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Department of Building Engineering	
Passive Solar Systems Design (68432)	
Total Credits	**3**
major compulsory	
Prerequisites	P1 : Environmental Systmens II- Thermal Systems (68331)

Course Contents

Passive solar engineering, Solar Window, Solar Walls, Solar Roof, Solar Chimneys, Solar room. Solar forced ventilation, calculation programs, shading, thermal storage for solar energy

	Intended Learning Outcomes (ILO's)	Student Outcomes (SO's)	Contribution
1	1. be able to state different ways to adjust and design buildings so they can utilize passive solar heating	A	10 %
2	2. be able to perform shading calculations with sun path diagrams and showing knowledge about the importance of shading calculations in planning buildings and built areas	B	20 %
3	3. show understanding of design of different solar systems, including solar windows, walls, chimneys, roofs and greenhouses.	C	20 %
4	4. be able to do heat balance calculations on buildings with respect to both internal and external generation of heat, including energy transfer through windows	E	30 %
5	5. show knowledge on solar forced ventilation and technologies for causing and facilitate natural ventilation	C	10 %
6	6. show understanding of how thermal mass of building affects storage of solar thermal energy for different climates.	C	10 %

Textbook and/ or Refrences

Passive Solar Energy, Bruce Anderson and Malcolm Wells, brick House Publishing Co, Benjamin Stein and John S. Reynolds, Mechanical and Electrical Equipment for Buildings, 11th Edition, 2010, John Wiley &Sons.

Assessment Criteria	Percent (%)
First Exam	20 %
Second Exam	20 %
Projects	10 %
Final Exam	50 %

Course Plan

Week	Topic
1-4	Sun movement, azimuth and altitude angles
5-6	Passive solar systems
7-8	Solar insolation on vertical and horizontal surfaces
9-14	Solar gain storage and thermal mass
15	Solar water heating
16	Final exam