

Central University of Rajasthan

**School of Architecture
Department of Architecture**

M. Arch. (Sustainable Architecture)

Syllabus

(Applicable from AY 2023-24)

**Title of the Programme: Masters of Architecture (Sustainable Architecture) Degree
Titled "M.Arch. (Sustainable Architecture)"**

1. **Preamble:** Buildings consume vast resources during their construction, operation, and life cycle. Directly or indirectly, they account for nearly half of the Nation's primary energy consumption. Emissions from making or operating buildings damage the environment, create waste disposal problems, and add to global warming. Building occupants can face ill health and discomfort if the building's internal environment and air quality are improper.

Thus, designing a sustainable built environment both in rural and urban contexts is essential to provide a good quality of life to inhabitants and protect the earth's environment. Architecture education in India, especially at the undergraduate level, minimally emphasizes integrating technical, economic, social, and environmental aspects to design a sustainable built environment.

This Master's programme aims to train Architects – to understand issues associated with Sustainable Architecture, including environmental concerns, assessment methods, energy consumption, construction materials, health, economic and social concerns, and management of buildings and other construction projects in a life-cycle perspective. This programme encompasses residential, commercial, and public architecture and planning of sites and layouts as well as their effect on the urban and rural built environment.

The program structure follows a multidisciplinary approach integrating technology, architecture, engineering, physical sciences, ecology, management, and legal framework. The course follows a modular approach offering adequate flexibility to learners to choose from a basket of courses according to their career interests.

2. **Aim:** The programme aims to produce Architects who are competent enough to combine architectural design and planning principles with modern technology and traditional community wisdom to design a sustainable project and manage the implementation of such projects.
3. **Career Options:** The course is highly relevant for Architects who want to pursue a professional career in Architectural and Planning practice, the construction industry, the rural and urban development field, academics and multidisciplinary research, or at policy-making levels in government and other organizations.
4. **Duration:** 4 Semesters (2 years). It is a two-year full-time program divided into four semesters.
5. **Eligibility:** Bachelor's degree in Architecture recognized by the COA with minimum 55% marks for general and 50% for SC/ST/OBC/EWS categories
6. **Admission:** Through CCMT / GATE scores / Entrance Examination of the Central University of Rajasthan.

7. Course Structure

The program will lead to a Master of Architecture in Sustainable Architecture degree.

Semester 1: The first semester will provide an insight into the awareness and culture on which sustainability is based, presenting the different contexts in which it can be applied. Theory courses will cover concepts and approaches to Sustainable Development, Traditional and Historic perspective.

The architecture of different climatic zones, Climatology and Building Physics, Ecology and Environmental Management, Communication skills and concepts and strategies related to design of energy-efficient, sustainable and zero emission-built environments. Historical perspectives will expose students to traditional wisdom and passive building design strategies besides retracing the history of the exploitation of renewable resources. The design project course will emphasize climate and built form and apply traditional community wisdom to achieve sustainable architecture.

Semester 2: Theory courses of this semester will cover Services Water and Waste Management, Energy systems and services, and their integration into architectural design. The design project course will emphasize on the application of modern technologies and integrated renewable energy systems to design energy-efficient buildings. In this semester, students will also be exposed to legal and policy issues concerning green buildings and environmental impact assessment of projects.

In the second semester, students will work on a large-scale project as a *Master's Design Thesis.

This is essentially a self-study design project course with formal classes with two or more one-week review and feedback studios as may be decided by the H o D and Dean.

Semester 3: In this Semester, a basket of elective courses will allow students to choose their thrust area. Seminar courses will build students' research, writing, and presentation skills. Elective courses will allow students to pursue their subject interests. This Semester also has a Sustainable Design course, which can be an Urban Design studio or a large-scale project of neighborhood scale.

Semester 4: A basket of generic and Departmental elective courses will allow students to choose their thrust area. Students will also write a research-based dissertation, a 'self-study' compulsory course this semester.

(To facilitate sequential learning, a program structure is suggested for the four semesters. Students are free to take elective courses of their choice. Depending on the prerequisites of individual courses and other logistics, there may be a slight reshuffle of the sequence of courses in 2nd, 3rd and 4th semesters.)

8. Credit Framework:

The program is designed for the optimum desired number of credits. However, to obtain the Master's Degree, a student must successfully complete the minimum requirements of credits as given in this document. Students can register for courses in different semesters per the University ordinances' provisions.

