**19CEXXΦ2– BUILDING PLANNING AND CONSTRUCTION TECHNIQUES**

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| **Course Category:** | Open Elective | **Credits:** | 3 |
| **Course Type:** | Theory | **Lecture - Tutorial - Practical:** | 3 - 0 - 0 |
| **Prerequisite:** | None | **Sessional Evaluation :**  **Univ. Exam Evaluation:**  **Total Marks:** | 40  60  100 |

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| **Course Objectives** | 1. Expose students to various factors considered in planning and construction of buildings. 2. Impart knowledge on the basic building materials, properties and their applications. 3. Acquire knowledge on various cementitious materials. 4. Describe the different types of smart construction materials and their applications. 5. Develop knowledge of various types of the building components. 6. Learn the techniques of damp proofing and finishing works of the building. | |
| **Course Outcomes** | CO1 | Identify the factors to be considered in planning and construction of buildings and Plan a building following the bye-law**s** |
| CO2 | Understand various types of stones and methods of manufacturing of bricks and tiles. |
| CO3 | Identify the importance of ingredients of lime, cement and concrete. |
| CO4 | Provide scope of smart construction materials alternative for cement and also be able to understand various types of masonry construction. |
| CO5 | Evaluate various building components and their various types. |
| CO6 | Understand the techniques and importance of damp proofing and finishing works of the building. |
| **Course**  **Content** | **UNIT – I**  **Building Planning:** Terms used in building drawing as per National Building Code (N.B.C) – Factors affecting in selection of site – Functional requirements of a residential building – Minimum size requirements as per N.B.C. – Standard sizes of Door – Windows and ventilators.  Basic building elements, Principles of planning. Relevant building by-laws (N.B.C) & Municipal, orientation of buildings – Provision of rainwater harvesting – provision for physically handicapped facilities.  **UNIT – II**  **Stones:** Properties of building stones – Relation to their structural requirements – Classification of stones.  **Bricks:** Composition of good brick earth, various types of bricks.  **Tile**: Characteristics of good tile and types of tiles.  **UNIT – III**  **Lime:** Various ingredients of lime –Constituents of lime stone – Classification of lime.  **Cement:** Portland cement – Chemical Composition – Hydration, setting and fineness of cement – Various types of cement and their properties – Various field and laboratory tests for Cement – Various ingredients of cement concrete and their importance – Various tests for concrete.  **UNIT – IV**  **Wood:** Introduction– Classification of timber (I.S.: 399) – Characteristics of good timber– Defects in timber – Types and Uses of Ply-wood and Engineered wood. –Uses of materials like Aluminium, Gypsum, Glass and Bituminous materials.  **Masonry:** Types of masonry – English and Flemish bonds – Cavity, partition and shear walls.  **Smart Construction Materials:** Overview and use of Fly ash, Silica fume, Carbon fibers, Self-healing materials and Fiber reinforced plastics – Benefits of Nano-technology in construction industry.  **UNIT – V**  **Building Components:** Lintels – Arches – Vaults – Stair cases.  **Floors:** Different types of floors – Concrete – Mosaic and Terrazzo floors.  **Roofs:** Pitched roofs – Lean to roof – Coupled Roofs – Trussed roofs – King and Queen post Trusses – Flat roofs – R.C.C Roofs – Doors and windows.  **UNIT – VI**  **Building Finishes:** Damp Proofing and water proofing materials and uses. Plastering – Pointing – White washing and distempering.  **Paints:** Constituents of paint – Types of paints –Painting of new/old wood – Varnish. | |

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| **Textbooks**  **and**  **References** | **TEXTBOOKS:**   1. B.C. Punmia, Arun K Jain, Ashok K Jain, *Building Construction*, Laxmi Publications, 11th Edition, 2016. 2. S. K. Duggal, *Building Materials*, New Age International Publishers, 5th Edition, 2012. 3. Dr. N. Kumara Swamy & A. Kameswara Rao, *Building Planning and Drawing*, Charotar publishing house, 9th Edition, 2019.   **REFERENCE BOOKS:**   1. S.C Rangwala, *Engineering Materials*, Charotar Publishing House, 43rd Edition, 2019. 2. Sushil Kumar, *Building Construction*, Standard Publisher, 19th Edition 2020. 3. Indian Standard Institution, National Building Code of India, B.I.S 2016. |

**CO-PO Mapping:** 3-High Mapping, 2-Moderate Mapping, 1-Low Mapping, - -Not Mapping

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|  | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** |
| **CO1** | 2 | - | 1 | 1 | - | 1 | 1 | - | - | - | 2 | 1 |
| **CO2** | 1 | 1 | 2 | 1 | 1 | - | - | - | - | - | - | 1 |
| **CO3** | 1 | 1 | 2 | - | 2 | - | - | - | - | - | - | 2 |
| **CO4** | 2 | - | 2 | - | 1 | 2 | 1 | - | - | - | 1 | 2 |
| **CO5** | 2 | - | 2 | - | 2 | 1 | - | - | - | - | 1 | 1 |
| **CO6** | 2 | 2 | 1 | - | 2 | 2 | - | 2 | - | 2 | - | - |