1ST SEMESTER

ELECTRONICS AND COMMUNICATION ENGINEERING, SEMESTER –I 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	SH0101	Differential Calculus & Matrix Algebra	04	02	00	05	06	30	10	60	00	00	100
2	SH0001	Engineering Physics	03	00	02	04	05	30	10	60	40	60	200
3	EL0001	Electrical Workshop	00	00	02	01	02	00	00	00	40	60	100
4	EL0002	Elements of Electrical Engineering	03	00	02	04	05	30	10	60	40	60	200
5	ME0001	Engineering Graphics	01	06	00	04	07	30	10	60	00	00	100
6	EC0001	Basic Electronics	02	00	02	03	04	30	10	60	40	60	200
7	MT0001	Materials Science	03	00	00	03	03	30	10	60	00	00	100
8	SH0102	Technical English	01	02	00	02	03	30	10	60	00	00	100
TOTAL			**17**	**10**	**08**	**26**	**35**	**210**	**70**	**420**	**160**	**240**	**1100**

Subject: **Differential Calculus & Matrix Algebra**								
Program: **B.Tech All Branches**				Subject Code: SH0101			Semester: **I**	
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	2	0	5	60	00	40	00	100

Course Objectives:

1. To provide mathematical knowledge and skills needed to support their concurrent and subsequent engineering studies.
2. To provide an ability to apply knowledge of basic science and engineering fundamentals.
3. To provide an ability to undertake problem identification, formulation and solution.
4. To provide an ability to analyze different mathematical models within science and technology and work creatively, systematically and critically.
5. To provide an ability to find strategies for the solution of different types of mathematical models using knowledge about the possibilities and limitations of the different methods and tools.
6. To provide an ability to develop abstract, logical and critical thinking and the ability to reflect critically upon their work and work of others.
7. To provide an ability to insight their strengths and weakness as learners and to appreciate the value of errors or mistakes as powerful motivators to enhance learning and understanding.

Contents

UNIT I **Differential Calculus** **10 hrs.**

Derivatives of nth Derivative of some Elementary Functions
Leibnitz's Theorem
Taylor's Series and Maclaurin's Series Expansions
Indeterminate Forms.
Functions of Several Variables: Limit and Continuity

UNIT II **Partial Differentiation and its Applications** **13 hrs.**

Partial Differentiation
Variable Treated as Constant, Total Derivative
Partial Differentiation of Composite Functions: Change of Variable-Differentiation of an

Implicit Function -Euler's Theorem
Jacobian, Error and Approximations
Taylor's Theorem for Function of two Variables
Maxima and Minima of Functions of two Variables: with and without constraints
Lagrange's Method of Undetermined Multipliers.

UNIT III **Basic of Matrix algebra** **13 hrs.**

Concepts of Determinants and Matrices, Types of Matrices
Row Echelon and Reduced Row Echelon form
Inverse of a Matrix, Rank of a Matrix, Normal Form
System of Linear Homogeneous Equations
System of Non-Homogeneous Equations, Gaussian Elimination Method

UNIT IV **Vector Differential Calculus** **12hrs.**

Curvilinear coordinate system, Cartesian, Spherical and Cylindrical coordinate system
Vector Differentiation, Directional Derivative, Gradient of a Scalar Function and Conservative Field
Directional Derivative, Gradient of a Scalar Function and Conservative Field
Divergence and Curl, Related Properties of Gradient, Sums of Divergence and Curl

Subject: **Engineering Physics**								
Program: **B.Tech All Branches**				Subject Code: SH0001			Semester: **I/II**	
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 Objectives:

1. An ability to apply knowledge of basic physics, mathematical foundations and engineering theory in the modeling and design of real-world problems (**fundamental engineering analysis skills).**
2. An ability to design and conduct experiments, as well as to analyze and interpret data **(information retrieval skills).**
3. An ability to analyze a problem , identify and formulate using the concept of physics and to solve engineering problem**(engineering problem solving skills).**
4. Recognition of the need for, and an ability to engage in continuing professional development and life-long learning **(continuing education awareness).**
5. An ability to use current techniques, skills, and tools necessary for Physics and engineering practice **(practical engineering analysis skills).**

Course Content:

UNIT-I **[12]**

Wave motion and Sound

Propagation of waves, longitudinal and transverse waves, mechanical and non-mechanical waves Introduction to sound waves, Characteristics and Properties of Sound, Absorption co-efficient, Reverberation time, Sabine's formula (without derivation), Factors affecting architectural acoustics,

Introduction of Ultrasonic waves, Generation of ultrasonic waves, Detection of ultrasonic waves, Applications of Ultrasonic waves: NDT, SONAR & others.

Optics

Introduction to Reflection, Refraction and Total Internal Reflection;

Wavefront and Huygen's principle;Interference: Types of interferences, Thin film interference, Newton's rings and its applications

Diffraction of light waves: Types of Diffraction, Single-slit Fraunhoffer diffraction, Plane diffraction grating, Resolving power of grating, Rayleigh Criterion, Optical polarization (Introduction)

UNIT-II **[11]**

Quantum Mechanics

Black body radiation: Planck's law (without derivation), Wien's displacement law and Rayleigh – Jeans' law from Planck's theory; Compton effect (Theory and experimental verification), De-Broglie theorem, Uncertainty principle; Schrodinger's wave equation – Time independent and time dependent equations – Physical significance of wave function, Particle in one dimensional rigid box.

Laser

Energy levels in atoms, Absorption, Spontaneous Emission and Stimulated Emission of light, Relation between Einstein's Coefficients, Population Inversion, Metastable State, Pumping Mechanism, Optical Resonators, Fundamentals of LASER, Characteristics of Laser radiation

Types of Laser: Solid State Laser (Nd-YAG laser), Gas laser (He-Ne laser), Applications of Laser: Medical, Industrial, Holography (introduction).

UNIT-III **[12]**

Electromagnetism & Dielectrics

Coulomb's law for distribution of charges, Gauss's law and applications, Electric current and Equation of continuity, Electric field intensity, Electric flux, Electric dipole moment, Electric field due to dipole, Introduction to dielectrics, Polarizability, Types of polarization – electronic, ionic, orientational, Polarization of dielectrics, Gauss's law in presence of dielectric, Dielectric constant, Electric susceptibility and Permittivity, Internal (Local) field in dielectric, ClausiusMossotti equation (with derivation)

Magnetic field, Steady current, Biot-Savart law, Ampere's law and applications, Faradays law of Induction, Lenz's Law; Effect of magnetic field on current carrying conductor, Lorentz force

Magnetism

Basic important terms and units in Magnetism, Concept and origin of magnetic moment, magnetic susceptibility, Total angular momentum, Diamagnetism, Paramagnetism, Ferromangnetism, Ferrimagnetism, Antiferromagnetism, Domain theory of Ferromagnetism, Curie temperature and hysteresis loss

UNIT-IV **[10]**

Superconductivity

Superconductivity: Zero resistance, Critical temperature, Meissner effect, Critical field, General properties of superconductors**,** Type-I and Type-II superconductors, BCS theory of Superconductor, High temperature superconductors

Applications of Superconductors: SQUID, Maglev

Nanophysics

Nanoscale, Surface to volume ratio, Surface effects on nanomaterials, Quantum size effect, Electron confinement, Nanoparticles and Nanomaterials, Properties of Nanomaterials

Advantages & Disadvantages of Nanomaterials**,**

Synthesis of nanomaterials: Laser ablation, ball milling, chemical vapor deposition, sol gel, Carbon nanotubes: structure, synthesis, properties and applications, Applications of Nanomaterials.

