With effect from academic year 2015-16

SCHEME OF INSTRUCTION & EXAMINATION
B.E. (BIOMEDICAL ENGINEERING)

Semester -II

S.No	Syllabus Ref.No.(Code)	Subject Title	Scheme of Instruction				Contact hrs/week	Scheme of Examination		Credits
			L	T	Dg	P		CIE	SEE	
1	BS 201 MT	Mathematics-II	3	1	-	-	4	30	70	3
2	BS 202 PH	Engineering Physics-II	3	-		-	3	30	70	3
3	BS 209 CH	Applied Chemistry	3	-	-	-	3	30	70	3
4	ES 208 CE	Applied Mechanics	3	-	-	-	3	30	70	3
5	ES 206 EC	Electronic Devices & Circuits	3	-	-	-	3	30	70	3
6	HS 204 EG	Business Communication and Presentation Skills	3	-	-		3	30	70	3
1	BS 251 PH	Engineering Physics Lab-II	-	-	-	2	2	25	50	1
2	BS 255 CH	Applied Chemistry Lab	-	-	-	2	2	25	50	1
3	ES 253 CS	Computer skills lab	-	-	-	2	2	25	50	1
4	ES 256 EC	Electronic Devices & Circuits lab	-	-	-	2	2	25	50	1
5	ES 257 BM	Circuit Design and Simulation lab	-	-	-	2	2	25	50	1
6	HS 254 EG	Communication Skills Lab	-	-	-	2	2	25	50	1
			18	**01**	**-**	**12**	**31**	**275**	**720**	**24**

With effect from academic year 2015-16

SCHEME OF INSTRUCTION & EXAMINATION
B.E. (CIVIL ENGINEERING)

SEMESTER - II

S.No.	Course Code	Course Title	Scheme of Instruction				Contact hrs/week	Scheme of Examination		Credits
			L	T	Dg	P		CIE	SEE	
1	BS201MT	Mathematics-II	3	1	-	-	4	30	70	3
2	BS202PH	Engineering Physics -II	3	-	-	-	3	30	70	3
3	BS203CH	Engineering Chemistry -II	3	-	-	-	3	30	70	3
4	ES205CE	Engineering Mechanics-II	3	-	-	-	3	30	70	3
5	HS204EG	Business Communication and Presentation Skills	3	-	-	-	3	30	70	3
6	BS251PH	Engineering Physics Lab-II	-	-	-	2	2	25	25	1
7	BS252CH	Engineering Chemistry Lab-II	-	-	-	2	2	25	25	1
8	ES253CS	Computer Skills Lab	-	-	-	2	2	25	50	1
9	HS254EG	Communication Skills Lab	-	-	-	2	2	25	50	1
10	ES256CE	Engineering Graphics-II	-	-	2+2	-	4	50	50	2
11	PC255CE	Building Drawing Lab	-	-	2+2	-	4	50	50	2
			15	**01**	**08**	**08**	**32**	**280**	**620**	**23**

Service Courses (Offered to BME)

S.No.	Course Code	Course Title	Contact hrs/week			Contact hr/week	Scheme of Examination		Credits
			L	T	P		CIE	SEE	
1	ES208CE	Applied Mechanics	3	-	-	3	30	70	3

SCHEME OF INSTRUCTION & EXAMINATION
B.E (Mechanical) II Semester

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination		Credits
			L	T	P/ Dg	Contact Hrs/wk	CIE	SEE	
1.	BS 201 MT	Mathematics-II	3	1	-	4	30	70	3
2.	BS 202 PH	Engineering Physics-II	3	-	-	3	30	70	3
3.	BS 203 CH	Engineering Chemistry-II	3	-	-	3	30	70	3
4.	HS 204 EG	Business Communication and Presentation Skills	3	-	-	3	30	70	3
5.	ES 205 CE	Engineering Mechanics-II	3	-	-	3	30	70	3
6.	ES 258 ME	Engineering Workshop – II	-	-	2	2	25	50	1
7.	BS 251 PH	Engineering Physics Lab-II	-	-	2	2	25	50	1
8.	BS 252CH	Engineering Chemistry Lab-II	-	-	2	2	25	50	1
9.	HS 254 EG	Communication Skills Lab	-	-	2	2	25	50	1
10.	ES 253 CS	Computer Skills Lab.	-	-	2	2	25	50	1
11.	ES 207 ME	Engineering Drawing-II	2	-	2	4	50	50	3
			17	01	12	30	325	650	23

Service Courses Offered to Other Departments
(Common to ECE & EEE)

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination		Credits
			L	T	P	Contact Hrs/wk	CIE	SEE	
Theory									
1.	ES210 ME	Elements of Mechanical Engineering (For ECE & EEE)	3	-	-	3	30	70	3

SCHEME OF INSTRUCTION & EXAMINATION
B.E (ECE)

SEMESTER - II

S. No	Course Code	Course Title	Scheme of Examination		L	T	P	Hrs/ Wk	Credits
			CIE	SEE					
1.	BS 201 MT	Mathematics II	30	70	3	1	0	4	3
2.	BS 202 PH	Engineering Physics II	30	70	3	0	0	3	3
3.	BS 203 CH	Engineering Chemistry II	30	70	3	0	0	3	3
4.	**PC 211 EC**	**Electronic Devices**	30	70	3	1	0	4	3
5.	**ES 210 ME**	**Elements of Mechanical Engineering**	30	70	3	0	0	3	3
6.	ES 212 EE	Basic Electrical Engineering	30	70	3	0	0	3	3
7.	HS 204 EG	Business Communication and Presentation Skills	30	70	3	0	0	3	3
	Practicals								
8.	BS 251 PH	Engineering Physics Lab - II	25	50	0	0	2	2	1
9.	BS 252 CH	Engineering Chemistry Lab II	25	50	0	0	2	2	1
10.	**PC 259 EC**	**Electronic Devices Lab**	**25**	**50**	**0**	**0**	**2**	**2**	**1**
11.	**BS 253 CS**	**Computer Skills Lab**	**25**	**50**	**0**	**0**	**2x2**	**4**	**2**
12.	HS 254 EG	Communication Skills Lab	25	50	0	0	2	2	1
Total			**335**	**740**	**21**	**2**	**12**	**35**	**27**

Service Courses Offered to Other Departments
(Common to BME & EEE)

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination		Credits
			L	T	P	Contact Hrs/wk	CIE	SEE	
1.	**ES206EC**	Electronic Devices & Circuits (BME)	**3**	**-**	**-**	**3**	**30**	**70**	**3**
2.	**ES207EC**	Electronic Engineering – I(EEE)	**3**	**-**	**-**	**3**	**30**	**70**	**3**

SCHEME OF INSTRUCTION & EXAMINATION

B.E.(EEE)

Semester- II

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination		Credits
			L	T	P	Contact Hrs/wk	CIE	SEE	
1.	BS201MT	Mathematics-II	3	1	-	4	30	70	3
2.	BS202PH	Engineering Physics-II	3	-	-	3	30	70	3
3.	BS203CH	Engineering Chemistry-II	3	-	-	3	30	70	3
4.	ES210ME	Elements of Mechanical Engineering	3	-	-	3	30	70	3
5.	HS204EG	Business Communication and Presentation Skills	3	-	-	3	30	70	3
6.	ES207EC	Electronic Engineering – I	3	-	-	3	30	70	3
7.	BS251PH	Engineering Physics Lab-II	-	-	2	2	25	50	1
8.	BS252CH	Engineering Chemistry Lab-II	-	-	2	2	25	50	1
9.	HS254EG	Communication Skills Lab	-	-	2	2	25	50	1
10.	ES253CS	Computer Skills Lab.	-	-	2	2	25	50	1
			18	01	08	27	280	620	22

Interdisciplinary Courses Offered to Other Departments
B.E. II Semester

S. No.	Course Code	Course Title	Scheme of Instruction				Scheme of Examination		Credits
			L	T	P	Contact Hrs/wk	CIE	SEE	
1.	ES212EE	Basic Electrical Engineering (For ECE & CSE)	3	-	-	3	30	70	3

With effect from academic year 2015-16

SCHEME OF INSTRUCTION & EXAMINATION

B.E (COMPUTER SCIENCE & ENGINEERING)