9. Learning Outcomes: The M. Arch. (Sustainable Architecture) the program offered by the School of Architecture at CURAJ prepares its graduates to be professionals who will be able to:

1. Demonstrate an understanding of environmental, economic, societal, and cultural aspects of sustainable human settlement development.
2. Appreciate the contribution of the rich heritage of India and other ancient civilizations and apply the knowledge of passive design strategies, building materials, and construction technologies to create sustainable architecture
3. Effectively blend the Vernacular and traditional wisdom with modern technologies to plan and design a wide range of building typologies, large campuses, and townships in different climatic zones of India with reverence to natural resources, building materials, and the environment.
4. Engage constructively with communities using participatory approaches both in rural and urban

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contexts.

5. Use simulation tools to improve overall building performance during the architecture process.
6. Appraise architectural designs and assist in the preparation of documents for green certifications and environmental clearances
7. Exhibit intellectual autonomy with humility and openness to information and ideas from different disciplines.
8. Assimilate complex ideas and communicate them effectively in professional and academic forums.
9. Work independently and collaboratively in multidisciplinary teams to manage resources, design processes, and implementation of sustainable architectural projects.

Following are the tables indicating the relationship between courses and learning outcomes:

Table 1: Core and compulsory courses for Semesters 1 and 2

Program Outcomes	Core and Compulsory Courses									
	Semester 1						Semester2			
	ARC 601	ARC 602	ARC 603	ARC 604	ARC 605	ARC 606	ARC 607	ARC 608	ARC 701	ARC 705
Outcome 1	X		X		X	X			X	X
Outcome 2	X	X		X	X	X	X			X
Outcome 3	X	X		X	X	X		X		X
Outcome 4					X	X				X
Outcome5				X			X			X
Outcome 6	X		X					X	X	X
Outcome 7			X							
Outcome8										X
Outcome 9	X					X				X

Table 2: Core and compulsory courses for Semester 3 and 4

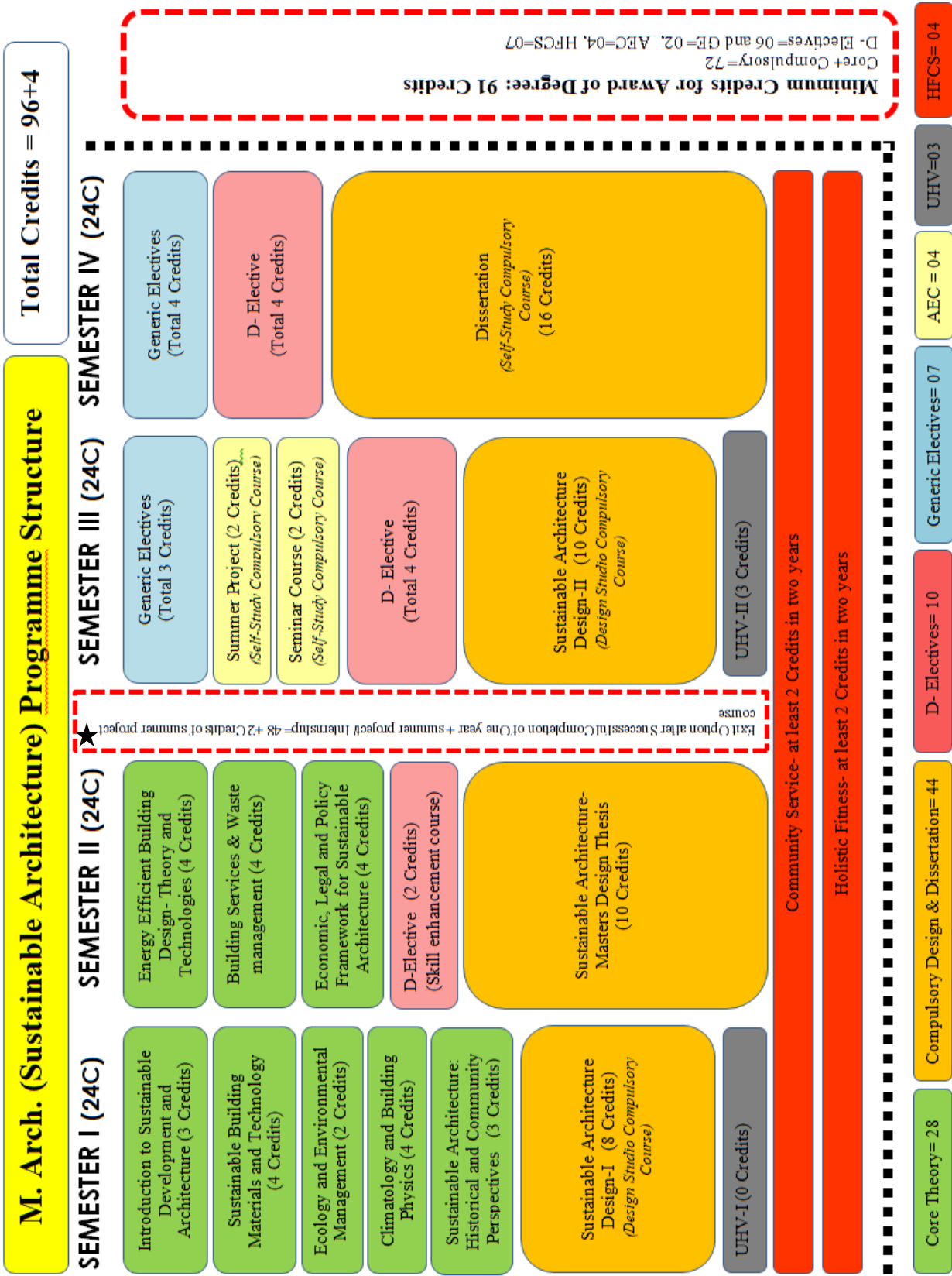
Program outcomes	Core and Compulsory Courses			
	Semester 3			Semester 4
	ARC 702 Summer Project	ARC 710 Seminar Course	ARC 609 Sustainable Architecture Design II	ARC 703 Dissertation
Outcome 1			X	X
Outcome 2			X	
Outcome 3			X	
Outcome 4			X	
Outcome 5				
Outcome 6				
Outcome 7	X	X		X
Outcome 8	X	X		X
Outcome 9		X	X	

