**17CE4XO5 – COST EFFECTIVE HOUSING TECHNIQUES**

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| **Course Category**  | Open elective | **Credits**  | 3 |
| **Course Type**  | Theory | **Lecture-Tutorial-Practical**  | 3-0-0 |
| **Prerequisite**  | Building Materials | **Sessional Evaluation**  | 40 |
| **External Evaluation**  | 60 |
| **Total Marks**  | 100 |

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| **Course****Objectives** | 1. To understand and apply the basic concepts of housing.
2. To understand the basics concepts of housing programmes.
3. To plan for design, evaluation, construction and financing of housing projects.
4. To plan for cost effective construction materials and methods.
5. To understand and apply the basic concepts of rural housing.
6. To apply the concept of housing in disaster prone areas.
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| **Course Outcomes** | CO1 | Acquire basic knowledge in housing. |
| CO2 | Acquire basic knowledge in housing programmes. |
| CO3 | Able to design, evaluation, construction and financing of housing projects. |
| CO4 | Familiar with the innovative construction materials. |
| CO5 | Be in position to adopt the suitable techniques in rural areas. |
| CO6 | Be in position to adopt the suitable techniques in disaster prone areas by using locally available materials. |
| **Course****Content** | **UNIT – I****INTRODUCTION TO HOUSING:** Definition of Basic Terms: House – Home – Household – Apartments – Multi storied Buildings – Special Buildings – Objectives and strategies of national housing policies including slum housing policy – Principle of sustainable housing – Integrated approach on arriving holding capacity and density norms – All basic infrastructure consideration – Institutions for housing at national – State and Local levels. **UNIT – II****HOUSING PROGRAMMES:** Basic Concepts – Contents and standards for housing programmes – Sites and services – Neighborhoods – Plotted land development programs – Open development plots – Apartments – Gated communities – Townships – Rental housing – Co-operative housing – Slum housing programmes – Slum improvement – Slum redevelopment relocation. Use of GIS and MIS in Slum Housing Projects – Role of public housing agencies –Private sector in supply – Quality – Infrastructure and pricing – Role of Non-Government Organizations in slum housing.**UNIT – III****Development and adoption of lowcost Housingtechnology:** Introduction – Adoption of innovative cost effective construction techniques – Adoption of precast elements – Adopting of total prefabrication of mass housing in India – General remarks on pre-cast rooting/flooring systems – Economical wall system – Single brick thick loading bearing wall – 19cm thick load bearing masonry walls – Half brick thick load bearing wall – Fly ash gypsum thick for masonry – Stone block masonry – Adoption of precast R.C. plank and join system for roof/floor in the building.**UNIT – IV****Alternative building materials for low cost housing and Infrastructure SERVICES:** Introduction – Substitute for scarce materials – Ferrocement – Gypsum boards – Timber substitutions – Industrial wastes – Agricultural wastes – Low cost infrastructure services: Introduce – Present status – Technological options – Low cost sanitation – Domestic wall – Water supply – Energy.**UNIT – V****RURAL HOUSING:** Introduction traditional practice of rural housing continuous – Mud housing technology – Mud Roofs – Characteristics of mud – Fire treatment for thatch roof – Soil stabilization – Rural housing programs.**UNIT – VI****Housing in Disaster prone AREAS:** Introduction – Earthquake – Damages to houses – Traditional prone areas – Type of damages and railways of Non-engineered buildings – Repair and restore action of earthquake damaged non -engineered buildings recommendations for future constructions – Requirements of structural safety of thin pre-cost roofing units against earthquake forces – Status of R& D in earthquake strengthening measures – Floods – Cyclone – Future safety. |
| **Textbooks****&****References** | **TEXTBOOKS:**1. Hand Book of Low Cost Housing by A.K.Lal – New Age International Publishers.
2. Low Cost Housing – G.C. Mathur, IBH Publishers.
3. Housing in India by Francis Cherunilam and Odeyar D Heggade, Himalaya Publishing House, Bombay, 1997.

**REFERENCES:**1. Disaster Management by Rajib Shaw, Universities Press, India.
2. Disaster Science and Management by Tushar Bhattacharya, TMH Publications.
3. Building Materials for Low-Income Houses - International Council for Building Research Studies and Documentation.
4. Modern Trends In Housing In Developing Countries – A.G. Madhava Rao, D.S. Rama Chandra Murthy & G.Annamalai.
5. Properties of Concrete – Neville A.M. Pitman Publishing Limited, London.
6. Light Weight Concrete, Academic Kiado, Rudhai.G – Publishing home of Hungarian Academy of Sciences 1963.
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