DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

INDUS INSTITUTE OF TECHNOLOGY & ENGINEERING
INDUS UNIVERSITY

ELECTRONICS AND COMMUNICATION ENGINEERING, SEMESTER –III TEACHING & EXAMINATION SCHEME WITH EFFECT FROM JULY 2017													
SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					
								THEORY			PRACT		TOTAL
								CIE					
			L	T	P			MID	IE	ESE	CIE	ESE	
1	SH0301	Differential Equations and Integral Transforms	3	2	0	4	5	30	10	60	0	0	100
2	EC0301	Digital logic design	3	0	2	4	5	30	10	60	40	60	200
3	EC0302	Object oriented computer programming	3	0	2	4	5	30	10	60	40	60	200
4	EC0303	Network analysis	3	2	0	4	5	30	10	60	00	00	100
5	EC0304	Analog electronics	3	2	2	5	7	30	10	60	40	60	200
6	EC0305	Control theory	2	2	2	4	6	30	10	60	40	60	200
7	SH0307	Human values & professional Ethics	1	0	0	0	1	0	0	0	0	0	100
TOTAL			**18**	**8**	**8**	**25**	**34**	**180**	**60**	**360**	**160**	**240**	**1100**

Approved Vide Agenda Item No. 03 of Minutes of Meeting of Academic Council held on 11 July 17

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

INDUS INSTITUTE OF TECHNOLOGY & ENGINEERING
INDUS UNIVERSITY

ELECTRONICS AND COMMUNICATION ENGINEERING, SEMESTER –IV TEACHING & EXAMINATION SCHEME WITH EFFECT FROM JULY 2017													
SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					
								THEORY			PRACT		TOTAL
								CIE					
			L	T	P			MID	IE	ESE	CIE	ESE	
1	SH0401	Complex Analysis and Numerical Methods	3	2	0	4	5	30	10	60	00	00	100
2	EC0401	Linear Integrated Circuits	3	0	2	4	5	30	10	60	40	60	200
3	EC0402	Microprocessor & computer architecture	3	0	2	4	5	30	10	60	40	60	200
4	EC0403	Signals & systems	3	2	0	4	5	30	10	60	0	0	100
5	EC0404	Electromagnetics	3	2	0	4	5	30	10	60	0	0	100
6	EC0405	Digital systems design	3	0	2	4	5	30	10	60	40	60	200
7	CE0407	Cyber security & Intellectual Property Rights	1	0	0	0	1	0	0	0	0	0	100
TOTAL			**19**	**6**	**6**	**24**	**31**	**180**	**60**	**360**	**120**	**180**	**1000**

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

INDUS INSTITUTE OF TECHNOLOGY & ENGINEERING
INDUS UNIVERSITY

ELECTRONICS AND COMMUNICATION ENGINEERING, SEMESTER –V TEACHING & EXAMINATION SCHEME WITH EFFECT FROM JULY 2017													
SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					
								THEORY			PRACT		TOTAL
								CIE					
			L	T	P			MID	IE	ESE	CIE	ESE	
1	EC0501	Digital signal processing	3	2	2	5	7	30	10	60	40	60	200
2	EC0502	Electronics measurements and instrumentation	3	0	2	4	5	30	10	60	40	60	200
3	EC0503	Microcontroller and interfacing	3	0	2	4	5	30	10	60	40	60	200
4	EC0504	Analog communication systems	4	0	2	5	6	30	10	60	40	60	200
5	EC0505	Microwave engineering	4	0	2	5	6	30	10	60	40	60	200
6	EC0506	Probability and random process	2	2	0	3	4	30	10	60	0	0	100
7	SH0507	Technical Communication and Soft Skills	1	0	0	0	1	0	0	0	0	0	100
TOTAL			**20**	**4**	**10**	**26**	**34**	**180**	**60**	**360**	**200**	**300**	**1200**

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
INDUS INSTITUTE OF TECHNOLOGY & ENGINEERING
INDUS UNIVERSITY

ELECTRONICS AND COMMUNICATION ENGINEERING, SEMESTER –VI TEACHING & EXAMINATION SCHEME WITH EFFECT FROM JULY 2017

SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					
								THEORY			PRACT		TOTAL
								CIE					
			L	T	P			MID	IE	ESE	CIE	ESE	
1	EC0601	Digital Communication	3	0	2	4	5	30	10	60	40	60	200
2	EC0602	Antenna & Wave Propagation	3	2	2	5	7	30	10	60	40	60	200
3	EC0603	Wireless communication	3	0	2	4	5	30	10	60	40	60	200
4	EC0604	VLSI Design	3	2	2	5	7	30	10	60	40	60	200
5	EC0605	Video Engineering (EL-I)	3	0	2	4	5	30	10	60	40	60	200
	EC0606	Power Electronics (EL-I)											
6	EC0607	Radar and Navigation (EL-II)	3	2	0	4	5	30	10	60	40	60	200
	EC0608	Advanced Processor (EL-II)											
	EC0609	Error Correcting Codes (EL-II)											
7	SH0607	Advanced Technical Communication And Soft Skills	1	0	0	0	1	0	0	0	0	0	100
TOTAL			**22**	**6**	**12**	**26**	**35**	**180**	**60**	**360**	**240**	**360**	**1300**

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

INDUS INSTITUTE OF TECHNOLOGY & ENGINEERING
INDUS UNIVERSITY

ELECTRONICS AND COMMUNICATION ENGINEERING, SEMESTER –VII TEACHING & EXAMINATION SCHEME WITH EFFECT FROM JULY 2017													
SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					
								THEORY			PRACT		TOTAL
								CIE					
			L	T	P			MID	IE	ESE	CIE	ESE	
1	EC0701	Embedded System	3	0	2	4	5	30	10	60	40	60	200
2	EC0702	Satellite communication	3	2	0	4	5	30	10	60	0	0	100
3	EC0703	Image and Video Processing	3	0	2	4	5	30	10	60	40	60	200
4	EC0704	Data Communication Networks	3	0	2	4	5	30	10	60	40	60	200
5	EC0705	Optical Fiber Communication	3	0	2	4	5	30	10	60	40	60	200
6	EC0706	Advanced Mobile Communication (EL-III)	3	2	0	4	5	30	10	60	0	0	100
	EC0707	Cryptography and Network Security (EL-III)											
	EC0708	Raspberry pi platform and python programming for raspberry pi by coursera (MOOC Course) (EL-III)											
7	CV0712	Disaster Management	1	0	0	0	1	0	0	0	0	0	100
TOTAL			**19**	**04**	**08**	**24**	**31**	**180**	**60**	**360**	**160**	**240**	**1100**

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

INDUS INSTITUTE OF TECHNOLOGY & ENGINEERING
INDUS UNIVERSITY

ELECTRONICS AND COMMUNICATION ENGINEERING, SEMESTER –VIII TEACHING & EXAMINATION SCHEME WITH EFFECT FROM JULY 2017													
SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					
								THEORY			PRACT		TOTAL
								CIE		ESE	CIE	ESE	
			L	T	P			MID	IE				
1	EC0801	Project	00	00	40	20	40	00	00	00	40	60	100
TOTAL			**00**	**00**	**40**	**20**	**40**	00	00	00	40	60	**100**

3RD SEMESTER

Approved Vide Agenda Item No. 03 of Minutes of Meeting of Academic Council held on 11 July 17

ELECTRONICS AND COMMUNICATION ENGINEERING, SEMESTER –III TEACHING & EXAMINATION SCHEME WITH EFFECT FROM JULY 2017													
SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					
								THEORY			PRACT		TOTAL
								CIE					
			L	T	P			MID	IE	ESE	CIE	ESE	
1	SH0301	Differential Equations and Integral Transforms	3	2	0	4	5	30	10	60	0	0	100
2	EC0301	Digital logic design	3	0	2	4	5	30	10	60	40	60	200
3	EC0302	Object oriented computer programming	3	0	2	4	5	30	10	60	40	60	200
4	EC0303	Network analysis	3	2	0	4	5	30	10	60	00	00	100
5	EC0304	Analog electronics	3	2	2	5	7	30	10	60	40	60	200
6	EC0305	Control theory	2	2	2	4	6	30	10	60	40	60	200
7	SH0307	Human values & professional Ethics	1	0	0	0	1	0	0	0	0	0	100
TOTAL			**18**	**8**	**8**	**25**	**34**	**180**	**60**	**360**	**160**	**240**	**1100**

Subject: **Differential Equations and Integral Transforms**								
Program: **B.Tech. EC Engineering**				Subject Code:SH0301			Semester: **III**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	60	00	40	00	100

1. Course Outcomes:

- To provide an ability to see differential equations as a rigorous way of modelling physical phenomena.
- To provide an ability to derive major differential equations from physical principles.
- To provide an ability to understand the role of initial and boundary conditions in determining the solutions of equations.
- To provide an ability to choose and apply appropriate methods for solving differential equations.
- To provide an ability to undertake problem identification, formulation and solution.
- To provide an ability to calculate Laplace transforms and inverse Laplace transforms and uses them to solve differential equations (Initial value problems, Boundary value problems).
- To provide an ability to understand various concepts of Control System -Theory using Laplace Transform.

2. Contents:

UNIT-I [12 Hours]

Ordinary Differential Equations with applications: Revision of ordinary differential equation: Introduction of Mathematical Modeling, Basic Definitions, First Order First Degree Differential Equations, Variable Separable equation, Homogeneous Equation, Exact Differential Equations, Reduction of Non-exact Differential Equations to exact form using Integrating Factors, First Order Linear Differential Equation, Bernoulli Equation, Applications: Orthogonal Trajectories, Simple Electric Circuits, Solution of Linear differential equations of higher order with constant coefficients, complimentary function and particular integral.

UNIT-II [12 Hours]

Ordinary and Partial Differential Equations with applications: Method of variation of parameters, Method of Undetermined coefficients, Linear differential equations with variable coefficients (Cauchy's and Legendre forms), Simultaneous linear differential equations, Bessel

and Legendre functions, Application of Linear differential equation - Application ofDeflection of Beams, Electric circuits, Series Solution of Ordinary Differential Equations – Power series method, Formation of Partial differential equations, Directly Integrable equations, Method of separation of variables, solution of one dimensional wave equation, heat equation and Laplace equation.

UNIT-III **[12 Hours]**

Laplace transforms: Relation between Laplace and Fourier Transform, Definition, Linearity property, Laplace transforms of elementary functions, Shifting theorem, Inverse Laplace transforms, Laplace transforms of derivatives and integrals, Convolution theorem, Application of Laplace transform in solving ordinary differential equations, Laplace transforms of periodic, Unit step and impulse functions.

UNIT-IV **[12 Hours]**

Fourier series, Fourier Integrals, Fourier Transforms and Z-Transforms: Fourier series, Drichlet's conditions, Euler's formula, Fourier expansion of periodic functions, Fourier series of even and odd functions, Half range Fourier series, Fourier integral theorem (only statement), Fourier sine and cosine integrals, Complex form of Fourier integral, Fourier transforms, Fourier sine and cosine transforms, Introduction to Z-transforms:Definition and Standard Z-transforms, Linearity Property, dumping Rule and some standard results, Some useful Z-transforms.

3. Text books:

1. Erwin Kreyszig: Advanced Engineering Mathematics (8th Ed.) , Wiley Eastern Ltd., New Delhi.

4. Reference Books:

1) B. V. Ramana: Higher Engineering Mathematics, Mc Graw Hill, New Delhi.
2) Dr. B.S. Growl: Higher Engineering Mathematics, Khanna Publishers, New Delhi.
3) R K Jain, S R K Iyengar: Advanced Engineering Mathematics. Third Edition, Narosa Publishing House
4) Merel C Potter, J L Goldberg: Advanced Engineering Mathematics (3rd Ed.), Oxford India Publication.
5) Murray Spiegel: Advanced Mathematics for Engineering & Science: (Schaum's Outline Series),Tata – McGraw Hill Publication

5. Digital resources

http://freevideolectures.com/blog/2010/11/130-nptel-iit-online-courses/
http://nptel.ac.in/video.php?subjectId=122107036
http://ocw.mit.edu/index.htm
https://www.khanacademy.org/

Subject: **Digital Logic & Design**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0301			Semester: **III**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	60	60	40	40	200

Course Outcomes :

Students can design the basic digital systems or modules (Adder, Substructures, Counters, and Register etc.) This is required for Microcontroller/Microprocessor architectures.

UNIT-I **[12]**

Binary Numbers

Introduction to Digital and Analog System, Octal, Decimal and Hexadecimal Numbering Systems,Binary Numbering System, Binary Conversion, Binary Operation, Gray Code, BCD code, Excess Three code

Boolean Algebra

Axioms and Laws of Boolean Algebra De Morgan's Theorem, Duality and Dual Simplification of Boolean Algebra using K-map and Tabulation method

UNIT-II **[12]**

Logic Gates

Basic Gates: AND, OR, NOT, Universal gates: NAND, NOR, X-OR, X-NOR and BUFFER,Logic Operations, NAND and NOR implementation, Sum of product and product of sum representation

Logic Families

Introduction, Noise Margins, Fan-in and Fan-out, RTL and DTL logic, Integrated-Injection Logic Emitter-Coupled Logic, Complementary MOS

UNIT-III **[12]**

Combinational Logic

Introduction, Code Conversion, Multilevel NAND and NOR circuit, various types of Adders and Subtractors, Magnitude Comparator, Decoders, Multiplexers, Programmable Logic Array

Sequential Logic
Introduction, Flip-Flops, Triggering of Flip-Flops, Conversion of Flip-Flops

UNIT-IV **[12]**
FSM, Counter and Shifters Design

FSM Design, Ripple Counter(Asynchronous Counter), Synchronous Counter, Serial-in, Serial-out Shift Register, Parallel-in, Serial -out Shift Register, Serial-in, Parallel-out Shift Register, Parallel-in, Parallel-out Shift Register, Universal Shift Register.