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Table 3: Electives

Programme Outcomes	ARC 711	ARC 712	ARC 713	ARC 714	ARC 715	ARC 716	ARC 718	ARC 719	ARC 720	ARC 721	ARC 722
Outcome 1					X			X			
Outcome 2			X		X						
Outcome 3		X	X		X						
Outcome 4					X						
Outcome 5				X							X
Outcome 6	X					X	X		X		X
Outcome 7	X	X	X	X		X	X	X			
Outcome 8	X					X				X	
Outcome 9		X	X		X		X	X			X

Figure 1: Course Structure



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Table 4: M.Arch. (Sustainable Architecture) List of Discipline Electives

Course Code	Name of The Course	Credits
ARC 711	Research Methods in Architecture	2
ARC 712	Water Management	2
ARC 713	Sustainable Urban Transportation: Basics of Transport Planning and Design at Neighborhood Level	3
ARC 714	Renewable Energy Technologies	2
ARC 715	Sustainable Neighborhood Planning and Urban Design	3
ARC 716	Technical and Scientific Communication for Architects*	3
ARC 718	Project Management for Sustainable Architecture	3
ARC 719	Sustainable Landscape Architecture	3
ARC 720	Green Building Certification	2
ARC 721	Basic Teaching Skills for Higher Education*	3
ARC 722	Simulation and Modelling for Building Energy Performance*	2
ARC 723	Academic and Research Writing Skills	2
	GIS and Remote Sensing	
	Environment Impact Assessment	

10. Scheme of Examination and Continuous Internal Assessment

The course instructor will decide the framework of formative and summative assessment for various courses for face-to-face courses as per the following:

A. For Theory Courses

- (i) Continuous Internal Evaluation (CIE) of 40 % marks consisting of:
 - a. Written Test 20 %
 - b. Assignment / Papers / Quiz /Presentation / Test 20 %
- (ii) End Semester Examination (ESE) of 60% of marks as outlined in the detailed course syllabus. Depending on the special requirement of the course the assessment may also include formal presentation and viva or practical drawing work. However this must be announced to the registered students well in advance.

B. For Design and project Courses

- (i) Continuous Internal Evaluation (CIE) of 40% marks consisting of internal reviews:
 - a. Mid Semester Internal Review (20%)
 - b. Mid Semester External Review (20%)
- (ii) End Semester Assessment of 60% marks by a Jury consisting of external expert(s).

C. For Master Design Thesis

- (i) Continuous Internal Evaluation (CIE) of 40% weight consisting of:
 - a. Mid Semester internal review (20%)
 - b. Mid Semester external review (20%)
- (ii) End Semester Assessment of 60% of marks evaluated by a Jury consisting of Internal/External experts.

D. For the Summer Project and Dissertation Courses

- (i) **Continuous Internal Evaluation (CIE) of 40% marks consisting of:**
 - a. e-mentor's / faculty guide's assessment based on reporting of progress by the student in the form of synopsis and interim report(s) (15%)
 - b. Review of Draft Report and Presentation (25%)
- (ii) **End Semester Assessment of 60% marks evaluated by a Jury consisting of Internal/External Experts**

E. For **MOOC** and other short-term face-to-face or online courses, the assessment shall be as per the course design and as decided by the department's course coordinator.