SEMESTER - II

S. No	Course Code	Course Title	Scheme of Examination		L	T	P	Hrs/ Wk	Credits
			CIE	SEE					
1.	BS 201 MT	Mathematics II	30	70	3	1	0	4	3
2.	BS 202 PH	Engineering Physics II	30	70	3	0	0	3	3
3.	BS 203 CH	Engineering Chemistry II	30	70	3	0	0	3	3
4.	**PC 213 CS**	**Object Oriented Programming using C++**	30	70	3	1	0	4	3
5.	ES 212 EE	Basic Electrical Engineering	30	70	3	0	0	3	3
6.	HS 204 EG	Business Communication and Presentation Skills	30	70	3	0	0	3	3
	Practicals								
7	BS 251 PH	Engineering Physics Lab - II	25	50	0	0	2	2	1
8.	BS 252 CH	Engineering Chemistry Lab II	25	50	0	0	2	2	1
9.	**ES 253 CS**	**Computer Skills Lab**	**25**	**50**	**0**	**0**	**2**	**2**	**1**
10.	**PC 260 CS**	**C++ Programming Lab**	**25**	**50**	**0**	**0**	**2x2**	**4**	**2**
11.	HS 254 EG	Communication Skills Lab	25	50	0	0	2	2	1
Total			**315**	**670**	**18**	**2**	**10**	**30**	**24**

BS 201 MT

MATHEMATICS –II

(Common for all branches)

Instruction	: 4 Periods per week (3 Theory + 1 Tutorial)
Duration of SEE	: 3 Hours
SEE	: 70 Marks
CIE	: 30 Marks
Credits	: 3

Objectives:

- To study matrix algebra and its use in solving system of linear equations and in solving eigen value problems
- To provide an overview of ordinary differential equations
- To introduce series solutions of differential equations
- To study special functions like Legendre and Bessel functions

UNIT – I

Matrices :

Elementary row and column operations, Rank of a matrix, Echelon form, System of linear equations, Linearly dependence and independence of vectors, Linear transformation,Orthogonal transformation,Eigenvalues, Eigenvectors, Properties of eigenvalues , Cayley-Hamilton theorem, Quadratic forms, Reduction of quadratic form to canonical form by orthogonal transformation , Nature of quadratic forms.

UNIT – II

Ordinary Differential Equations of First Order:

Exact first order differential equations , Integrating factors, Linear first order equations , Bernoulli's , Riccati's and Clairaut's differential equations ,Orthogonal trajectories of a given family of curves.

UNIT – III

Linear Differential Equations of Higher Order :

Linear independence and dependence, Solutions of second and higher order linear homogeneous equations with constants coefficients, Method of reduction of order for the linear homogenous second order differential equations with variable coefficients , Solutions of non-homogeneous linear differential equations, Method of variation of parameters , Solution of Euler-Cauchy equation, Simultaneous linear differential equations.

UNIT – IV

Series Solutions of differential equations:

Ordinary and Singular points of an equation, Power series solution ,Series solution about a regular singular point, Frobenius method, Beta, Gamma and error functions.

UNIT – V

Special Functions:

Legendre's differential equation and Legendre's polynomials, Rodrigue's formula, Generating function for Legendre's polynomials $P_n(x)$, Recurrence relations for Legendre's polynomials $P_n(x)$, Orthogonal and Orthonormal functions, Orthogonal property of Legendre's polynomials $P_n(x)$, Bessel's differential equation

and Bessel's functions, Derivatives and integrals of Bessel's functions, Recurrence relations for $J_n(x)$, Generating function for $J_n(x)$.

Suggested Reading:

1. R.K. Jain & S.R.K. lyengar, Advanced Engineering Mathematics, Narosa Publications, 4th Edition,2014.
2. Dr.B.S.Grewal, Higher Engineering Mathematics, Khanna Publications, 43rd Edition,2014.
3. Dr.M.D.Raisinghania, Ordinary and Partial differential equations, S.CHAND, 17th Edition 2014.
4. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley , 9th Edition, , 2012.

BS 202PH

Engineering Physics-II

(Common to All Branches)

Instructions	3 Periods/week
Duration of University Examination	3 Hours
University Examination	70 Marks
Sessional	30 Marks
Credits	3

OBJECTIVES: The aim of this course is to acquire the basic knowledge on elements of solid state physics. To understand the properties of semiconducting , superconducting ,dielectric and magnetic materials in their bulk form. To acquire the knowledge on latest material characterization techniques such as X-ray Diffractometry (XRD), Scanning Electron Microscopy (SEM), Atomic Force microscopy (AFM) and Raman Spectroscopy. Also get introduction to basics of thin films and nano materials.

RESULTS : At the end of the course the student will acquire the knowledge on the properties of the materials in their bulk and thin forms. Student will apply his knowledge of the materials in selecting the materials for various engineering applications.

UNIT- I (9 periods)

Crystallography: Crystal systems - Bravais lattices – Lattice planes and Miller Indices – Inter planar spacing - Bragg's law - Experimental determination of lattice constant by powder diffraction method.

Crystal defects: Classification of defects - Concentration of Schottky defects in metals and ionic crystals - Concentration of Frankel defects.

Band Theory of Solids: Classical free electron theory (qualitative) – Energy band formation in solids - Kronig-Penney model (qualitative treatment) - Electron gas - Fermi energy and Fermi level in metals - Classification of solids into conductors, semiconductors and insulators.

UNIT- II (8 Periods)

Magnetic Materials: Classification of magnetic materials: dia, para, ferro, antiferro and ferrimagnetic materials – Weiss molecular field theory of ferromagnetism - Magnetic domains - Hysteresis curve - Soft and hard magnetic materials – Ferrites: Applications of ferrites.

Superconductivity: Introduction - General properties of super conductors - Meissner effect - Type I and Type II superconductors - BCS theory (qualitative) – High T_c superconductors (in brief) - Applications of superconductors : Josephson's Junction and SQUIDS.

UNIT- III (8 Periods)

Semiconductors: Intrinsic and Extrinsic semiconductors - Concept of a hole - Concept of Fermi level in semiconductor - Carrier concentration and conductivity in intrinsic semiconductors – P-N junction diode and its I-V characteristics – Thermistor - Hall effect.

Dielectric Materials: Dielectrics - Types of dielectric polarizations – Electronic polarization, Ionic, Orientational and Space-charge polarizations – Expression for Electronic polarization - Frequency and temperature dependence of dielectric polarizations - Determination of dielectric constant by capacitance Bridge method - Ferro electricity - Barium titanate - Applications of Ferroelectrics.

UNIT-IV (8 Periods)

Techniques for characterization of materials: Principles of X-ray fluorescence – Raman Spectroscopy - Atomic force microscopy - Electron microscopy (SEM).

Thin films: Distinction between bulk, thin films and nano materials - Thin film preparation techniques: Thermal evaporation methods, Electron beam evaporation - Applications of thin films - Solar cell.

UNIT-V (7 Periods)

Nanomaterials: Zero dimensional materials - Properties of materials at reduced size - Surface to volume ratio at nano scale - Quantum confinement - Preparation of nanomaterials: bottom–up methods (sol gel and CVD), Top-down methods (ball milling) - Elementary ideas of carbon nanotubes – Applications.

Suggested Reading:

1) C. Kittel - Introduction to Solid State Physics, Wiley Eastern Ltd. 5th Edition, 1976.
2) S.L. Gupta and V. Kumar - Solid State Physics, K. Nath & Co., 8th Edition, 1992.
3) A. Goswami - Thin Film Fundamentals, New Age International, 2007.
4) A.K Bhandhopadhya - Nano Materials, New Age International, Ist Edition, 2007.
5) M.S. Avadhanulu and P.G. Kshirasagar - Engg. Physics, S.Chand & Co., Ist Edition, 1992.
6) C.M. Srivastava and C. Srinivasan - Science of Engg. Materials, New Age International, 2002.

With effect from academic year 2015-16

CH 209 UE

APPLIED CHEMISTRY

(FOR BME II SEMESTER)

Instruction	: 3 periods per week
Duration of University Examination	: 3 hours
University Examination	: 70 Marks
Sessional	: 30 Marks
Credits	: 3

Objective:

- To study the various types of conductances, elactrodes & cells
- To study the classification, journal properties and importance of Carbohydrates, Amino acids & Proteins
- To know the concept of Membrane Chemistry, Bio-energetics,Chemical Potential.Biochemist &Physical chemist standard states.
-

Unit– I :<u>ELECTROCHEMISTRY:</u>Electrolytic conductors-conductance, specific conductance, equivalent conductance and molar conductance. Cell constant, measurement of electrolytic conductance. Effect of dilution on various conductivities. Kohlrausch law and its applications – determination of Λ_∞ of weak electrolytes, solubility product and degree of dissociation. Principle and applications of conductometric titrations. Numerical problems.