Text Books:

1. Morris Mano, "Digital Logic and Computer Design", Pearson.

Reference Books:

1. Ronald J. Tocci, Gregory L. Moss, "Digital Systems", 10 Ed, Pearson
2. D.C.Green, "Digital Electronics"5th Ed., Pearson, 2005

Digital Learning Resources & MOOCS

1. http://nptel.ac.in/ (Lectures note and Video Lectures)
2. http://ocw.mit.edu/index.htm (Lecture notes)

Subject: **Object Oriented Computer Programming**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0302			Semester: **III**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	60	60	40	40	200

Course Outcomes :

After studying this course, Students will able to

- Apply object-oriented approaches to software problems
- Isolate and fix common errors in C++ programs
- Use existing C++ scientific libraries for signal processing application
- Develop small scale and medium scale C++ programs and libraries for engineering applicationsImprove problem solving skills

UNIT-I **[12]**

Introduction

Basic Concepts of Object-Oriented Programming, Benefits of Object oriented programming, Object Oriented Languages,Application of OOP

Introduction to C++

Structure of C++ program, Tokens, Keywords, Data types, Expression, Control Structure, Functions in C++, Function Overloading

UNIT-II **[12]**

Class and Objects

Introduction, Specifying class and objects, Array within a class, Memory allocation, Objects as Function arguments, Friendly functions, Returning Objects, Pointers to members, Constructors & Destructors, Overloading of constructor, Operator overloading

Inheritance: Extending class

UNIT-III **[12]**

Pointers, Virtual Functions, Polymorphism, I/O Operations

Pointers in C++, Pointers to objects, Pointers to Derived class, Virtual Functions, C++ streams, Formatted and unformatted I/O Operations, Working with files, Templates in C++

UNIT-IV **[12]**

Pointers, Virtual Functions, Polymorphism, I/O Operations

Pointers in C++, Pointers to objects, Pointers to Derived class, Virtual Functions, C++ streams, Formatted and unformatted I/O Operations, Working with files, Templates in C++

Text Books:

1. Object Oriented programming with C++, E Balagurusamy, Tata MacGraw Hill

Reference Books:

1. Object-oriented programming in Turbo C++ By Robert Lafore, Galgotia Publication
2. C++: The Complete Reference, 4th Edition, Herbert Schildt, McGraw Hill Publication

Subject: **Network Analysis**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0303			Semester: **III**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	60	00	40	00	100

Course Outcomes :

Students will able to

- Analyze circuits with passive components
- Apply to determine transient response of RLC circuit
- Synthesize various waveform and determine circuit response for particular input
- Analyze two port network
- Determine equivalent circuit of given network

UNIT-I **[12]**

Introduction to Basic Concepts & Network Equations

Electromotive force, potential, voltage, current, Resistor, capacitor, inductor, Voltage and current sources, Dependent sources, Dot conventions , current directions, Network Equations

Nodal analysis, Mesh analysis, Source transformation, Analysis of circuit containing dependent sources, Superposition theorem, Substitution Theorem, Compensation theorem,Thevenin's and Norton's theorem, Maximum power transfer theorem

UNIT-II **[12]**

Time domain response of linear circuits

Mathematical preliminaries, DC response of first order and second order circuits, Initial conditions in the network, Charging and discharging of capacitor, Charging and discharging of inductor, Solution of circuit equations by using Initial Conditions.

UNIT-III **[12]**

Laplace transform analysis: Circuit Applications

Manipulation of impedance and admittance, Equivalent Laplace transform of circuit elements, RLC circuit analysis using Laplace transform, Switching in RLC circuit, Waveform synthesis, Circuit analysis in Laplace transform

UNIT-IV **[12]**

Two Port Network

Y- Parameter, Z-Parameter, h-parameter, ABCD-parameter, Relation between two port parameters, Parallel connection of two network

Text Books:

Network Analysis: - By M.E Van Valkenburg PHI Publication

Reference Books:

1. Network Analysis & Synthesis By Franklin S. KUO, Wiley Publication
2. Electric Circuits and Networks :- By K. S. Suresh Kumar – Pearson Education
3. Linear Circuits Analysis 2nd edition :-By DeCarlo/ Lin – Oxford University Press(Indian edition)
4. Engineering Circuit Analysis : - By W H Hayt, J E Kemmerly, S M Durbin 6th Edition TMH Publication
5. Graphs: Theory and Algorithms by K. Thulasiraman, m.n.sSwamy, Wiley Publication.
6. Electric Circuit Analysis By S N Sivanandam, Vikas Publishing House
7. Introductory Circuit Analysis by Robert Boylestad, Pearson

Subject:**Analog Electronics**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0304			Semester: **III**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	2	5	60	60	40	40	200

Course Outcomes :

After completion of this course, the students will

- Learn the biasing techniques of BJT, and carry out DC and AC analysis and design of BJT amplifier circuits.
- Design and analyze MOS and MOSFET based circuits
- Design and analyze power supply, series and shunt voltage regulators using BJTs,power amplifier

UNIT-I **[14]**
Transistor at Low Frequencies and Transistor Biasing

Bipolar Transistor Biasing Single Resistor biasing, voltage divider biasing and bias stability, integrated circuit biasing, multi stage circuits, biasing for FETs

Transistor at Low Frequencies Graphical Analysis of CE Configuration, Transistor Hybrid Model, The h Parameters conversion formula for the parameter, Analysis of transistor amplifier using h parameters. The emitter follower.Millerstheorem,cascading transistor amplifier

UNIT-II **[11]**
Feedback Amplifiers & Oscillators

Feedback Amplifier-classification of basic amplifiers, the feedback concept, transfer gain with feedback, characteristics of feedback, input & output resistance of feedback, Methods of analysis of feedback amplifiers, voltage series, current series , voltage shunt and current shunt feedback amplifiers.

Sinusoidal Oscillator, Phase Shift Oscillators, Resonant circuit oscillators, A general forms of oscillators, Wien bridge oscillator, crystal oscillator, Frequency Stability.

UNIT-III **[11]**
Power Amplifiers

Output Stages and Power amplifier , Series and Shunt voltage regulator Concepts and Design ,Classification of amplifiers,2nd order and higher order Harmonic Distortions, Class B push pull amplifier, Class AB Amplifier, Power Circuits and Systems Series voltage regulator Shunt Voltage Regulator

UNIT-IV **[12]**
Operational Amplifiers &Multivibrators

Operational amplifier Transistorized, Differential amplifier, emitter coupled differential amplifier, transfer characteristic of differential amplifier. Example of IC operational amplifier, measurement of OPAMP parameters

Multi Vibrators, Mono stable Astable and BistableMultivibrators

Text Books

1. Jacob Millman and Christos Halkias "Integrated Electronics" Tata Mc Grow Hill edition
2. Donald Neamen "Electronics Circuits Analysis and Design", Tata McGrow Hill 2nd Edition onwards.
3. Shalivahanan "Electronics Devices and Circuits", Tata McGrow Hill 3rd Edition onwards.

Reference Books

1. Robert L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuit Theory", 9th Ed. Pearson Education..
2. David Bell "Solid State Pulse Circuits" PHI-Prentice Hall of India, fourth edition Onwards
3. Adel S Sedra& Kenneth C Smith, "Micro Electronic Circuits" 5th Indian Edition, Oxford University Press,2006
4. T.L.Floyd, David Buchla, "Fundamentals of Analog Circuits"2nd Ed, Pearson, 2012

Digital Learning Resources:

NPTEL Video Lecture series Prof Radhakrishnan:, IIT Madras "Analog Signal Processing I & II" Online Courses from NPTEL, Coursera and EDX

Subject:**Control Theory**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0305			Semester: **III**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
2	2	2	4	60	60	40	40	200

Course Outcomes :

To develop the techniques to analyze the response and stability of systems with applications to design electronic control systems.

UNIT-I **[12]**

Introduction to Basic Concepts & Mathematical modeling

Introduction, Open-loop system and its examples, Closed-loop system and its examples, Open loop vs Closed-loop

Modeling of Mechanical system, Modeling of Electronic and electrical system, Modeling of Liquid-level system, Transfer function of system, Modeling in state-space, Block diagram formulation, Block diagram reduction, Signal Flow graph, Mason's Gain formula

UNIT-II **[12]**

Transientresponse analysis

Standard test signals, First-order and second order systems, Higher order systems, Transient response of system, Steady-state error for unit , ramp and parabolic inputs.

UNIT-III **[12]**

Time domain Stability Analysis& Root Locus

RH stability criteria, Effect of Proportional, derivative and integral control, MATLAB simulations, Introduction to root locus, Rules for constructing the root locus, System analysis with the help of Root-locus, Root-locus plot using MATLAB

UNIT-IV **[12]**

Frequency Response Analysis

Introduction, Specification for frequency response, Polar-plots, Bode plots, Nyquistplots,Stability analysis, MATLAB simulations

Text Books:

1. Katsuhiko Ogata, "Modern Control Engineering", 4th Ed, Prentice Hall of India.
2. Benjamin C.Kuo, "Automatic Control Systems", John Wiley & Sons

Reference Books:

1. Norman S Nise, "Control system Engineering", 4th Ed., Wiley-India Edition
2. I J Nagrath, M Gopals "Control system Engineering", 5th Ed.

Subject: **Human values & professional Ethics**								
Program: **B.Tech. EC Engineering**				Subject Code: SH0307			Semester: **III**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
1	0	0	0	60	00	40	00	100

Course Objectives:

1. To create an awareness on Engineering Ethics and Human Values.
2. To understand social responsibility of an engineer.
3. To appreciate ethical dilemma while discharging duties in professional life.

Contents:

Unit 1: Values and Self Development **04 hours**

Social Values and individual Attitudes, Work ethics, Indian vision of Humanism, Moral and non moral valuation, Standards and principles, Value judgments. Importance of cultivation of values, Sense of duty, Devotion, Self reliance, Confidence, Concentration, Truthfulness, Cleanliness, Honesty, Humanity, Power of faith, National unity, Patriotism, Love for nature, Discipline.

Unit 2: Personality and Behavior Development **04 hours**

Soul and scientific attitude. Goad and scientific attitude, positive thinking, integrity and discipline, punctuality, love and kindness. Avoiding fault, finding. Free from anger, Dignity of labor, Universal brotherhood and religious tolerance, True friendship, Happiness vs. suffering love for truth. Aware of self destructive habits, Association and cooperation, doing best, saving nature.

Unit 3: Character and Competence **04 hours**

Science vs. God, Holy books vs. Blind faith, Self management and good health, Science of reincarnation, Equality, Nonviolence, Humility, Role of women, All religions and same message, Mind your mind, Self control, Honesty, Studying effectively.

Unit 4: Engineering Ethics **04 hours**

Senses of 'Engineering Ethics', variety of moral issues, types of inquiry, moral dilemmas, moral autonomy, Kohlberg's theory, Gilligan's theory, consensus and controversy, models of professional roles, theories about right action, self interest, customs and religions, uses of ethical theories, Valuing time, Co-operation and commitment, Code of ethics, Sample codes – IEEE, ASCE, ASME and CSI.

Text Books:

1. Chakraborty, S. K., Values and Ethics for Organization Theory and Practice, Oxford University Press, New Delhi, 2001

2. Gaur R. R., Sangal R., Bagaria G. P., *A foundation course in Value Education*, 2009.

3. Gaur R. R., Sangal R., Bagaria G. P*., Teacher's Manual*, 2009.

4. Mike Martin and RolandSchinzinger, *Ethics in Engineering*, Mc Graw Hill. New York, 1996.

Reference Books:

1. Govindrajan M., Natrajan S. and Senthil Kumar V. S., Engineering Ethics (including Human Values), Prentice hall of India Ltd., New Delhi, 2004.
2. Frankena, W. K., *Ethics*, Prentice Hall of India, New Delhi, 1990.
3. Dhar P. L., Gaur R. R., *Science and Humanism*, Commonwealth Publishers, 1990.
4. TripathyA. N., *Human Values*, New Age International Publishers, 2003.
5. Seebauer E. G. and Robert L. Berry, *Fundamentals of Ethics for Scientists andEngineers*, Oxford University Press, 2000.
6. Banerjee B. P., *Foundations of Ethics and Management*, Excel Books, 2005.
7. Bajpai B. L., *Indian Ethos and Modern Management*, New Royal Book Company, 2004.

4TH SEMESTER

Approved Vide Agenda Item No. 03 of Minutes of Meeting of Academic Council held on 11 July 17

ELECTRONICS AND COMMUNICATION ENGINEERING, SEMESTER –IV TEACHING & EXAMINATION SCHEME WITH EFFECT FROM JULY 2017													
SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					
								THEORY			PRACT		TOTAL
								CIE					
			L	T	P			MID	IE	ESE	CIE	ESE	
1	SH0401	Complex Analysis and Numerical Methods	3	2	0	4	5	30	10	60	00	00	100
2	EC0401	Linear Integrated Circuits	3	0	2	4	5	30	10	60	40	60	200
3	EC0402	Microprocessor & computer architecture	3	0	2	4	5	30	10	60	40	60	200
4	EC0403	Signals & systems	3	2	0	4	5	30	10	60	0	0	100
5	EC0404	Electromagnetics	3	2	0	4	5	30	10	60	0	0	100
6	EC0405	Digital systems design	3	0	2	4	5	30	10	60	40	60	200
7	CE0407	Cyber security & Intellectual Property Rights	1	0	0	0	1	0	0	0	0	0	100
TOTAL			**19**	**6**	**6**	**24**	**31**	**180**	**60**	**360**	**120**	**180**	**1000**

Subject:**Complex Analysis and Numerical Methods**								
Program: **B.Tech. EC Engineering**				Subject Code: SH0401			Semester: **IV**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	60	00	40	00	100

1. Course outcome

After completion of this course students will be able to gain knowledge about following

- To provide an ability to understand, interpret and use the basic concepts: complex number, analytic function, harmonic function, Taylor and Laurent series, singularity, residue, conformal mapping, meromorphic function.
- To provide an ability to prove certain fundamental theorems about analytic functions, e.g. Cauchy's integral formula
- To provide an ability to determine the images of curves under simple complex mappings.
- To provide an ability to determine the stability of certain dynamical systems using complex functions.
- To provide an ability to use conformal mapping to solve certain applied problems regarding heat conduction, electrical engineering and fluid mechanics.
- To provide an ability to use Taylor and Laurent expansions to derive properties of analytic and meromorphic functions.