Text Books:

1. Engineering Physics by Rajendran (Tata Mc Graw Hill)
2. Engineering Physics by D.K. Bhattacharya, Poonam Tandon (Oxford University Press)

Reference Books:

1. Resnick and Haliday, Physics Part-I & II, Wiley Eastern publication
2. Engineering Physics by P. Khare&Swarup (Jones & Bartlett Learning)
3. A textbook of Engineering Physics by S.O. Pillai (New Age International)
4. An introduction to Electrodynamics by David Griffiths (Pearson Education)
5. Optics by A. Ghatak (Tata McGraw-Hill)
6. Engineering Electromagnetics by W H Hayt& J A Buck (Tata McGraw-Hill)
7. Engineering Physics by K. Rajagopal (Prentice Hall India)
8. Engineering Physics by M. N. Avadhanulu, P. G. Khirsagar (S.Chand Pub.)

Web resources:

1. http://www.nptel.iitm.ac.in/courses/Webcourse-contents/IIT%20Guwahati/engg_physics/index_cont.htm
2. http://ncert.nic.in/html/learning_basket.htm
3. http://science.howstuffworks.com/laser1.htm
4. http://physics-animations.com/Physics/English/optics.htm
5. http://www.epsrc.ac.uk
6. http://www.pitt.edu/~poole/physics.html#light
7. https://www.khanacademy.org/science/physics

MOOCs:

https://www.edx.org/course/subject/physics

List of Experiments:

1 Photocell: To verify the inverse square law using photocell.

2 Ultrasonic Interferometer: To determine the wavelength and velocity of ultrasonic wave through ultrasonic interferometer.

3 Determination of Refractive index: To determine the refractive index of a given material (prism) using spectrometer.

4 Resolving power of grating: To determine resolving power of a diffraction grating.

5 Newton's Ring: To determine the wavelength of monochromatic light

6 Planck's Constant : To determine the Planck's Constant using LED

7 Determination of Wavelength of Laser: To determine the wavelength of LASER using diffraction grating.

8 Determination of wavelength of laser using single slit

9 Dielectric constant: To determine the dielectric constant of a dielectric substance.

10 Hysteresis loss: To determine the Hysteresis loss in a Ferromagnetic material.

11 To determine the magnetic field at the center of a coil and its variation with distance and radius of the coil.

12 To verify the Faraday's law of electromagnetic induction.

Text Books

1. B.V.RAMANA: "HIGHER ENGINEERING MATHAMATICS", TATA McGraw Hill**.**
2. R K Jain, S R K Iyengar: " Advanced Engineering Mathematics. Third Edition", Narosa Publishing House

Reference Books

1. Erwin Kreyszig: "Advanced Engineering Mathematics (8th Edition) ",Wiley Eastern Ltd., New Delhi.
2. Dr. B.S. Grewal : "Higher Engineering Mathematics", Khanna Publishers, New Delhi
3. Murray Spiegel : "Advanced Mathematics for Engineering & Science: Schaum's Outline Series" ,Tata - McGraw Hill Publication
4. Merel C Potter, J L Goldberg: "Advanced Engineering Mathematics (3rd Edition)"Oxford India Publication.

Digital Learning Resources & Moocs

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

Subject: **Electrical Workshop**								
Program: **B.Tech All Branches**				Subject Code: EL0001			Semester: **I/II**	
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	2	1	00	60	00	40	100

Course Objectives:

After completion of this course, expected outcomes from the students:

1. **Fundamental Engineering Analysis Skill**: Ability to apply knowledge of Electrical Engineering.
2. **Information Retrieval Skills:** Ability to design electrical circuits and conduct experiments with electrical engineering as well as to analyze and interpret data.
3. **Practical Engineering Analysis Skills:** Ability to acquire new knowledge to use modern engineering tools and equipments to analyze problems necessary for engineering practice. Knowledge of basic electrical and electronic device.

LIST OF EXPERIMENTS

Exp. No.	Title	Learning Outcome
1	Introduction to symbols and abbreviations used in electrical engineering.	• Basic knowledge of symbols and abbreviations that are used in electrical engineering
2	Introduction to IE rules.	• Understanding of safety rules • Safety precautions to be taken in the laboratory
3	Identify different types of cables/wires, switches, fuses, MCB, ELCB, MCCB with their ratings and usage.	• To understand basic working principle of different protective devices • To recognize the practical applications of these protective devices by their demonstration
4	Performance of Electric shock phenomena, precautions, preventions,	• To identify the importance of earthing

	earthing.	in electric network. • To understand, how earthing works
5	Measuring instruments like Ammeter, Voltmeter, Wattmeter, Watt-hour Meter, and Megger with their description and usage.	• To get familiar with different measuring devices • To understand the working principle on which these devices work
6	To measure earthing resistance using insulation tester (Megger).	• Basic knowledge of earthing resistance • Working principle of insulation tester (megger)
7	Wiring of power distribution arrangement using single phase MCB distribution board with ELCB, Main switch and Energy meter.	• To identify different components used in wiring scheme • Basic knowledge of designing a simple wiring scheme • To identify the principle and working of energy meter
8	Wiring of light/fan circuit using Two way switches (Staircase wiring), Wiring of fluorescent lamps and light sockets (6 A)	• Basic knowledge of staircase wiring • Wiring of fluorescent lamps • Identification of sockets
9	Wiring of backup power supply including inverter, battery and load for domestic installations.	• To have the basic idea of inverter and battery • Basic knowledge of back-up power supply
10	Demonstration and measurement of power consumption of Electric Iron, Mixer Grinder, Single phase pump, exhaust fan or other home appliance.	• To have the knowledge of working of electric iron, mixer grinder and pump • To demonstrate the power consumption by these devices
11	Preparing the drawing for wiring a newly built room, without any electrical wiring along with a bill of materials with specifications; the room may be a class-room, an office, a shop, a clinic, a small workshop etc.	• Exercise for students to make a wiring scheme for any of the given example • To estimate the total cost of appliances, materials and wiring

Subject: **Elements of Electrical Engineering**								
Program: **B.Tech All Branches**				Subject Code: EL0002			Semester: **I/II**	
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	24/60	24/60	16/40	16/40	200

Course Outcome:

1. **Fundamental Engineering Analysis Skill**: Ability to apply knowledge of Electrical Engineering.
2. **Information Retrieval Skills:** Ability to design electrical circuits and conduct experiments with electrical engineering as well as to analyze and interpret data.
3. **Engineering Problem Solving Skills:** Ability to identify, formulate and solve engineering problems.
4. **Practical Engineering Analysis Skills:** Ability to acquire new knowledge to use modern engineering tools and equipment's to analyze problems necessary for engineering practice.

Contents:

UNIT-I **[07]**

DC Circuits

Elementary Concepts:

Ohm's Law and Kirchhoff's Laws, Analysis of series, parallel and series-parallel circuits; Star–Delta conversion; Nodal analysis, Mesh analysis, voltage sources and current sources, Super position theorem, Thevenin's theorem, Norton's theorem, Equvalence of thevenin's and norton's theorem, Maximum power transfer theorem.

UNIT-II **[12]**

Electrostatics:

Electric charge and Laws of electrostatic, Capacitor; Capacitor in series and parallel, variable capacitor, Instantaneous voltage and current in capacitor, charging and discharging of capacitor, Energy stored in a capacitor, types of capacitor.

