Detail Syllabus of 2nd Year Odd Semester B.Sc. Engineering

GCE2303 (Glass Fundamentals)
Lecture: 3 hrs/week, No. of Credit: 3.00
Fundamentals of the Glassy State: The non-crystalline solids & the glasses, Formation from liquid phase, Formation from a gaseous phase, Formation from a solid phase, Definitions of glass, The Volume-Temperature Diagram.
Glass Formation: Structural concepts of glass formation, Kinetic considerations, Ranges of glass formation, Vitreous transition, Conditions of vitrification.
Glass Transformation Range Behavior: Introduction, Measurement of Glass transition temperature T_g and The Fictive temperature T_f, Relaxation of properties.
Diffusion in Glass: Measurement of diffusion, Temperature dependence of diffusion, Composition dependence of diffusion, Permeation.
Structure of Glass: Structural models of glass, Phase separation and Liquid immiscibility, Miscibility gaps in oxide systems, Atomic arrangements in glass.
Composition-Structure-Property Relationships: Presentation of glass formulas, Interdependence of glass composition, Structure and Properties.
Chemical Durability: Measurement of chemical durability, Composition dependence, Methods of improving chemical durability.
Glass-Ceramics: Controlled crystallization of glass, Examples of some systems, Special applications.

GCE2307 (Crystallography)
Lecture: 3 hrs/week. No. of Credit: 3.00
Solid Materials: Types of solids: Crystalline, Amorphous and Polycrystalline solids. Types of crystalline solids: Ionic, Covalent, Molecular and Metallic crystals. Cohesive energy of ionic crystals, Lattice energy, Born-Haber cycle, Isomorphism, Polymorphism, Enantiotropy and Monotropy.
Crystals and Crystal Structures: The nature of crystalline states, Construction of crystals from closed packed hexagonal layers of atoms, Unit cells for the hcp and ccp structures, Construction of crystals from square layers of atoms, Construction of body-centred cubic crystal, Interstitial structure, Some simple ionic and covalent structures. Selected crystal structures: Pure metals, Diamond and Graphite, Co-ordination in ionic crystals, AX-type crystal structure, AmXp-type crystal structure, $A_mB_nX_p$-crystal structure, Silicate structures, Alumina, Complex oxides, Silicates, Crystallinity in polymers.
Representation and Study of Crystals in Projection: Introduction, Representation in two dimensions, Stereographic projection and its construction, Stereographic projection in small circle, Stereographic net, Use of stereographic projection in crystallography, Gnomonic projection. Twodimensional
symmetry elements, The five-plane lattice, Bravais lattices and crystal systems: The fourteen space (Bravais) lattices, The symmetry of fourteen Bravais lattices.
Describing Lattice Planes and Directions in Crystals: Arrangements of ions in crystals, Lattice planes, Indexing lattice directions and lattice planes, Miller indices and zone axis symbols, Lattice planes in cubic crystals: Lattice plane spacing, Interplanar distance, Ratio of lattice spacing. Miller indices and Laue indices, Zones, Zone axes and The zone law, The addition rule, Indexing in the trigonal and hexagonal systems, Transforming miller indices and zone axis symbols.
Imperfections of Atomic Packing in Crystals: Disordered crystals, Line defects: Dislocation types, Dislocation theory, Plane defects: Large-angle and small-angle boundaries, Stacking faults and F-centre, Defects in crystals and their influences on the properties of materials.

ME2315 (Engineering Mechanics)
Lecture: 3 hrs/week. No. of Credit: 3.00
Basic concepts of mechanics, Statics of particles and Rigid bodies, Centroids of lines, areas and volumes, Forces in trusses and frames, Friction, Moments of inertia of areas and masses, Relative motion, Kinematics of particles- Newton's second law of motion, Principles of Work, Energy and Power, Impulse and Momentum, System of particles, Kinematics of rigid bodies, Kinematics of plane motion of rigid bodies-Forces and Acceleration.

CSE2329 (Computer Fundamentals and Programming)
Lecture: 3 hrs/week, No. of Credit: 3.00
Digital Computer: I/O devices, Memory unit and CPU, Primary and secondary storage devices.
Application and System Software: DOS, Windows and UNIX operating systems, Microsoft word, Spreadsheet etc.
Programming Languages: Assembly, machine and high level language, Compiler, Interpreter and assembler. Flowchart and algorithm development.
C Language: Preliminaries, Program construction and data types, I/O statements, Expressions, Decision making, Loops, Function and its Calling procedure, Recursion, Arrays and Pointer, Structure aduminar, Equivalent programs in ORACLE, Application of computer programming for solving engineering problems.

EEE2333 (Electrical and Electronics Engineering)
Lecture: 3 hrs/week, No. of Credit: 3.00
Fundamental Concepts, Units and Electrical Networks: Basic concepts and units, Network laws and theorems, Methods of analysis, Electrical field concepts and capacitance, Magnetic field concept and Inductance, Transient and Steady state analyses of electrical networks.
Alternating Current Circuit: Effective and average values of ac waveforms, Phasor and Impedance, Steady state analysis of AC networks, Introduction to Poly-phase systems.
Measurement of Electrical Quantities: Voltage, Current, Power and Power factor measurement, Introduction to Oscilloscope, Measurement of physical quantities using transducers.
Electromagnetic Energy Conversion: Introduction to electromagnetism, Transformers-single & three phase, Open and Short circuit test of transformer, DC-machines-generators and motors, starting and speed control. AC-machines- synchronous and asynchronous machines.
Fundamentals of Electronics: Introduction to diode, FET, BJT, Amplifier, Thyristor etc. - their properties and applications, PLC and Interfacing, Digital electronics.

GCE2308 (Crystallography and Structure of Solids Sessional)
Sessional: 3 hrs/week, No. of Credit: 1.50
Sessional based on **GCE2307**

CSE2330 (Computer Fundamentals and Programming Sessional)
Sessional: 1.5 hrs/week, No. of Credit: 0.75
Sessional based on **CSE2329**

EEE2334 (Electrical and Electronics Engineering Sessional)
Sessional: 1.5 hrs/week, No. of Credit: 0.75
Sessional based on **EEE2333**

MES2310 (Machine Shop Practice)
Sessional: 3 hrs/week, No. of Credit: 1.50
Acquaintance with tools & appliances used in welding & sheet metal shop: Electric arc welding, Gas welding, Gas cutting, Soldering & Brazing practices.
Welding defects, Simple exercise on sheet metal work.
Introduction to fitting shop tools, equipment and operation. Chiseling, Sawing, Filing, Reaming, Thread cutting (outside & inside), Hand finishing & any other job that the department will consider if necessary.