2. Contents:

UNIT-I **[12 Hours]**

Complex Analytic Functions:

Complex Numbers, Demoivere's Theorem, Roots of Complex Numbers, Elementary complex functions, Complex planes, Curves in complex planes, Concept of neighborhood in The complex plane, Analytic function, Cauchy- Riemann equations (Cartesian and polar forms – without proof), Harmonic functions, conformal mappings, some standard conformal transformations.

UNIT-II **[12 Hours]**

Interpolation

Finite differences and Interpolation: Finite differences Forward, Backward & Central difference operators and difference tables. Interpolation, Interpolation Formulae with equal

intervals: Newton's forward, Newton's backward, Central difference interpolation by Stirling's formulae

Interpolation Formulae with unequal intervals: Lagrange's & Newton's divided difference interpolation**Numerical Integration:** Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule.

Numerical differentiation: Using Newton's forward and backward interpolation formula

UNIT-III **[12 Hours]**

Numerical Methods: Basic Errors.
Solution of Algebraic and Transcendental Equations: Bisection method, Regula-Falsi method, Newton-Raphson method, Convergence condition for these methods.
Numerical methods in Linear Algebra: Gauss-Jacobi, Gauss-seidel method
Largest Eigen values and corresponding Eigen vectors: By power method
Numerical Solutions of ordinary differential equations: Taylor's Method, Euler's Method, Improved Euler Method (Heun's Method), Runge-Kutta method of order four

UNIT-IV **[12 Hours]**

Complex Integration: Complex integration, Cauchy's integral theorem and Cauchy's integral formula (without proof), Singularities, Taylor's and Laurent's series, Cauchy-Residue theorem, Residues & Contour integration, Applications of residue to evaluate real integrals.

3. Text books:

1) Erwin Kreyszig: Advanced Engineering Mathematics (8^{th} Edition) Wiley Eastern Ltd., New Delhi (1999).

4. Reference Books:

1) R. V. Churchill and J. W. Brown: Complex variables and applications (7^{th} Edition), McGraw-Hill (2003)
2) B. V. Ramana: Higher Engineering Mathematics, McGraw Hill, New Delhi (2008).
3) Merel C Potter, J L Goldberg: Advanced Engineering Mathematics (3rd Edition) Oxford India Publication (2005).
4) Dr. B.S. Growl: Higher Engineering Mathematics, Khanna Publishers, New Delhi (2000).
5) R K Jain, S R K Iyengar: Advanced Engineering Mathematics. Third Edition, Narosa Publishing House (Reprint2014).
6) Murray Spiegel: Advanced Mathematics for Engineering & Science: (Schaum's Outline Series), TataMcGraw Hill Publication (2009).

5. Digital learning resources :

- http://freevideolectures.com/blog/2010/11/130-nptel-iit-online-courses/
- http://nptel.ac.in/video.php?subjectId=122107036
- http://ocw.mit.edu/index.htm
- https://www.khanacademy.org/

Subject: **Linear Integrated Circuits**								
Program: **B.Tech. EC Engineering**				Subject Code: EC0401			Semester: **IV**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	60	60	40	40	200

Course Outcomes :

After competing this course the student will be able to

- Understand operational amplifiers
- Able to select op-amp and other linear integrated circuits for specific application, and design circuits using the ICs
- Able to analyze circuits and determine their limitations

Contents:

UNIT-I **[12]**

Operational Amplifier

Introduction, Parameters, Performance, datasheet, Frequency response, compensation, noise

UNIT-II **[12]**

Application of Op-Amp

DC amplifiers, difference amplifier, instrumentation amplifier, ac amplifier, current source and sink, current amplifier, DC voltmeter circuit, Ohmmeter circuit, Log and antilog amplifiers, Switching circuit with op-amp, voltage level detectors, Schmitt trigger, integrator and differentiators.

UNIT-III **[12]**

Signal Processing Circuits

Precision rectifiers, limiting circuits, clamping circuit, peak detectors, sample and hold circuits. Signal generation using 555 timer IC, VCO, Delay timers, sequential timers, Pulse-tone oscillator, 7555 CMOS timer, IC function generators. Active filter design and analysis

UNIT-IV **[12]**

Voltage Regulators, Audio Power Amplifiers and Data converters

Voltage regulator basics, IC liner voltage regulators, switching regulators, Basics of audio amplifier, performance improvement of audio power amplifier, IC and MOSFET power amplifier, Basics of ADC and DAC

Text Books:

1. David A. Bell, "Operational Amplifier and Liner ICs", 3/e, Oxford University Press,
2. RamakantGayakwad "Op-amps and Linear Integrated Circuits", 4/e, PHI

Reference Books:

1. Sergio Franco "Design with Operational Amplifiers and Analog Integrated Circuits", Tata Mcgraw-hill 2009 Edition
2. D. Roy Choudhury and Shail B. Jain, "Linear Integrated Circuits", 3/e New AgeInternational Publishers
3. R. Schaumann, and M E. Van Valkenburg, "Design of Analog Filers", Oxford University Press

Subject: **Microprocessor & Computer Architecture**								
Program: **B.Tech. EC Engineering**			Subject Code: EC0402			Semester: **IV**		
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	60	60	40	40	200

Course Outcomes:

1. To introduce 8085 architecture and programming in assembly language.
2. To introduce basic concepts of interfacing memory and peripheral devices to amicroprocessor.

Contents:

UNIT-I **[12]**

Introduction to Microprocessor

Microprocessor System, Bus Organization, Microprocessor Architecture, Microprocessor Operation

8085 Microprocessor Architecture:

8085 Architecture, Address, Data and Control Bus, Pin Functions, Demultiplexing of bus Generation of Control Signals, Instruction Cycle , Machine Cycle

UNIT-II **[12]**

8085 Instruction Set:

Addressing Modes, Data Transfer Instructions, Arithmetic Instructions, Logical Instructions Branching Instructions, Stack and Subroutine, Writing Assembly Language Programs

Memory and I/O interfacing:

Memory interfacing, Decoding Methods, Basic Interfacing Concepts, Interfacing Output Devices Interfacing Input Devices, Memory Mapped I/O and Peripheral Mapped I/O

UNIT-III **[12]**

Counters and Time Delays, Stack

Counter and Time delay, Different Methods of generating Time delay, Programs, Stack , Subroutine, Restart Conditional call and Return Instructions, Advanced Subroutine Concepts

Interrupts , Serial I/O and Data Communication:

8085 Interrupts, 8085 Vectored and Non-Vectored Interrupts, Restart as Software Instructions Basic Concepts in Serial I/O, 8085 Serial I/O lines SID & SOD

UNIT-IV **[12]**

Programmable Interface Devices

The 8255 Programmable Peripheral Interface, The 8279 Keyboard / Display Interface, The 8253 Programmable Interval Timer

Interfacing of Data Converters and Peripheral devices

Digital to Analog Converters, Analog to Digital Converters, 8259 Programmable InterruptController, Direct Memory Access and 8237 DMA controller

Text Books

1. Microprocessor Architecture Programming and Applications with 8085, Ramesh Gaonkar, Penram International Publishing Pvt. Ltd
2. 8085 Microprocessor Programming and Interfacing by K. Udayakumar& B.S Umashankar, Pearson Education

Reference Books

1. Microprocessor and Microcontroller fundamentals. The 8085 and 8051 Hardware and Software by William Kleitz
2. 8085 Microprocessor: Programming And Interfacing by N.K Shrinath , Phi Learning Pvt. Ltd.

Subject: **Signal & Systems**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0403			Semester: **IV**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	60	00	40	00	100

Course Outcomes :

To develop the techniques to analyze the response and stability of systems with applications to design electronic control systems.

UNIT-I **[12]**

Signals & Systems:

Introduction, Continuous time and discrete time signals, Continuous time and discrete time systems, Basic system properties, Basic operations on signals.

UNIT-II **[12]**

Linear Time Invariant systems

Discrete time LTI systems Convolution, Continuous time LTI convolution, Properties of LTI systems, causal LTI systems describe by differential and difference equations, Correlation.

UNIT-III **[12]**

Fourier Series & Fourier Transform:

Fourier series representation of continues time and discrete time periodic signals, Properties of Fourier series in continuous time and discrete time, Filtering, Fourier transform representation in continues time and discrete time for aperiodic and periodic signals, Properties of Fourier transform in continuous time and discrete time, Time and frequency characterization of signals and systems ,Sampling

UNIT-IV **[12]**

The Laplace Transform & Z-Transform:

The region of convergence for Laplace Transform, Inverse Laplace Transform, Properties of Laplace Transform ,Analysis and characterization of Laplace Transform , The region of convergence for Z-Transform, Inverse Z-Transform, Properties of Z-Transform ,Analysis and characterization of Z-Transform

Text Books:

1. Signals and Systems by Alan V. Oppenheim, Alan S. Wilsky and Nawab, Prentice Hall
2. Signals &Systems by H P HSU, Second edition McGraw Hill Education.

Reference Books:

1. Signals and Systems by A NagoorKani, Tata McGraw-Hill Education
2. Signals and Systems by AnandKumar,Pearson publication.

Subject:**Electromagnetics**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0404			Semester: **IV**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	60	00	40	00	100

Course Outcomes:

- Student will be able to determine electric and magnetic fields due to specified charge and current distributions.
- Relate the physical basis of Maxwell's equations in integral form and differential form, and apply them for the solution of appropriate problems involving static as well as time varying fields.
- Apply the appropriate electric and magnetic field boundary conditions for a given problem involving their use. Analyze problems involving one-dimensional Poisson's and Laplace's equations.
- Basic knowledge of Uniform plane waves can be acquired.

UNIT-I **[12]**

Vector Analysis:

Scalars & Vectors, Dot and cross products, Co-ordinate systems and conversions.

Electrostatics I:

Coulomb's law, Electric field intensity, Field due to continuous volume charge distribution, field of a Line charge, Field of a Sheet of charge, Concept of electric flux density, Gauss's law and its applications, Differential volume element, Divergence, Maxwell's first eqn. and divergence theorem.

UNIT-II **[12]**

Electrostatics II:

Energy and potential , potential difference, potential gradient, current and current density, continuity equation, conductor properties & boundary conditions, boundary condition for perfect dielectric materials, Poisson's and Laplace equation, Uniqueness theorem, Examples.

UNIT-III **[12]**

Steady magnetic field:

Biot-Savart's law, Ampere's circuital law, Point form of Ampere's circuital law, concept of flux density, Scalar and vector magnetic potential, Stoke's theorem for magnetic field, Magnetic boundary conditions.

Time Varying Fields and Maxwell's Equations:

Faraday's law, Displacement current, Maxwell's equations in point and integral forms for time varying fields

UNIT-IV **[12]**

The Uniform Plane Wave:

The wave equation, wave motion in free space, waves motion in perfect dielectric, Plane waves inside the lossy matter, Poynting vector and Wave power, Propagation in good conductor, Phenomena of skin effect, Reflection of uniform plane waves.

Text Books

1. Engineering Electromagnetics, W H Hayt, J A buck, 7^{th} Edition, TMH Publication

Reference Books

1. 1. Electromagnetic Waves & Radiating Systems, Edward C. Jordan, Keith G. Balmain, 2nd Edition, PHI publication.
2. Fields and Waves in Communication Electronics, Simon Ramo, John R. Whinnery, Wiley Publication

Subject: **Digital System Design using HDL**								
Program: **B.Tech. EC Engineering**				Subject Code: EC0405			Semester: **IV**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	60	60	40	40	200

Course Outcomes :

After competing this course the student will be able to

1. design complex digital systems in HDL at different levels of abstraction
2. partition a digital system into different subsystems
3. transfer a design from a version possible to simulate to a version possible to synthesize
4. identify principal parts in programmable circuits (PLD, FPGA, ASIC) and implement complex digital systems in programmable circuits

Contents:

UNIT-I **[12]**

Basic Language Elements:

Identifiers, Data Objects, Data Types, Operators.

Behavioral Modeling:

Entity Declaration, Architecture Body, Process Statement, Variable Assignment Statement, Signal Assignment Statement, Wait Statement, If Statement, Case Statement, Null Statement, Loop Statement, Exit Statement, Next Statement, Assertion Statement

UNIT-II **[12]**

Dataflow and Structural:

Concurrent Signal Assignment Statement, Concurrent versus Sequential Signal Assignment, Delta Delay, Multiple Drivers, Conditional Signal Assignment Statement, Selected Signal Assignment Statement, Block Statement, Concurrent Assertion Statement, Component Declaration, Component Instantiation, generic and generate statements

UNIT-III **[12]**

Basics of Verilog:

Verilog as an HDL , Levels of design description, Concurrency, Simulation And Synthesis , Functional Verification ,System Tasks, Programming language Interface , Module

Gate Level Modeling: Gate level Primitives, Module structure, Instances of primitives, Delays models, Port types.

Modeling At Data Flow Level: Continuous assignment, Delays and continuous assignments, assignment to vectors, operators

UNIT-IV **[12]**

Behavioral Modeling: Operations and assignments, Procedures, Assignments with delays, Blocking andNon-blocking assignments, types of constructs, loops, Functions, Tasks and User-defined primitives.