Magnetic Circuit:

Magneto motive force, magnetic field strength, reluctance, Relation between magnetic circuit parameter, Laws of magnetic circuit, composite magnetic circuit: series magnetic circuit, parallel magnetic circuit, comparison of Electric and magnetic circuit, Effect of magnetic field on current carrying conductor; Statically and dynamically induced EMF; Concepts of self inductance, mutual inductance, energy stored in inductor, coefficient of coupling; Inductance in series and parallel; Hysteresis and Eddy current losses.

UNIT-III **[16]**

Single Phase A.C. Circuits:

Generation of sinusoidal voltage, Definition of average value, root mean square value, form factor and peak factor; Phasor representation of alternating quantities; Analysis with phasor diagrams of R, L, C, R-L, R-C and R-L-C circuits; Concepts of Real power, Reactive power, Apparent power and Power factor, methods to improve power factor, Series, Parallel and Series - Parallel circuits; Power in AC circuit, Resonance in series and parallel circuits.

Three Phase A.C. Circuits:

Necessity and Advantages of three phase systems, Generation of three phase power, definition of Phase sequence, balanced supply and balanced load; Relationship between line and phase values of balanced star and delta connections; Power in balanced three phase circuits, measurement of power by two wattmeter method; Work, Power, Energy, Problems

UNIT-IV **[13]**

Transformers: Principle of operation and construction of single phase transformers (core and shell types). EMF equation, losses, efficiency.

DC Machines: Working principle of DC machine as a generator and a motor; DC series motor, DC shunt motor, DC compound motor constructional features.

Induction Motor: Concept of rotating magnetic field; Principle of operation, types and constructional features, slip and its significance.

Text Books:

1. A. Chakrabarti, “Basic Electrical Engineering”, Tata McGraw Hill
2. A.E Fitzgerald, David E. Higginbotham, Arvin Grabel, “Basic Electrical Engineering”, 5th Edition, Tata McGraw Hill.

Reference Books:

1. Vincent Del. Toro (2012), “Principles of Electrical Engineering”, Prentice Hall, India
2. Electrical Estimating & Costing by Surjit Singh (Dhanpat Rai & sons).
3. J.N. Swamy, “Elements of Electrical Engineering” Mahajan Publishing House.
4. Nagrath I.J. and D. P. Kothari (2001), “Basic Electrical Engineering”, Tata McGraw Hill.
5. Rajendra Prasad (2009), “Fundamentals of Electrical Engineering”, Prentice Hall, India

Web Resources:

1. www.nptel.ac.in
2. www.youtube.com

Subject: **Engineering Graphics**								
Program: **B.Tech All Branches**				Subject Code: ME0001			Semester: **I/II**	
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	6	0	4	24/60	00	16/40	00	100

Content:

Unit - I

1. **Introduction to engineering graphics**
   Principles of Engineering Graphics and their Significance – Drawing Instruments and their Use – Conventions in Drawing – Lettering – BIS Conventions- Dimensioning systems – polygons-types of lines
2. **Engineering curves**
   Classification and application of Engineering Curves, Construction of different methods of Ellipse, parabola and Hyperbola, construction of Conics, Cycloid Curves – Cycloid, Hypocycloid, Epicycloids, Involutes and Spirals.

Unit- II

3. **Projections of Points and Lines**
   Introduction to principal planes of projections, Projections of the points located in same quadrant and different quadrants, Projections of line with its inclination to one reference plane and with two reference planes. True length and inclination with the reference planes.
4. **Projections of Planes**
   Projections of planes (polygons, circle, and ellipse) with its inclination to one reference plane and with two reference planes, Concept of auxiliary plane method for projections of the plane.

Unit- III

5. **Projections of Solids**
   Classification of solids. Projections of solids (Cylinder, Cone, Pyramid, Prism) along with frustum of cone and pyramid with their inclinations to one reference plane and with two reference planes.

Unit- IV

6. **Orthographic And Sectional Orthographic Projections**
   Fundamental of projection along with classification, Projections from the pictorial view of the object on the principal planes for view from front, top and sides using first angle

projection method and third angle projection method, introduction of section of objects, full sectional view.

7. **Isometric Projections**
   Isometric Scale, Conversion of orthographic views into isometric projection, isometric view or drawing.

Text Books

1. P.J. Shah, "A Text Book of Engineering Graphics" Publication: S.Chand.
2. A Text Book of Machine Drawing By P. J. Shah S.Chand & Company Ltd., New Delhi

Reference Books

1. N.D.Bhatt , "Elementary Engineering Drawing", Charotar Publishing House, Anand
2. P.D.Patel, " Engineering Graphics" Publication: Mahajan
3. A text book of Engineering Drawing by R.K.Dhawan, S.Chand &Company Ltd., New Delhi
4. A text book of Engineering Drawing by P.S.Gill, S.K.Kataria & sons, Delhi

Web Resources

1. www.nptel.ac.in

Subject: **Basic Electronics**								
Program: **B.Tech All Branches**				Subject Code: EC0001			Semester: **I/II**	
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	0	2	3	24/60	24/60	16/40	16/40	200

Course Outcome:

After completion of the course, the student will be able to –

1. Recognize basic electronic components and devices used for different electronic functions
2. Explain the concepts of semiconductor physics
3. Design and test basic electronic circuits using active components
4. Solve basic problems in simple electronic circuits

Contents

UNIT 1 **[10]**

Energy Bands in Solids

Charged Particles, Field Intensity, Potential Energy, The eV Unit of Energy, Nature of Atom, Atomic Energy Levels, Electronic Structure of the Elements, Energy distribution of electrons, Fermi-Dirac function, Energy Band Theory of Crystals, Insulators, Semiconductors and Metals

Transport Phenomena in Semiconductors

Mobility and Conductivity, Electrons and Holes in an Intrinsic Semiconductor, Donor a Densities in a Semiconductor, Electrical properties of Ge and Si, Hall Effect, Conducti Recombination of Charges, Diffusion, The Continuity Equation, Injected Minority–Carrier a Graded Semiconductor,

UNIT 2 **[10]**

Junction –Diode Characteristics: Open circuit p-n Junction, p-n Junction as a Rectifier, Current Components in a p-n diode, Volt-Ampere Characteristic, Temperature Dependence of the V/I Characteristic, Diode Resistance, Space Charge, Transition Capacitance, Charge-Control Description of a Diode, Diffusion Capacitance, Junction Diode Switching Times, Breakdown Diodes, Tunnel Diode, Semiconductor Photodiode, Photovoltaic Effect, Light

–Emitting Diodes, Schottky diode, varactor diode, GUNN diode, SCR

Diode Circuits:
Diode as a Circuit Element, Load-Line Concept, Piecewise Linear Diode Model, Clipping Circuits, Clipping at Two Independent Levels, Comparators, Sampling Gate, Rectifiers, Other Full-Wave Circuits, Capacitor Filters, Additional Diode Circuits

UNIT 3 **[5]**

Transistor Characteristics:
Junction Transistor, Transistor Current Components, Transistor as an Amplifier, CB Configuration, CE Configuration, CC Configuration, Analytical Expressions for Transistor Characteristics Maximum Voltage Rating, Phototransistor, Transistor biasing.