Electrolytic and galvanic cells, cell notation, concept of electrode potential, single electrode potential and its determination. Electrochemical series and emf calculations.Types of electrodes- Hydrogen ,Calomel, Quinhydrone and Glass electrode. Nernst equation and its applications. Determination of pH by using Quinhydrone and Glass electrodes. Principle and applications of Potentiometric titrations.Numerical problems.

Unit- II:BATTERY TECHNOLOGY: Primary batteries: Zin–Carbon battery. Secondary batteries: Lead-acid battery, Nickel-Cadmium battery-charging and discharging reactions and its applications. Modern Lithium batteries, advantages and applications.

Solar Cells: Concept of Solar energy conversion, Photo- Voltaic cells.

Fuel Cells: Concept of fuel cells and their advantages. H_2-O_2 alkaline fuel cell and methanol-Oxygen fuel cell.

Unit–III:Carbohydrates and Proteins: Classification of carbohydrates – mono, oligo, poly saccharides. General properties of monosaccharides, aldoses and ketoses. Reactions of glucose and fructose. Establishment of open chain structure (Configuration not necessary)

Di-saccharides: Sucrose, Maltose and their reactions. Reducing/non reducing sugars. Polysaccharides: starch, cellulose, importance of cellulose citrate, acetate, xanthate.

Amino acids and Proteins: Classification of amino acids, neutral, acidic, basic and essential amino acids. Nomenclature, methods of preparation- Streckers synthesis, Gabriel pthalimide synthesis and properties. Zwitter ionand iso-electric point.

Peptide, peptide linkage, proteins, importance,classification, general properties and colour tests of proteins.

Unit–IV:Osmosis&Alloys:Colligative properties, osmosis and osmotic pressure, Berkeley-Hartley method for determination of osmotic pressure, isotonic, hypotonic & hypertonic solutions. Plasmolysis, Dialysis, Electrodialysis and Ultrafiltration.

Alloys: Solid solution, interstitial alloys, intermetallic compounds.

Hume-Rothery rules. Composition, properties and uses of copper alloys, stainless steel, titanium and tantalum alloys.

Unit–V:Membrane Chemistry: Structure of cell, open system, concept of bioenergetics chemical potentials, biochemist's and physical chemist's standard state. Gibbs-Donnan membrane equilibrium, Gibbs-Donnan effect and its relation to the salt concentration, pH, osmotic pressure and trans-membrane potentials and applications. Structure of biological membranes, bi-layer theory of fluid mosaic model.

Permeability and membrane transport, simple facilitate and active transport coupling of reactions. Active membrane transport, sodium potassium pump, membrane potentials, ionic fluxes, Nernst potentials, origin of membrane potential, recording of membrane potentials and micro electrodes.

Suggested Reading:

1. Text book of Physical Chemistry, PL Soni, OP DhrmaraSultan Chand & Co. New Delhi, 22nd ed. 2001.
2. Bio-physics and Bio-Physical Chemistry, Debjyothi Das, Academic Publishers, Calcutta, 1991.
3. A text book of Organic Chemistry,Arun Bahl and BS Bahl, S.Chand Co. Ltd., New Delhi 16th ed. 2002.

ES 208 CE

APPLIED MECHANICS
[Bio- Medical Engineering]

Course Objectives:

- To know concepts of mass moment of inertia.
- To understand the basic concepts, theory, and evaluation of stresses and strains
- To determine the basic parameters, shear force, bending moments, and bending stress
- To understand the concept of fluid flow in statics, Kinematic, dynamics conditions
- To evaluate the flow properties in static and dynamic compressible and incompressible flow.

PART A: SOLID MECHANICS

UNIT-I

Center of Gravity and Mass Movement of Inertia: Pappu's theorems and its applications. Center of gravity of solids. Mass moment of inertia of solids and composite bodies. Radius of gyration.

UNIT-II

Simple Stresses and Strains: Types of stresses and strains, Stress-strain curve for ducti Ie materials. Deformation of prismatic bars under axial loads. Poisson's ratio. Volumetric strain, Elastic Constants. Composite sections, and
temperature stresses.

UNIT-III

Beams and bending: Concepts of shear force and bending moments, and Shear force and bending moment diagram for cantilever, simply supported, and overhanging beams subjected to concentrated and uniformly distributed loads. Simple bending theory - Bending stresses.

Suggested Reading:

1. Prakash Rao, D.S. (1999). "Strength of Materials_A Practical ApproaciUniversity Press.
2. Iunarker, S.B. and Shah, R.I. (2001). “Applied Mechanics", Charaotar Pi lishers.
3. Ryder, G.H. (2002). “Strength of Materials”. Third Edition St. units, Macmill India Limited, Delhi.
4. Pytel, A and Singer, F. I. (1987). “Strength of Materials.” Harper and RC Fourth Edition, New York.

PART –B
FLUID MECHANICS

UNIT - I

Fluid Statics : Basic Concepts – specific weight, volume, mass, specific gravity, Compressibility, Surface Tension, Viscosity, measurement of Pressure – manometers.Stream line, Streak line, path line , Flow net, Types of flows, Continuity equation in Cartesian Coordinates.

UNIT - II

Fluid Dynamics : Convective and local acceleration, concept of continuity, Three-dimensional continuity equation, Body forces and surface forces, Body Force Potential, Euler's equation of motion for 3D flow,, Bernoulli's equation by integration of Euler's Equation, Momentum principle.

UNIT - III

Laminar and Turbulent Flows Through Pipes: Reynold's experiment, significance of Reynolds number, Hydraulic Gradient, Laminar flow through circular pipes (Hagen Poiseuille equation). Tubulent flow through pipes – Darcy's equation.

Suggested References:

1. K. Subramanyam, 'Theory and Applications of Fluid Mechanics', Tata McGraw-Hill Publishing Company Ltd., New Delhi, 1993.
2. Vijay Gupta and Santosh K. Gupta (1984), 'Fluid Mechanics and its applications', Wiley Eastern Ltd., New Delhi.
3. K. L. Kumar, 'Enigineering Fluid Mechanics', Eurasia Publishing House Pvt. Ltd., New Delhi, 2009.
4. Som, S. K. and Biswas, G. (1998), 'Fluid Mechanics and Fluid Machines', Tata McGraw-Hill Publishing Company, New Delhi, 1998.
5. C. S. P. Ohja, R. Berndtsson, P. N. Chandramouli, 'Fluid Mechanics and Machinery', Oxford University Press, New Delhi, 2010.

ELECTRONIC DEVICES & CIRCUITS

ES 206 EC

UNIT – I

Semiconductors & diodes:

Energy bands, Intrinsic and Extrinsic Semiconductors, Mobility and Conductivity, Band structure of PN Junction, Quantitative Theory of PN Diode, Volt – Amp Characteristics, Temperature Dependence, Transition and Diffusion Capacitance of PN Junction, Zener Diode, Tunnel Diode, LED, Varactor Diode, Photo Diode.

Diode circuits:

Diode as a rectifier-Half-wave, Full-wave and Bridge Rectifiers, types of Filters, Capacitor and inductor filter, zener diode as a voltage regulator, Ripple Factor and Regulation Characteristics.

UNIT – II

Bipolar Junction Transistor:

NPN and PNP junction Transistors, Transistor current components, CB, CE and CC Configurations and their Characteristics, Saturation, Cutoff and Active Regions, Comparison of CE, CB and CC Configurations, Maximum voltage rating, The operating point, fixed-bias, emitter stabilized bias circuits, Voltage-divider bias, DC bias with voltage feedback, Stabilization, Bias compensation, Thermal Runaway, Thermal Stability, High frequency model of a Transistor.

UNIT – III

Small Signal – Low Frequency Transistor amplifier Circuits:

Transistor as an Amplifier, Simplified CE and CC hybrid models, The h parameters of the three transistor configurations, Analysis of Transistor Amplifier Circuits using h–parameters. Linear analysis of a Transistor circuit, BJT transistor modeling parameters: Zi, Z0, Av, Ai. Miller's theorem and it's duality, The CE amplifier with emitter resistance, Darlington pair, Analysis of Single Stage Amplifiers.