Text Books:

1. J. Bhasker "A VHDL primer", Prentice Hall
2. Samir Palnitkar "Verilog hdl: a guide to digital design and synthesis, second edition ", Prentice Hall

Reference Books:

1. VHDL, Analysis and Modeling of Digital Systems by Navabi, Z. Second Edition, McGraw-Hill.
2. HDL Chip Design: A Practical Guide for Designing, Synthesizing & Simulating Asics &Fpgas Using VHDL or Verilog " by Douglas J. Smith

Subject: **Cyber Security and Intellectual Property Rights**								
Program: **B.Tech. EC Engineering**				Subject Code: CE0407			Semester: **IV**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
01	00	00	00	60	00	40	00	100

Learning Objectives

1. To facilitate understand & critical understanding about Cybercrimes, Ethical Hacking, cyber security, forensics and cyber laws
2. Exploration of the legal and policy developments in various countries for cyber space
3. To provide in-depth knowledge of Information Technology Act, 2000 including Information Technology Amendment Act, 2008
4. Understanding e-Governance, Electronic Contracts, e-Banking & Secure electronic records

UNIT-I **[3 hours]**

Introduction:

Information Security Overview, Cyber security, Cyber security objectives and policies, Differences between Information Security & Cyber security, Cyber security Principles, Introduction of Cyber crime, Classifications of Cybercrimes.

UNIT-II **[3 hours]**

Security Threats and vulnerabilities:

Overview of Security threats, Hacking Techniques, Password Cracking, Insecure Network connections, Malicious Code, Programming Bugs, Cyber crime and Cyber terrorism, Information Warfare and Surveillance. Applicationsecurity(Database,E-mailandInternet).

UNIT-III **[3 hours]**

Overview of Security Management:

Overview of Security Management , Security Policy , Security Procedures and Guidelines , Risk Management , Security Laws**, System Security** (Desktop, email,web), Intrusion Detection Systems, SecurityTechnology-FirewallandVPNs ,Backup SecurityMeasures.

UNIT-IV **[3 hours]**

Cyber law- Intellectual property right:

Introduction, Objectives of Intellectual property law, Types of IPR, Advantages of IPR, IPR in India, Offences and Penalties.

Text Books

1. "Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Nina Godbole, SunitBelapur, Wiley India Publications, April, 2011

Reference Books

1. CharlesP.Pfleeger,ShariLawerancePfleeger,"AnalysingComputerSecurity", PearsonEducationIndia.
2. .K.Pachghare,"CryptographyandinformationSecurity",PHI LearningPrivateLimited,DelhiIndia.
3. Dr.SuryaPrakashTripathi,RitendraGoyal,PraveenkumarShukla,"Introductionto InformationSecurityand CyberLaw"WilleyDreamtechPress.
4. Schou,Shoemaker,"InformationAssurancefortheEnterprise",TataMcGrawHill.
5. CHANDER,HARISH**,"**CyberLawsAndIt Protection**"**,PHILearningPrivateLimited,Delhi,India

Online courses:

- https://www.youtube.com/watch?v=yjmQurhbVas
- https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/video-lectures/
- https://www.youtube.com/watch?v=mut5Z9Ajva4
- https://www.youtube.com/watch?v=MI5KxHookDs
- https://www.youtube.com/playlist?list=PLRkCJvWSrxbt-xBX5cjzTr4pE0SZ-pIOf

5TH SEMESTER

Approved Vide Agenda Item No. 03 of Minutes of Meeting of Academic Council held on 11 July 17

ELECTRONICS AND COMMUNICATION ENGINEERING, SEMESTER –V TEACHING & EXAMINATION SCHEME WITH EFFECT FROM JULY 2017													
SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					
								THEORY			PRACT		TOTAL
								CIE					
			L	T	P			MID	IE	ESE	CIE	ESE	
1	EC0501	Digital signal processing	3	2	2	5	7	30	10	60	40	60	200
2	EC0502	Electronics measurements and instrumentation	3	0	2	4	5	30	10	60	40	60	200
3	EC0503	Microcontroller and interfacing	3	0	2	4	5	30	10	60	40	60	200
4	EC0504	Analog communication systems	4	0	2	5	6	30	10	60	40	60	200
5	EC0505	Microwave engineering	4	0	2	5	6	30	10	60	40	60	200
6	EC0506	Probability and random process	2	2	0	3	4	30	10	60	0	0	100
7	SH0507	Technical Communication and Soft Skills	1	0	0	0	1	0	0	0	0	0	100
TOTAL			**20**	**4**	**10**	**26**	**34**	**180**	**60**	**360**	**200**	**300**	**1200**

Subject: **Digital Signal Processing**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0501			Semester: **V**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	2	5	60	60	40	40	200

Course Outcomes:

After competing this course the student will be able to

- Describe the difference between analog, continuous-time, discrete time and digital signals and Describe basic operation involved in A/D and D/A conversion.
- Design digital FIR and IIR Filters.

Contents:

UNIT-I **[12]**

INTRODUCTION

Signals, systems and signal processing,concept of frequency in continuous and discrete time signals ,Periodic Sampling & Frequency domain representation of sampling,Reconstructions of band limited signals from its samples, general applications of DSP

Discrete-Time signals and systems:

Discrete-Time Signals, Discrete-Time Systems, LTI Systems,Properties of LTI Systems, Linear Constant Co-efficient Difference equations, linear convolution and its properties, Frequency domain representation of Discrete-Time Signals & Systems

Representation of sequences by discrete time Fourier Transform, (DTFT), Properties of discrete time Fourier Transform, and correlation of signals, Fourier Transform Theorems

UNIT-II **[10]**

THE Z-TRANSFORM AND ITS APPLICATION TO THE ANALYSIS OF LTI SYSTEMS

Properties of ROC for Z-transform, Inverse Z-transform,Frequency response of LTI system, System functions for systems with linear constant-coefficient Difference equations,Freq. response of rational system functions relationship between magnitude & phase,All pass systems, inverse systems, Minimum/Maximum phase systems, systems with linear phase

Structures of Discrete-Time Systems:

Block Diagram representation of Linear Constant-Coefficient Difference equations, Structures of IIR Systems, Basic Structures for FIR Systems

UNIT-III **[10]**

DISCRETE- FOURIER TRANSFORM (DFT)

Discrete Fourier Transform (DFT), Relationship between the DTFT and DFT and their inverses, DFT properties,Linear and circular convolution, Linear filtering methods based on DFT.

FAST FOURIER TRANSFORM[F.F.T]

Direct computation of DFT, DIT & DIF - FFT using radix 2 – Butterfly structure. Decimation in Time[D.I.T] , Decimation in frequency[D.I.F], Introduction to basic butterfly computation in radix-4 FFT algorithm,Goertzel algorithm and Chirp-Z Transform algorithm, Effect of Quantisation in DFT

UNIT-IV **[11]**

IIR FILTER DESIGN

Analog filter design – Butterworth and Chebyshev approximations; Discrete time IIR filter from analog filter, IIR filter design by impulse invariance, bilinear transformation, Approximation of derivatives-(HPF,BPF,BRF) filter design using frequency translation, Warping, prewarping - Frequency transformation.

FIR FILTER DESIGN

Linear phase FIR filter, Filter design using windowing techniques, Frequency sampling techniques, Finite word length effects in digital Filters

Architecture of DSP Processors:

Harward architecture, pipelining, Multiplier-accumulator (MAC) hardware, Architectures of fixed and floating point (TMSC6000) DSP processors.

Text Books:

John G. Proakis& Dimitris G.Manolakis, “Digital Signal Processing – Principles, Algorithms & Applications”, Fourth edition, Pearson education / Prentice Hall, 2007

Reference Books:

1. Alan V.Oppenheim, Ronald W. Schafer &Hohn. R.Back, “Discrete Time Signal Processing”, Pearson Education, 2nd edition, 2005
2. Digital Signal Processing: A Computer-Based Approach, S. K. Mitra, McGraw-Hill, Third edition, 2006

Subject: **Electronics measurements and instrumentation**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0502			Semester: **V**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	60	60	40	40	200

Course Outcomes :

After competing this course the student will be able to

5. Evaluate the performance parameters of electronic and communication systems
6. Prepare test plans to verify the specifications
7. Design test procedures for verification of system/sub-system specifications
8. Design custom test instruments

Contents:

UNIT-I **[12]**

Basics: Parameters, Units of measurements, Accuracy, Resolution, Precision

Sensors and Transducers: Various types of sensors, Signal Conditioners, Data Acquisition systems

UNIT-II **[12]**

Analog measurements: Voltage, Current and Power, Impedance, Resistance, Capacitance, Inductance, Time and Phase, Gain and loss, Frequency, Frequency response, Noise power, Noise figure, Non-linearity, Group Delay, Distortion, Video Measurements

Digital measurements: Jitter, BER, Eye diagram

UNIT-III **[12]**

Signal Sources: Audio and RF Oscillators, Data Generators, Pattern Generators, Video Signal Generator

Measuring Instruments: DVM, Oscilloscopes, DSO, Spectrum Analyzer, Logic Analyzer, Distortion Analyzer, Network Analyzer, TDR, RF Power Meters,

UNIT-IV **[12]**

Interfaces: GPIB, HPIB, USB, PCI

Virtual Instruments: Software based instrumentation, PC based instrumentation

Text Books:

1. David A. Bell, “Electronic Instrumentation and Measurements”, 3rd Ed, Oxford University Press, 2013

Reference Books:

1. Oliver and Cage, “Electronic Measurements and Instrumentation”, McGraw Hill
2. H.Kalsi, “Electronic Instrumentation”, McGraw Hill India, 2004
3. Banerjee, Gopal Krishna, “Electrical and Electronic Measurements”, PHI Learning, 2012
4. HP Application Notes, Agilent Application Notes

Subject: **Microcontroller and Interfacing**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0503			Semester: **V**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	60	60	40	40	200

Course Outcomes :

After competing this course the student will be able to

1. Develop software for microcontroller systems using assembly & C programming language.
2. Demonstrate an ability to use both polling and interrupt-driven approaches for interfacing a microcontroller with peripheral devices.
3. Develop and analyze software to interface a microcontroller with common peripheral devices, such as switches, visual displays, digital-to-analog converters, analog-to-digital converters, D.C Motor, Stepper Motor.

Contents:

UNIT-I **[12]**

8051 Microcontroller and Assembly Language Programming:

Microcontroller and Embedded Processor, Overview of 8051 family, Architecture of 8051, Assembling and Running of 8051 Programs, Program Counter, Stack Pointer, PSW and Register Banks and Stack, ROM and RAM Space

8051 Programming in Assembly Language

8051 addressing modes, Arithmetic and Logical instructions and Programs, Jump, Loop and Call instructions, BCD, ASCII and other Application Programs

8051 Hardware Connection, Intel Hex file & I/O Port Programming

Pin Description of the 8051, Design and test of 8051 Minimum Module, Explaining Intel Hex File, I/O Programming, I/O bit Manipulation Programming

UNIT-II **[12]**

8051 Programming in C

Data Types and Time Delays in 8051 C, I/O Programming in 8051 C, Logic Operation in 8051 C, Data Conversion Programs in 8051 C, Access code ROM space in 8051 C, Data Serialization Using 8051 C

8051 Timer & Counter Programming in Assembly and C

8051 Timer Programming, 8051 Counter Programming, Programming Timer and Counter in C 8051 C

8051Timer , Serial & Interrupt Programming in Assembly and C

Basics of Serial Communication, 8051 Connection to RS-232, 8051 Serial Port Programming in Assembly, Serial Port programming in C, 8051 Interrupt Programming, Timer Interrupts, Programming External Hardware Interrupts, Programming the serial communication interrupts, Interrupt Priority, Interrupt Programming in C

UNIT-III **[12]**

8051 Interfacing

8051 interfacing with external ROM, flash memory and RAM, LCD interfacing, Key-board interfacing, Parallel and serial ADC, DAC interfacing, RTC interfacing,RTC programming in C, Alarm, SQW, and IRQ features of the DS12887 chip. Relays and Opt isolators, Stepper motor interfacing,DC motor interfacing and PWM.

UNIT-IV **[12]**

Introduction to Arduino

What is Arduino, Introduction to Arduino Uno, Interfacing LED's , LCD, Pheripherla interfacing with Arduino

Text Books

1. 8051 Microcontroller and Embedded system using Assembly and C, 2nd Edition, Muhammad Ali Mazidi, Janice GillispieMazidi and RolinMcKinlay, Pearson Eduction
2. The 8051 Microcontroller, Architecture, programming and applications, 2nd Edition, Kenneth J Ayala, Penram International Publishing Pvt. Ltd

Reference Books

1. Microprocessor and Microcontroller fundamentals. The 8085 and 8051 Hardware and Software by William Kleitz
2. 8051 Microcontroller: Internals, Instructions, Programming and Interfacing 1st Edition by SubrataGhosal ,Pearson Education

Subject: **Analog Communication Systems**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0504			Semester: **V**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	0	2	5	60	60	40	40	200

Course Outcomes:

After completing this course the student will be able to

1. Understand how the information transfer over a longer distance can take place and the techniques involved in such communication.
2. Understand the reliability of communication process in presence of noise.
3. Understand some real-world application of communication systems.

Contents:

UNIT-I **[14]**

Introduction to Signals:

Types of Signals, Signals and Vectors, Signal comparison using correlation, Orthogonal signal set, Fourier Series, Analysis and Transmission of Signals using Fourier Transform, Signal transmission through linear system.

Communication System:

Analog and Digital Messages, Parameters of Communication systems: Signal-to-ratio, Channel Bandwidth, Transmission Bandwidth, Signal Bandwidth, Rate of Communication, Modulation, Redundancy and Coding, Application of Communication Systems

UNIT-II **[11]**

Amplitude Modulation:

Baseband and Carrier Modulation, Double side band, Double Side band Suppressed Carrier, Amplitude Modulation (AM), Quadrature Amplitude Modulation(QAM), Single Side Band (SSB), Vestigial Side Band (VSB)

Angle Modulation:

Concept of instantaneous frequency, Bandwidth of angle modulated wave, Generation of FM waves, Demodulation of FM, Phase Modulation

UNIT-III **[11]**

Noise:

Introduction, Thermal Noise, Shot Noise, Partition, Noise, Flicker Noise, Performance of AM systems in presence of Noise, Performance of Angle modulated systems in presence of Noise, Pre-emphasis and Deemphasis

UNIT-IV **[12]**

Receivers:

Superheterodyne Receiver, Tracking, Tuning, Sensistivity, Gain, Image Rejection, AGC, Adjacent channel selectivity, FM receiver

Recent Trends and Development in Analog Communication:

Applications of AM, FM and PM, FM Broadcast Radio, Frequency Stabilizers

Text Books:

1. Modern digital and analog Communication systems“, B. P. Lathi, Oxford, University Press., 4th Ed, 2010.
2. Electronic Communications”, Dennis Roddy and John Coolen, Pearson, 4th edition, 2011.