UNIT4 **[7]**

Field Effect Transistors:
Junction FET, JFET Volt-Ampere Characteristics, MOSFET

Operational Amplifiers:
Introduction to Op Amps, Inverting Amplifier, Non-inverting amplifier, Op Amp applications

Introduction to Data converters:
ADC & DAC

Introduction to Microprocessors and Microcontrollers:
Basic digital ICs, Architecture of processors and controllers

Text book

1. 'Integrated Electronics' By J. Millman and C. C. Halkias, Chetan Parikh, 2nd Ed., Tata McGraw Hill Publication

Reference Books

1. 'Electronic Principles' by Albert Malvino and David Bates, 7th Ed., Tata McGraw Hill Publication
2. 'Electronic Devices and Circuit Theory' by Robert Boylestad and Louis Nashelsky, 9th Ed., Prentice Hall India
3. "Digital Electronics" by Morris Mano, 2006

List of Experiments

1. To plot VI characteristics of PN junction diode
2. To plot VI characteristics of Zener diode

3. To plot VI characteristics of Tunnel diode
4. To measure ripple factor of a rectifier
5. Build and test wave shaping circuits
6. To plot input and output VI characteristics of CB configuration using BJT
7. To plot input and output VI characteristics of CE configuration using BJT
8. To plot input and output VI characteristics of CC configuration using BJT
9. To plot drain and transfer characteristics of a JFET
10. To build and test inverting and non-inverting amplifier
11. To build an LED driver circuit and test
12. To build and test an integrator and differentiator with Op Amp

Subject: **Materials Science**								
Program: **B.Tech All Branches**				Subject Code: MT0001			Semester: **I/II**	
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	0	3	24/60	00	16/40	00	100

1. Course Outcomes

- Evaluate different materials for engineering applications.
- To categorize material according to their properties and requirement.
- To classify materials and understand the importance of each material in order to find applications in other fields of engineering.

2. Contents

		Time Allotted
Unit 1	Introduction, Engineering requirement of different materials, Classification of Engineering materials, Properties of engineering materials , Criteria for selection of materials for engineering application. Crystal Physics; Structure of crystalline solids; Lattices, unit cells; Indexing of directions and planes, notations, Interplanar spacings and angles, Crystal structure analysis - Bragg's law for X-ray diffraction.	8 hours
Unit 2	Ferrous metals & Alloys- Pig iron, cast iron, carbon steel, alloy steels- Classification, properties, composition and applications. Non-Ferrous Metals & Alloys- Important non-ferrous metals (Al, Cu, Pb, Zn, Sn, Mg, Ti, Ni,), Non-ferrous alloys (Cu alloys, Al alloys, Mg-alloys, Ni-alloys) – Composition, properties, classification and applications.	12 hours
Unit 3	Introduction, Simple crystal structure, Classification- Traditional (clay-products, refractories, abrasives, cement) and Engineering Ceramics- Glass Ceramics, Properties of ceramics, Application of Ceramics, Glasses, Glass structure, Properties and application of Glass, Types of glass. Introduction, Classification and forms of Polymers, Thermosetting & thermoplastic polymer, types of polymerizations, Molecular weight, Plastics, Natural rubber and synthetic rubber, Applications of	12 hours

	polymeric materials.	
Unit 4	Introduction, Classification & Applications, Dispersion-strengthened, Composites, Particulate Composites, Fiber-reinforced Composites: Influence of Fiber Length, Influence of Fiber Orientation and Concentration, The Fiber Phase, The Matrix Phase, Polymer-Matrix. Composites, Metal-Matrix Composites, Ceramic - Matrix Composites, Carbon–Carbon Composites, Processing of Fiber-Reinforced Composites. Smart materials (Shape memory material, Piezo electric material) Photoconductors, Bio-materials, Nano materials, Dielectric materials, magnetic materials, metamaterials, Cryogenics, Optical Fiber.	14 hours

3. Text Book(s)

1) Material Science and Metallurgy by O.P Khanna, Dalpat Rai Publications
2) Engineering Materials by R. K Rajput, S. Chand Publications.
3) Material Science & Engineering – An Introduction by W.D. Callister, John Wiley.

4. Reference Books

1) Introduction to Materials Science for Engineers – James Shackelford, Pearson, Prentice Hall; 8 edition.
2) Elements of Materials Science –by L.H. Vanvlack, Addision-Wisley Series
3) Element s of Metal lurgy by D. Swarup, Rastogi Publication
4) Engineering Materials by S.C. Rangwala and P.S. Rangwala, Charotar publication house Pvt. Ltd.
5) Materials Science and Engineering by Willing F. Smith, TMH publication

5. Web Resources

http://nptel.ac.in/

Subject: **Technical English**								
Program: **B.Tech All Branches**			Subject Code: SH0102			Semester: **I**		
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	2	0	2	60	00	40	00	100

Course Objectives:

1. To help students develop comprehension and soft skills
2. To increase student's ability to improve and utilize the technical skills necessary for reading and writing.
3. To improve students' communication skills in both technical and professional contexts.

Course Content:

Unit 1:
Language Focus Vocabulary
Technical vocabulary, Synonyms and Antonyms, Idiom & Proverbs, One Word Substitutes, Phrasal Verbs, Collocations.

Unit 2:
Language Focus Grammar (Rules & Exception)
Sub-Verb-Agreement, Tenses, Numerical adjectives, Conjunction and Preposition clauses, Noun and adjective clauses, Relative clauses, Imperative and infinitive structures, Question pattern, Auxiliary verbs (Yes or No questions), Contrasted time structures, Adverbial clauses of time, place and manner, Intensifiers, Basic pattern of sentences(Simple, Complex, Compound Construction).

Unit 3:
Listening
Listening to lectures, seminars, workshops, TED Talks, Writing a brief summary or answering questions on the material listened.

Unit 4:
Speaking
Phonetics (Pronunciation, stress and intonation), Role Play Activity, Group Discussion & Debate (Acceptance & Arguing each other's view points), Verbal & Non-Verbal Communication.

Reference Books:

1. English for Engineers and Technologists, Volumes 1 and 2, Department of Humanities

and Social Sciences, Anna University, Chennai, Orient Longmans Publication, 2008.

1. Balasubramanyam, M and Anbalagan, G., Perform in English, Anuradha Publications, Kumbakonam, 2010.
2. Meenakshi Raman and Sangeetha Sharma, Technical Communication: Principles and Practice, Oxford University Press, New Delhi, 2004.
3. KiranmaiDutt, P. et al., A Course on Communication Skills, Edition Foundation Books, New Delhi, 2007.
4. Ashraf Rizvi, M., Effective Technical Communication, Tata McGraw Hill Publication, New Delhi, 2008.
5. Geoffrey Leech, Jan Swartvik, 'A Communicative Grammar of English', ELBS – Longman.
6. Norman and Lewis, 'English Made Easy', Oxford Publication.
7. E- Writing: 21st –Century Tools for Effective Communication, Dianna Booher, Macmillan India Ltd., 2007, ISBN – 1403-93202-6
8. R. K Bansal, spoken English for India (Orient Longman, Madras, 1972.

