



DEMAND

PAVIATH INTEGRATED SOLUTION

CIVIL ENGG

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ELEMENTS OF EARTHQUAKE ENGINEERING

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◆ CIVIL UNIVERSITY ◆ THIRD YEAR II SEMESTER ELECTIVE I ◆ CODE AG0123

**UNIT I**  
ENGINEERING SEISMOLOGY: EARTHQUAKE PHENOMENON CAUSE OF EARTHQUAKES- FAULTS- PLATE TECTONICS- SEISMIC WAVES- TERMS ASSOCIATED WITH EARTHQUAKES- MAGNITUDE/INTENSITY OF AN EARTHQUAKE-SCALES-ENERGY RELEASED-EARTHQUAKE MEASURING INSTRUMENTS-SEISMOSCOPE, SEISMOGRAPH, ACCELEROGRAPH-STRONG GROUND MOTIONS- SEISMIC ZONES OF INDIA. THEORY OF VIBRATIONS: ELEMENTS OF A VIBRATORY SYSTEM- DEGREES OF FREEDOM- CONTINUOUS SYSTEM-LUMPED MASS IDEALIZATION- OSCILLATORY MOTION-SIMPLE HARMONIC MOTION- FREE VIBRATION OF SINGLE DEGREE OF FREEDOM (SDOF) SYSTEM-UNDAMPED AND DAMPED- CRITICAL DAMPING- LOGARITHMIC DECREMENT-FORCED VIBRATIONS-HARMONIC EXCITATION-DYNAMIC MAGNIFICATION FACTOR-EXCITATION BY RIGID BASED TRANSLATION FOR SDOF SYSTEM-EARTHQUAKE GROUND MOTION.

**UNIT II**  
CONCEPTUAL DESIGN: INTRODUCTION-FUNCTIONAL PLANNING- CONTINUOUS LOAD PATH- OVERALL FORM-SIMPLICITY AND SYMMETRY-ELONGATED SHAPES- STIFFNESS AND STRENGTH-HORIZONTAL AND VERTICAL MEMBERS-TWISTING OF BUILDINGS-DUCTILITY-DEFINITION- DUCTILITY RELATIONSHIPS-FLEXIBLE BUILDINGS-FRAMING SYSTEMS- CHOICE OF CONSTRUCTION MATERIALS-UNCONFINED CONCRETE-CONFINED CONCRETE-MASONRY-REINFORCING STEEL. INTRODUCTION TO EARTHQUAKE RESISTANT DESIGN: SEISMIC DESIGN REQUIREMENTS-REGULAR AND IRREGULAR CONFIGURATIONS-BASIC ASSUMPTIONS-DESIGN EARTHQUAKE LOADS-BASIC LOAD COMBINATIONS-PERMISSIBLE STRESSES- SEISMIC METHODS OF ANALYSIS-FACTORS IN SEISMIC ANALYSIS-EQUIVALENT LATERAL FORCE METHOD.

**UNIT III**  
REINFORCED CONCRETE BUILDINGS: PRINCIPLES OF EARTHQUAKE RESISTANT DESIGN OF RC MEMBERS- STRUCTURAL MODELS FOR FRAME BUILDINGS- SEISMIC METHODS OF ANALYSIS- SEISMIC DESIGN METHODS- IS CODE BASED METHODS FOR SEISMIC DESIGN- SEISMIC EVALUATION AND RETROFITTING- VERTICAL IRREGULARITIES- PLAN CONFIGURATION PROBLEMS- LATERAL LOAD RESISTING SYSTEMS- DETERMINATION OF DESIGN LATERAL FORCES- EQUIVALENT LATERAL FORCE PROCEDURE- LATERAL DISTRIBUTION OF BASE SHEAR.

**UNIT IV**  
MASONRY BUILDINGS: INTRODUCTION- ELASTIC PROPERTIES OF MASONRY ASSEMBLAGE- CATEGORIES OF MASONRY BUILDINGS- BEHAVIOUR OF UNREINFORCED AND REINFORCED MASONRY WALLS- BEHAVIOUR OF WALLS- BOX ACTION AND BANDS- BEHAVIOUR OF INFILL WALLS- IMPROVING SEISMIC BEHAVIOUR OF MASONRY BUILDINGS- LOAD COMBINATIONS AND PERMISSIBLE STRESSES- SEISMIC DESIGN REQUIREMENTS- LATERAL LOAD ANALYSIS OF MASONRY BUILDINGS.

**UNIT V**  
STRUCTURAL WALLS AND NON-STRUCTURAL ELEMENTS: STRATEGIES IN THE LOCATION OF STRUCTURAL WALLS- SECTIONAL SHAPES- VARIATIONS IN ELEVATION- CANTILEVER WALLS WITHOUT OPENINGS- FAILURE MECHANISM OF NON-STRUCTURES- EFFECTS OF NONSTRUCTURAL ELEMENTS ON STRUCTURAL SYSTEM- ANALYSIS OF NON-STRUCTURAL ELEMENTS- PREVENTION OF NON-STRUCTURAL DAMAGE- ISOLATION OF NON-STRUCTURES- DUCTILITY CONSIDERATIONS IN EARTHQUAKE RESISTANT DESIGN OF RC BUILDINGS: INTRODUCTION- IMPACT OF DUCTILITY- REQUIREMENTS FOR DUCTILITY- ASSESSMENT OF DUCTILITY- FACTORS AFFECTING DUCTILITY- DUCTILE DETAILING CONSIDERATIONS AS PER IS 18920. BEHAVIOUR OF BEAMS, COLUMNS AND JOINTS IN RC BUILDINGS DURING EARTHQUAKES- VULNERABILITY OF OPEN GROUND STOREY AND SHORT COLUMNS DURING EARTHQUAKES

## TEXT BOOKS:

1. EARTHQUAKE RESISTANT DESIGN OF STRUCTURES – S. K. DUGGAL, OXFORD UNIVERSITY PRESS.
  2. EARTHQUAKE RESISTANT DESIGN OF STRUCTURES – PANKAJ AGARWAL AND MANISH SHRIKHANDE, PRENTICE HALL OF INDIA PVT. LTD.
- REFERENCES:
1. SEISMIC DESIGN OF REINFORCED CONCRETE AND MASONRY BUILDING – T. PAULAY AND M.J.N. PRIESTLY, JOHN WILEY & SONS.
  2. EARTHQUAKE RESISTANT DESIGN OF BUILDING STRUCTURES BY VINOD HOSUR, WILEY INDIA PVT. LTD.
  3. ELEMENTS OF MECHANICAL VIBRATION BY R.N.IYENGAR, I.K. INTERNATIONAL PUBLISHING HOUSE PVT. LTD.
  4. MASONRY AND TIMBER STRUCTURES INCLUDING EARTHQUAKE RESISTANT DESIGN –ANAND S. ARYA, NEM CHAND & BROS.
  5. EARTHQUAKE TIPS – LEARNING EARTHQUAKE DESIGN AND CONSTRUCTION C.V.R. MURTHY.



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SELF - 4/UNIT ASSIGNMENT  
PRESENTATION - 2/UNIT  
SHOWTIME - 2/UNIT



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