UNIT – IV

Field Effect Transistors:

The Junction field effect transistor, Pinch off Voltage, Volt-ampere characteristics, Drain Saturation Current, Small Signal model of FET, MOSFET – Enhancement and Depletion Modes. The low Frequency common source and common drain amplifiers, FET biasing.

UNIT – V

Feedback Amplifiers:

Concept of Feedback Amplifiers – Effect of Negative feed back on the amplifier Characteristics. Four Feedback Amplifier Topologies. Method of Analysis of Voltage Series, Current Series, Voltage Shunt and Current Shunt feedback Amplifiers, Analysis of simple feed back amplifiers using BJT and FET, Design Considerations.

Reference Books:

1. Integrated Electronics Analog and Digital Circuits and systems, Jacob Millman and Christos C. Halkias, McGraw Hill.Edition1988.
2. Electronic Devices and Circuits Theory– Robert L Boylestad and Louis Nashelsky, Pearson Education.9th, Pearson publications,2009.
3. Electronics Principles, Albert Paul Malvino, Tata McGraw Hill Edition 2001.

HS204 EG

BUSINESS COMMUNICATION SKILLS AND PRESENTATION SKILLS (COMMON TO ALL BRANCHES)

Instruction	3 periods per week
Duration of University Examination	3 Hours
University Examination	70 Marks
Sessional	20 Marks

The following are the objectives of the course:s

To enable the students to

- communicate clearly, accurately and appropriately
- learn different models of interpersonal communication
- work in teams effectively and learn how to be effective in using time
- comprehend the difference between technical and general writing
- write reports, scientific papers, letters, Statement of Purpose, Resume
- learn how to plan and prepare to face interviews effectively

UNIT – I

Business Communication: Importance of business communication; ABC of technical communication – Accuracy, Brevity, Clarity; Channels of communication: Downward communication, Upward communication, Diagonal communication, Horizontal communication; Organisational GDs

UNIT – II

Interpersonal Communication and Personality Development: Models of interpersonal development, Johari window, Knapp's model, styles of communication; Team work; Persuasion techniques; Mobile Etiquette, e-mail Etiquette; Time Management

UNIT – III

Technical Written Communication: Differences between Technical Writing and General Writing; Report Writing: Types of Reports, Structure/Format, Language Style, Writing Technical Reports; Writing Scientific Papers

UNIT – IV

Career Oriented Written Communication: Writing SOPs; Job Application: Language style and Format; Résumé writing: design and style; Cover Letter; Business Letters: Letters of enquiry and responses, Letters of complaint, Letters of adjustment, Sales letters; Agenda and minutes of the meeting

UNIT – V

Interview Skills and Group Discussions: Interviews: Purpose, Planning, Preparation, Language and style, Sample interview questions and answers; Group discussions: Types of GDs, Features of good GDs, Preparing for a group discussion

Textbook prescribed:

E. Suresh Kumar, *Engineering English,* Orient Blackswan, 2014.

Books Recommended:

1. E. Suresh Kumar et al., *Communication Skills and Soft Skills.* Pearson, 2011.
2. E. Suresh Kumar et al., *English for Success*. Cambridge University Press India Private Ltd, 2010.
3. Sanjay Kumar and Pushp Lata. *Communication Skills. OUP, 2011.*
4. Kavita Tyagi and Padma Misra. *Professional Communication.* PHI, 2011.
5. Meenakshi Raman and Sangeeta Sharma. *Technical Communication: Principles and Practice. OUP, 2011.*

BS 251PH

Engineering Physics Lab -II

(Common to All Branches)

Instructions	3 Periods/week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessional	25 Marks
Credits	2

1. **Dielectric Constant:** To determine the dielectric constant and phase transition temperature of given material (PZT).

2. **B-H Curve:** *(a)* To draw graph between the magnetising field and the intensity of magnetisation of a ferromagnetic specimen and *(b)* To determine i) Coercivity ii) Retentivity and iii) Hysteresis loss of given specimen (soft iron) from the graph.

3. **P-N Junction Diode:** To draw the volt-ampere characteristics of the given P-N junction diode.

4. **Photo Cell:** To determine the planck's constant and the work function of the photometal.

5. **Thermister:** To draw the temperature characteristics of a thermistor and to evaluate the constants

6. **Solar Cell:** To draw I-V characteristics of a solar cell and to calculate the (a) Fill factor (b) Efficiency and (c) Series resistance

7. **Hall Effect:** To determine the (a) Hall coefficient (b) Carrier concentration and (c) Mobility of charge carriers of given semi conducting material.

8. **Thermo Electric Power:** To calculate (a) Thermoelectric power (b) Fermi Energy and (c) Carrier concentration of given ferrite sample.

9. **Four Probe Method:** To determine the conductivity of semiconductors.

Demonstration Experiments:

1. X – Ray Diffractometer
2. D.C. Conductivity
3. Preperation of Nano materils- Sol-gel method

APPLIED CHEMISTRY LAB

(for BME II semester)

BS 255 CH

Instruction	: 3 periods per week
Duration of University Examination	: 3 hours
University Examination	: 50 Marks
Sessional	: 25 Marks
Credits	: 2

1. Identification of the functional group in the given organic compound by qualitative test:
    i) Carboxylic acids
    ii) Phenols
    iii) Amines
    iv) Aldehydes and ketones
    v) Carbohydrates
2. Preparation of the following Organic Compounds:
    i) Acetanilide
    ii) Aspirin
    iii) Azo-dye
    iv) Benzyalidene aniline

3. Acid-base titrations using the following instruments
    i) Conductivity meter
    ii) pH meter
    iii) Potentionmeter
4. Estimation of Glucose by colorimetry

Suggested Readings:

1. Practical Organic Chemistry ,PG Mann, BC Saunder, Orient Longman Ltd. New Delhi 4^{th} ed. 1999
2. Senior Practicla Physical Chemistry,BD Khosla, A. Gulati, VC Garg, Chand & Co, New Delhi 10^{th} ed. 2001.

ES 253 CS

COMPUTER SKILLS LAB

(Common to all branches)

Instruction	: 2 Hrs /Week
Duration of University Examination	: 2 Hours
CIE	: 25 Marks
SEE	: 50 Marks
Credits	: 1

Course Objectives:

- To learn assembling and disassembling of PC Hardware
- To understand the installation of Operating systems
- To be able to acquire skills in Productivity tools

I: PC Hardware

1. Identify the peripherals of a computer. (Processor, Memory chips, Mother board, Disk drives, and Controller card such as AGP board, Network cards, Sound card, as well as Parallel and Serial ports etc.,)

2. Disassembling and Assembling PC in working condition. Load the Operating Systems with partitions for Windows and Linux, configure for Network.

II: **Productivity Tools:**

1. **Documentation Using MS-Word** - Introduction to Office Automation, Creating & Editing Document, Formatting Document, Auto-text, Autocorrect, Spelling and Grammar Tool, Document Dictionary, Page Formatting, and Bookmarks.

2. **Presentation using MS-PowerPoint**: Creating presentation slides and Enhancing Slides with features like Organizational charts, Excel Charts, Word Art, Objects, Animations and Sounds, Inserting Animated Pictures or Accessing through Object.

3. **MS Excel :** Introduction to MS-Excel, Creating & Editing Worksheet, Formatting and Essential Operations, Formulas and Functions- like sum, average, standard deviation, and charts.

4. **Internet** and **HTML:**
   a) Telnet/Secure Shell (Remote login to university computers)
   b) Electronic Mail (Communicating with email software)
   c) File Transfer Protocols (transferring files between networked computers)
   d) World Wide Web (Interface, Navigation, Search Tools)
   e) Publishing Web Pages (Using HTML editors to create personal web sites)
   f) **C**reate the web-page (With title, text, frames, hyperlinks to some sites, pictures, lists, tables, fonts and colors) without using any web authoring tools.

5. **Documentation Using LATEX:** Introduction to Linux Commands, Introduction to LateX, Creating & Editing Document, Formatting Document, Auto-text, Autocorrect, Spelling and Grammar tool, Page Formatting, Single/Multi column, Pictures/Objects, Drawing, Hyperlinks, Header/Footer, and Tables.

Suggestion Reading:

1. Peter Norton, "*Introduction to Computers*" , 6th Edition, McGraw Hill Publishers,
2. Leslie Lamport**, "***Latex: A Document Preparation System",* 2nd Edition, Pearson Education India, 1994.
3. Stefan Kottwitz, "*LaTeX Beginner's Guide*"**,** Shroff/Packt Publishers, First Edition, 2012.