Web resources/ MOOCs:

1. Grammar Clauses: https://www.khanacademy.org/humanities/grammar/syntax-sentences-and-clauses
2. Parts of Speech Conjunctions & Prepositions: https://www.khanacademy.org/humanities/grammar/parts-of-speech-the-preposition-and-the-conjunction
3. Nouns: https://www.khanacademy.org/humanities/grammar/parts-of-speech-the-noun
4. Verbs: https://www.khanacademy.org/humanities/grammar/parts-of-speech-the-verb
5. Pronouns: https://www.khanacademy.org/humanities/grammar/parts-of-speech-the-pronoun
6. Adjectives & Adverbs: https://www.khanacademy.org/humanities/grammar/parts-of-speech-the-modifier
7. Syntax: Conventions of Standard English: https://www.khanacademy.org/humanities/grammar/syntax-conventions-of-standard-english

2ND SEMESTER

ELECTRONICS AND COMMUNICATION ENGINEERING, SEMESTER –II 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	SH0201	Integral Calculus and Linear Algebra	04	02	00	05	06	30	10	60	00	00	100
2	SH0002	Engineering Chemistry	03	00	02	04	05	30	10	60	40	60	200
3	ME0004	Mechanical Workshop	00	00	02	01	02	00	00	00	40	60	100
4	ME0002	Elements of Mechanical Engineering	03	00	02	04	05	30	10	60	40	60	200
5	CE0001	Computer Programming	03	00	02	04	05	30	10	60	40	60	200
6	CV0002	Engineering Mechanics	03	02	00	04	05	30	10	60	00	00	100
7	CV0001	Environmental Science	01	00	02	02	03	30	10	60	40	60	200
8	SH0202	Business Communication and Presentation Skill	01	02	00	02	03	30	10	60	00	00	100
TOTAL			**18**	**06**	**10**	**26**	**34**	**210**	**70**	**420**	**200**	**300**	**1200**

Subject: **Integral Calculus and Linear Algebra**								
Program: **B.Tech All Branches**				Subject Code: SH0201			Semester: **II**	
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	2	0	5	60	00	40	00	100

Course Objectives:

1. To provide mathematical knowledge and skills needed to support their concurrent and subsequent engineering studies.
2. To provide an ability to apply knowledge of basic science and engineering fundamentals.
3. To provide an ability to undertake problem identification, formulation and solution.
4. To provide an ability to analyze different mathematical models within science and technology and work creatively, systematically and critically.
5. To provide an ability to find strategies for the solution of different types of mathematical models using knowledge about the possibilities and limitations of the different methods and tools.
6. To provide an ability to develop abstract, logical and critical thinking and the ability to reflect critically upon their work and work of others.
7. To provide an ability to insight their strengths and weakness as learners and to appreciate the value of errors or mistakes as powerful motivators to enhance learning and understanding.

CONTENTS

UNIT I **Infinite Series** **8 hrs.**

Standard Infinite Series: Geometric Series and Harmonic Series
Tests for Convergence and Divergence
Comparison Test, Cauchy's Integral test, D'alembert's ratio Test, Cauchy's nth Root Test
Alternating Series Leibnitz's Theorem, Absolute Convergence and Conditionally Convergence, Power Series

UNIT II **Multiple Integration** **13 hrs.**

Curve Tracing: Curves in Cartesian and Polar Form
Reduction Formulae
Double Integral, Change of order of Integration in Double integral
Change of Variables in Double Integral from Cartesian to polar
Application of Double Integral to find area and volume
Triple Integral

UNIT III **Linear Algebra** **14 hrs.**

Eigen Values and Eigen Vectors - Properties of Eigen Values and Eigen Vectors
Cayley-Hamilton Theorem – Diagonalization, Powers of a Matrix
Real Matrices: Symmetric, Skew Symmetric, Orthogonal
Complex Matrices: Hermition, Skew Hermition, Unitary Matrices.

UNIT IV **Vector Integral Calculus** **13 hrs.**

Vector Integration: Integration of a Vector Function of a Scalar Argument

Line Integrals: Work Done, Potential, Conservative Field and Area

Introduction to Surface Integrals, Volume Integrals

Green's Theorem in Plane, Stokes' Theorem, Gauss Divergence Theorem

Text Books

1. B.V.RAMANA: "HIGHER ENGINEERING MATHAMATICS", TATA McGraw Hill**.**
2. R K Jain, S R K Iyengar: " Advanced Engineering Mathematics. Third Edition", Narosa Publishing House

Reference Books

1. Erwin Kreyszig: "Advanced Engineering Mathematics (8th Edition) ",Wiley Eastern Ltd., New Delhi.
2. Murray Spiegel : "Advanced Mathematics for Engineering & Science: Schaum's Outline Series" ,Tata - McGraw Hill Publication
3. Dr. B.S. Grewal : "Higher Engineering Mathematics", Khanna Publishers, New Delhi
4. Merel C Potter, J L Goldberg: "Advanced Engineering Mathematics (3rd Edition)"

Web Resources & Moocs

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

Subject: **Engineering Chemistry**								
Program: **B.Tech All Branches**				Subject Code: SH0002			Semester: **I/II**	
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 study the basic concepts of chemistry & Engineering Applications of Chemistry.
2. To address the principles of general chemistry and specific topics relevant to various engineering disciplines, wherein the students should apply this learning in their respective areas of expertise.
3. To present sound knowledge of chemistry fundamentals.
4. To enrich students to understand the role of Applied Chemistry in the field of science and engineering.
5. To inculcate habit of scientific reasoning to do the task rationally.
6. To develop an ability to identify, formulate & solve chemistry & Engineering related Problems.
7. To provide mathematical knowledge and skills needed to support their concurrent and subsequent engineering studies.
8. Understand the various basic concepts used in engineering and process calculations.
9. Use fundamental chemistry concepts with direct application to the built environment.
10. Solve chemistry problems typically found on the Fundamentals of Engineering exam.

CONTENTS

UNIT I **(A) Electrochemistry** **7 hrs.**

Conductance, Cell constant and its determination; Electrochemical Cell, Galvanic Cell, Electrolytic Cell, Types of electrodes, Single electrode potentials, Reference Electrodes, Standard Hydrogen Electrode (SHE), Standard Calomel Electrode (SCE), Quinhydrone Electrode, EMF series, Cell emf measurement, Nernst equation, Conductometric titrations, Numerical.

(B) Corrosion **6 hrs.**

Definition and types of corrosion, Dry (chemical corrosion), Wet (Electrochemical corrosion) and its mechanisms; Types of electrochemical corrosion, (differential aeration, galvanic, concentration cell, water line, pitting, stress, erosion and soil corrosion, Caustic embrittlement, Factors affecting on corrosion (Metallic and Environmental), Pourbaix diagram, Protective measures to control Corrosion, Sacrificial anode and Cathode process for corrosion control.

UNIT II **Water Treatment Technology** **10 hrs.**

Sources of water, Soft Water & Hard Water, Types of hardness, Units of hardness measurement, Impurities in water, Disadvantages of hard water, Determination of water hardness by EDTA method, Alkalinity of water and its significance, Boiler feed water, Scale and sludge formation in boilers and pipes etc , Boiler Corrosion, Water softening through Soda lime process, Zeolite Process & Ion-exchange Process, Characteristics of Potable water, Specifications for drinking water (BIS and WHO standards), Sources and quality of drinking water, Treatment of water for domestic use: Filtration, Coagulation, Sedimentation and Disinfection, Concept of water harvesting, storage and recycling. Desalination through Electro Dialysis & Reverse Osmosis, Numerical problems.

UNIT III **(A) Dimensions, Units & Energy balances** **6 hrs.**

Dimensions and Units: Basic chemical calculations – atomic weight, molecular weight, equivalent weight, Mole concept, Inter-conversion of concentration units.
Material Balance without chemical reactions: Flow diagram for material balance, simple material balance with or without recycles or bypass.
Material Balance involves chemical reactions: concept of limiting reactant, conversion, yield, selectivity and liquid phase reaction, gas phase reaction with or without recycle or bypass.

