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**Demo university B.E./B.Tech CIVIL
Sem 3 syllabus**

Basic Electronics

EC110 Basic Electronics

3 Credits

1 Introduction to Microprocessor Systems: Architecture and Pin diagram of 8085, Timing Diagram, Memory organization, Addressing modes, Interrupts. Assembly Language Programming, 8085 interrupts, Additional I/O concepts and processes.

2 Interfacing of 8085 with 8255, 8254/ 8253, 8251, 8259: Introduction, Generation of I/O Ports, Programmable Peripheral Interface (PPI)-Intel 8255, Sample-and- Hold Circuit and Multiplexer, Keyboard and Display Interface, Keyboard and Display Controller (8279), Programmable Interval timers (Intel 8253/8254), USART (8251), PIC (8259), DAC, ADC, LCD, Stepper Motor.

3 Introduction to 8086, 80286, 80386 and 80486 Microprocessor: 8086 Architecture, Generation of physical address, Pin diagram of 8086, Minimum Mode and Maximum mode, Bus cycle, Memory Organization, Memory Interfacing, Addressing Modes, Assembler Directives, Instruction set of 8086, Assembly Language Programming, Hardware and Software Interrupts. Introduction of 80286, 80386, and 80486 microprocessor

4 Overview of Microcontroller 8051: Introduction to 8051 Microcontroller, Architecture, Memory organization, Special function registers, Port Operation, Memory Interfacing, I/O Interfacing, Programming 8051 resources, interrupts, Programmer's model of 8051, Operand types, Operand addressing, Data transfer instructions, Arithmetic instructions, Logic instructions, Control transfer instructions, Timer and Counter Programming, Interrupt Programming.

Name of Authors / Books /Publishers

- 1 “Microprocessors and Microcontrollers”, Muhammad Ali Mazidi, Pearson, 2006
- 2 “Microprocessors and Interfacing, Programming and Hardware”, Douglas V Hall, Tata McGraw Hill, 2006
- 3 “MicroProcessor Architecture, Programming and Applications with the 8085”, Ramesh Gaonkar, PHI
- 4 “The 8051 Microcontroller and Embedded Systems”, Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D. MCKinlay, 2nd Edition, Pearson Education, 2008
- 5 “The 8086 Microprocessor: Programming and Interfacing The PC”, Kenneth J. Ayala, Delmar Publishers, 2007
- 6 “Advanced Microprocessors and Peripherals”, A K Ray, K M Bhurchandi, Tata McGraw Hill, 2007

Surveying

Unit I: Compass and Levelling.

- a) Definition and Importance of Surveying; Principles of Surveying,
- b) Definition, objective and fundamental classification of surveying (Plane and Geodetic), concept of Scale, Ranging, Chaining, Offsetting and Traversing. Construction and use of prismatic compass, Concept of bearing &, types of bearings such as Whole Circle Bearing, Quadrantal Bearing, meridian and their types, local attraction and correction for local attraction, dip, declination and calculation of true bearings, including numericals of all types.
- c) Equipment required for plane table surveying, uses, advantages and disadvantages and errors in plane table surveying. Methods of plane table Survey Radiation, intersection, traversing and resection -
- d) Introduction to leveling, Types of leveling, Types of benchmarks, Study and use of dumpy level, auto level, digital level and laser level in construction industry, principal axes of dumpy level, testing and permanent adjustments reciprocal leveling, curvature and refraction corrections, distance to the visible horizon. Collimation Plane Method, Rise & Fall Method

Unit II: Theodolite Surveying

a) Study of vernier transit 20" theodolite, uses of theodolite for measurement of horizontal angles by repetition and reiteration, vertical angles, measurement of deflection angles using transit theodolite and magnetic bearing, prolonging a line, lining in and setting out an angle with a theodolite. Fundamental axes of theodolite: testing and permanent adjustments of a transit theodolite.

b) Theodolite traversing - computation of consecutive and independent co-ordinates, adjustment of closed traverse by transit rule and Bowditch's rule, Gales traverse table. Checks, omitted measurements, area calculation by independent co-ordinates.

Unit III: Tacheometry and Contouring.

a) Tacheometry - applications and limitations, principle of stadia tacheometry, fixed hair method with vertical staff to determine horizontal distances and elevations of points, finding tacheometric constants. Tacheometric contouring. Numericals

b) Contouring - Definition of Contours, Characteristics of Contours, Contour Patterns for various natural features, direct and indirect methods of contouring, uses of contour maps, study and use of topo-sheets, profile leveling and cross-sectioning and their applications.

Unit IV: Curves.