ELECTRONIC DEVICES & CIRCUITS LAB

ES 256 EC

Instruction:	3 Periods per week
University Examination:	50 Marks
Sessional:	25 Marks
Credits:	2

1. Usage of multimeter, CRO, function generator, LCR meter, power supplies and bread board.
2. Characteristics of Semi-conductor Diodes (Si, Ge and Zener)
3. Static characteristics of Bipolar-junction Transistors CB configuration
4. Static characteristics of Bipolar-junction Transistors CE configuration
5. Characteristics of Field effect Transistors
6. Half-wave Rectifier with and without filters
7. Full-wave Rectifier with and without filters
8. Regulators:
   a) Series and Shunt Regulators
   b) Regulators ICs
9. Clipping and clamping circuits using diodes
10. Frequency response of single stage amplifier
11. Characteristics of Voltage series and Voltage shunt feedback amplifiers
12. Characteristics of Current series and Current shunt feedback amplifiers

CIRCUIT DESIGN AND SIMULATION LAB

ES 257 BM

Instruction:	2 Periods per week
Sessional:	25 Marks
Credits:	2

1. Identification and testing of different types of diodes, resistors, capacitors and transistors.
2. Usage of multimeter, CRO, function generator, LCR meter, power supplies and bread board.
3. Familiarization with multisim software.
4. Simulation of following circuits using Multisim:

1. Characteristics of Semi-conductor Diodes (Si, Ge and Zener)
2. Characteristics of CB and CE amplifier configuration
3. Characteristics of Field effect Transistors
4. Half-wave and full-wave Rectifiers with and without Filters
5. Series and shunt regulators
6. Regulator ICs
7. Clipping and clamping circuits using diodes
8. Frequency response of single stage amplifier

HS 254 EG

COMMUNICATION SKILLS LAB

(COMMON TO ALL BRANCHES)

Instruction	2 periods per week
Duration of University Exam	3 hours
University Examination	50 marks
Sessional	25 marks

The following are the objectives of the course:

To enable the students to

- learn the appropriate use of language
- learn to use the appropriate body language
- participate in group discussions and debates
- improve their public speaking skills
- improve their presentation and participation skills
- learn how interviews are conducted and faced

Note: While teaching the following items, emphasis may be laid on intensive practice in the language lab. Lecturing may be avoided as far as possible.

1. **Role play**: Use of dialogues in a variety of situations and settings
2. **Presentation Skills**: Making effective presentations, Expressions which can be used in presentations, Use of non-verbal communication, Coping with stage fright, Handling questions and answer session
3. **Public Speaking**: Planning, Preparation, Techniques of delivery, Handling stage fear/fright
4. **Group Discussion**: Initiating, continuing and concluding a GD, Giving feedback; Practising case studies and Topic based GDs
5. **Debate**: Differences between a debate and a group discussion, Essentials of a debate, Participating in a debate

6. **Interview Skills**: Facing interviews confidently, Use of suitable expressions during interviews; Mock interviews

Lab Manual Recommended:

E. Suresh Kumar. *A Handbook for English Language Laboratories (with CD).* Revised edition, Cambridge University Press India Pvt. Ltd. 2014

Books Recommended:

1. T. Balasubramanian. *A Text book of English Phonetics for Indian Students.* Macmillan, 2008.
2. Edgar Thorpe. *Winning at Interviews*. Pearson Education, 2006.
3. J. Sethi et al., *A Practical Course in English Pronunciation (with CD).* Prentice Hall of India, 2005.
4. Hari Mohan Prasad. *How to Prepare for Group Discussions and Interviews*. Tata McGraw Hill, 2006.

CH 203 UE

ENGINEERING CHEMISTRY - II
(FOR ALL BRANCHES EXCEPT BME)

Instruction	: 3 periods per week
Duration of University Examination	: 3 hours
University Examination	: 70 Marks
Sessional	: 30 Marks
Credits	: 3

Objective:

- To study the various types of electrodes, cells and batteries & their applications.
- To study the various types of corrosion, the factors that influencing the corrosion & various corrosion controlling methods.
- To study the various types of chemical fuels, composites & liquid crystals.

Unit– I :<u>ELECTROCHEMISTRY:</u>Electrolytic conductors-conductance, specific conductance, equivalent conductance and molar conductance. Cell constant, measurement of electrolytic conductance.Effect of dilution on various conductivities.Kohlrausch law and its applications – determination of Λ_∞ of weak electrolytes, solubility product and degree of dissociation.Principle and applications of conductometrictitrations.Numerical problems.

Electrolytic and galvanic cells, cell notation, concept of electrode potential, single electrode potential and its determination.Electrochemical series and emfcalculations.Types of electrodes- Hydrogen ,Calomel, Quinhydrone and Glass electrode.Nernst equation and its applications.Determination of pH by using Quinhydrone and Glass electrodes.Principle and applications of Potentiometrictitrations.Numerical problems.

Unit-II: CHEMISTRY OF BATTERIES:<u>Chemical Cells:</u>Primary batteries: Zin–Carbon battery. Secondary batteries:Lead-acid battery, Nickel-Cadmium battery-charging and discharging reactions and its applications. Modern Lithium batteries, advantages and applications.

Solar Cells: Concept of Solar energy conversion, Photovoltaic cells.

Fuel Cells: Concept of fuel cells and their advantages. H_2-O_2 alkaline fuel cell and methanol-Oxygen fuel cell.

Unit-III: CORROSION AND ITS CONTROL: Introduction, causes and effects of corrosion-Dry or chemical corrosion and wet or electro chemical corrosion and their mechanism.Pilling-Bedworth Rule and its significance.Types of electrochemical corrosion-Differential aeration,Galvanic,Waterline and Pitting corrosion.Factors effecting rate of corrosion: a) Nature of metal –galvanic series, over voltage, relative areas of anode and cathode, purity of metal,

nature of surface oxide film b) Nature of environment-effect of temperature, effect of humidity andeffect of pH.

Corrosion control methods: Cathodic protection –Sacrificial anode and impressed current cathode methods. Corrosion inhibitors-anodic and cathodic inhibitors.

Surface Coatings: Types of metallic coatings-anodic and cathodic coatings methods of application of metallic coatings: Hot-dipping, galvanizing, tinning and electroplating. Paints-constituents and their functions.

Unit–IV: CHEMICAL FUELS: DefinitionandClassification. Requirement of a good fuel, advantages, disadvantages of solid, liquid and gaseous fuels.

Combustion: Ignition temperature of a fuel. Calculation of air quantities by weight and volume required for the combustion of the fuels. Calorific value of the fuel-lower calorific value (LCV) Higher calorific value (HCV)-theoretical calculations of calorific value by Dulongs formula – Numerical problems.

Solid Fuels: Coal-Proximate and Ultimate analysis and its significance.

Liquid fuels: Source- fractional distillation of petroleum, important fractions, and their uses. Cracking and its significance.Catalytic cracking by moving bed method.Knocking, fuel rating-Octane and Cetane numbers.

Gaseous fuels: LPG, CNG composition and uses.

Unit–V: ENGINEERING MATERIALS-II:Composites: Introduction, constituents of composites. Types of composites-Fibre-reinforced,Particulate and Layered composites. Advantages and applications of Composites.

Liquid Crystals: Introduction, classification of liquid crystals, Thermotropic, Lyotropic liquid crystals. Chemical constitution and liquid crystalline behavior.Molecular ordering in liquid crystals.Nematic, Smectic and Cholestric liquid crystals and their applications.

Insulators: Thermal and Electrical- their Characteristics and applications.

Suggested Readings:

1. Engineering Chemistry by PC Jain & Monica Jain, DhanpatRai Publications.
2. A Text book of Physical Chemistry by PL Soni, OP Dharmara, Sultan Chand & Sons.
3. Engineering Chemistry by ShashiChawla,DhanpatRai Publications.
4. Engineering Chemistry by O.G. Palanna, TMH Publications, New Delhi
5. A text book of Engineering Chemistry by SS Dara, S.Chand& Co.
6. Engineering Chemistry by C. Parameshwara Murthy, CV Agarwal and Andra Naidu BS Public

ES 205 CE

ENGINEERING MECHANICS-II

[Common to Civil Engineering and Mechanical Engineering]

Course Objectives:

- To understand the mass moment of inertia analysis for the different bodies.
- To know basic concepts of dynamic loads, their behavior, analysis and motion bodies
- To determine the work energy principles and impulse momentum theory

UNIT-I

Centre of Gravity and Mass Moment of Inertia: Centre of gravity and mass moment of inertia for solid and composite bodies. Radius of gyration

Virtual Work: Principle of virtual work and its application to simple systems.

