.Pomportsis; Wiley Pub.
2	Wireless Communication & Networks by William Stallings(Pearson Edition)
3	Wireless communication and Networks by Upena Dalal(Oxford)

LIST OF EXPERIMENTS: (ANY 8 EXPERIMENTS)

1	Study of ISDN Trainer kit Hardware & Software Setup.
2	Study of Architecture of ISDN kit.
3	Study of Analog & Digital Subscriber Link establishment using ISDN trainer kit.
4	Study of numbering plans in ISDN trainer kit.
5	Study of Establishment point to point & Multidraft Links using ISDN.
6	Study of Protocol Analysis (based on any protocol).
7	Study of Mobile Communication Set up (Study of Link Mobile Trainer Kit , Handset).
8	Study of Multiple Access Techniques (Any one).
9	Visit to Mobile Company Like BSNL , AIRTEL , Idea.
10	Implementation of outdoor propagation Model (Any one) using Matlab.
11	Implementation of Free Space propagation model using Matlab

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)

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SUBJECT NAME: VIDEO ENGINEERING

Course Details

Class	**B.Y. B. Tech. Sem-VIII**
Course Code and Course Title	**PCC- ETC 803: Video Engineering**
Prerequisites	**Electronics all basic circuits.**
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, POE: 50 Marks**

Course Objectives: The course aims to :	
1	Provide basics information of TV system
2	Know color TV transmission and reception
3	Understand basic concept of digital TV system
4	Understand high definition TV
5	Know advanced TV systems like LCD, plasma, LED, CCTV
6	Provide the knowledge of digital video systems like video conferencing and video phone.

Course Outcomes: Upon successful completion of this course, the students will be able to:	
1	Describe picture and sound transmission and reception
2	Explain color composite video signal
3	Describe principle of digital TV system
4	Explain high definition television system
5	Elaborate concept of video conferencing and videophone.

6	Describe advanced TV system like LCD, plasma, LED, CCTV, etc..

COURSE CONTENTS		
Unit No.1	**ELEMENTS OF A TELEVISION SYSTEM** Modulation of picture and sound signals, positive and negative modulation, aspect ratio, kell factor, horizontal and vertical resolution, video bandwidth, progressive and interlaced scanning, composite video signal, horizontal & vertical sync details, vestigial sideband correction, channel bandwidth, CCIR-B standards, monochrome TV receiver block diagram	**8 Hrs.**
Unit No.2	**COLOR SIGNAL TRANSMISSION AND RECEPTION** Color mixing theory (additive and subtractive), compatibility considerations, frequency interleaving process, luminance, hue and saturation, color difference signals, color composite video signals, chromaticity diagram, Color TV receiverblock diagram.	**8 Hrs.**
Unit No.3	**TV CAMERA TUBE, PICTURE TUBE AND COLOR TELEVISION STANDARDS** NTSC, PAL & SECAM TV standards: Introduction, Coder, decoders, Comparison, Simple PAL and delayed PAL,TV camera tubes- Vidicon, Plumbicon; Color Picture Tubes- PIL, Delta gun, Trintron; picture tubes, purity & convergence, automatic degaussing.	**8 Hrs.**
Unit No.4	**DIGITAL TV & HDTV** Merits of digital technology, digital TV signals, digitized video parameters ,digital transmission and reception, codec functions, ITT Digit 2000 IC system, MAC signals, D2- MAC/Packet signals, advantages of MAC signals, HDTV systems, HDTV standards & compatibility, the MUSE system	**7 Hrs.**
Unit No.5	**ADVANCED DISPLAY & STUDIO SYSTEMS** Stereo sound system, flat panel display TV receivers, 3-D TV picture, digital equipment for TV studios, construction & working of LED TV.	**7 Hrs.**
Unit No.6	**ADVANCED TELEVISION SYSTEM** CATV, CCTV, DTH receiver, IR remote control, Satellite TV: satellite communication system, satellite electronics	**6 Hrs.**

TEXT BOOKS:

1	Monochrome and Color TV – R.R. Gulati, 2nd revised edition, New Age International Publication
2	Modern Television Practice – Principles, Technology and Service – R.R. Gulati, 4th edition, New Age International Publication
3	Television and Video Engineering - A.M. Dhake, 2nd Edition.

