

**School of Planning and Architecture: Vijayawada**

(An institution of National Importance under the Ministry of Human Resource Development, Govt. of India)
Survey No.4/4, ITI Road, Vijayawada-520008, Andhra Pradesh, India

Department of Architecture

Course: MSAR122 -Solar Passive Design
Instructors: Dr. Lilly Rose A

Class: I M. Arch(SA) II Sem A.Y. 2023-24

Internal Assessment: 50

External Theory Exam: 50

Total Marks: 100

Credits:3

Contact Periods/ week: 03 periods.(55 min each)

Time Table: Tuesday 09:00am - 11:45am

Attendance: Min 75%

Min. Passing Marks: 50% each in Internal & External Assessment

Objective: To equip the students the advanced solar passive design techniques

Out Line of the Course:

LECTURE PLAN

WEEK	DATE	TOPIC OF CLASS LECTURE & DISCUSSION	TOPIC OF STUDIO WORK& ASSIGNMENTS / REMARKS
1	Week-2 09-01-2024	Introduction of passive solar architecture, appreciation of Built form for different climates	Lecture + visit to climatology lab to understand the use of various equipments
2	Week-3 16-01-2024	Built form for different climates, building clusters and solar exposure, thermal environment.	Lecture + inclass activity
3	Week-4 23-01-2024	Types of passive systems, direct gain, thermal storage wall, attached green house, thermal storage roof and convective loop.	Lecture + thermal comfort analysis using portable weather station
4	Week-5 30-01-2024	Direct gain system, Evolution of direct gain system, calculation of Distributed and concentrated thermal mass.	Lecture + calculation of sample thermal mass for a 1000 sq.m built up area in different climates.
5	Week-6 06-02-2024	Indirect gain system, Evolution of indirect gain system, Thermal mass and thermal roof pond systems	Lecture + introduction to mobile traverse survey using instruments from climatology lab
6	Week-7 13-02-2024	Types of thermal roof ponds and it application in various climate types.	Lecture + Quiz
7	Week-8 20-02-2024	Indirect Gain – Trombe wall, Water wall and Transwall.	Lecture + inclass activity
8	Week-9 27-02-2024	Mid Semester Assessment	
9	Week-10 05-03-2024	Intoduction to Isolated heat Gain, Evolution, Sun space / attached solarium / conservatory.	Lecture + Introduction to Seminar topic
10	Week-11 12-03-2024	Radiative cooling –The earth as a cooling source for buildings. Cooling of attached outdoor spaces	Lecture + case study analysis
11	Week-12 19-03-2024	Earth sheltered / earth bermed structures and earth-air tunnels. The use of earth-air tunnels to heat or cool the buildings.	Lecture + case study analysis
12	Week-13 26-03-2024	Translucent insulation and Double skin facades - Modern and postmodern passive architecture, methods, strategies, systems, and construction	Lecture + inclass activity
13	Week-14 02-04-2024	Optimization of passive cooling needs through building design: building shape & layout, orientation, size of windows, shading of window, colour of the envelope and climatic impact of plants around building.	Lecture + Inclass activity / Quiz
14	Week-15 09-04-2024	Ugadi - Holiday	
15	Week-16 16-04-2024	Modern and postmodern passive architecture - Case Studies	Seminar

S. No.	Stages of Evaluation	Weightage in %
1	Internal assessment (Class test, Quizzes, assignments, exercises, seminar etc.)	30
2	Mid-semester Assessment	20
3	End Semester Examination	50
	Total	100

Reference Books:

1. Givoni Baruch, "Passive and Low Energy Cooling of Buildings", Van Nostrand Reinhold, New York, 1994.
2. Sodha, M., Bansal, N. K., Bansal, P. K., KuMEB, A., and Malik, M. A. S., "Solar Passive Buildings", Pergamon Press, Oxford, 1986.
3. Bansal Narendra, K., Hauser Gerd and Minke Gernot, "Passive Buildings Design: A Hand book of Natural Climatic Control", Elsevier Science, Amsterdam, 1994.
4. Goulding, John, R., Lewis, Owen, J., and Steemers, Theo, C., "Energy in Architecture", Bastford Ltd., London, 1986.

Course Instructor:
(Dr. Lilly Rose A)

Head of Department:
(Dr. Uma Sankar Basina)