UNIT-II

Kinematics: Rectilinear motion, curvilinear motion, Velocity and acceleration, Types of rigid body motion, and its analysis in a plane.

UNIT-III

Kinetics: Analysis as a particle and as a rigid body in Translation, Fixed axis rotation, Rolling bodies and Plane motion.

UNIT -IV

Work -Energy: Principles of work- energy, and its applications to bodies in Translation, Particle motion and connected systems. Fixed axis rotation and Plane motion.

UNIT-V

Impulse momentum: Linear impulse momentum, Conservation of momentum, Elastic impact and Plane motion.

Suggested Reading:

1. Ferdimand L. Singer. (1975). "Engineering mechanics", Harper & Collins,Singapore.
2. Timoshenko, S.P. and.Young, D.H (1983). Engineering Mechanics",Mcflraw-Hill International Edition.
3. Rajashekaran, S and G.Sankarasubramanyan , "Engineering Mechanics". Vikas Publications.
4. Junarkar, S.B. and Shah, H.J. (2001). "Applied Mechanics",Charotar Publishers.
5. Shames, I.H. (1987). "Engineering Mechanics", Prentice Hall of India.
6. Bhattacharyyya, B. (2015). “Engineering Mechanics.”Oxford Higher Education.

ENGINEERING CHEMISTRY LAB - II

(FOR ALL BRANCHES EXCEPT BME)

BS 152 CH

Instruction	: 3 periods per week
Duration of University Examination	: 3 hours
University Examination	: 50 Marks
Sessional	: 25 Marks
Credits	: 3

INSTRUMENTAL ANALYSIS

CONDUCTOMETRY

1. Conductometric and acid-base strong acid vs strong base titration
2. Conductometric weak acid vs strong base titration
3. Conductometric mixture of acids vs strong base titration
4. Conductometric precipitation titration-barium chloride against sodium sulphate

POTENTIOMETRY

1. Potentiometric acid-base titration –strong acid vs strong base, using quinhydrone electrode.
2. Potentiometric redox titration-$KMnO_4$vs Fe^{+2}

pH Metry

1. pH metry strong acid vs strong base titration
2. pH metry weak acid vs strong base titration

COLORIMETRY

1. Verification of Beer's Law –using Potassium permanganate
2. Estimation of $KMnO_4$(Mn) in the given solution
3. Estimation of iron in cement

KINETICS

1. First order reaction-hydrolysis of methyl acetate
2. Second order reaction-potassium iodide and persulphate

Suggested Readings:

1. Senior practical Physical Chemistry, BD Khosla, A.Ghulati, VC.Garg., R.Chand and Co., New Delhi 10^{th} ed. 2001.
2. Practical Physical Chemistry ,B.Vishwanathan, P.S Raghavan, Viva Books Private Limited.

ES 256 CE

ENGINEERING GRAPHICS-II

[**Civil Engineering**]

Course Objectives:

- To understand the Engineering drawing concepts of section of solids and development of their surfaces.
- To know basic concepts of isometric projections.
- To determine the orthographic projections for solid sections.
- To analyze and obtain the perspective views for different solid bodies.

UNIT-I

Sections of Solids: True shape of solids, sections of prisms, pyramids, cylinders and cones.
3D modeling: Poly, Orbit, Mesh, Array, Clip.

UNIT-II

Development of Surfaces: Basics concepts of developments of surfaces. Methods of development-parallel line development and redial line development. Development of prisms, pyramids, cylinders and cones

UNIT-III

Intersection of surfaces: Intersection of cylinder and cylinder and cone.

UNIT-IV

Isometric Projections: Isometric Scale, Isometric projections of prisms, pyramids, cylinders, cones and spheres, and combinations of two or three solids

UNIT- V

Perspective Views: Perspective views of straight lines, plane figure (triangle, square, pentagon, hexagon, circle), and simple solids (cylinder cone, regular prism, regular pyramid) using Visual Ray Method and Vanishing Point method.

Suggested Reading:

1. Bhatt, N.D. (1998). Elementary Engineering Drawing", Charotar Publisher.
2. Narayana, K.L. and Kannaiah, P. (2001). "Text book on Engineering Drawing" SciTech Publications.
3. French, T.E. et al. (1993). "Engineering Drawing and Graphic Technology McGraw-Hill International Editions.
4. Venugopal, K. (1998). "Engineering Drawing and Graphics plus AutoCAD New Age International (P) Ltd, New Delhi.
5. Siddique, N et al. (2004). "Engineering Drawing with a Primer.c AutoCAD" Prentice Hall of India Pvt., Ltd., New Delhi.

BUILDING DRAWING

ES 255 CE

Instruction: 2+2 periods per week *Duration of Semester End Examination: 3 hours*
CIE: 50 marks *SEE: 50 marks*
Credits : 2

Objectives:
Introduction to the basic concepts of building drawing
Knowledge about application of different signs in building drawing
Description of principles of planning the buildings

UNIT-I

Conventional representation of building elements and materials.

Drawing of English and Flemish bonds in odd and even courses, Drawing of doors, windows: framed, paneled , and glazed, Drawing of different forms of staircases, Drawing of different types of footings.

UNIT-II

Drawing of different types of floors/roofs, Drawing of different types of roof trusses, detailed elevations, and enlarged details of joints in trusses.

UNIT-III

Principles of planning involved in buildings, orientation of buildings, and building bye-laws as per National Building Code of India.

Drawing plans, elevations, and sections of a residential building (single and two storied), School building, and library buildings.

Suggested reading:

Shah, M.G., Kalae, C.M., and Pakti, S.Y. , Building drawing, Tata McGraw Hill Book Company, New Delhi, 2002.

Kumara Swamy,N and Kameshwara Rao, A ., Building Planning and Drawing, Charotar Publishers, Ahmedabad, 2005

Sushil Kumar, Building Construction, Standard Publishers, New Delhi, 1992.

ENGINEERING WORKSHOP -II
(Common to Civil & Mechanical)

ES 258 ME

Instruction	:	2 periods per week
Duration of University Examination	:	2 hours
University Examination	:	50 Marks
Sessional	:	25 Marks
Credits	:	1

Objectives

1. To know the usage of smithy tools and its operations.
2. To acquire the skills in welding and machining of metals.
3. To familiarize with usage of plumbing tools for making pipe joints and PC parts assembly

LIST OF EXERCISES

SMITHY

1. Flattening Operation
2. Bending Operation
3. Upsetting Operation
4. Fullering Operation

WELDING

1. Demonstration of Arc and Gas Welding
2. Bead formation on a plate
3. Lap and Butt Joints
4. Brazing and Soldering

MACHINING

1. Plain and Step Turning Operations
2. Knurling Operation
3. Taper turning Operation
4. Thread Cutting Operation

PLUMBING

1. Making Single Joint with Coupling and Union.
2. Making 90^{o} Pipe Joint using Elbow/Bend
3. Making Tee and 4-way joint
4. Making pipe joint with two different diameters (3/4" x 1/2" Reducer)

PC ASSEBLY

1. Demo of Assembling PC components

Suggested Reading

1. K.C. John, "Mechanical Workshop" 2nd Edn., PHI, New Delhi, 2010.
2. Hajra Choudary, "Elements of Workshop Technology-Vol. 1, Asian Publishers, 6th Edn., 1993.
3. G.S. Sawhney, "Mechanical Experiments and Workshop Practice", I.K. International Publishing House, New Delhi, 2009.

ES 207 CE

ENGINEERING DRAWING-II
[**Mechanical Engineering**]

Course Objectives:

- To understand the Engineering drawing concepts of section of solids and development of their surfaces.
- To know basic concepts of isometric projections.
- To determine the orthographic projections for solid sections.
- To analyze and obtain the perspective views for different solid bodies.

UNIT-I

Sections of Solids: True shape of solids, sections of prisms, pyramids, cylinders and cones.
3D modeling: Poly, Orbit, Mesh, Array, Clip.