REFERENCE BOOKS:

1.	Digital Video Processing-A. Murat Tekalp, Prentice Hall Signal Processing Series, BS publications.

2.	Audio-Video Engineering – R.C.Jaiswal
3.	Consumer Electronics –S P Bali, Pearson

LIST OF EXPERIMENTS: (Minimum 8 experiments)

1	Study of circuit diagram of monochrome and color a TV receiver
2	CVS for different test patterns
3	RF tuner
4	Video IF & detector
5	Sync separators (V & H)
6	Sound section
7	Horizontal section
8	Vertical section
9	DTH
10	LED TV
11	CATV
12	Trouble shooting of color TV
13	Industrial Visit

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 Questions based on unit no 1, 2, 3 (Carries 14 marks)
Q.3 Questions based on unit no 1, 2, 3 (Carries 14 marks)
Q.4 Questions based on unit no 4, 5, 6 (Carries 14 marks)
Q.5 Questions based on unit no 4, 5, 6 (Carries 14 marks)

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SUBJECT NAME: HIGH PERFOMANCE COMMUNICATION NETWORKS

Course Details

Class	**Final Year B.Tech. Sem-V**
Course Code and Course Title	**PCE-ETC 801:High Performance Communication Networks (Elective II)**
Prerequisites	**Computer Networks, 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: 1 Hr./Week	**TW: 25 Marks**

Course Objectives: The course aims to :	
1	To provide students with an overview of the concepts and fundamentals of different communication networks
2	To study and utilize the frame formats used in communication networks.
3	Acquire the knowledge of the interoperability of networks.
4	To understand the different advanced networks architecture and functionality.

Course Outcomes: Upon successful completion of this course ,the students will be able to:	
1	Illustrate the different communication networks using the architecture and frames format
2	Design and analyzes simple communication networks.
3	Compare various high performance networks.
4	Develop and research on various networks and its interoperability.

COURSE CONTENTS		
Unit No.1	**PACKET SWITCHED NETWORKS** OSI & IP models – Ethernet (IEEE 802.3) – Token Ring (IEEE 802.5) Wireless LAN (IEEE 802.11), FDDI-DQDB-SMDS: Internetworking with SMDS.	**6 Hrs.**
Unit No.2	**ISDN & BROADBAND ISDN** ISDN – overview –interfaces and functions- Layers and Services – Broadband ISDN architecture and protocols - Signaling System 7.	**7 Hrs.**
Unit No.3	**ATM** ATM: Main features – addressing- signaling & routing – ATM header structure – adaptation layer –management & control – ATM switching & transmission.	**7 Hrs.**
Unit No.4	**FRAME RELAY** Frames relay Protocols & services – congestion control – internetworking with ATM – Internet and ATM– Frame relay via ATM.	**6 Hrs.**
Unit No.5	**OPTICAL NETWORKS** Optical Links, WDM system, Optical cross-connects, Optical LANs, Optical paths and networks	**6 Hrs.**
Unit No.6	**ADVANCED NETWORK ARCHITECTURE** IP forwarding architectures overlay model –Multi protocol Label switching (MPLS) – integrated services in the Internet – Resource Reservation Protocol (RSVP) – Differentiated services	**8 Hrs.**

TEXT BOOKS:

1	Jean Walrand, PravinVaraiya, “High performance communication networks”, 2nd edition Morgan Kaufmann Publication. (CH-1, 5)
2	William Stallings, “ISDN and Broadband ISDN with Frame Relay and ATM”, 4th Edition Pearson.(CH- 2, 3,4)
3	Leon Gracia, IndraWidjaja, “Communication Networks-Fundamental concepts and Key architectures”, McGraw Hill Companies.(CH- 6)

REFERENCE BOOKS:

1	Behrouz Forouzan, “Data Communications and Networking”, 4th Edition, McFraw Hill Companies .
2	Forouzan, “TCP/IP Protocol Suite”, II Ird Edition Tata Mc-Graw Hill publication.

NOTE: Minimum eight assignments 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. (Carries 14 Marks)
Q.2 Questions based on unit no 1, 2, 3 (Carries 14 marks)
Q.3 Questions based on unit no 1, 2, 3 (Carries 14 marks)
Q.4 Questions based on unit no 4, 5, 6 (Carries 14 marks)
Q.5 Questions based on unit no 4, 5, 6 (Carries 14 marks)

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SUBJECT NAME: ADVANCED NETWORK SECURITY (Elective II)

Course Details

Class	**Final Year B. Tech. Sem-VIII**
Course Code and Course Title	**PCE-ETC 801:Advanced Network Security (Elective II)**
Prerequisites	**Modular Arithmetic, Number theory, Computer network**
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:100Marks, 70 (ESE) + 30 (CIE)**
Tutorial: 1 Hr./ Week	**TW: 25Marks**

Course Objectives: The course aims to :	
1	Introduce students to security challenges, access control models, authentication and authorization
2	Introduce students to malware and social engineering attacks, network authentication and identity management
3	Familiarize students with physical security and hardware security.
4	Familiarize students with web application attacks and Internet browsers, wireless network security attacks, vulnerabilities and solutions.

