**20CEXXO7 – COST EFFECTIVE HOUSING TECHNIQUES**

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| **Course Category**  | Open elective | **Credits**  | 3 |
| **Course Type**  | Theory | **Lecture-Tutorial-Practical**  | 3-0-0 |
| **Prerequisite**  | None | **Sessional Evaluation**  | 40 |
| **External Evaluation**  | 60 |
| **Total Marks**  | 100 |

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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:**G. C. Mathur, Low *Cost Housing in Developing Countries*, [Oxford & IBH Publishing Co. Pvt. Ltd.](https://librarysearch.nirmauni.ac.in/cgi-bin/koha/opac-search.pl?q=Provider:Oxford%20%26%20IBH%20Publishing%20Co.%20Pvt.%20Ltd.), 1993.1. A. K. Lal, *Hand Book of Low Cost Housing,*New Age International Publishers, 1995.
2. Kiado- Rudhai. G,*Light weight concrete,*Publishing home of Hungarian Academy of Sciences, 1963.
3. **REFERENCES:**
4. A.G. Madhava Rao, D.S. RamaChandra Murthy &G.Annamalai,*Modern Trends In Housing In Developing Countries,* 1984*.*
5. Neville A.M. Pitman, *Properties of Concrete,* Publishing home of Hungarian Academy of Sciences, 1963.
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**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** | **PSO1** | **PSO2** | **PSO3** |
| **CO1** | 2 | 1 | 1 | - | 2 | 2 | 1 | 2 | 1 | 2 | 2 | 2 | -  | - | 1 |
| **CO2** | - | 2 | 1 | 1 | 2 | 2 | 1 | 3 | - | 2 | 2 | 3 | - | - | 1 |
| **CO3** | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | - | 2 | 2 | 2 | 1 | 1 | 1 |
| **CO4** | - | 2 | 1 | 1 | 2 | 2 | 1 | 3 | - | 2 | 2 | 2 |  - | 1 | 2 |
| **CO5** | - | 3 | 2 | 2 | 2 | 3 | 2 | 2 | - | 2 | 2 | 2 | - | 1 | - |
| **CO6** | - | 2 | 1 | 1 | 2 | 3 | 2 | 2 | 1 | 2 | 2 | 3 | - | 1 | - |