Reference Books:

1. Communication Systems, Simon Haykins, 5th Edition, John Willey,India Pvt. Ltd, 2009.
2. Taub& Schilling: Principles of Communication Systems, Tata McGraw-Hill
3. Leon W.Couch, II: Digital and Analog Communication Systems, Pearson, Education (Seventh Edition)

Subject: **Microwave Engineering**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0505			Semester: **V**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	0	2	5	60	60	40	40	200

Course Outcomes:

- Obtain an understanding of transmission lines & waveguides.
- Gain the knowledge of the different microwave passive components and evaluate their S-parameters.
- Study of the different microwave semiconductor devices and microwave tubes.

Contents:

UNIT-I **[12]**

Transmission lines:

Lumped-element circuit model for a transmission line, the transmission line equations, terminated lossless transmission lines, Voltage standing wave ratio& Reflection co-efficient, Input impedance of finite length transmission line, Smith chart and impedance matching.

UNIT-II **[15]**

Waveguides:

General solutions for TEM, TE and TM waves, Rectangular waveguide, Circular waveguide, group velocity, phase velocity & wave impedance, Co-axial line, Stripline, Microstrip lines.

UNIT-III **[15]**

Microwave Passive Components:

Scattering Matrix, Reciprocal & lossless networks, Waveguide Tees (E-Plane and H-Plane), Directional Coupler, Magic Tee, Waveguide bends and corners, S-matrix for E-plane Tee junction, S-matrix for H-plane Tee junction, S-matrix for directional coupler, circulator, Isolator.

UNIT-IV **[15]**

Microwave tubes & Diodes:

Limitation of conventional tubes, Two cavity klystron amplifier, Reflex Klystron oscillator, velocity modulation in reflex klystron, Applegate diagram with gap voltage for a reflex klystron, Operation of magnetron, advantages of slow wave devices, principle of operation of TWT, IMPATT , TRAPATT, BARITT diodes.

Text Books

1. Microwave Engineering, 3rd Edition, David M Pozar, Wiley Publication

Reference Books

1. Microwave Devices and Circuits, S. Y. Liao, PHI Publication
2. Fields & Waves in Communication Electronics, Ramo S. Whinnery , 3rd Edition, Wiley

Subject: **Probability and Random process**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0506			Semester: **V**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
2	2	0	3	60	00	40	00	100

Course Outcomes:

A student passing this course will have acquired the following abilities:

- Students would attain sufficient maturity to apply probability theory.
- They will be able to visualize probabilistic view point of the problem as the extension of deterministic view point.
- Understand different probabilistic viewpoints based on deductive theory, axiomatic and frequents approach.
- Students will be able to apply basic estimation theory to the Engineering problem.

UNIT-I **[12]**

Probability:

Introduction, The definitions, Probability and Induction, Causality Versus Randomness

The Axioms of Probability:

Set Theory, Probability Space, Conditional Probability.

Repeated Trials:

Combined Experiments, Bernoulli Trials and Theorem

UNIT-II **[12]**

The Concepts of Random Variables:

Distributions and Density Functions, Specific Random Variables, Conditional Distributions

UNIT-III **[12]**

Functions of One Random Variable (RV):

Mean of RV, Variance of RV, Moments of RV, and Joint moments of RVs.

UNIT-IV **[12]**

Statistics:

Estimation, Parameter Estimation, Hypothesis Testing

Introduction to Regression:

Linear, RANSAC

Text Books

1. Papoulis, A, and S. U. Pillai (2002), Probability, Random Variables and Stochastic Processes, 4th Edition, Tata McGraw-Hill.

Reference Books

1. A first Course in Probability, Sheldon Ross, 9th Edition, 2012, Pearson
2. Grimmett, Geoffrey, and David Stirzaker. Probability and Random Processes. 3rd ed. Oxford University Press, 2001.

Subject: **Technical Communication and Soft Skills**								
Program: **B.Tech. EC Engineering**			Subject Code: SH0507			Semester: **V**		
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
1	0	0	0	60	00	40	00	100

Course Objectives:

1. To enable students to interact with a degree of fluency and spontaneity that makes regular interaction with fluent English speakers quite possible without strain for either party.
2. To understand with ease virtually everything heard or read.
3. To express themselves spontaneously, very fluently and precisely, differentiating finer shades of meaning even in the most complex situations.
4. To understand sentences and frequently used expressions related to areas of most immediate relevance (e.g. very basic personal and family information, shopping, local geography, employment).
5. To communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar and routine matters
6. To understand the main ideas of complex text on both concrete and abstract topics, including technical discussions in their field of specialization.

Course Content:

	Sr. No.	**Content**
Listening	1	**Listening: Cloze test**
	2	**Listening to Talks (BBC, TED) 1**
	3	**Listening to Talks 2**

Speaking	**4**	**Phonetics: Sounds & Symbols & Accent Patterns**
	5	**Vocabulary Games: Intermediate Level**
	6	**Vocabulary Games: Intermediate Level**
	7	**Building Dialogues: Situational Conversation**
	8	**Role Play**
	9	**Group Discussion**

Reading	**10**	**How to Read effectively**
	11	**Reading to Remember : SQ3R**

Writing	**12**	**Grammar Intermediate: Sentence Transformation**
	13	**Common Errors in English**
	14	**Précis Writing**
	15	**Effective Paragraph Writing**

6TH SEMESTER

Approved Vide Agenda Item No. 03 of Minutes of Meeting of Academic Council held on 11 July 17

ELECTRONICS AND COMMUNICATION ENGINEERING, SEMESTER –VI TEACHING & EXAMINATION SCHEME WITH EFFECT FROM JULY 2017													
SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					
								THEORY			PRACT		TOTAL
								CIE					
			L	T	P			MID	IE	ESE	CIE	ESE	
1	EC0601	Digital Communication	3	0	2	4	5	30	10	60	40	60	200
2	EC0602	Antenna & Wave Propagation	3	2	2	5	7	30	10	60	40	60	200
3	EC0603	Wireless communication	3	0	2	4	5	30	10	60	40	60	200
4	EC0604	VLSI Design	3	2	2	5	7	30	10	60	40	60	200
5	EC0605	Video Engineering (EL-I)	3	0	2	4	5	30	10	60	40	60	200
	EC0606	Power Electronics (EL-I)											
6	EC0607	Radar and Navigation (EL-II)	3	2	0	4	5	30	10	60	40	60	200
	EC0608	Advanced Processor (EL-II)											
	EC0609	Error Correcting Codes (EL-II)											
7	SH0607	Advanced Technical Communication And Soft Skills	1	0	0	0	1	0	0	0	0	0	100
TOTAL			22	6	12	26	35	180	60	360	240	360	1300

Subject: **Digital Communication**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0601			Semester: **VI**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	60	60	40	40	200

Course Outcomes:

On successful completion of this course student will be able to Study representation of signals and discuss the process of sampling, quantization and coding.

Understand baseband and band pass signal transmission and reception techniques.

- Learn error control coding for the encoding and decoding of digital data streams over noisy channels for their reliable transmission.
- Design variable length codes for a given message source to increase efficiency.

Contents:

UNIT-I **[12]**

Introduction to Digital Communication Systems, Communication System Model, Typical Digital communication System, Advantage of Digital communication

Probability and random process

Information, Probability, Random Variables, Mean and variance, Conditional Probability of independent events, Relation between probability and probability Density , Rayleigh Probability Density , CDF, PDF, Random Variables, correlation between Random Variables, Linear mean square Estimation, Central limit theorem, Error function and Complementary error function Discrete and Continuous Variable, Gaussian PDF, Threshold Detection, Statistical Average,Chebyshev In Equality, Autocorrection.

UNIT-II **[10]**

Information Theory:

Introduction, Concept & Measure of information, statistics of discrete channel, Error Free Communication Over a noisy channel, Shannon Theorem, The channel capacity of a Discrete Memory less Channel, Optimum System, The channel capacity of a Continuous Channel, Source Coding.

Error Control Coding:
Introduction, Linear block code, cyclic code, convolution code, Burst Error Correcting and detecting code

UNIT-III **[10]**
Base Band Modulation:

PAM Signals, Digital multiplexing ,line coding,Digitizing Analog signals sampling,Quntization,Encoding, Alising, Nyquist first and second criterion for zero ISI, PCM, DPCM, ADPCM, Uniform and Non-uniform Quantization, Quantization Error in PCM,Delta Modulation, Adaptive Delta Modulations ,SNR Calculation, Non-uniform Quantization

UNIT-IV **[11]**
Digital Modulation Techniques:
QAM, BPSK, QPSK, DPSK, MSK, M-ary-FSK, M-ary-PSK, BFSK of various digital modulation techniques and scrambling

Digital Demodulation Techniques:

Coherent and non-coherent detection of ASK, FSK, PSK, QPSK,DPSK. Noise Figure, Signal to noise Ratio, performance of communication system with channel noise.

Text Books:

1. Digital Communication-Theory, Techniques and Applications by R. N. Mutagi, 2nd edition, OXFORD University press.
2. Digital and analog communication system by B.P.Lathi .Zhi Ding (international 4th Edition), OXFORD university press.

Reference Books:

1. An Introduction to Analog and Digital Communications by Simon Haykin, Wiley India.
2. Principle of communication system by Taub . Schilling (2nd Edition), TATA McGRAW-HILL.
3. Digital Communications by Simon Haykin, Wiley India

Subject: **Antenna & Wave Propagation**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0602			Semester: **VI**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	2	5	60	60	40	40	200

Course Outcomes :

- The objective of this subject is to deliver an in-depth knowledge of the basic antennas.
- Also give the practical design consideration and simulation of various antennas for different applications.
- The basic theoretical concepts for the radio wave propagation are also covered.

Contents:

UNIT-I **[12]**

Overview of antennas:

Types of Antennas , Radiation mechanism, Current distribution on a thin wire antenna, Antenna parameters, radiation pattern, antenna field zones, radiation power density, radiation intensity, directivity, gain, antenna efficiency, half-power beamwidth, first null beamwidth, beam efficiency, bandwidth, polarization, input impedance, antenna radiation efficiency, antenna effective area , Friss transmission equation.

UNIT-II **[12]**

Radiation integral:

Vector potential A and F for Electric & Magnetic current sources J & M, E and H field for electric and magnetic current sources, Far field radiation, duality theorem, reciprocity theorem, radiation form current element and dipole, radiation patterns of different dipoles, radiation power density, radiation resistance & directivity of dipole.

UNIT-III **[12]**

Antenna Arrays:

Two-element array, N-element linear array- Uniform amplitude & spacing, array/space factor, broadside array, end-fire array, N-element linear array- Uniform spacing & non uniform amplitude, planar array, introduction to active phased (scanning) array and adaptive arrays.

Wave Propagation:

Ground wave propagation, terrain and earth curvature effects, tropospheric propagation, fading, diffraction and scattering, ionospheric propagation, refractive index, critical frequencies, maximum usable frequency, effects of magnetic field.

UNIT-IV **[10]**

Miscellaneous Antennas:

Huygen's Field Equivalence Principle, Aperture Antennas, Horn Antennas, Reflector Antennas, Micorstrip Antennas, Helical Antennas, Babinet's principle, Slot Antennas.

Text Books:

1. Antenna Theory: Analysis and Design, 3rd Edition, C A Balanis, Wiley Publication.
2. Antennas, J D Krauss, Mcgraw-Hill Higher Education.

Reference Books:

1. Electromagnetic Wave and Radiating Systems, Edward C. & Balmain, Keith G. Jordan. Prentice Hall of India.
2. Electronic and Radio Engineering, F.E. Terman, McGraw-Hill, 4th edition, 1955.

Subject: **Wireless communication**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0603			Semester: **VI**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	60	60	40	40	200

Course Outcomes:

Students will be able to

- Understand the era of wireless communication system
- Get the knowledge of all important concept of wireless systems
- Implement the propagation model for different environments
- Understand the working of today's GSM and CDMA architecture
- Know the recent trends in wireless communication systems

UNIT-I **[12]**

Elements of Cellular Radio System Design

Introduction of cellular system, General description of problem, Concept of frequency reuse channels, Interferences, Handoff mechanism, Umbrella concept, Trunking and Grade of Service, Techniques to improve coverage and capacity in cellular system.

UNIT-II **[10]**

Frequency Management and Channel Assignment

Frequency management, Frequency-spectrum utilization, Set-up channels, Definition of channel assignment, Fixed channel assignment, Nonfixed channel assignment algorithms, Traffic and channel assignment, Value of implementing handoffs, Initiation of a handoff, delaying a handoff, Forced handoffs, power-difference handoffs, Mobile assisted handoff and soft handoff, Introduction to dropped call rate, Formula of dropped call rate

UNIT-III **[10]**

Multiple access techniques and Propagation models of Mobile Radio

FDMA, TDMA, CDMA, OFDM, Radio wave propagation, Transmit and receive signal models, Free-Space path loss, Ray tracing, Empirical path-loss models, Shadow fading, Combined pathloss and shadowing, Outage probability under path loss and shadowing, cell coverage area.