Course Outcomes: Upon successful completion of this course ,the students will be able to:	
1	Develop Concept of Security needed in Communication of data through computers and networks along with Various Possible Attacks.
2	Understand Various Encryption mechanisms for secure transmission of data and management of key required for required for encryption.
3	Understand authentication requirements and study various authentication mechanisms.
4	Understand network security concepts and study different Web security mechanisms.

COURSE CONTENTS		
Unit No.1	**INTRODUCTION** Need for Security , Security Attacks ,Services and Mechanisms ,Network Security Mode	**5 Hrs.**
Unit No.2	**SYMMETRIC CIPHERS** Substitution &Transposition Techniques , Block Cipher , DES , Triple DES , AES ,Stream Ciphers , RC4	**6 Hrs.**
Unit No.3	**PUBLIC KEY CRYPTOGRAPHY** Need and Principles of Public Key Cryptosystems , RSA Algorithm , Key Distribution and Management , Diffie-Hellman Key Exchange , Digital Signatures	**7 Hrs.**
Unit No.4	**AUTHENTICATION** Authentication Requirements , Message Authentication Codes , Hashes, MD5 & SHA ,User Authentication: Password, Certificate based & Biometric Authentication , Kerberos	**7 Hrs.**
Unit No.5	**NETWORK SECURITY** Firewalls , IP Security , Electronic Mail Security , Intrusion Detection , Web Security , SSL, TLS	**6 Hrs.**
Unit No.6	**NETWORK TOOLS** Network security Monitoring Tools, Encryption Tools, Web Vulnerability Scanning Tools, Packet Sniffers and Password Auditing Tools, Network Defense Wireless Tools, Network Intrusion & Detection Tools, One case Study using Tools.	**5 Hrs.**

TEXT BOOKS:

1	William Stallings, “Cryptography and network security principles and practices”, Pearson, 6th Edition, ISBN : 978-93-325-1877-3
2	Atul Kahate, “Cryptography and Network Security”, Mc Graw Hill Publication, 2nd Edition, 2008, ISBN : 978-0-07-064823-4
3	Forouzan, “Cryptography and Network Security (SIE)”, Mc Graw Hill, ISBN, 007070208X, 9780070702080

REFERENCE BOOKS:

1	Wenbo Mao "Modern Cryptography, Theory & Practice", Pearson Education
2	Hoffstein, Pipher, Silvermman "An Introduction to Mathematical Cryptography",Springer.
3	J. Daemen, V. Rijmen "The Design of Rijndael", Springer.
4	A. Joux "Algorithmic Cryptanalysis", CRC Press.
5	S. G. Telang "Number Theory", Tata Mc Graw Hill.

6	C. Boyd, A. Mathuria "Protocols for Authentication and Key Establishment", Springer.
7	Matt Bishop "Computer Security", Pearson Education.
8	Christof Paar, Jan Pelzl “Understanding Cryptography”, Springer-Verlag Berlin Heidelberg

NOTE: Minimum Ten Tutorials 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. (carries 14 Marks)
Q.2 Questions based on unit no 1, 2, 3 (Carries 14 marks)
Q.3 Questions based on unit no 1, 2, 3 (Carries 14 marks)
Q.4 Questions based on unit no 4, 5, 6 (Carries 14 marks)
Q.5 Questions based on unit no 4, 5, 6 (Carries 14 marks)

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SUBJECT NAME: ELECTRICAL AUTOMOBILES (Elective II)

Course Details

Class	**Final Year B. Tech Sem - VIII**
Course Code and Course Title	**PCE-ETC 801: Electrical Automobiles**
Prerequisites	**Basic Electrical &Electronics, Engineering Mathematics**
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	To understand basics of EVs & HEVs.
2	To understand basics of battery, battery charging Systems in EVs & HEVs
3	To analyze power management and grid technology
4	To understand the construction and working principle of various motors used in electric vehicles
5	To analyze design of EV and HEV
6	To analyze the effect of changing of parameters on vehicle performance

