ELECTIVE COURSE 3

Course Code	Course Name	L-T-P	Credits
CKV731	**Net zero energy buildings**	1-3-0	4

Module 1:

Life Cycle impacts of materials and products – sustainable design concepts – strategies of Design for the Environment -The sun-earth relationship and the energy balance on the earth's surface, climate, wind –Solar radiation and solar temperature – Sun shading and solar radiation on surfaces – Energy impact on the shape and orientation of buildings – Thermal properties of building materials.

Module 2: Energy efficient buildings

Passive cooling and day lighting – Active solar and photovoltaic- Building energy analysis methods- Building energy simulation- Building energy efficiency standards- Lighting system design- Lighting economics and aesthetics- Impacts of lighting efficiency – Energy audit and energy targeting-Technological options for energy management.

Module 3: Indoor environmental quality management

Psychrometry- Comfort conditions- Thermal comfort- Ventilation and air quality-Air conditioning requirement- Visual perception- Illumination requirement- Auditory requirement- Energy management options- -Air conditioning systems- Energy conservation in pumps- Fans and blowers- Refrigerating machines- Heat rejection equipment- Energy efficient motors- Insulation.

Module 4: Green building concepts

Green building concept- Green building rating tools- Leeds and IGBC codes. – Material selection Embodied energy- Operating energy- Façade systems- Ventilation systems- Transportation-Water treatment systems- Water efficiency- Building economics

Green building design case study: Students to work through a controlled process of analysis and design to produce drawings and models of their own personal green building project. Topics include building form, orientation and site considerations; conservation measures; energy modeling; heating system and fuel choices; renewable energy systems; material choices; and construction budget-Students will research green construction and design in a particular -construction context and report their results to the class.

References

1. Kibert, C. "Sustainable Construction: Green Building Design and Delivery", John Wiley & Sons, 2005
2. Edward G Pita, "An Energy Approach- Air-conditioning Principles and Systems", Pearson Education, 2003.
3. Colin Porteous, "The New Eco-Architecture", Spon Press, 2002.
4. Energy Conservation Building Codes: www.bee-india.nic.in
5. Lever More G J, "Building Energy Management Systems", E and FN Spon, London, 2000.
6. Ganesan T P, "Energy Conservation in Buildings", ISTE Professional Center, Chennai, 1999.
7. John Littler and Randall Thomas, "Design with Energy: The Conservation and Use of Energy Buildings", Cambridge University Press, 1984.