(B) Instrumental Techniques **6hrs.**

Fundamentals of Spectroscopy; Principles and applications of UV-visible, IR, NMR, Mass & Atomic absorption Spectroscopy; Principles and applications of Chromatographic techniques including TLC, PC, Gas, HPLC.

UNIT IV **(A) Advance Organic Materials** **6 hrs.**

Liquid Crystals: Introduction, classification and applications, Organic Electronic Materials: Introduction, types and applications, Chemical Sensors: Introduction, types and applications, Ionic Liquids: Introduction and applications, Chromic Materials: Introduction, types and applications.

(B) Catalysis & Adsorption **7hrs.**

Catalysis: Types of catalysis, Positive & Negative catalysis, Homogeneous and Heterogeneous catalysis, Characteristics of Catalytic action, Poisoning of catalysis, Promoters, Auto Catalysis, Acid-Base Catalysis, Industrial Applications of Catalysts.
Adsorption: Types of adsorption, adsorption isotherm: Freundlich adsorption isotherm, Langmuir adsorption Isotherm, Determination of surface area by BET method, Application of adsorption.

Text Books

1. P.C. Jain, M. Jain, Engineering Chemistry, Dhanpat Rai Publishing Company, New Delhi, **2005**.

2. Shashi Chawla, Textbook of Engineering Chemistry, Dhanpat Rai Publishing Co.**2004**.

Reference Books

1. Dara, S.S., Umare S.S.; A Text Book of Engineering Chemistry (Twelfth edition); S. Chand. Co. 2010.
2. P. Atkins, J.D. Paula, Physical Chemistry, Oxford University Press, **2002**.
3. A. J. Mee, Physical Chemistry, 6th Ed. English Language Book Society and Heinemann Educational Books Ltd. London, **1962**.
4. Douglas A. Skoog, Donald M. West, Fundamentals of Analytical Chemistry, Cengage Learning, Ninth Edition, **2014**.
5. Puri B. R., Sharma L. R. , Pathania M.S; Principles of Physical Chemistry; Vishal Publishing Co. (46nd Edition), **2013**.
6. Arthur E. Morris, Gordon Geiger and H. Alan Fine, Handbook on Material & Energy Balance Calculations in Material Processing,Third Edition, **2011**.

Digital Learning Resources & Moocs

1. http://freevideolectures.com/blog/2010/11/130-nptel-iit-online-courses/
2. http://nptel.ac.in/courses/113108051/
3. http://ocw.mit.edu/index.htm
4. https://www.khanacademy.org/

List of Practical:

1. Determination of the alkalinity of unknown water sample.
2. Estimation of hardness of water sample by EDTA method.
3. Estimation of dissolved oxygen in water sample.
4. Determination of metal ions (Ca^{2+}/Zn^{2+}) from the mixture by EDTA titration.
5. Determination of metal ions (Pb^{2+}/Mg^{2+}) from the mixture by EDTA titration.
6. Determination of the concentration of chloride ions in unknown water sample.
7. Thin Layer Chromatography (TLC) and Paper Chromatography (PC).
8. Determination of strength of Acid or Base by pH meter.
9. Determination of strength of Acid or Base by Conductometer.
10. To calculate the Acid value of the given sample of oil.
11. Determination of the saponification value of a given oil sample.
12. Determination of iron content from unknown sample by spectrophotometer.

Text Books:

1. G. H. Jeffery, J. Bassett, J. Mendham, R. C. Denney, Vogel's Textbook of Quantitative Chemical Analysis, 5th Edition, Longman Group of Publication, UK, **1989**.
2. Manual on Engineering Chemistry, S.K. Bhasin, S. Rani, Dhanpat Rai Publishing Company, New Delhi, 2011.

Subject: **Mechanical Workshop**								
Program: **B.Tech All Branches**			Subject Code: ME0004				Semester: **I/II**	
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	2	1	60	00	40	00	100

Content

Unit - I

1. **Introduction**

   Introduction to Mechanical Workshop, Safety, and Safety rules, Safety Slogans, Tools and Equipments used for safety purpose.

Unit- II

2. **Fitting Shop:**

   Introduction, Fitting materials, Tools and Equipments used in Fitting, Fitting Joints.

   1 Job in for practical demonstration

Unit- III

3. **Carpentry Shop:**

   Introduction, Carpentry materials, Tools and Equipments used in Carpentry, Carpentry Joints.

   1 Job in for practical demonstration

Unit- IV

4. **Welding Shop:**

   Introduction, Welding Tools, Equipments and Machines, Various Welding Joints

   1 Job in for practical demonstration

Text Books

1. Workshop Technology Vol. 1 and 2, by Raghuvanshi B.S. Dhanpat Rai & Sons 1998.

Reference Books

1. Mechanical Workshop Practice by K C John, PHI Learning.
2. Workshop Technology by Chapman W.A. J and Arnold E. Viva low priced student edition, 1998.
3. Workshop Practices, H S Bawa, Tata McGraw-Hill, 2009.
4. Workshop Practices and Materials, B J Black, CRC Press

Web Resources

1. www.nptel.ac.in

Subject: **Elements of Mechanical Engineering**								
Program: **B.Tech All Branches**			Subject Code: ME0002			Semester: **I/II**		
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

Content

Unit - I

1. **Basic Concepts of Thermodynamics**
   Basic units and dimensional analysis, Intensive and Extensive Properties, Energy, heat, temperature, specific heat capacity, Interchange of heat, change of state, mechanical equivalent of heat, Internal energy, enthalpy, entropy, efficiency, Open and Closed systems, statements of Zeroth Law, First law and its limitations, Second law of Thermodynamics

2. **Properties of Gases**

   Ideal and Real Gases, Gas laws, Boyle's law, combined gas law, gas constant, Internal energy, Relation between Cp and Cv, Enthalpy, Non flow process, constant volume process, Constant pressure process, Isothermal process, Poly-tropic process, Adiabatic process.

Unit- II

3. **Fuels and Lubricants**

   Different types of fuels, their properties and applications. Different types of lubricants, their properties and applications.

4. **Internal Combustion Engines**

   Classifications, Difference between I.C. and E.C. , Otto four-stroke engine, Diesel-four-stroke engine, Difference between Otto cycle and Diesel engine, Two-stroke engines, Difference between two- stroke and four-stroke engines, indicated power (ip), Brake power (bp), Efficiencies.

Unit- III

5. **Properties of Steam**

Introduction, steam formation, types of steam, enthalpy, specific volume of steam and dryness fraction of steam, Internal energy, steam tables, Measurement of dryness fraction throttling calorimeter, separating calorimeter, Combined calorimeter.

6. **Steam Boilers**

   Introduction, Classification, Simple vertical and horizontal boiler, Boiler details, Boiler performance. Functioning of different mountings and accessories.

Unit- IV

7. **Refrigeration and Air-conditioning**

   Introduction, Refrigerant, Vapor compression & absorption cycles & system, basic applications.

8. **Transmission of Motion and Power**

   Introduction, Couplings methods of drive, power transmission elements, shaft and axle, Belt-drive, pulleys, power transmitted by a belt, Chain drive, Friction drive, Gear drive.

Text Books

1. Basant Agrawal 'Basic mechanical Engineering' Wiley-India, 2008.
2. Shanmugam G and Palanichamy M S, 'Basic Civil and Mechanical Engineering', Tata McGraw Hill publishing Co., New Delhi.

Reference Books

1. Elements of Mechanical Engineering by K.P. Roy and Prof. S.K. Hajra Chaudhary, Media Promoters and publishers Pvt. Ltd. Bombay
2. A Text Book of Elements of Mechanical Engineering by S. M. Bhatt, H. G. Katariya, J. P. Hadiya – Books India Publications, New Delhi
3. Basic & Applied Thermodynamics by P K Nag - Tata McGraw Hill Pvt. Ltd., Mumbai

Web Resources

1. www.nptel.ac.in

Subject: **Computer Programming**								
Program: **B.Tech All Branches**				Subject Code: CE0001			Semester: **I/II**	
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. Identify the parts of the computer system.
2. Adequately explain functioning of computer components.
3. Explain the process of problem solving using computer
4. Design an algorithmic solution for a given problem
5. Write a maintainable C program for a given algorithm.
6. Trace the given C program manually.

Contents:

Unit No	Sub unit	Name of Topic	Hours
		UNIT 1	
1	**1.1**	**Introduction to Programming** What is programming?, Problem solving methods with examples- Algorithm and Flowchart, Types of Programming languages ,Characteristics of higher level language, Some Programming languages	**4**
	1.2	**Introduction to 'C'** Introduction, Importance of C, Sample C programs, Basic structure of C programs, Programming style, executing a C program. Introduction, Character Set, C tokens, Keywords and Identifiers, Constants, Variables, Data types, Declaration of Variables, Defining symbolic constants.	**3**
	1.3	**Operators and Expression:** Introduction, Arithmetic of Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators,	**4**

		Special Operators, Arithmetic Expressions, Evaluation of expressions, Precedence of arithmetic operators, Type conversions in expressions, Mathematical function.	
		UNIT 2	
2	**2.1**	**Decision Making Statements** Introduction, Decision making with IF statement, Simple IF statement, the IF ELSE statement, Nesting of IF … ELSE statements, The ELSE IF ladder, The switch statement, the turnery (? :) Operator, the GOTO statement,	**4**
	2.2	**Looping** WHILE statement, the DO statement, The FOR statement, Jumps in loops Break and continue.	**5**
	2.3	**Array & Handling of Character strings:** Introduction, One-dimensional arrays, Two-dimensional arrays, Initialization of two dimensional arrays, Concept of Multidimensional arrays.	**4**
		UNIT 3	
3	**3.1**	**Handling of Character strings:** Introduction, Declaring and initializing string variables, Reading string from terminal, Writing string to screen, Arithmetic operations on characters, Putting string together, String Operations : String Copy, String Compare, String Concatenation and String Length, String Handling functions, Table of strings	**5**
	3.2	**User-Defined Functions :** Introduction, Need for user-defined functions, Return values and their types, Calling a function, category of functions, No arguments and no return values, Arguments with return values, Handling of non-integer functions, Nesting of functions, Recursion, Functions with arrays, The scope and Lifetime of variables in functions.	**5**
		UNIT 4	
4	**4.1**	**Pointers:** Introduction, Understanding pointers, Accessing the address of variable, Declaring and initializing pointers, Accessing a variable through its pointer, Pointer expressions, Pointer increments and scale factor, Pointers and arrays, Pointers and character strings, Pointers and Functions, Pointers and structures	**5**
	4.2	**Structures and Unions:** Introduction, Structure definition, Giving values to members, Structure initialization, Comparison of structures, Arrays of structures, Arrays within structures, Structures within Structures,	**2**

		Structures and functions, Unions,	
	4.3	**Introduction to Object Oriented Concepts & Programming** Review of fundamental concepts of Object-oriented programming, Introduction to C++, class and objects, Functions in C++,Constructors & Destructors	**4**
		TOTAL	**45**

Text Books:

1. Programming in ANSI C, by Balagurusamy, Publisher - Tata McGraw Hill.
2. Object-oriented programming with C++,E.Balagurusamy, 2nd Edition, TMH.

Reference Books:

1. Introduction to C by Reema Thareja, Publisher-Oxford
2. Programming with ANSI and Turbo C, by Ashok N Kamthane, Publisher – Pearson Education.
3. Let us C, by Yashwant Kanitkar, Publisher – BPB Publication

Online Courses:

1. http://nptel.ac.in/courses/106105085/2
2. https://onlinecourses.nptel.ac.in/iitk_cs_101/preview
3. https://onlinecourses.nptel.ac.in/noc15_cs15/preview

Subject: **Engineering Mechanics**								
Program: **B.Tech All Branches**				Subject Code: CV0002			Semester: **I/II**	
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 Objectives:

1. To provide fundamental knowledge of Engineering Mechanics.
2. To make students realize the importance of applications of engineering Mechanics in their day to day life.
3. To focus on the applicability aspect of the subject in their respective branch.

Course Outcomes:

1. Students will be able to understand the fundamentals of mechanics.
2. Students should be able to apply the knowledge of Engineering Mechanics to solve complex Problems by making them comprehensible and simple.
3. Students should be able to construct free-body diagrams.
4. To calculate the reactions necessary to ensure static equilibrium.
5. Students will be able to calculate centre of gravity and moment of inertia.
6. Students can analyse the dry surfaces in contact with each other considering friction between Surfaces.
7. Students will be able to determine the parameters of motion for the bodies in motion.

COURSE CONTENTS

UNIT - I **(08 HRS)**

Introduction: Beginning and Development of Engineering Mechanics, Fundamental Principles of Mechanics, Idealizations in Mechanics, Branches of Mechanics, Units.

Coplanar Forces: Effect of Force, Characteristics of Force, Principle of Transmissibility of Forces, System of Forces, Resultant Force, Composition of Forces, Methods for Resultant Force, All major Laws of Forces, Principle of Equilibrium, Analytical Method for the Equilibrium of Coplanar Forces, Lami's Theorem.

Non-Coplanar Forces: Moment of a Force, Graphical Representation of Moments, Types of Moments, Varignon's Principle of Moments, Application of Moments, Levers, Types of Levers.

UNIT - II **(12 HRS)**

Beams: Types of Loads, Types of Supports, Types of Beams, Analytical Method for Determination of Support Reactions of a Beam (Simply Supported Beam, Cantilever Beam).

Friction: Static Friction, Limiting Friction, Normal Reaction, Angle of Friction, Coefficient of Friction, Laws of Friction, Equilibrium of a Body on a Rough Horizontal Plane, Equilibrium of a Body on a Rough Inclined Plane, Equilibrium of a Body on a Rough Inclined Plane Subjected to a Force Acting Along the Inclined Plane, Equilibrium of a Body on a Rough Inclined Plane Subjected to a Force Acting Horizontally. Ladder & Wedge Friction.

UNIT - III **(13 HRS)**

Centre of Gravity: Centroid, Methods for Centre of Gravity, Centre of Gravity by Geometrical Considerations, Axis of Reference, Centre of Gravity of Plane Figures, Centre of Gravity of Symmetrical Sections, Centre of Gravity of Unsymmetrical Sections, Centre of Gravity of Solid Bodies, Pappus Guldinus Theorem.

Moment of Inertia

Moment of Inertia of Plane area, Methods for Moment of Inertia, Moment of Inertia by Integration Method, Moment of Inertia of simple lamina, Parallel and Perpendicular Axis Theorem, Moment of Inertia of Built-up Section.

UNIT IV **(15 HRS)**

Graphical Method: Method for the Resultant of two Co- Planar forces, Equilibrium of Coplanar Forces (Force Polygon), Funicular Polygon Method to find Support Reactions, Graphical Method for determination of CG, MI.