Course Outcomes: Upon successful completion of this course, the students will be able to:	
1	Know Concept of Electric Vehicles, Hybrid Electric Vehicles & Plug in Hybrid Electric Vehicles
2	Analyze the battery management system& PHEV design
3	Analyze different power converter topology used for electric vehicle application
4	Develop the electric propulsion unit and its control for application of electric vehicles

5	Design issues of EVs & HEVs
6	How to model EVs & HEVs

COURSE CONTENTS		
Unit No.1	**INTRODUCTION TO EVS & HEVS** A brief history of EV & HEV, Basics of EV & HEV, Architectures of EV & HEV, HEV fundamentals.	**6 Hrs.**
Unit No.2	**PLUG-IN HEVS** Introduction to PHEVs, PHEV architectures, Power management of PHEVs, Fuel economy of PHEVs, PHEV design & component sizing, Vehicle-to-grid technology.	**6 Hrs.**
Unit No.3	**POWER ELECTRONICS IN EVS & HEVS** Introduction, Principles of power electronics, Rectifiers, Converters, Inverters, Battery chargers used in EVs & HEVs, Emerging power electronic devices	**6 Hrs.**
Unit No.4	**ELECTRIC MACHINES & DRIVES IN EVS & HEVS** Introduction, Induction motor drives, Permanent magnet motor drives, Brushed & Brushless DC motor, Switched reluctance motors.	**6 Hrs.**
Unit No.5	**COMPONENTS & DESIGN CONSIDERATIONS OF EVS & HEVS** Batteries, Ultra capacitors, Fuel Cells, Controls, Aerodynamic considerations, Consideration of rolling resistance, Transmission efficiency, Consideration of vehicle mass, Electric vehicle chassis & body design, General issues in design.	**7 Hrs.**
Unit No. 6	**MODELLING& CASE STUDIES OF EVS & HEVS** Introduction, Fundamentals of vehicle system modelling, HEV modelling, Case studies - Rechargeable battery vehicles, Hybrid vehicles.	**5 Hrs.**

Text Books:

1	Chris Mi, M. Abul Masrur, David WenzhongGao, “Hybrid Electric Vehicles: Principles and Applications with Practical Perspectives”, 2011, Wiley publication.

Reference Books:

1	MehrdadEhsani,YiminGao, Sebastien E. Gay, Ali Emadi, “Modern Electric, Hybrid Electric, and Fuel Cell Vehicles”, CRC PRESS
2	Allen Fuhs, “Hybrid Vehicles and the future of personal transportation”, 2009, CRC Press.
3	James Larminie, John Lowry, “Electric Vehicle Technology Explained”, 2003, Wiley publication.

NOTE: Minimum Eight Tutorials 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. (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)

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SUBJECT NAME: ELECTIVE-II (BIG DATA ANALYTICS)

Course Details

Class	**Final Year B. Tech.Sem-VIII**
Course Code and Course Title	**PCE-ETC 801:ELECTIVE-II (BIG DATA ANALYTICS)**
Prerequisites	**Data Base Management System**
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:100Marks,** **70 (ESE) + 30 (CIE)**
Tutorial: 1 Hr./Week	**TW: 25Marks**

Course Objectives: The course aims to:	
1	To Provide an Overview of an exciting growing field of Big Data Analytics.
2	To introduce the tools required to manage and analyze big data like Hadoop, No SQL, Map Reduce.
3	To teach the fundamental techniques in achieving big data analytics with scalability and streaming capability

Course Outcomes: Upon successful completion of this course, the students will be able to:	
1	Understand the key issues in big data management.
2	Acquire fundamental enabling techniques using tools in big data analytics.
3	Achieve adequate perspectives of big data analytics in various applications like sensor, recommender systems, social media applications etc.