UNIT-IV **[11]**

Digital Cellular Systems

GSM architecture, GSM channel types, GSM speech coding, Location tracking and call setup, security, Data services, Supplementary service data, GSM location update, Mobility databases, Failure restoration, CDMA architecture, RAKE receiver, Frequency and channel specifications, PDC,PHS,WCDMA,GPRS system architecture, Introduction to Wi-Fi, WiMAX, ZigBee Networks, Software defined radio, UWB radio, Wireless Adhoc network and mobile portability, Security issues and challenges in a wireless network.

Text Books:

1. Mobile Cellular Telecommunications analog and digital systems, William C. Y. Lee. 2nd Edition, MGH.
2. Wireless Communication", Theodore S. Rappaport, Prentice hall.

Reference Books:

1. Wireless and Mobile Network Architecture by YI-Bang Lin and Imrich Chlamtac, Wiley publication.
2. "Wireless Communications and Networking ",Vijay Garg, Elsevier
3. Mobile and personal Communication system and services by Rajpandya, IEEE press(PHI).

Subject: **VLSI Design**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0604			Semester: **VI**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	2	5	60	60	40	40	200

Course Outcomes:

The learning outcomes for this course are as follows :

- Be able to use mathematical methods and circuit analysis models in analysis of CMOS digital electronics circuits, including logic components and their interconnect
- Be able to create models of moderately sized CMOS circuits that realize specified digital functions.
- Be able to apply CMOS technology-specific layout rules in the placement and routing of transistors and interconnect, and to verify the functionality, timing, power, and parasitic effects.
- Be able to complete a significant VLSI design project having a set of objective criteria and design constraints

Contents:

UNIT-I [12]

Introduction to VLSI

Introduction, NMOS/PMOS manufacturing, CMOS process steps, Physics of MOS, characteristics of the MOSFET, Threshold voltage, gradual channel approximation, channel length modulation, Scaling of MOSFET, Short channel effects, Narrow channel effects, Latch-up and its prevention in CMOS, SPICE model of MOSFET, Physical design of MOSFET in CAD

UNIT-II [10]

MOS Inverters : Dynamic and Static characteristics

Resistive load inverters, CMOS inverters, Analysis, design, Power consumptions in inverters, Interconnects and parasitic assisted handoff and soft handoff, Introduction to dropped call rate, Formula of dropped call rate

UNIT-III **[10]**

MOS Logic Circuits

Introduction, Combinational MOS Logic Circuits, Sequential MOS Logic circuits, Dynamic Logic Circuits, CMOS Transmission Gates, Schmitt trigger circuits, Voltage Bootstrapping, Pass transistor circuits, High performance CMOS dynamic circuits, Low-power CMOS Logic circuits.

UNIT-IV **[11]**

Sequential MOS Logic Circuits :

Introduction, Behavior of Bi-stable elements, The SR latch circuit, Clocked latch and Flip-flop circuit, CMOS D-latch and Edge-triggered flip-flop

Design for testability:

Introduction, Fault types and models, Controllability and observability, Ad Hoc Testable design techniques, Scan –based techniques,

Text Books:

1. CMOS Digital Integrated circuits – Analysis and Design by Sung – Mo Kang, Yusuf Leblebici,TATA McGraw-Hill Pub. Company Ltd., Third Edition.

Reference Books:

2. Basic VLSI Design By Pucknell and Eshraghian, PHI,3rd ed.
3. Introduction to VLSI Circuits & Systems – John P. Uyemura

Subject: **Video Engineering**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0605			Semester: **VI**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	60	60	40	40	200

Course Outcomes:

Student will be able to understand

- working principle of camera tube
- Scanning requirements
- Proper modulation technique to transmit composite TV signal

Contents:

UNIT-I **[12]**

Fundamental Concept of Television:

Camera tube, TV Transmitter and Receiver, Image continuity, Scanning, Need of scanning, Sawtooth current for scanning, Progressive scanning, Interlaced scanning, Fields, Frame Field and Line frequencies, Active lines, Kell factor, Resolution, Bandwidth, Determination of Number of scanning lines, Synchronization, Blanking, Composite video signal, Positive and Negative polarities of CVS, H-Blanking pulse, Vertical Blanking pulse, Modulation requirement of TV, TV Channels used in India, RF spectrum

UNIT-II **[10]**

Monochrome Receiver and Circuits

Elements of monochrome receiver, Importance of the Inter-carrier frequency in TV receivers, Electronic Tuner, IF system, Surface Acoustic Wave Filter, Video Detector Circuit, Circuit for Cancellation of Noise, Trap circuits, Keyed AGC circuit, DC restoration, Deflection circuits, Sync Separator, Vertical and Horizontal Deflection circuits, Phase splitter, AFC, Sound section of TV receiver.

UNIT-III **[10]**

TV signal Transmission and Reception & Colour Signal Transmission and Reception:

TV Signal propagation, Interference suffered by TV channels, Bandwidth for color signal transmission, Modulation of color Difference signals, Weighting factors, Formation of the Chrominance signal, NTSC color TV system, PAL color Television system, SECAM system, Merits and Demerits of NTSC,PAL and SECAM systems

Digital TV transmission and Reception:

Digitizing video, Chroma Sub sampling, Basics of video compression(MPEG-x, H.26x), Digital VTR, HDTV, Video Interfaces (Composite, Component, S-Video, DV,SDI, HDMI, DVI),Digital color TV receiver, Display Technologies.

UNIT-IV **[11]**

Video Recording:

Principle of Video recording, Relation between Tape speed and Bandwidth, Problems in Video Recording on Tape, Need of Frequency Modulation, Recording of Luminance and Colour signals on the same Track, Reproduction of Video signal on VCR,Recording on VCD and DVD.

Text Books:

R.R. Gulati, “Modern Television Practice”, 4th edition, New Age Publication

Reference Books:

1. R.G. Gupta, “Television Engineering and Video Systems”, Tata Mc-Graw-Hill.
2. John Watkinson, “ Guide To Compression”,

Subject: **Power Electronics**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0606			Semester: **VI**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	60	60	40	40	200

Course Outcomes:

On successful completion of this course the student will be able to

- Describe the role power electronics play in the improvement of energy usage efficiency and basic operation of various power semiconductor devices.
- Analyze and design an AC/DC Rectifier circuits and DC/DC Converter Circuits.
- Analyze DC/AC inverter circuits.
- Design and describe the need of power electronics applications.

UNIT-I **[12]**

POWER DEVICES:

SCR structure, characteristics, Two transistor Analogy, rating, Gate triggering circuits(R and RC triggering), UJT, Turn-on and turn off methods and characteristics of SCR, serial and parallel operation of SCR, structure and characteristics of power semiconductor devices (IGBT, GTO, DIAC, TRIAC, power MOSFET and LASCR).

UNIT-II **[10]**

Phase controlled converters:

Single phase Half and Full wave controlled Rectifier with R and RL load, single phase Half and full controlled Bridge Rectifier with R and RL load, effect of freewheeling diode, Three phase Half and full wave controlled Rectifier with R and RL load, Three phase half and full controlled bridge rectifiers with R and RL load-- circuit diagram, waveforms, derivation of average load voltage and rms load voltage.

UNIT-III **[10]**

DC chopper:

Introduction, operation principle, chopper classification, step up and step down dc-dc converters-circuit diagram, waveforms, output waveform calculations, chopper control of motors, Analysis with waveform of buck, boost and buck-boost converter.

UNIT-IV **[11]**

Inverters and power electronic applications:

Introduction, principle of operation of PWM inverters, performance parameters, single phase half and full bridge inverters with R and RL load, Three phase bridge inverters.

Applications:

Introduction, UPS, SMPS, battery chargers, RF heating.

Text Books:

1. M.D Singh and K.B Khanchandani –Power Electronics, TMH (2nd edition).
2. M.H Rashid- Power Electronics circuits, devices and applications, PHI (3rd edition).

Reference Books:

1. Denis Fewson: Introduction to Power Electronics, Oxford University Press.
2. Ned Mohan, T.M Undelandand W.P Robbins-Power Electronics, converters, application and design, john Wiley and son (3rd edition).

Subject: Radar & Navigation								
Program: **B.Tech. EC Engineering**				Subject Code:EC0607			Semester: **VI**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	60	00	40	00	100

Course Outcomes:

After competing this course the student will be able to

- Evaluate the performance parameters of electronic and communication systems
- Prepare test plans to verify the specifications
- Design test procedures for verification of system/sub-system specifications
- Design custom test instruments

UNIT-I **[10]**

Introduction

The simple form of Radar Equation, Radar Block diagram and Operation, Types of transmitters, duplexer and displays. Radar Frequencies, millimeter and submilimeter waves, Applications of Radar.

Radar Equation

Prediction of Range Performance, Minimum Detectable Signal, Receiver Noise, Signal to Noise Ratio, Matched filter impulse response, Integration of radar Pulses, Radar Cross Section of Targets, Cross section Fluctuations, Radar Clutter-surface clutter, sea clutter and Land clutter ,weather clutter, Transmitter Power, Pulse Repetition Frequency and Range ambiguities.

UNIT-II **[13]**

CW and FM CW Radar

Doppler Effect. CW radar. FM CW radar. Airborne Doppler Navigation, Multiple CW radar

MTI and Pulse Doppler Radar

Introduction, Delay line Cancellers, Multiple or staggered Pulse Repetition Frequencies, Range gated Doppler Filters, Block Diagram of Digital Signal Processor, Example of MTI radar Processor, , Pulse Doppler Radar, Non coherent MTI ,MTI from moving platform, Other types of MTI, Airborne radar.

UNIT-III **[13]**

Tracking and Imaging Radar

Tracking with Radar, Monopulse tracking, Conical scan and Sequential lobing, Low angle tracking, Air surveillance radar, Introduction to Synthetic aperture radar (SAR).tracking in range and Doppler, Acquisition.

Electronic Scanning Radar

Principle of phased array for electronic scanning, Advantages and capabilities of electronic scanning, block diagram of an electronic scanning system and its operation

UNIT-IV **[12]**

Navigation

Introduction, Hyperbolic systems of navigation, Doppler navigation, Inertial navigation, Satellite navigations.

Recent trends in Satellite Navigation

GPS principle of operation, Position location determination, principle of GPS receiver and applications, Brief note on Global Satellite Navigation system, Martitime Satellite ,Satellite Constellations ,Navigation Satellites of different countries such as Glonas and Compass, GAGAN,IRNSS, NAVIC Receiver and applications

Text Books:

1. Introduction to Radar System M.I. Skolnik ,McGraw Hill
2. Elements of Electronic Navigation Systems, Tata McGraw-Hill,

Reference Books:

1. Radar Systems and Radio Aids to Navigation, Sen & Bhattacharya, Khanna publishers
2. Radar Principles, Peyton Z. Peebles ,JohnWiley, 2004

Digital Learning Resources:

1. http://nptel.iitm.ac.in/courses.php?branch=Ece
2. http://www.radartutorial.eu/07.waves/wa04.en.html

Subject: **Advanced Processor**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0608			Semester: **VI**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	60	60	40	40	200

Course Outcomes:

- Students will be able to write Assembly language programs using MASM assembler. Student will be able to interface 8086 with memory and I/O devices.
- Students will be able to write assembly language programs for the 8086 processor.

Contents:

UNIT-I **[12]**

Introduction to 8086

Introduction, the 8086 Microprocessor, Real Mode Memory Addressing, Memory organization of 8086

Instruction set of 8086

Addressing modes, Instruction format, Instruction set

UNIT-II **[10]**

Assembler Directives

Assembly Language, Assembly Language Program Development tools, MASM Assembler, Assembler Directives, Programming of 8086

8086 Hardware Specification

8086 Pin Descriptions, Clock Generator, Minimum mode and Maximum Mode operations, Memory Interfacing with 8086, address decoding, Introduction to basic I/O Interface, I/O port address decoding

UNIT-III **[10]**

Interrupts of 8086:

Advantage of Interrupts, Interrupt Systems,Classification of Interrupts,Interrupts of 8086, Interrupt Pointer Table

80186 and 80286 Microprocessor:

Intel 80186 Microprocessor, Internal Block diagram of 80186, Pin configuration of 80186, Microprocessor 80286, Architecture of 80286, Pin description of 80286, Registers of 80286, Memory organization and segmentation, Memory operating modes Protected Virtual address mode, Local and Global descriptor table, Multitasking in 80286,Privilege level

UNIT-IV **[11]**

80386 and 80486 Microprocessor:

Microprocessor 80386, Architecture of 80386, Signal Descriptions of 80386, Modes of Operation, Register Organization of 80386, Addressing modes, Memory Organization and memory Management unit of 80386, Global and Local Descriptors table, Paging, Virtual 8086 mode of 80386, Memory Protection, Microprocessor 80486, Pin Configuration of 80486, Eflag Register of 80486, Memory organization of 80486, Memory Management of 80486, Interrupt and Exceptions of 80386 and 80486

Pentium, Pentium Pro, Pentium II, Pentium III, Pentium IV and Core2 microprocessors:

Introduction to Pentium microprocessor, Special Pentium registers, Basic and additional features of Pentium Pro Pentium II, Pentium III, Pentium IV and Core2 microprocessors.

Text Books:

The Intel Microprocessors: 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro Processor, Pentium II, Pentium III, Pentium 4, and Core2 with 64-bit Extensions, 8th Edition , Barry B. Brey, Pearson Education

Reference Books:

1. The x86 Microprocessors: 8086 to Pentium, Multicores, Atom and the 8051 Microcontroller: Architecture, Programming and Interfacing, 2/e, Pearson Education, Lyla B Das
2. Microprocessors and Interfacing By Douglas V Hall Revised Second Edition, McGraw Hill Publication

Subject: **Error Correcting Codes**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0609			Semester: **VI**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	60	00	40	00	100

Course Outcomes:

- To understand life cyclic redundancy codes and convolution codes
- To get a clear concept of different error correcting codes and convolution codes

Contents:

UNIT-I **[10]**

Introduction to coding theory, Coding for reliable digital Transmission, Types of codes, Types of errors, Average mutual information and Entropy, introduction to source coding & Channel coding theorem, Huffman coding.