Kinematics & Kinetics: Linear Motion, Relative Motion, Rectilinear Motion of Particle, Curvilinear Motion of Particle Newton's Second Law of Motion, Work, Work Done by Force, Energy, Law of Conservation of Energy, Work- Energy Principle, Power, Efficiency.

Mechanical Vibrations: Simple Harmonic Motion, Vibrations, D'alembert's Principle, Classification of Vibration, Damping and Vibration, Derivation of Free Vibration without Damping

Text Books:

1. R C Hibbler, 'Engineering Mechanics', Pearson Publication.

Reference Books:

1. Ferdinand P. Beer & E. Russell Johnston, "Statics and Dynamics"- McGraw Hill Publication.
2. S. Ramamrutham, 'Engineering Mechanics', Dhanpat Rai Publication.
3. Basudeb Bhattacharya, 'Engineering Mechanics', Oxford University Press.
4. R S Khurmi, 'Engineering Mechanics', S Chand Publication.
5. S B Junnarkar, H J Shah, 'Applied Mechanics', Charotar Publishing House.

Web Resources:

1. http://nptel.ac.in/courses/122102004/
2. http://textofvideo.nptel.iitm.ac.in/122102004/

Subject: **Environmental Science**								
Program: **B.Tech All Branches**				Subject Code: CV0001			Semester: **I/II**	
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	2	2	24/60	24/60	16/40	16/40	200

Course Objectives:

1. To make students understand the importance of Environment in their day to day life.
2. To make students familiar with environmental Bio-diversity and related concepts.
3. Also to make students familiar with environmental legislations.

Course Outcomes:

1. Students will be able to understand the studies and importance related to environmental problems.
2. Students will be able to understand the legal procedures pertaining to environmental legislations
3. Students should be able to apply the knowledge gained in their respective branches of engineering & technology.

Course Contents:

UNIT I **(04 HRS)**

Concepts of Environmental Sciences: Environment, Levels of organizations in environment, Structure and functions in an ecosystem; Biosphere, its Origin and distribution on land, in water and in air, Broad nature of chemical composition of plants and animals, Natural Resources: Renewable and Non-renewable Resources, Forests, water, minerals, Food and land (with example of one case study); Energy, Growing energy needs, energy sources (conventional and alternatives)

UNIT II **(05 HRS)**

Biodiversity and its conservation: Biodiversity at global, national and local levels; India as a mega-diversity nation; Threats to biodiversity (biotic, abiotic stresses), and strategies for conservation. Environmental Pollution: Types of pollution- Air, water (including urban, rural, marine), soil, noise, thermal, nuclear; Pollution prevention; Management of pollution-Rural/Urban/Industrial waste management [with case study of any one type, e.g., power (thermal/nuclear), fertilizer, tannin, leather, chemical, sugar], Solid/Liquid waste management, disaster management.

UNIT III **(04 HRS)**

Environmental Biotechnology: Biotechnology for environmental protection- Biological indicators, bio-sensors; Remedial measures- Bio-remediation, phytoremediation, bio-pesticides, bio-fertilizers; Bio-reactors- Design and application. Social Issues and Environment: Problems relating to urban environment- Population pressure, water scarcity, industrialization; remedial measures; Climate change- Reasons, effects (global warming, ozone layer depletion, acid rain) with case studies.

UNIT IV **(05 HRS)**

Legal issues- Environmental legislation (Acts and issues involved), Environmental ethics. Environmental Monitoring: Monitoring- Identification of environmental problem, tools for monitoring (remote sensing, GIS); Sampling strategies- Air, water, soil Sampling techniques.

Text Books:

1. R C Hibbler, 'Engineering Mechanics', Pearson Publication.

Reference Books:

1. Ferdinand P. Beer & E. Russell Johnston, "Statics and Dynamics"- McGraw Hill Publication.
2. S. Ramamrutham, 'Engineering Mechanics', Dhanpat Rai Publication.
3. Basudeb Bhattacharya, 'Engineering Mechanics', Oxford University Press.
4. R S Khurmi, 'Engineering Mechanics', S Chand Publication.
5. S B Junnarkar, H J Shah, 'Applied Mechanics', Charotar Publishing House.

Web Resources:

1. http://nptel.ac.in/courses/122102004/
2. http://textofvideo.nptel.iitm.ac.in/122102004/

List of Practicals:

1. Plotting of bio geographical zones and expanse of territorial waters on the map of India.
2. Identification of biological resources (minimum 20) (plants, animals, birds) at a specific locations.
3. Determination of:
   (i) pH value
   (ii) Water holding capacity
   (iii) Electrical conductivity of different types of soils.
4. Determination of energy content of plants by bomb calorimeter.
5. Measurement and classification of noise pollution.
6. Determination of particulate matter from an industrial area by high volume sampler.
7. Determination of ico-chemical parameters (Alkalinity, Acidity) of tap water well water, rural water supply industrial effluent and sea water & potability issues.
8. Determination of ico-chemical parameters (Salinity, COD, BOD) of tap water well water, rural water supply industrial effluent and sea water & potability issues.
9. Demonstration of Remote Sensing and GIS methods.
10. Understanding Environmental Biotechnology Processes.

Subject: **Business Communication and Presentation Skills**								
Program: **B.Tech All Branches**				Subject Code: SH0202			Semester: **II**	
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	2	0	2	60	00	40	00	100

Course Objectives:

1. To orient students about the varied uses of business communication.
2. Under the importance of personality and its reflection in communication.
3. Train students to develop business correspondence in writing and presentation skills.

Course Content:

Unit 1:
Business Communication- **Role of Communication in Information Age**, concept and meaning of communication; skills necessary for technical communication; Communications in a technical organization; Barriers to the process of communication. Style and organization in technical communication covering, Language skills, Objectivity, clarity, precision, and organizational etiquettes as defining features of technical communication.

Unit 2:
Effective Presentation Skills-Oral Presentation and professional speaking, Elements of effective presentation; Planning and preparing a model presentation; organizing the presentation to suit the audience and context; Basics of public speaking and Group Discussion.

Unit 3:
Reading- Intensive reading, Predicting content, Interpretation, Inference from text, skimming & scanning techniques of reading, Critical Interpretation, Editorial of newspapers.

Unit 4:
Writing: Basic Writing skill development & Paragraph development(Unity, coherence, cohesive devices), Letters; Inquiry- reply to inquiry, Complain, request , business letters, Using e-mail for business communication; Language in e-mail.

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:

1. Business Conversation Rule 1 :https://www.youtube.com/watch?v=wB8mr4iViy0
2. Business English Conversations Rule 2: https://www.youtube.com/watch?v=wB8mr4iViy0
3. Business English Conversations 3: https://www.youtube.com/watch?v=wB8mr4iViy0
4. Business English Conversations Rule 4: https://www.youtube.com/watch?v=wB8mr4iViy0
5. Business English Conversations Rule 5: https://www.youtube.com/watch?v=wB8mr4iViy0
6. English Presentation Video: https://www.youtube.com/watch?v=wB8mr4iViy0
7. Powerful Presentation Skills: Body Language: https://www.youtube.com/watch?v=wB8mr4iViy0
8. Make Body Language Your Superpower: https://www.youtube.com/watch?v=wB8mr4iViy0
9. Make a Presentation Like Steve Jobs: https://www.youtube.com/watch?v=wB8mr4iViy0

3RD SEMESTER

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

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

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

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

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

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**

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