Introduction to horizontal and vertical curves (including numericals but derivation not expected), different types of curves and their applications, simple and compound circular curves, elements and setting out by linear methods such as radial and perpendicular offsets, offsets from long chord, successive bisection of chord and offsets from chords produced. Angular methods: Rankine's method of deflection angles (one and two theodolite methods). (Numerical on simple circular curves and compound curves to be asked), Transition curves:

necessity.

Unit V: Construction Survey & Modern Techniques such as Space Based Positioning System (SBPS)

- a. Introduction to construction survey, establishing of horizontal and vertical controls, setting out of buildings, maintaining verticality of tall buildings, survey for open traverse (roadway, railways, drainage lines, water lines, canals)., Setting out of a bridge, Determination of the length of the central line and the location of piers. Setting out of a tunnel - Surface setting out and transferring the alignment underground.
- b. Introduction to SBPS, SBPS systems - GPS, GLONASS, Galileo, GAGAN, BeiDou and their features, Segments of SBPS (Space, Control and User), applications of SBPS in surveying.

Engineering Mechanics

ESC 202 Engineering Mechanics

Unit 1: Statics: Force System, Moment of a force about a point and an axis; Equivalent force and moment

Unit 2: Equilibrium: Free body diagram; equations of equilibrium; problems in two and three dimension; plane frames and trusses.

Unit 3: Friction: Laws of Coulomb friction, impending motion problems involving large and small contact surfaces; square threaded screw; principle of virtual work and stability.

Unit 4: Dynamics: Kinematics and kinetics of particles dynamics in rectangular coordinates cylindrical coordinates and in terms of path variables.

Unit 5: Properties of areas: Center of mass; Moments of inertia; kinematics of rigid bodies; Chasle's Theorem, concept of fixed vector, velocity and acceleration of particles in different frames of references. General plane motion.

Unit 6: Work & Energy and impulse and Momentum methods for particles and rigid bodies: Conservation of momentum, coefficient of restitution, moment of momentum equation.

Text /Reference Books:

1. Engineering Mechanics by Shames, Pearson's Education.
2. Mechanics for Engineers. Beer, F.P. and Johnston. Tata McGraw Hill. New Delhi
3. Engineering mechanics. Meriam Wiley pub.
4. Engineering Mechanics. Timoshenko. McGraw Hill Inc.

Mathematics III

Unit - 1 Set Theory and Logic

Discrete Mathematics, Significance of Discrete Mathematics in Computer Engineering, Sets- Naïve Set Theory (Cantorian Set Theory), Axiomatic Set Theory, Need for Sets, Representation of Sets, Set Operations, cardinality of set, principle of inclusion and exclusion, Types of Sets - Countable and Uncountable Sets, Finite and Infinite Sets, Countably Infinite and Uncountably Infinite Sets. Introduction to bounded and unbounded sets and multiset. Countability of Rational Numbers Using Cantor Diagonalization Argument, power set. Propositional Logic- logic, Propositional Equivalences, Application of Propositional Logic-Translating English Sentences, Proof by Mathematical Induction and Strong Mathematical Induction.

Unit- 2 Relations and Functions

Relations and Their Properties, n-ary Relations and Their Applications, Representing Relations , Closures of Relations, Equivalence Relations, Partial Orderings, partitions, Hasse Diagram, Lattices, Chains and Anti-Chains, Transitive Closure and Warshall's Algorithm, n-Ary Relations and their Applications. Functions- Surjective, Injective and Bijective functions, Inverse Functions and Compositions of Functions, The Pigeonhole Principle.

Unit - 3 Counting

The Basics of Counting, rule of Sum and Product, Permutations and Combinations, Binomial Coefficients and Identities, Generalized Permutations and Combinations, Algorithms for generating Permutations and Combinations.

Unit - 4 graph theory

Graphs and Graph Models, Graph Terminology and Special Types of Graphs, Representing Graphs and Graph Isomorphism, Connectivity,

Euler and Hamilton Paths, Single source shortest path- Dijkstra's Algorithm, Planar Graphs, Graph Colouring. Case Study- Web Graph, Google map

Unit- 5 Trees

Introduction, properties of trees, Binary search tree, decision tree, prefix codes and Huffman coding, cut sets, Spanning Trees and Minimum Spanning Tree, Kruskal's and Prim's algorithms, The Max flow- Min Cut Theorem (Transport network). Case Study- Game Tree, Mini-Max Tree

Engineering Geology

207003 Engineering Geology

Unit I: General Geology, Mineralogy and Petrology

- a) Introduction to the subject, scope and sub divisions. General Geology: The Earth as a planet, Interior & General composition of the Earth, The rock cycle
- b) Introduction to mineralogy: Physical Properties of Minerals, Classification of Minerals, silicate and non-silicate minerals, Rock forming minerals.
- c) Introduction to petrology and Broad classification of rocks. Igneous Petrology: Plutonic, Hypabyssal and Volcanic rocks, Structures, Textures and Classification of Igneous rocks. Study of common rock types prescribed in practical work and their engineering applications. Secondary Petrology: Rock weathering, Sedimentary Structures, lithification and diagenesis Process, Genetic classification of secondary rocks and grain size classification and Textures, Study of common rock types prescribed in practical work and their civil engineering applications. Metamorphic Petrology: Agents, Types of metamorphism, Texture and structures. Study of common rock types prescribed in practical work and their civil engineering applications.

