SCHEME OF INSTRUCTION
BE (Biomedical Engineering)
Proposed from the Academic year 2015-2016

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	BS 201 MT	Mathematics-II	3	1	-	-	4	30	70	3
2	BS 202 PH	Engineering Physics-II	3	-		-	3	30	70	3
3	HS 204 EG	Business Communication and Presentation Skills	3	-	-		3	30	70	3
4	ES 206 EC	Electronic Devices and Circuits	3	-	-	-	3	30	70	3
5	ES 208/221 CE	Applied Mechanics	3	-	-	-	3	30	70	3
6	BS 209 CH	Applied Chemistry-II	3	-	-	-	3	30	70	3
Practicals										
1	BS 251 PH	Engineering Physics Lab-II	-	-	-	2	2	25	50	1
2	ES 253 CS	Computer skills lab	-	-	-	2	2	25	50	1
3	HS 254 EG	Communication Skills Lab	-	-	-	2	2	25	50	1
4	BS 255 CH	Applied Chemistry Lab	-	-	-	2	2	25	50	1
5	ES 256 EC	Electronic Devices and Circuits Lab	-	-	-	2	2	25	50	1
6	ES 257 BM	Circuit Design and Simulation lab	-	-	-	2	2	25	50	1
			18	**01**	**-**	**12**	**31**	**330**	**720**	**24**

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	ES221CE	Applied Mechanics	3	-	-	3	30	70	3

With effect from the Academic Year 2015-2016

BS 201 MT

MATHEMATICS –II

(Common to all branches)

Instructions	3 Hours/week
Duration of University Examination	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 202 PH

ENGINEERING PHYSICS-II

(Common to All Branches)

Instructions	3 Hours/week
Duration of University Examination	3 Hours
SEE	70 Marks
CIE	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.

OUTCOMES: 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 the Academic Year 2015-2016

BS 209 CH

APPLIED CHEMISTRY

(FOR BME II SEMESTER**)**

Instructions	3 Hours/week
Duration of University Examination	3 Hours
SEE	70 Marks
CIE	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)

Instructions	3 Hours/week
Duration of University Examination	3 Hours
SEE	70 Marks
CIE	30 Marks
Credits	3

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.

ES 206 EC

ELECTRONIC DEVICES AND CIRCUITS

Instructions	3 Hours/week
Duration of University Examination	3 Hours
SEE	70 Marks
CIE	30 Marks
Credits	3

UNIT – 1

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 – 2

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 – 3

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 its duality, CE amplifier with emitter resistance, Darlington pair, Analysis of Single Stage Amplifiers.

UNIT – 4

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 – 5

Feedback Amplifiers:

Concept of Feedback Amplifiers – Effect of Negative feedback 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 feedback amplifiers using BJT and FET, Design Considerations.

Suggested Reading:

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.

HS 204 EG

BUSINESS COMMUNICATION SKILLS AND PRESENTATION SKILLS

(Common to all branches**)**

Instructions	3 Hours/week
Duration of University Examination	3 Hours
SEE	70 Marks
CIE	30 Marks
Credits	3

Objectives:

The following are the objectives of the courses

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 251 PH

ENGINEERING PHYSICS LAB -II

(Common to All Branches)

Instructions	2Hours/week
Duration of University Examination	3 Hours
SEE	50 Marks
CIE	25 Marks
Credits	1

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

BS 252 CH

APPLIED CHEMISTRY LAB

(for BME II semester)

Instructions	2Hours/week
Duration of University Examination	3 Hours
SEE	50 Marks
CIE	25 Marks
Credits	1

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 4th ed. 1999
2. Senior Practicla Physical Chemistry,BD Khosla, A. Gulati, VC Garg, Chand & Co, New Delhi 10th ed. 2001.

ES 253 CS

COMPUTER SKILLS LAB

(Common to all branches)

Instruction	: 2 Hours /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.

ES 256 EC

ELECTRONICS DEVICES AND CIRCUITS LAB

Instructions	2Hours/week
Duration of University Examination	3 Hours
SEE	50 Marks
CIE	25 Marks
Credits	1

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

ES 257 BM

CIRCUIT DESIGN AND SIMULATION LAB

Instructions	2Hours/week
Duration of University Examination	3 Hours
SEE	50 Marks
CIE	25 Marks
Credits	1

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 LABORATORY

(Common to all branches**)**

Instructions	2Hours/week
Duration of University Examination	3 Hours
SEE	50 Marks
CIE	25 Marks
Credits	1

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

Suggestion Reading:

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.