COURSE CONTENTS		
Unit No.1	**INTRODUCTION TO BIG DATA ANALYTICS:** Introduction to Big Data, Big Data characteristics, types of Big Data, Traditional vs. Big Data business approach. Technologies Available for Big Data, Infrastructure for Big Data, Big Data Challenges, Case Study of Big Data Solutions.	**4 Hrs.**
Unit No.2	**INTRODUCTION TO HADOOP:** Introduction to Hadoop. Core Hadoop Components, Hadoop Ecosystem, Physical Architecture, Hadoop limitations.	**5 Hrs.**
Unit No.3	**NOSQL:** Introduction to NoSQL, NoSQL business drivers, NoSQL case studies. NoSQL data architecture patterns: Key-value stores, Graph stores, Column family (Big table) stores, Document stores, Variations of NoSQL architectural patterns. Using NoSQL to manage big data: What is a big data NoSQL solution? Understanding the types of big data problems; Analyzing big data with a shared-nothing architecture; Choosing distribution models: master-slave versus peer-to-peer; Four ways that NoSQL systems handle big data problems	**6 Hrs.**
Unit No.4	**MAP REDUCE:** Map Reduce and The New Software Stack: Distributed File Systems, Physical Organization of Compute Nodes, Large Scale File-System Organization .Map Reduce: The Map Tasks, Grouping by Key, The Reduce Tasks, Combiners, Details of Map Reduce Execution, Coping with Node Failures. Algorithms Using Map Reduce: Matrix-Vector Multiplication by Map Reduce, Relational-Algebra Operations by Map Reduce, Matrix Operations, Matrix Multiplication by Map Reduce.	**6 Hrs.**
Unit No.5	**TECHNIQUES IN BIG DATA ANALYTICS:** Finding Similar Item: Nearest Neighbor Search, Similarity of Documents, Mining Data Streams: Data Stream Management Systems, DataStream Model, Examples of Data Stream Applications: Sensor Networks, Network Traffic Analysis, Link Analysis: Page Rank Definition, Structure of the web, dead ends, Using Page rank in a search engine, Efficient computation of Page Rank: Page Rank Implementation Using Map Reduce Frequent Item set Mining : Market-Basket Model, Apriori Algorithm, Algorithm of Park-Chen-Yu	**9 Hrs.**
Unit No.6	**BIG DATA ANALYTICS APPLICATIONS:** Recommendation Systems: Introduction, A Model for Recommendation Systems, Collaborative-Filtering System: Nearest Neighbor Technique, Example. Mining Social-Network Graphs: Social Networks as Graphs, Types of Social-Networks. Clustering of Social Graphs: Applying Standard Clustering Techniques, counting triangles using Map Reduce.	**6 Hrs.**

TEXT BOOKS:

1	Radha Shankarmani and M Vijayalakshmi ―Big Data Analytics‖, Wiley
2	Alex Holmes ―Hadoop in Practice‖, Manning Press, Dreamtech Press
3	Dan McCreary and Ann Kelly ―Making Sense of NoSQL‖ – A guide for managers and therest of us, Manning Press

REFERENCE BOOKS:

1	Bill Franks , ―Taming The Big Data Tidal Wave: Finding Opportunities In Huge DataStreams With Advanced Analytics‖, Wiley
2	Chuck Lam, ―Hadoop in Action‖, Dreamtech Press

NOTE: Minimum Eight Tutorials 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. (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)

SHIVAJI UNIVERSITY, KOLHAPUR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SUBJECT NAME: PROJECT PHASE-II

Course Details

Class	**Final Year B. Tech. Sem-VIII**
Course Code and Course Title	**PW-ETC701 : Project Phase-II**
Prerequisites	
Teaching scheme: Lectures +Tutorial/Practical	**0 Hrs. + 8 Hr.**
Credits	**0 + 6**
Evaluation Scheme ESE + CIE for Theory	**-**

Teaching scheme	**Examination scheme**
Practical: 8 Hrs. /Week	**-**
-	**TW: 150 Marks POE: 50 Marks**

Course Objectives: The course aims to :	
1	Allow students to demonstrate a wide range of the skills learned at the College of Engineering during their course of study by asking them to deliver a product that has passed through the design, analysis, testing and evaluation
2	Encourage multidisciplinary research through the integration learned in a number of courses.
3	Provide a student the opportunities to apply and integrate his/her knowledge acquired throughout the undergraduate study.

Course Outcomes: After the completion of the course the student should be able to:	
1	Identify the problem statement through literature survey for project work.
2	Develop design strategy for the project work.
3	Develop presentation and interpersonal communication skills through project work.
4	Develop the ability to learn independently and to find/integrate information from different sources required in solving real-life problems.
5	enhance technical report writing skills with proper organization of materials;

- The each project group of semester one will continue the project work in semester II and complete the project in all respect (assembly, testing, fabrication, tabulation, test results etc).
- Hardcopy of project diary should be maintained group wise, where report of every week activity should be maintained, which should be presented at the time of examination

- The project work along with project report should be submitted as part of Semester II on or before the last day of the semester -II.