UNIT-II

Development of Surfaces: Basics concepts of developments of surfaces. Methods of development-parallel line development and redial line development. Development of prisms, pyramids, cylinders and cones

UNIT-III

Intersection of surfaces: Intersection of cylinder and cylinder and cone.

UNIT-IV

Isometric Projections: Isometric Scale, Isometric projections of prisms, pyramids, cylinders, cones and spheres, and combinations of two or three solids

UNIT- V

Perspective Views: Perspective views of straight lines, plane figure (triangle, square, pentagon, hexagon, circle), and simple solids (cylinder cone, regular prism, regular pyramid) using Visual Ray Method and Vanishing Point method.

Suggested Reading:

5. Bhatt, N.D. (1998). Elementary Engineering Drawing", Charotar Publisher.
6. Narayana, K.L. and Kannaiah, P. (2001). "Text book on Engineering Drawing" SciTech Publications.
7. French, T.E. et al. (1993). "Engineering Drawing and Graphic Technology McGraw-Hill International Editions.
8. Venugopal, K. (1998). "Engineering Drawing and Graphics plus AutoCAD New Age International (P) Ltd, New Delhi.
5. Siddique, N et al. (2004). "Engineering Drawing with a Primer.c AutoCAD" Prentice Hall of India Pvt., Ltd., New Delhi.

PC 211 EC

ELECTRONIC DEVICES

Instruction	: 3 periods per week
Duration of University Examination	: 3 hours
SEE	: 70 Marks
CIE	: 30 Marks
Credits	: 3

Objectives :

- To understand the characteristics and applications of Diode.
- To understand the characteristics, configurations and biasing of transistors.
- To understand the characteristics and biasing of FET.
- To study the working of CRO.
- To study the working of Thyristors and their characteristics.

Unit- I Formation of PN diode: Types of materials, electrons and holes in an Intrinsic Semiconductor, Conductivity of a semiconductor, Carrier concentrations in an Intrinsic Semiconductor, Fermi level in an Intrinsic semiconductor, Donor and Acceptor impurities, Fermi level in a semiconductor having impurities, Diffusion.

PN junction as a diode: band structure of an open circuited PN junction, Current components in a pn diode, Volt-ampere characteristics, Temperature dependence of pn characteristics, diode resistance, Transition capacitance, Diffusion capacitance, PN diode forward bias and reverse bias condition.

Unit-II Rectifiers: Half-wave, Full-wave and bridge rectifiers and their performance characteristics. Design of rectifiers with filters (L, C, LC and π). Comparison of different rectifiers with and without filters.

Unit-III Bipolar Junction Transistors: Junction transistor, Transistor current components, Current flow in BJT. CB, CE, CC configurations, Input and Output characteristics.

Biasing of BJT: Operating point, Bias stability, Stability factor S, Types of Biasing circuits for BJT, Fixed bias, Collector-to-base bias and Self-bias methods. Bias Compensation techniques, Thermal Runaway, Thermal Resistance, Thermal Stability, Heat sink.

Unit-IV Field Effect Transistors: JFET formation, FET operation, Pinch-off Voltage, V-I characteristics. Comparison of BJT and FET. MOSFET, Enhancement MOSFET and Depletion MOSFET and characteristics.

Unit -V Special Devices: Zener diode, Tunnel diode, Varactor diode, Schottky diode, Photo diode and their Input- Output characteristics. SCR, Diac, Triac, UJT, CRO - Block diagram and its applications in Electronic measurements.

Suggested Reading :

1. Milliman, J. Halkais.C.C and Satyabrata Jit, " Electronic Devices and Circuits", 3rd edition, Tata Mcgraw-Hill, 2011.
2. J.B.Gupta, " Electronic Devices and circuits", Katson educational series, 4th edition , 2011.
3. Salivahan. S, Suresh Kumar.N " Electronic Devices and circuits", 3rd edition, Tata McGraw-Hill, 2012.

ME210 UE

ELEMENTS OF MECHANICAL ENGINEERING

Objectives

- To understand basic concepts of thermodynamics.
- To understand applications of thermodynamics concepts.
- To understand the working principles of I.C. engines, Reciprocating compressors and Refrigeration
- To familiarize the design and working principles of drives transmission systems.
- To understand various manufacturing processes.

UNIT- I

Statements of 0^{th}, 1^{st} , 2^{nd} and 3^{rd} Laws of thermodynamics with their applications. Representation of thermodynamics processes on P-V and T-s plots. Ideal gas equation. Relations for internal energy and entropy changes, heat and work transfers for closed systems. Steady flow energy equation for an open systems-derivation and applications in turbines, compressors, nozzles and diffusers. Relations for enthalpy changes, heat and work transfers for open systems.

UNIT-II

Power Cycles: Concept of air standard cycles- Otto, Diesel , Joule cycles with applications. Representation of Cycles on P-V and T-s plots. Calculation of Cycle efficiencies.

IC Engines: Classification of IC Engines. Mechanical components of IC Engines. Working Principles of four stroke and two stroke cycle engines. Differences between petrol and diesel engines. Calculation of engine parameters -IP, BP, Specific fuel consumption, mechanical and thermal efficiencies.

UNIT-III

Working principles of reciprocating air compressors-single and double acting, single stage and two stage. Effect of clearance. Conditions for maximum efficiency. Isentropic and isothermal efficiencies. Problems on work input, power required and efficiencies of single and two stage compressors. Methods for improving efficiency –use of intercooler and aftercooler.

Refrigeration: Carnot and Reversed Carnot Cycles-representation on T-s ,P-V and P-h Plots. Working principle of vapour compression refrigeration system. COP calculation. Common refrigerants in use.

UNIT-IV

Belt drives: Velocity ratio, effect of slip, belt thickness and creep. Length of open and cross belts. Ratio of tensions, centrifugal tension and its effect on power transmission. **Gear drives**: Nomenclature and types of gears. Problems on simple , compound and epicyclic gear trains. **Governors**: Working of Watt, Porter and Hartnell governors. Effect and power of governor, Effect of friction. Stability of governor and isochronism. Balancing of several masses in one plane and in several planes.

UNIT- V

Production Techniques: Principles of Arc, Gas and Resistance welding, soldering and Brazing, Working mechanism of Lathe, milling and drilling machines by simple sketches. Working principle of NC machines. Basic principles of USM, EDM, LBM, EBM, ECM and Chemical machining and etching. Principles of sand casting, die casting and investment casting. Plastics and their moulding methods.

Suggested Reading

1. R.K. Rajput, "Thermal Engineering", Laxmi Publications, New Delhi, Eighth Edition, 2010.
2. P.K. Nag, " Basic and Applied Thermodynamics", Tata Mc-Graw Hill, Eigth Reprint, 2006
3. Thomas Bevan, "Theory of Machines", College Book Store (CBS) Publishers, 3rd Edn., 1986.
4. Hajra Choudary, "Elements of Workshop Technology-Vel. I and 2, Asian Publishers, 6th Edn., 1993.
5. P. N. Rao, "Manufacturing Technology", Vol. I &2, Tata McGraw- Hill, 2nd Edn., 2009.

ES 212 EE

BASIC ELECTRICAL ENGINEERING
(Common to ECE&CSE)

Instruction	: 3 periods per week
Duration of University Examination	: 3 hours
SEE	: 70 Marks
CIE	: 30 Marks
Credits	: 3

Objectives :

1. To acquire knowledge in circuits and principle operation of electrical machines.
2. To be able to understand the tariff and safety measures.

Unit-I

DC & AC Circuits : Ohm's law**,** Kirchhoff's laws, Series & parallel circuits, Star & Delta conversions, Thevenin's, Norton's and Superposition theorems (analysis with DC excitation only).

A.C. Circuits : Production of sinusoidal voltage, Phasor representation of sinusoidal quantities, Average & rms values, Form factor, RLC circuits excited by sinusoidal input. Active & reactive power, power factor.

Unit-II

3-Phase Balanced Circuits: Star & Delta connections, Measurement of 3-phase power by two-wattmeter method.

Single-Phase Transformer: Principle of operation, Constructional details, Transformer on no-load and on load, OC & SC tests, Losses, Efficiency, Regulation.

Unit-III

DC Generator: Principle of operation, Constructional details, EMF equation, Types of generators, Armature reaction, No-load & Load characteristics, Losses & efficiency, Applications.

DC Motor: Principle of operation, Types of motors, Torque equation, 3-point starter, Characteristics of DC motors, Speed control of DC shunt motor, Losses & efficiency, Applications.

