Course Syllabus for M.Sc. Engineering in Energy for Sustainable Social Development (MSESSD)

**Sustainable Building Design and Planning**

(ELECTIVE COURSE 4)

(Credit 4)

Lecture: 2 hrs Year: II

Tutorial: 2 hrs Part: I

**Course Objective**:

The main objective of the course is to provide advance knowledge regarding the Sustainable Building Design and Planning**.** The objectives of the course are to:

* Introduce the sustainability in building design and planning in urban context;
* Enable application of sustainable in designing and planning to deal with the use of the Green concept to produce healthy, economical, comfortable, energy efficient and environment friendly green buildings
* Analyze and plan building with sustainable and energy efficiency aspect

After attending the course, the students will be able to bring basic knowledge of sustainable building design and planning as a contribution to their project and thesis works. The student should be able to solve future sustainability by designing and planning with suitable and sustainable to solve the problem in households and urban settlement context.

**Teaching and Examination Schedule:**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S.N. | Teaching Schedule | | | | | | | Examination Scheme | | | Total | Remarks |
| Course Code | Course Title | Credit | L | T | P | Total | Theory | | |
| Assessment Marks  Fieldworks | Final | |
| Duration, hr | Marks |
| 1 | EG 902 AR | Sustainable Building Design and Planning | 4 | 2 | 2 | 0 | 4 | 40 | 3 | 60 | 100 |  |

The course will be delivered basically in a lecture mode supplemented by field based tutorial and practice sessions. The course will be delivered with two contact hours weekly for a total of 15 weeks. Field work may be scheduled for one to two weeks. The lectures, demonstration and discussions will be largely centered in the class and the course.

Evaluation: There will be assessments made of interactions, presentations and reports of assigned activities in tutorial classes. In addition, outcomes either as a written report or presentation of field works will form important basis for internal evaluation. Attendance requirements will be as per TU regulations i.e. minimum 75% of contact hours have to be attended for eligibility to sit for examination.

**Course Outline**:

1. **Introduction of Sustainable building Design and Planning 6 Hrs**

* History of sustainable building in Nepal and World
* Housing Scenario in Nepal - Problems in Nepali Housing trend
* Needs of Sustainable design
* Sustainable Building design and techniques

1. **Sustainable building practices in Nepal and World 10 Hrs**

* National practices – GREEN homes, Affordable sustainable housing and LEED practices in Nepal
* International practices –Sustainable Building Rating System(LEED, BREEAM, CASBEE, GRIHA etc.)
* Sustainable Building Rating System - LEED, BREEAM, CASBEE, GRIHA etc. practices in different countries
* Non rated Sustainable Building practices

1. **Sustainability in Urban Settlement Planning 8 Hrs**

* Sustainable Development Goals (SDGs )
* SDG 11 – Make Cities and human settlement inclusive safe, resilient and sustainable
* SDGs in national context of Nepal
* Eco-city, Smart city concept
* Integrated land use, transportation, Infrastructures, Urban services, etc.
* Application of Smart concept for Smart city and its people

1. **Application of sustainable building 6 Hrs**

* Green Building Design and Planning - Site efficiency, Green material and resources, Green technology, Energy efficiency, Water efficiency, Indoor air quality, Waste management, Innovative design

1. **Project work 30 Hrs**

* Case study of Sustainable building Design in Nepal **-** Zero Energy Building (CES), Green School Buildings, LEED rated Buildings, etc.
* Study and analysis of Site Efficiency, Green Building Material and resources, Green Building Technology, Energy Efficiency, Water Efficiency, Solid waste management & Indoor air quality, etc.

**References:**

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* Bajracharya S.B., 2014, Sustainable Building Design Manual, UN Habitat Nepal, Lalitpur, Nepal
* Bajracharya S.B., Shrestha B., Lamsal P., 2015, Development of Passive Solar Design Data and Model Design, UN Habitat Nepal, Lalitpur, Nepal
* Rydin, Y. 2011, The Purpose of Planning: Creating Sustainable Towns and Cities, University of Bristol, UK
* Graham, P., Booth, P. 2010, Guidelines on Education, Policy and Sustainable Built Environments, UNEP and UNSW, Sydney, Australia
* Sen, J. 2013, Sustainable Urban Planning, teri, New Delhi, India
* Chavannes, M., Revedin, J., Kugler, E., 2009, Sustainable Design: Towards a new Ethic in Architecture and Town Planning, Walter de Gruyter, Stuttgart, Germany
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* Campbell Scott, “Green Cities, Growing Cities & Just Cities: Urban Planning & the Contradictions of Sustainable Development”, Journal of American Planning Association 62:3, 296-312, 1996
* Feng Liu, Anke S. Mayer, John F. Hogan, “Mainstreaming the Building Energy Efficiency Codes in Developing Countries: Global Experience and Lessons from Early Adopters”, Executive Summary, The World Bank Working Paper 204, ESMAP, 2010
* William E. Rees, “Achieving Sustainability: Reform or Transformation?” Journal of Planning Literature, Vol. 9, No.4, May 1995, pp-343-361.
* N.P.C., 2017. *Sustainable Development Goals,* Singha Durbar, Kathmandu: National Planning Commision, GON.
* UNFPA & YUWA, 2016. *My SDG's My Responsibility, A youth Guide for sustainable development in Nepal,* s.l.: s.n.
* UN-HABITAT, 2016. *A Guide to assist National & Local Governments to Monitor and Report on SDG Goal 11 Indicators,* s.l.: UN HABITAT.