NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF ARCHITECTURE

COURSE PLAN – PART I			
Name of the programme and specialization	M. Arch. (Energy Efficient and Sustainable Architecture)		
Course Title	BUILDING ENERGY ANALYSIS STUDIO		
Course Code	AR 709	No. of Credits	3
Course Code of Pre-requisite subject(s)	NONE		
Session	July 2022	Section (if, applicable)	A / B (NOT APPLICABLE)
Name of Faculty	Dr. G. Subbaiyan	Department	ARCHITECTURE
Email	subbaiah@nitt.edu	Telephone No.	04312503557
Name of Course Coordinator(s) (if, applicable)	NONE		
E-mail		Telephone No.	
Course Type	☑ Core course	☐ Elective course	

Syllabus (approved in BoS)

Exploration of a range of analytical and design tools. Understanding of capabilities of limitations of various energy analysis tools. Tools to be explored – Solar shadow modeling tools, heat flow analysis, light simulation tools, modeling of ventilation, fire dynamics, sizing of passive solar features, estimation of energy conservation. Studio projects involve the design and evaluation of buildings to demonstrate energy analysis and efficiency of building designs.

COURSE OBJECTIVES

The course attempts to provide

1. Analytical approach to understand climate data and Thermal comfort assessment.
2. Knowledge of applying the design of shading devices to be integrated into the design.
3. Introduction to various commonly available software tools to evaluate the performance of Architectural design.
4. Integration of various sustainable design and sizing mechanisms such as RWH, Water recycling, water treatment, solar panels, Waste recycling, etc into architectural design.
5. Provides opportunities to apply Heat transfer concepts and terminology through software tools while evaluating the performance of the architectural design.

COURSE OUTCOMES (CO)

Course Outcomes	Aligned Programme Outcomes (PO)
1. Understanding climate& Comfort analysis and design of shading.	
2. Understand the use of various software tools aimed at evaluation of building performance and design.	
3. Understand and apply concepts of Heat transfer and Insulation in Buildings through software tools	
4. Understand Sustainable design with respect to water, Rain, Solar, and Treatment of solid and liquid waste	

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COURSE PLAN – PART II

COURSE OVERVIEW

The course firms up on the fundamentals of Climate responsive architecture and extends to provide an understanding of various concepts of Building science topics.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	2 weeks	Project stage 1: Preliminary design and Integration of sustainable elements	Studio design & Literature Review
2	8 weeks	Project stage 2: Analysis of design using software tools:	
	2	Climate analysis, Comfort analysis, IMAC	
	1	Tools to evaluate U factor, Insulation, Time-lag, and Decrement Factor	
	1	Ecotect shading device design and analysis	
	2	Efficiency of shading device, Radiation, and Sun hour analysis by using Ladybug	
	1	OTTV Calculation	
	1	Comfen tool for façade optimization	
3	4 weeks	Project Stage 3: Integration of results and revision of design with GRIHA Project Report	
4	1 week	Review/Evaluation of final work.	

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assignment 1		3 weeks	15%
2	Assignment 2		2 weeks	10%
3	Assignment 3		4 weeks	30%
4	Assignment 4		4 weeks	15%
CPA	Compensation Assessment*			
5	Final Assessment *		1 week	30%

***mandatory; refer to guidelines on page 4**

COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

The survey may be conducted by NITT as per practice at the time of registration for final examination

COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)

MODE OF CORRESPONDENCE (email/ phone etc):

A detailed program and project brief detailing various stages and tasks have been circulated in the first week.

Assignments will be explained in the class, and students are required to make note of the same. In addition, communication will be made through the class representative and/ or email.
Expert lectures will be held to introduce software tools.

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COMPENSATION ASSESSMENT POLICY: For genuine delay in assignment submission, extra time will be given. Otherwise, 10 to 30% of marks will be cut for late submission.

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

- **At least 75% attendance in each course is mandatory.**
- **A maximum of 10% shall be allowed under On Duty (OD) category.**
- Students with **less than 65% of attendance** shall be prevented from writing the final assessment and **shall be awarded 'V' grade.**

ACADEMIC DISHONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, or copying from others during an assessment will be treated as punishable dishonesty.
- Zero marks are to be awarded to the offenders. For copying from another student, both students get the same penalty of zero marks.
- The departmental disciplinary committee, including the course faculty member, PAC chairperson, and the HoD, as members, shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

ADDITIONAL INFORMATION

A minimum of 30% should be scored in the final assessment (for all courses) for a pass. The passing minimum for all the courses shall be the maximum of 35% or the Class Average/2

The following books will be useful in addition to working literature about software tools.

1. Handbookook on Energy Conscious Buildings: By J.K. Nayak, MNRE 2006
2. Introduction to Architectural Science: The Basis of Sustainable Design: by Steven V. Szokolay; Elsevier Ltd., 2008
3. A Handbook of sustainable building design and engineering: An Integrated approach to energy, Health, and Operational performance: By Dejan Mumovic and Matt Santamouris.
4. Designing Rainwater Harvesting systems: Integrating rainwater into Building systems: By Celeste Allen Novak, Eddie Van Giesen and Kathy M Debusk, Wiley & Sons, 2014.
5. GRIHA volume 1, TERI, India

FOR APPROVAL

Course Faculty _____ Dr. G. SUBBAIYAN **CC-Chairperson** _____ **HOD** _____