UNIT-II **[13]**

Linear block codes: Basics, matrix description of linear block codes, Equivalent codes, parity check matrix, decoding of linear block codes, syndrome decoding, probability of error correction, Perfect codes, Hamming codes.

UNIT-III **[13]**

Cyclic codes: Polynomials, The division algorithm for polynomials, A method of generating cyclic codes, matrix description of cyclic codes, Cyclic encoding, Syndrome decoding, Introduction to BCH codes, Golay codes.

UNIT-IV **[12]**

Convolution codes, tree and trellis codes, analytical representation of convolution codes. Trellis coded modulation basics, turbo coding and decoding

Text Books:

Lin shu,Shu lin and Daniel Costello, ‘Error control coding’ Prentice Hall, 2nd Ed, 2004

Reference Books:

Todd k.Moon, ‘Error correcting coding: mathematical Methods & algorithms’, Wiley India

Subject: **Advanced Technical Communication And Soft Skills**								
Program: **B.Tech. EC Engineering**			Subject Code: SH0607				Semester: **VI**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
1	0	0	0	60	00	40	00	100

	Sr. No.	Content
Speaking	1	Vocabulary Games: Advanced Level
	2	Role Play 1
	3	Role Play 2
	4	Role Play 3
	5	Selected speeches & Songs: Declamation 1
	6	Selected speeches & Songs: Declamation 1
	7	Report Presentation Seminar
	8	Report Presentation Seminar
	9	Report Presentation Seminar
	10	Interview Skills (Mock Interview Sessions 2)
Writing	11	Writing Reports
	12	Making Proposals
	13	Resume Building
	14	Letter, Email application

Reference Books:

1. Fred Luthans, Organizational Behaviour, McGraw Hill
2. Lesikar and petit, Report writing for Business
3. M. Ashraf Rizvi, Effective Technical Communication, McGraw Hill
4. Wallace and masters, Personal Development for Life and Work, Thomson Learning
5. Hartman Lemay, Presentation Success, Thomson Learning
6. Malcolm Goodale, Professional Presentations
7. Farhathullah, T. M. Communication skills for Technical Students

8. Michael Muckian, John Woods, The Business letters Handbook

9. Herta A. Murphy, Effective Business Communication

10. Lehman, Dufrene, Sinha BCOM, Cengage Learning

Web resources/ MOOCs:

Introduction to English Language & Literature Mod-1 Lec-1
https://www.youtube.com/watch?v=xC3M9EqduyI

The English Language Mod-1 Lec-
https://www.youtube.com/watch?v=HsR4jFszFdw#action=share

International English Mod-1 Lec-4
https://www.youtube.com/watch?v=FT4cQkXCc8g

Effortless EnglishRule-1 English Phrases:
https://www.youtube.com/watch?v=r5z-lilm-gg

Pronunciation Training Techniques:
https://www.youtube.com/watch?v=wB8mr4iViy0

Make Body Language Your Superpower:
https://www.youtube.com/watch?v=wB8mr4iViy0

English Job Interviews | Best Answers to Questions:
https://www.youtube.com/watch?v=wB8mr4iViy0

7TH SEMESTER

Approved Vide Agenda Item No. 03 of Minutes of Meeting of Academic Council held on 11 July 17

ELECTRONICS AND COMMUNICATION ENGINEERING, SEMESTER –VII TEACHING & EXAMINATION SCHEME WITH EFFECT FROM JULY 2017													
SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					
								THEORY			PRACT		TOTAL
								CIE					
			L	T	P			MID	IE	ESE	CIE	ESE	
1	EC0701	Embedded System	3	0	2	4	5	30	10	60	40	60	200
2	EC0702	Satellite communication	3	2	0	4	5	30	10	60	0	0	100
3	EC0703	Image and Video Processing	3	0	2	4	5	30	10	60	40	60	200
4	EC0704	Data Communication Networks	3	0	2	4	5	30	10	60	40	60	200
5	EC0705	Optical Fiber Communication	3	0	2	4	5	30	10	60	40	60	200
6	EC0706	Advanced Mobile Communication (EL-III)	3	2	0	4	5	30	10	60	0	0	100
	EC0707	Cryptography and Network Security (EL-III)											
	EC0708	Raspberry pi platform and python programming for raspberry pi by coursera (MOOC Course) (EL-III)											
7	CV0712	Disaster Management	1	0	0	0	1	0	0	0	0	0	100
TOTAL			**19**	**04**	**08**	**24**	**31**	**180**	**60**	**360**	**160**	**240**	**1100**

Subject: **Embedded System**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0701			Semester: **VII**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	60	60	40	40	200

Course Outcomes:

After studying this course the student will be able to

- Understand ARM7 architecture and real time operating system
- Interface various peripherals with microcontroller through programming

UNIT-I **[10]**

Introduction

Embedded system and general purpose computers, embedded system components, Embedded System Design Process Classification of an embedded system, Examples of an embedded system Applications of an embedded system.

ARM Architecture

ARM Programming Model, Processor Modes, Registers, Exceptions, Interrupts & the vector table, Pipeline, 3-stage Pipeline ARM Organization, 5-stage Pipeline ARM Organization

UNIT-II **[13]**

ARM Instruction set

Data Processing Instructions, Branch Instructions, Load-Store Instructions, Software-Interrupt Instruction, Program status register instruction, multiply instruction, Assembly language Programs

Thumb Instruction set

Thumb programmers model, Thumb branch instruction, Thumb software interrupt instruction, Thumb data process instruction, Thumb single register data transfer instruction, Thumb multiple register data transfer instruction, Thumb breakpoint instruction

UNIT-III **[13]**

Interprocess communication and synchronization

Multiple process & thread in application, Task and task state, Task control block ,Task coding, Task scheduling, Semaphores for synchronization, Data sharing & deadlocks, Interprocess Communication

UNIT-IV **[12]**

RTOS

Operating system services, Process management, Timer & Event function, Memory management, Device, file, I/O subsystem management, Interrupt routine in RTOS environment and handling of interrupt service calls, Basic design using RTOS, RTOS task scheduling models, Interrupt latency and response of task & performance metrics, OS security issues

Text Books:

1. Raj Kamal, "Embedded System Architecture, Programming and Design", Tata McGraw-Hill
2. Steve Furber, "ARM System on Chip Architecture", Pearson Education

Reference Books:

1. Wayne Wolf, "Computer as Components: Principles of Embedded Computing System Design", Morgan Kaufmann Publication
2. Andrew N. Sloss, Dominic Symes , Chris Wright, "ARM System Developer's Guide Designing and Optimizing System Software", Morgan Kaufmann Publishers

Subject: **Satellite communication**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0702			Semester: **VII**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	60	00	40	00	100

Course Outcomes:

After competing this course the student will be able to

- Evaluate the performance parameters of electronic and communication systems
- Prepare test plans to verify the specifications
- Design test procedures for verification of system/sub-system specifications
- Design custom test instruments

Contents:

UNIT-I **[10]**

Introduction to Satellite Communication

Benefits of satellite communication, Historical evolution of communication satellites, Satellite communication in India, Elements of satellite communication, Types of satellites, Satellite services, Satellite network configurations, Satellite frequency bands

Satellite Orbits and Orbital Parameters

Introduction, Types of orbits, Kepler's laws, Orbital Elements, Solar Time and Sidereal Time, Satellite Orbits, Orbital Perturbations, Satellite position determination, Limits of visibility, earth eclipse of satellite, Eclipse of satellite, Satellite Launching, Geolaunching Methods

UNIT-II **[13]**

Space Segment

Introduction to Satellite System, Transponder Subsystem, Antenna Subsystem, Altitude and Orbit Control (AOC) Subsystem, Telemetry, Tracking and Command Subsystem,

Power Subsystem, Thermal Subsystem, Structural Subsystem, Reliability and Quality Assurance

Ground Segment

Introduction, Elements of an Earth Station, Types of earth stations, Earth Station transmitter, Earth Station Receiver, Antenna and Feed Systems, Antenna Tracking, High Power Amplifier, Low Noise Amplifier, Up-converter, Down converter, IF subsystems, Baseband subsystems, Terrestrial Interface equipment, Earth station performance, Redundancy and reliability, Mission Control for Communication Satellites

UNIT-III **[13]**

Propagation effects

Rain attenuation, Depolarization, Cross polarization, Propagation impairments and Mitigation techniques

Satellite link design

Introduction, Satellite Communication system model, Basic transmission equation, Noise at the receiver, G/T ratio for earth stations, Uplink Equations, Downlink Equations, Total link, System Design Examples

UNIT-IV **[12]**

Satellite Multiple Access

Introduction, Frequency Division Multiple Access, SCPC, MCPC, SPADE, Time Division Multiple Access, SS-TDMA, Acquisition and Burst synchronization, Spread Spectrum Multiple Access, Demand Assigned Multiple Access, Random Access

Satellite Applications

VSAT Systems, Voice Network Configurations, Data Networks, VSAT Terminal

Broadcast Services: TVRO, DTH, DVB, HDTV, Satellite Radio, DAB, Satellite News Gathering, Satellite broadcast standards

Text Books:

1. T.Pratt, C.Bostian, J.Allnutt, “Satellite Communications” 2nd Ed., Wiley India, 2009

2. Dennis Roddy, “Satellite Communication”, 4th Ed., McGraw Hill, 2008

Reference Books:

1. Louis J. Ippolito, Jr., “Satellite Communications Systems Engineering”, Wiley, 2008
2. B.G.Evans, “Satellite Communication Systems”, IET Telecommunication Series 38, 2008
3. M.Richharia, “Stellite Communication Systems: Design Principles”, McGraw Hill, 1999

Subject: **Image and Video Processing**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0703			Semester: **VII**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	60	60	40	40	200

Course Outcomes:

- Fundamentals of Image
- Enhancing the quality of Image by Spatial and Frequency domain techniques
- Basics of color Image Processing
- Digital video Fundamentals and Compression standards for Image and Video

Contents:

UNIT-I **[10]**

Introduction to Image Processing:

Image Sampling, quantization, Resolution, Classification of digital images, Image types, basic of Image processing systems, Application of Digital Image Processing.

Image Transforms:

2D-DFT, Walsh, Hadamard, Haar, Slant, DCT, KL, Wavelet.

UNIT-II **[13]**

Image Enhancement:

Spatial Domain:
Intensity Transform functions, Histogram processing, Spatial filters

Frequency Domain:

Basics of filtering in Frequency domain, Spatial domain filters.

UNIT-III **[13]**

Image restoration and reconstruction:

Noise models, Restoration in presence of noise in spatial and frequency domain, estimating of degradation function.

Color-Image Processing:

Color Models, Color-image quantization, Histogram of color image, Color image filtering, Pseudo-Color Image processing, color transformations.

UNIT-IV **[12]**

Representation of Digital Video :

Analog Video, Digital Video, Digital Video Processing, Time-Varying Image formation Models, Spatio-Temporal Sampling, International standards for image and video compression (JPEG, JPEG 2000,MPEG1/2/4, H.261, SVC).

Text Books:

1. Digital Image Processing, S Jayaramanm,S Esakkirajan,T Veerakumar, McGraw Hill 2009.
2. Digital Video Processing, A. M. Tekalp, Prentice Hall, 1995.

Reference Books:

1. Digital Image Processing, Gonzalez and Woods, Third Edition, Pearson.
2. Multidimensional Signal, Image and Video Processing and Coding, J. W. Woods, Academic Press, 2006
3. Video Processing and Communications, Y. Wang, J. Ostermann, and Y.-Q. Zhang, Prentice Hall, 2002.

Subject: Data Communication Networks								
Program: **B.Tech. EC Engineering**				Subject Code:EC0704			Semester: **VII**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	60	60	40	40	200

Course Outcomes:

After competing this course the student will be able to

- Evaluate the performance parameters of electronic and communication systems
- Prepare test plans to verify the specifications
- Design test procedures for verification of system/sub-system specifications
- Design custom test instruments

Contents:

UNIT-I **[10]**

Introduction: Internet, Network Edge, Network performance in switching network, protocol layers and service models, history of computer network in internet.

Network services and applications: Principles of network applications, The web and HTTP, E mail in the internet, DNS, peer-to-peer systems, socket programming with TCP and UDP.

UNIT-II **[13]**

Transport Layer: introduction to transport layer, principles of reliable data transfer, Connectionless and connection oriented transport, principles of congestion control, TCP congestion control,

Network Layer: Introduction, virtual circuits and data gram networks, Internet Protocol: Addressing and forwarding, Routing Algorithms, intra-domain and inter-domain routing algorithms, broadcast and multicast routing.

UNIT-III **[13]**

Link layers and local area networks: Introduction, framing techniques, error detection and correction techniques, multiple access protocols, Addressing, Ethernet Link layer switches, PPP, link virtualization: A network as a link layer, Data flow in computer network

UNIT-IV **[12]**

Network security: Introduction, principle of cryptography, message integrity, security in various layers, operational security, Summary of Physical layer

Text Books:

James F. Kurose and Keith W. Ross. Computer Networking - A Top down Approach, Addison-Wesley. (Fifth Edition or higher)

Reference Books:

1. Computer Networks: A Systems Approach, by L Peterson and B Davie.
2. Advanced Programming in the UNIX Environment, by Stevens and Rago.
3. Data Networks by Dimitri P Bertsekas, Robert Gallager.

Subject**: Optical Fiber Communication**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0705			Semester: **VII**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	0	2	4	60	60	40	40	200

Course Outcomes:

The objective of the course is to provide a fundamental understanding of optical communication systems, On Successful completion of this course the student will be able to

- Analyze the performance of both digital and analogue optical fiber systems and the most advanced topics in this area as well
- Understand the basic operating principles of light sources, detectors and amplifiers.
- Be familiar with commonly used components and subsystems in optical communication and network systems
- To design a simple optical communication link and Solve the main issues in designing optical communication system.

Contents:

UNIT-I **[12]**

Introduction to Optical Fiber Communication:

Historical Development, Optical spectral bands, Advantage of Optical Fiber Communication, Fundamental Data Communication Concepts, Key Elements of Optical Fiber Communication

Optical Fiber Waveguide and Structures:

Ray Theory Transmission, Basic Optical laws and Definitions, Optical Fiber Modes, Single Mode Fibers, Step Index Fibers, Graded Index Fibers

Transmission Characteristics of Optical Fibers:

Attenuation, Material absorption losses in silica glass fibers, Linear scattering losses, Nonlinear scattering losses, Fiber bend loss, Dispersion

UNIT-II **[10]**

Optical Sources:

Basic concepts, Semiconductor Physics, LED: Operation principal, LED structure, LED power and efficiency, Modulation, LASER: Operation principal, Semiconductor injection laser, Laser Structure and modes, Threshold Gain, Figure of merit, Modulation

Power Launching and coupling:

Source to fiber power launching, Lensing schemes for coupling improvement, Fiber to fiber joints, LED coupling to single mode fibers, Fiber splicing, Optical connectors

UNIT-III **[10]**

Optical Detectors:

Operation principal of Photodiode, types, characteristics, figure of merits, photodiode materials, photodetector noise, detector response time, temperature effects on gain, comparison of photodetectors

Optical Receiver:

Receiver Operation, Noise, Receiver structures, Digital receiver performance, Coherent detection, Link power budget, Rise time budget, Bit error rate

UNIT-IV **[11]**

Optical Amplifiers:

Basic operation and application, Types of optical amplifiers, Semiconductor optical amplifiers, Erbium –Dopped amplifier, Raman amplifier, Amplifier noise, Optical SNR

WDM and Optical Networks:
WDM principal, Optical couplers, Isolators & Circulators, Fiber Grating Filters, Add/Drop Multiplexer, SONET/SDH, Optical Switching

Free Space Optical Communication:

Introduction, Propagation Concepts, Challenges, Advantage, Disadvantages, Applications

Text Books:
Optical Fiber Communications by Gerd Keiser, 5th Edition (Mc Graw Hill)

Reference Books:

1. Optical Fiber Communication by John M. Senior (PHI/Pearson)
2. Fiber optical communication Technology by Djafar Mymbaev & Lowell L, Scheiner. (Pearson)

Subject:**Advanced Mobile Communication**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0706			Semester: **VII**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	60	00	40	00	100

Course Outcomes:

After successfully completing this course the students…

- Will be exposed to the most important problems and solutions involved in current and emerging services and applications relying on mobile and radio technologies.
- Can describe the emerging advanced mobile communications systems from several perspectives: systems and network architectures, protocols, mobility management, applications and services.
- Can explain the similarities and major differences between current and emerging communication systems including mobile, nomadic or, simple wireless connectivity.
- Will have the ability to work in operational department of mobile communication service Provider Company.

UNIT-I **[10]**

Introduction of mobile communication

Wireless Communications and Diversity- Frequency, Time, Space, Fast Fading Wireless Channel Modeling, Rayleigh/Ricean Fading Channels, BER Performance in Fading Channels, Diversity modeling for Wireless Communications, BER Performance Improvement with diversity

Architectural Review of UMTS and GSM, History of Mobile Telecommunication Systems, the Need for LTE, From UMTS to LTE, From LTE to LTE-Advanced, The 3GPP Specifications for LTE

UNIT-II **[13]**

LTE Architecture and its performance

System Architecture Evolution: High-Level Architecture of LTE, User Equipment, Evolved UMTS Terrestrial Radio Access Network, Evolved Packet Core, Communication Protocols, Example Signalling Flows, State Diagrams

Architecture of the LTE Air Interface: Air Interface Protocol Stack, The Resource Grid, Multiple Antenna Transmission, Resource Element Mapping, Acquisition Procedure, Procedures after Acquisition

UNIT-III **[13]**

MOBILITY management and security in LTE

Mobility Management: Transitions between Mobility Management States, Cell Reselection in RRC_IDLE, Measurements in RRC_CONNECTED, Handover in RRC_CONNECTED, Inter-operation with UMTS and GSM, Inter-operation with Non-3GPP Technologies

Security Procedures: Network Access Security, Network Domain Security

UNIT-IV **[12]**

Enhancement and performance in LTE technology

VoLTE and the IP Multimedia Subsystem: Hardware Architecture of the IMS, Service Provision in the IMS, VoLTE Registration Procedure, Call Setup and Release, Single Radio Voice Call Continuity, Delivery of SMS Messages over the IMS

Performance of LTE: Peak Data Rates of LTE, Coverage of an LTE Cell, Capacity of an LTE Cell, Performance of Voice over IP LTE ADVANCED:Carrier Aggregation, IMT-2000 development, LTE-Advanced – The 3GPP candidate for IMT-Advanced, Technical components of LTE-Advanced

Text Books:

1. Cox, Christopher “An introduction to LTE: LTE, LTE-advanced, SAE,VoLTE and 4G mobile communications” 2nd John Wiley & Sons, 2014.
2. Dahlman, Erik, et al. “3G evolution: HSPA and LTE for mobile broadband ” Academic press, 2010.
3. Goldsmith, Andrea “ Wireless communications” Cambridge university press, 2005.

Reference Books:

1. Olsson, Magnus, et al. “SAE and the Evolved Packet Core: Driving the mobile broadband revolution” Academic Press, 2009.
2. Rappaport, Theodore S. “ Wireless communications: principles and practice” Vol. 2. New Jersey: Prentice Hall PTR, 1996.
3. Biglieri, Ezio, et al. “ MIMO wireless communications” Cambridge university press, 2007.

Digital Learning Resources:

1. http://nptel.ac.in/courses/117104099/
2. https://www.coursera.org/learn/wireless-communication-technologies

Subject: **Cryptography and Network Security**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0707			Semester: **VII**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	60	00	40	00	100

Course Outcomes:

The course provides an overview of cryptography and network security, after competing this course the student will be able to

- Explain and make practical use of the concepts, principles and mechanisms for providing security to the information/data.
- Select the optimum security protocol according to application requirement.
- Design security model of application level and network level security.
- Design encryption algorithms.

Contents:

UNIT-I **[10]**

Introduction: OSI Security Architecture, Classical Encryption techniques, Cipher Principles, Cryptography, Cryptanalysis and Attacks; Substitution and Transposition techniques

Symmetric Key Cryptography:
Stream ciphers and block ciphers, Block Cipher structure, Feistel Cipher, Diffusion and Confusion, Data Encryption standard (DES) with example, strength of DES, Design principles of block cipher, AES, Multiple encryption and triple DES, Electronic Code Book, Cipher Block Chaining Mode, Cipher Feedback mode, Output Feedback mode, Counter mode, RC4 algorithm, Confidentiality using Symmetric encryption, Key Distribution, Random Number Generator

UNIT-II **[13]**

Public Key Cryptography:

Key Management, Diffie-Hellman key Exchange, Elliptic Curve Architecture and Cryptography, Introduction to Number Theory, Confidentiality using Symmetric Encryption, Public Key Cryptography and RSA.

Message Authentication and Hash Functions:

Authentication Requirements, Authentication Functions, MAC, Hash Functions, Security of Hash Functions and MACs, Secure Hash Algorithm, MD5

UNIT-III **[13]**

Digital Signatures and Authentication Applications :
Authentication Protocols, Kerberos, DSS, X.509 Authentication Service, Digital Signatures

Network Security:
PGP, S/MIME, IPSec Architecture, Authentication Header, ESP, Combining Security Association, Key Management, Web Security Consideration, SSL and TLS, Introduction to E-Commerce, Secure Electronic Transaction (SET).

UNIT-IV **[12]**

System Level Security:

Intrusion detection, Password management, Viruses and related Threats, Virus Counter measures, Firewall Design Principles, Trusted Systems, DDOS attack, Smart Cards and Security, Zero Knowledge Protocol, Database Access Control

Text Books:

William Stallings, "Cryptography and Network Security – Principles and Practices", Pearson Education

Reference Books:

1. Bruce Schneier, "Applied Cryptography", John Wiley & Sons Inc
2. Charles B. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Third Edition, Pearson Education
3. Atul Kahate, "Cryptography and Network Security", Tata McGraw-Hill
4. Wenbo Mao, "Modern Cryptography Theory and Practice", Pearson Education

Subject: **Raspberry pi platform and python programming for raspberry pi by coursera (MOOC Course)**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0708			Semester: **VII**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	60	00	40	00	100

UNIT-I

This module describes the basic functionality the Raspberry Pi B+ board. I'll describe how to set up the board, configure it, and use it. An important point differentiating Raspberry Pi from the Arduino platform which we have talked about previously is that Raspberry Pi uses an operating system. I'll describe some of the implications of an operating system on the behavior of the Raspberry Pi as an IoT device

UNIT-II

The Raspberry Pi is typically installed with a Linux-based operating system, so we present the basics of Linux and its use. We describe some of the main features including navigating the file system and managing processes. We describe the text-based user interface through the shell and we overview the graphic user interface which is the default with the Raspian Linux distribution

UNIT-III

We present the basics of the Python programming language to prepare you for programming on the Raspberry Pi. Many languages can be used but Python is the most convenient for the Raspberry Pi because convenient APIs are provided for basic operations such as controlling the pins. Python is a powerful language with useful features that we will present so that you can use these features to control the Raspberry Pi

UNIT-IV

In this module we describe how to communicate with devices through the pins of the Raspberry Pi. We examine the RPi.GPIO library which provides Python functions used to access the pins. We discuss how to set up the pins, apply digital voltages, and generate Pulse Width Modulated signals. We also describe the Tkinter Python library and show how it can be used to access pins through a graphic user interface

Subject: **Disaster Management**								
Program: **B.Tech. EC Engineering**				Subject Code: CV0712			Semester: **VII**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
1	0	0	0	24/60	0	16/40	0	100

Course Objectives:

1. To explain students the conceptual applications and principles of management to mitigate various disasters.

Course Outcome:

1. Understand disasters, disaster preparedness and mitigation measures.
2. Understand role of IT, remote sensing, GIS in risk reduction.
3. Understand disaster management acts and guidelines along with the role of various stack-holders during disasters.

COURSE CONTENTS:

UNIT-I **[03]**

Introduction

Concepts and definitions: disaster, hazard, vulnerability, risk, capacity, impact, prevention, mitigation)

UNIT-II **[04]**

Disasters classification

Natural disasters (floods, drought, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.); manmade disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills etc); hazard and vulnerability profile of India, mountain and coastal areas, ecological fragility

UNIT-III **[06]**

Disaster Impacts

Disaster Impacts (environmental, physical, social, ecological, economic, political, etc.); health, psycho-social issues; demographic aspects (gender, age, special needs); hazard locations; global and national disaster trends; climate-change and urban disasters. Disaster Risk Reduction

Disaster management cycle

Phases; prevention, mitigation, preparedness, relief and recovery; structural and non-structural measures; risk analysis, vulnerability and capacity assessment; early warning systems, Post-disaster environmental response (water, sanitation, food safety, waste management, disease control); Roles and responsibilities of government, community, local institutions, NGOs and other stakeholders; Policies and legislation for disaster risk reduction, DRR programmes in India and the activities of National Disaster Management Authority.

UNIT-IV **[02]**

Applications of Science and Technology for Disaster Management and Mitigation

Geo-informatics in Disaster Management (RS, GIS and GPS), Disaster Communication System (Early Warning and Its Dissemination), Land use planning and development regulations, Disaster safe designs and Development Regulations, Disaster safe designs and Construction structural and Non structural Mitigation of Disasters. Science and Technology Institutions for Disaster Management in India.

Text Books:

1. Ghosh G.K., 2006, Disaster management, APH Publishing Corporation.

Reference Books:

2. Pradeep Sahni, 2004, Disaster Risk Reduction in South Asia, Prentice Hall.
3. Singh B. K., 2008, Handbook of Disaster Management: techniques and guidelines, Rajat Publications

Web resources:

1. http://nidm.gov.in/PDF/Disaster_about.pdf
2. https://www.slideshare.net/Jyothi19587/disaster-ppt
3. https://www.slideshare.net/SayefAmin1/natural-disaster-its-causes-effects
4. https://www.slideshare.net/rahulp4/man-made-disasters-23947076

5. https://www.slideshare.net/urveshprajapati3990/disaster-management-in-india-56546805
6. www.ndmindia.nic.in/presentation/Presentation%20by%20JS%20(DM)%20(1).ppt
7. https://www.geospatialworld.net/article/information-technology-and-natural-disaster-management-in-india/
8. http://www.bvicam.ac.in/news/NRSC%202007/pdfs/papers/st_230_03_02_07.pdf
9. http://eagri.tnau.ac.in/eagri50/ENVS302/pdf/lec13.pdf
10. http://nptel.ac.in/courses/105105104/pdf/m16l39.pdf
11. https://www.unisdr.org/we/inform/events/50220

MOOCs:

1. https://www.mooc-list.com/tags/disaster-management

8TH SEMESTER

Approved Vide Agenda Item No. 03 of Minutes of Meeting of Academic Council held on 11 July 17

ELECTRONICS AND COMMUNICATION ENGINEERING, SEMESTER –VIII TEACHING & EXAMINATION SCHEME WITH EFFECT FROM JULY 2017													
SR NO	CODE	SUBJECTS	TEACHING SCHEME			CREDITS	HOURS	EXAMINATION SCHEME					
								THEORY			PRACT		TOTAL
								CIE					
			L	T	P			MID	IE	ESE	CIE	ESE	
1	EC0801	Project	00	00	40	20	40	00	00	00	40	60	100
TOTAL			**00**	**00**	**40**	**20**	**40**	00	00	00	40	60	**100**

Approved Vide Agenda Item No. 03 of Minutes of Meeting of Academic Council held on 11 July 17

Subject: **Project**								
Program: **B.Tech. EC Engineering**				Subject Code:EC0801			Semester: **VIII**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
0	0	40	20	00	60	00	40	100