Unit-IV

Three-phase Induction Motor: Production of rotating field, Constructional details. Types of motors, Torque-slip characteristics, Star-delta starter, Auto-transformer starter, Losses & efficiency, Applications.

Single-phase Induction Motors: Principle of operation, Capacitor run & Capacitor start motor, Applications.

Unit-V

Tariff & Electrical Safety Measures: Types of Tariff: Simple tariff, Flat demand tariff, Flat rate tariff, Step rate tariff, Block rate tariff, Two-part tariff. Types of consumers and their tariff. Power Factor: Disadvantage of low P.F., Causes of low P.F., Improvement of P.F. by using Static Capacitors.

Electrical Safety Measures: Earthing and its Importance, Safety practices, Basic ideas of Fuse, Circuit Breaker, and relay.

Suggested Reading

1. J.B.Gupta, "Fundamentals of Electrical Engineering and Electronics" S.K.Kataria & Sons Publications, 2002.
2. J.B.Gupta, "Utilization of Electric Power and Electric Traction" S.K.Kataria & Sons Publications, 2010.
3. Abhijit Chakrabarti, Sudipta Nath, Chandan Kumar Chanda, " Basic Elactrical Engineering" Tata McGraw Hill, Publications, 2009.
4. Hughes, "Electrical Technology", VII Edition, International Student -on, Addison Welsey Longman Inc., 1995.

PC 259 EC

ELECTRONIC DEVICES LAB

Instruction	: 2 periods per week
Duration of University Examination	: 3 hours
SEE	: 50 Marks
CIE	: 25 Marks
Credits	:1

Objectives :

- To understand the characteristics of Diode.
- To understand the input and output characteristics of different Transistor configurations.
- To understand the input and output characteristics of FET.
- To study the working of CRO.
- To study the characteristics of different devices, UJT, SCR.

List of Experiments :

1. Study of CRO.
2. Static Characteristics of Diodes (Si, Ge)
3. Static Characteristics and voltage regulation of Zener Diode.
4. Ripple and Regulation characteristics of Half-wave, Full-wave and Bridge rectifiers.
5. Ripple and Regulation characteristics of Half-wave, Full-wave and Bridge rectifiers with Filters (C, L , LC and π)
6. Static Characteristics of CB Configuration of Transistor
7. Static Characteristics of CE Configuration of Transistor
8. Static and Transfer Characteristics of FET.
9. Static characteristics of CS configuration of FET.
10. Characteristics of special device UJT.
11. Characteristics of special device SCR.
12. Characteristics of Light emitting Diode and Photo diode.

Suggested Reading:

1. David Bell. A, Laboratory Manual for Electronic Devices and circuits, Prentice hall of India, 2001.
2. Robert L. Boylestad , Louis Nashelsky "Electronic Devices and Circuit Theory", 11th edition, Pearson Publishers, 2012

ES207EC

ELECTRONIC ENGINEERING – I

Instruction	4 periods per week
Duration of University Examination	3 Hours
University Examination	70 Marks
Sessionals	30 Marks
Credits	4

Objective:

1. To understand the characteristics of diodes and transistor configurations
2. To understand the design concepts of biasing of BJT and FET
3. To understand the design concepts of OP Amp
4. To study the characteristics of logic families

Unit I

Semiconductor Diodes: Mobility and Conductivity, electrons and holes in an intrinsic semiconductor, donor and acceptor Impurities, The volt-ampere characteristics. The open-circuited p-n Junction, the diode as a circuit element, the load-line concept, the p-n junction as a rectifier, principles of Half-wave and full-wave rectification, ripple and regulation, capacitor filters.

Unit II

Bipolar Junction Transistor and Transistor Biasing Circuits: The Junction transistor, current components, the transistor as an amplifier, the common base, common emitter and common collector configurations, operating point, fixed-bias, emitter stabilized basis circuits, voltage-divider bias, and DC bias with voltage feedback. Amplification in the AC domain, BJT Transistor modeling parameter:Zi,Zo,Av,Ai. The hybrid equivalent model small-signal analysis of transistor amplifier using h-parameters for CE CB CC configurations.

Unit III

The Junction Field-effect transistor, pinch-off voltage, volt-ampere characteristics, the FET small-signal model, the Metal-Oxide-Semiconductor FET(MOSFET),Small signal analysis of common source, common gate, and common-drain amplifiers.FET Biasing

Unit IV

Operational Amplifiers: The basic Operational Amplifier, Ideal Op-Amp, inverting and non-inverting, the differential amplifier and the emitter coupled differential amplifier. Basic Op-

Applications: Differential DC amplifier, stable AC-coupled amplifier, analog integration and differentiation, electronic analog computation. SMPS & Linear Regulators.

Unit V

Digital(Binary) Operation of a system, The OR gate, The AND gate, The NOT ,or Inverter circuit, The INHIBIT(ENABLE) operation, The EXCLUSIVE OR circuit DeMorgan's laws. The NAND and NOR Diode-Transistor logic gates, Transistor-Transistor Logic (TTL) gates, Output Stages, Resistor-Transistor Logic (RTL) and Direct-Coupled Transistor Logic(DCTL)

Suggested Reading:

1. Millman J., Halkias C.C. and Satyabrata Jit, *Electronic Devices and Circuits.* Tata McGraw-Hill- New Delhi, 2010.

2. Millman J., Halkias C.C. and Parikh C, *Integrated Electronics, 2nd* Edition, McGraw-Hill-New Delhi, 2009.

3. S Salivahanan, N Kumar, and A Vallavaraj, Electronic Devices and Circuits, McGraw Hill, 2nd edition 2007.

PC 213 CS

OBJECT ORIENTED PROGRAMMING USING C++

Instructions	: 3 Hrs/Week
Duration of SEE	: 3 Hours
SEE	: 70 Marks
CIE	: 30 Marks
Credits	: 3

Course Objectives:

- To understand basic notions of object oriented programming
- To acquire object-oriented problem solving skills
- To be able to write programs in C++

UNIT - I

Introduction to C++: Programming paradigms, Object Oriented Programming Concepts, Advantages and Applications of OOPs.
Variables and assignments, Data types, expressions, Simple flow control and Control structures.

UNIT - II

Functions: Call by value, call by reference. Parameters using procedural abstraction; Testing and debugging functions. I/O Streams as an introduction to classes and objects.
Introduction to arrays, Arrays in functions, Programming with arrays and multidimensional arrays. Structures, Classes, Abstract data types.

UNIT – III

Strings, Pointers and Dynamic Arrays, Recursion, Constructors, Destructors, Copy Constructors.
Inheritance: The notation of inheritance, derived classes, overriding, Virtual Base Class

UNIT-IV

Static Polymorphism: Function and Operator overloading, Friend function, Runtime Polymorphism, Virtual functions, and Exception Handling.
Function Templates, and Class Templates.

UNIT – V

Pointers and Linked Lists: Nodes and linked lists, Implementation of stacks and queues using arrays and linked lists, Operation on linked lists- inserting a node, deleting a node, searching for a node.

Suggested Reading:

1. Walter Savitch, "*Problem Solving with C++",* 6th Edition, Pearson Education Publishing, 2009.

2. SB Lippman, J Lajoie, "*C++ Primer"*, 3rd Edition, AW Publishing Company, 2007.

3. Paul Dietel, Harvey Dietel, "*C How to Program"*, 6th Edition, PHI, 2010.

4. Bjarne Stroustrup, "*The C++ Programming Language"*, 3rd Edition, Pearson Education.

PC 260 CS **C++ PROGRAMMING LAB**

Instruction	: 2 Hrs/Week
Duration of SEE	: 2 Hours
SEE	: 50
CEE	: 25
Credits	: 1

Course Objectives:

- To be able to write, compile and debug programs in C++
- To be able to formulate problems and implement in C++.
- To be able to acquire skills to solve computing problems in real-world.

1. Implementation of complex numbers using classes.

2. Implementation of matrix class.

3. Programs using constructors, destructors and copy constructors.

4. Implementation of Various Sorting Techniques.

5. Programs on Inheritance.

6. Programs on Function overloading, operator overloading, and Exception Handling

7. Programs on Virtual Functions, Dynamic polymorphism.

8. Programs on Function templates and Class templates.

9. Implementation of Stack using arrays and linked list.

10. Implementation of Queue using Arrays and Linked list.