School of Planning and Architecture: Vijayawada
(An institution of National Importance under the Ministry of Human Resource Development, Govt. of India)
S.No. 71/1, NH-5, Nidamanuru, Vijayawada – 521 104, Andhra Pradesh, India

Department of Architecture

Course: **10110207 Applied Climatology** **Class: Ist Yr B. Arch II Sem A.Y. 2017-18**

Instructors: Atri Mishra **Internal Assessment: 50**
External Theory Exam: 50
Contact Periods/ week: 02 periods, 2(Theory), **Total Marks: 100**
Time Table: **Credits:**
Attendance: Min 75% **Min. Passing Marks:** 40% each in Internal & External Assessment, 50% in Aggregate

Objective: Equip the students with scientific background required to design climate responsive buildings, by offering a clear understanding of the various climatic zones and its climate responsive considerations in architectural design of building and built up areas.

Out Line of the Course:
Global climate factors, elements of climate, classification of climatic zones, desirable conditions, principals of thermal conditions and STI, body heat exchange, thermal balance, psychometric chart, sun path, sun angles, SAP, sunshine hours, solar noon, declination, extraterrestrial radiation, solar constant, radiation on different of different directions with different inclination of walls.
Effect of climate on habitat, shelter and environment. Human comfort conditions – comfort chart, comfort zone, effective temperature, humidity, radiation, wind, precipitation and its considerations at Macroclimate and Microclimate. Effect of landscape elements on Climate and Architecture.
Impact of climate and building on Ecological balance. Radiation spectrum, spectral sensitivity of eye, visual cone and comfort, daylight assessment, types of reflection, glare and quality and spread of light in buildings.
Sound waves, audible range of sounds, equal loudness controls, noise reduction systems, sound transmission path. Thermal conductivity, emissivity, radiation, Reflectivity and convection. Density, specific heat, latent heat, thermal bridging, diffusivity, thermal insulation.
Heat loss through common building elements due to transmission, R-values and U-values - imperial and SI units.
Basic concepts of thermo-dynamics, state and path functions, thermodynamic equilibrium, concept of perfect gas, specific heat, energy, temperature, pressure, Laws of thermodynamics. Reduction Heat Transfer or Enhancement, insulation properties of materials nd built forms.
Radiation versus other Heat Transfer Methods, Evaluating various built form and its components / or materials for comfort conditions with respect to thermal, visual and air movement. Brief introduction of rating systems for climate responsive buildings such as LEED, GRIHA and others.
Broad understanding of models, strategies and codes related to energy efficient and climate responsive considerations in buildings and built up areas.

LECTURE PLAN

S. No.	Week	TOPIC OF CLASS LECTURE & DISCUSSION	CLASS ACTIVITIES & ASSIGNMENTS
1	Week 1	**~Global climate factors,** **~elements of climate,** **~classification of climatic zones,** **~desirable conditions,**	**LECTURE**
2	Week 2	**~ principals of thermal conditions and STI,** **~ body heat exchange,** **~thermal balance,** **~ psychometric chart**	**LECTURE**
3	Week 3	**~ sun path,** **~ sun angles,** **~ SAP, sunshine hours,** **~ solar noon, declination,**	**LECTURE**

		~ extraterrestrial radiation, solar constant,	
4	Week 4	**~ Radiation on different of different directions with different inclination of walls.**	**LECTURE**
5	Week 5	**~ Effect of climate on habitat, shelter and environment. Human comfort conditions – comfort chart, comfort zone, effective temperature, humidity, radiation, wind, precipitation and its considerations at Macroclimate and Microclimate.**	**LECTURE**
6	Week 6	**~ Effect of landscape elements on Climate and Architecture. Impact of climate and building on Ecological balance**	**ASSESSMENT-I (30%)** **Written Test**
7	Week 7	**~ Radiation spectrum, spectral sensitivity of eye, visual cone and comfort, daylight assessment, types of reflection, glare and quality and spread of light in buildings.**	**LECTURE**
8	Week 8	**~ Sound waves, audible range of sounds, equal loudness controls, noise reduction systems, sound transmission path. Thermal conductivity, emissivity, radiation, Reflectivity and convection**	**LECTURE**
9	Week 9	**~ Density, specific heat, latent heat, thermal bridging, diffusivity, thermal insulation. Heat loss through common building elements due to transmission, R-values and U-values - imperial and SI units**	**LECTURE**
10	Week 10	**~ Basic concepts of thermo-dynamics, state and path functions, thermodynamic equilibrium, concept of perfect gas, specific heat, energy, temperature, pressure**	**LECTURE**
11	Week 11	**~ Reduction Heat Transfer or Enhancement, insulation properties of materials nd built forms.**	**ASSESSMENT-II (30%)** **Written Test**
12	Week 12	**~Radiation versus other Heat Transfer Methods, Evaluating various built form and its components / or materials for comfort conditions with respect to thermal, visual and air movement**	**LECTURE**
14	Week 13	**~ Brief introduction of rating systems for climate responsive buildings such as LEED, GRIHA and others**	**LECTURE**
13	Week 14	**. ~ Broad understanding of models, strategies and codes related to energy efficient and climate responsive considerations in buildings and built up areas.**	**LECTURE**
15	Week 15	**~ Revision**	**LECTURE**
16	Week 16		**ASSESSMENT-III (40%)** **Written Test**

S.No.	Category of Evaluation	Marks	Note
1	Assessment – I:	15	***The Marks allotted at each stage is tentative. Categories of evaluation may be increased or decreased (merged) on need-basis***
2	Assessment – II:	15	
3	Assessment – III:	20	

References:

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4. Koenigsberger, O. H., Ingersoll, T. G., Mayhew, A. and Szokolay, S. V. (1980). Manual of Tropical Housing and Building: Climatic
5.Kukreja, C. P. (1982). Tropical Architecture. New Delhi : McGraw–Hill.
6. Lam, W. M. C. (1986). Sun-lighting as Form-giver for Architecture. New York : Van Nostrand Reinhold.
7.Olgyay, A. and Olgyay, V. (1976). Solar Control and Shading Devices. New Jersey : Princeton University Press.
8. Sudha, M. S., Bansal, N. K., Kumar, A. and Bansal, P. K. (1986). Solar passive buildings, science and design. London : Pergamon Press.
9. USGBC. (1996). Sustainable Building Technical Manual. Public Technology Inc. Pergamon Press.
10. Wright, D. (1984). Natural Solar Architecture. New York : Van Nostrand Reinhold Company.

Signatures of the Instructors: Head of the Department: