| GANPAT UNIVERSITY | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FACULTY OF ARCHITECTURE DEISGN & PLANNING | | | | | | | | | |
| Programme | Bachelor of Architecture | | | | | Branch/Spec. | INSTITUTE OF ARCHITECTURE | | |
| Semester | V | | | | | Version | 2.0.0.0 | | |
| Effective from Academic Year | | | 2021-22 | | | Effective for the batch Admitted in | | | June 2019 |
| Subject code | 2VA04SDS | | Subject Name | | | Structural Design and Systems V | | | |
| Teaching scheme | | | | | | Examination scheme (Marks) | | | |
| (Per week) | Lecture (DT) | | Practical (Lab.) | | Total | | CE | SEE | Total |
| | L | TU | P | TW | | | | | |
| Credit | 2 | - | - | - | 2 | Theory | 40 | 60 | 100 |
| Hours | 2 | - | - | - | 2 | Practical | - | - | - |

**PRE-REQUISITES:**

Structure design and system – I, II, III, & IV

**OBJECTIVE:**

- This subject is applications of structural engineering principles to design basic structural elements using of reinforced concrete as materials. This subject is specifically aim to develop understanding of various design philosophy, Indian codal provisions, design basis used in design of basic elements of framed structures and its detailing requirement.

Learning Outcome:

**LO1:** Behaviours and requirement of various types of foundation and requirement effect of ductile details in structure.
**LO2:** Select various design philosophies to plan, to draw structural layout and to understand analytical approach to be used in the design of structural elements
**LO3:** Design & detail RC structures like Retaining Wall.
**LO4:** Apply the concept of earthquake resistant design in the building.

CONTENT & TEACHING UNITS

| Unit | Content | Hrs |
|---|---|---|
| A | **DESIGN OF FOOTING:** Definition, Types of footings based on structural requirements, importance of soil & other factors while recommending type of foundation. Design of Isolated footing Considering only Axial load. | 06 |
| B | **BUILDING LAYOUT AND DESIGN:** Loads as per I.S., distribution & flow of loads, lateral load due to wind and seismic as per latest IS standards, load combinations, guide lines for preparation of structural layout for building. General detailing required in structural drawing as per SP-34, do's details required for general drawing, beam, slab and column as per SP-34. | 08 |
| C | **DESIGN OF RETAINING WALL:** Types, behaviour and application of retaining wall, stability criteria, design & detailing of cantilever type retaining wall for various ground conditions | 06 |
| D | **DESIGN OF WATER TANK:** Underground and elevated circular and rectangular water tanks retaining walls. | 06 |

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|---|---|---|
| E | **SPECIAL TOPICS:** Introduction to Earthquake Resistant Features of unreinforced & reinforced masonry Structure, Confined Masonry, Soil liquefaction, Structural controls, Seismic strengthening. Earthquake resistant features: bands and vertical reinforcement IS 4326, IS 13827, IS 13828. | 06 |
| Text Books | | |
| 1 | | |
| Reference Books | | |
| 1 | 1. Junarkar S. B. & Shah H. J; Tata McGraw Hill book Company. | |
| 2 | Wang C. K.; Intermediate Structural Analysis; Tata McGraw Hill book Company, New Delhi | |
| 3 | Elements of Civil Engineering (IV Edition) - S. S. Bhavikatti | |
| 4 | Shah & Karve; Limit State Theory & Design of Reinforced Concrete; Structure Pub., Pune | |
| 5 | IS: 456 - Code of practice for plain and reinforced concrete. | |
| 6 | IS: 875 (Part I to V) - Code of practice for structural safety of Buildings Loading standards. | |
| 7 | Reinforcement detailing - SP : 34 | |
| 8 | IS: 13920 -Code of Practice for ductile detailing of RC structure subjected to seismic force. | |
| 9 | EQ Tips; IIT Kanpur & BM &TPC New Delhi. | |
| 10 | Structural Engineering for architecture - A.P. Dongre | |

| | BA - PO 1 | BA - PO 2 | BA PO 3 | BA PO 4 | BA PO 5 | BA PO 6 | BA PO 7 | BA PO 8 | BA PO 9 | BA PSO 1 | BA PSO 2 | BA PSO 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VA03S1H - CO1 | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 3 |
| VA03S1H - CO2 | 1 | 1 | 2 | 2 | 1 | 3 | 1 | 3 | 1 | 1 | 2 | 1 |
| VA03S1H - CO3 | 3 | 3 | 1 | 2 | 0 | 1 | 1 | 3 | 3 | 2 | 1 | 3 |
| VA03S1H - CO4 | 2 | 2 | 2 | 2 | 0 | 2 | 2 | 2 | 2 | 1 | 3 | 2 |