Unit II: Geomorphology and Historical Geology.

- a) Geomorphology: Endogenic and Exogenic processes, Geological action by fluvial process i.e. river and Landforms formed it, Aeolian and glacial process, Coastal geomorphology.
- b) Historical Geology: General principles of Stratigraphy, Geological time scale w.r.t. Indian geological time scale, Physiographic divisions of India, Archean's & Dharwar formation, Cudappah formations, Vindhyan formations, Gondwana formations, Deccan Trap formations, significance of their structural characters in major civil engineering

activities.

Unit III: Structural Geology, Plate Tectonics

- a) Introduction to plate tectonics and Mountain building activity.
- b) Structural Geology: Out crop, dip and strike, conformable series, unconformity, its types and overlap, faults and their types, folds and their types, inliers and outlier. Civil engineering importance of faults and folds with examples.
- c) Structures of rocks: Igneous intrusions and their types, joints and their types, stratification and lamination.

Unit IV: Remote Sensing and G.I.S., Preliminary Geological Studies

- a) Remote sensing (RS): Definition, Stages of Remote sensing, Remote sensing platforms, Active & Passive Remote sensing, Electromagnetic spectrum, visible band, scattering & absorption of EMR in atmosphere and its effect on Satellite Imagery; resolution of satellite images, Elements of remote sensing for Visual interpretation viz. Tone, shape, size, pattern, texture, shadow and Association.
- b) Geographical Information System (GIS): Introduction, Definition, tools, applications of remote sensing and geographical information system in Civil Engineering.
- c) Preliminary Geological Exploration: reconnaissance survey, Desk Study, surface and subsurface Geological Investigations: Direct methods like Test & trial pits, pilot trenches, Drilling, Core inspection significance and limitations of it. Indirect methods like Resistivity, seismic survey and its significance and limitations.

Unit V: Role of Engineering Geology in Dams, Reservoirs and Tunneling.

- a) Geology of Dams & Reservoir: Strength, stability and water tightness of foundation rocks, influence of geological conditions on the choice and type of dam, preliminary geological work on dam and reservoir sites, precautions to be taken to counteract unsuitable conditions and their relevant treatments with case studies.
- b) Tunneling: Preliminary geological investigations, important geological considerations while choosing alignment, difficulties during tunneling as encountered due to various geological conditions, Role of groundwater and suitability of common rock types for excavation and tunneling and important case studies in Kasara and BorGhat sections of central railway in Maharashtra and in India, particularly in Himalayas etc.

Unit VI: Geological Hazards, Ground Water and Building

Stones.

- a) Geological Hazards: Volcanism, Earthquakes & Seismic zones of India, Landslides and stability of hill slopes and preventive measures.
- b) Groundwater: Types of ground water, water table and depth zones, influence of hydro geological properties of rocks, types of aquifers, artesian wells and its geological conditions, artificial recharge of groundwater. Geological work of groundwater, levels, effects of dams and canals, effect of pumping, cone of depression, circle of influence, fluctuations in water table Methods of conservation of groundwater and its management; introduction of watershed management.
- c) Building stones: Requirements of good building stone: strength, durability, ease of dressing, appearance, mineral composition, textures and field structures, suitability of common rocks as building stone.

Text Books:

1. Text Book of Engineering Geology by R.B. Gupte , 2001, P.V.G. Publications, Pune.
2. A Text Book of Engineering Geology by N. ChennaKesavulu. 2010, McMillan India Ltd.
3. Principles of Engineering Geology by D. Venkat Reddy. 2010, Vikas Publishers.

Reference Books:

1. Geology P. K. Mukerjee, World Press
 2. Engineering Geology by F. G. H Blyth and De Frietus, Reed Elsevier India
 3. Geology for geotechnical engineers, J. C. Harvey, Cambridge University Press
 4. Principals of Engineering Geology, S.K. Garg, VikasPublishe
 5. Engineering Geology, Parbin Singh
 6. Geology and Engineering, K. V. G. K. Gokhale, D. M. Rao ,Tata McGraw Hill.
 7. Structural Geology, M. P. Billings, Pearson India Pvt. Ltd.
- Any Other book of prominent publisher that is recommended by Geology faculty.
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