11. **Unit-wise Detailed Syllabus:** The detailed syllabus is given hereafter.

(Prepared and Revised by Prof. Neeraj Gupta)

Course Code: ARC 601 (SA 1)

Name of Course: Introduction to Sustainable Development and Architecture

TEACHING SCHEME	EXAMINATION SCHEME	CREDITS ALLOCATED:
Theory: 3 Hour/ Week	Total Marks Allocated: 100 End Semester Examination: 60 Internal Assessment: 40	Theory: 3
Studio / Practical: 0 Hours / Week	Total Marks Allocated: 0 End Semester Examination: 0 Internal Assessment: 0	Practical/ Studio Work: 0
		Total Credits: 3

Course Pre-requisites:

- | | |
|----|---|
| 1. | Graduation in any discipline and basic understanding of Environment, Sustainable Development, and interest in Architecture. |
|----|---|

Course Objectives and Outline:

- | | |
|----|---|
| 1. | As governments and societies are becoming more environmentally conscious, architects and planners are beginning to have greater concern about the built environment and its long-term viability. Given the need for conserving natural resources and the environment, expectations from professionals have increased manifold. Sustainability is, thus, a critical concept and direction for future architects and planners. However, quite often, sustainable architecture practice is guided by architects who have not been formally trained in the environment and sustainable development. With this background, this course aims to impart an understanding of issues related to sustainable development, especially in the Indian context, that has implications on the design of buildings and neighborhoods. |
|----|---|

Course Outcomes:

- | | |
|----|---|
| 1. | Explain the concepts related to Sustainable Development and its three pillars – economic, environment, and society. |
| 2. | Describe the genesis and evolution of SDGs and explain the relevance of Goals directly related to sustainable architecture |
| 3. | Describe the conceptual framework of ‘Systems Thinking’ and ‘Building as a System.’ |
| 4. | Demonstrate the understanding of participatory approaches to development while interacting with communities during field studies. |
| 5. | Explain the influence of culture, lifestyle in shaping the sustainable built-environment with the help of examples drawn from Indian and other ancient civilizations of the world. |
| 6. | Explain the concept and principles of Sustainable Architecture, and the strategies used for the passive design of energy efficient buildings in different climatic conditions that bring a paradigm change in the architectural design field. |
| 7. | Present an overview of Green Building certification systems in India and other parts of the world. |

Course Content:

Unit	Contents	Tentative no of Hours

Arch. (Sustainable Architecture) AY 2023-24		
UNIT-I	<p>Overview of Sustainable Development</p> <p>a. Definitions, Genesis and historical background of Sustainable Development</p> <p>b. Overview of Sustainable Development Goals with special emphasis on</p> <p>i. Goal 5 – Gender Equality</p> <p>ii. Goal 6 – Clean Water and Sanitation</p> <p>iii. Goal 7 – Affordable and Clean Energy</p> <p>iv. Goal 11 – Sustainable Cities and Communities</p>	(9 Hours)
UNIT-II	<p>Systems Thinking</p> <p>a. Definition and Key Concepts</p> <p>b. Iceberg Model</p> <p>c. The building as a System,</p>	(6 Hours)
UNIT-III	<p>Culture, Lifestyle, and Sustainability – Overview of Indian Culture, Difference between Indian and Western Culture, Lessons from Indian Culture and Lifestyle in the context of reverence to nature, ecological systems, consumption, and energy.</p>	(8 Hours)
UNIT-IV	<p>Participatory Approaches to Development</p> <p>a. Overview and Basics of Participatory Rural Appraisal (PRA) and Participatory Learning and Action (PLA)</p> <p>b. Pretty’s Typology of Participation</p> <p>c. Participatory Approaches, Methods, and Tools</p>	(7 Hours)
UNIT-V	<p>Introduction to Sustainable Architecture</p> <p>a. Definitions and Principles</p> <p>b. Environmental Impact of Buildings</p> <p>c. Sustainable Design priorities</p> <p>d. Cultural and Economic aspects</p> <p>e. Life Cycle Design</p>	(8 Hours)
UNIT-VI	<p>a. Selected Examples of Sustainable Architecture – Vernacular, Historical and Contemporary</p> <p>b. Overview of passive design strategies for reducing energy consumption (enhancing user comfort while reducing or eliminating fossil fuel usage)</p> <p>c. Introduction to International and National Green Building Certification Systems</p>	(7 Hours)
Internal Assessment:		
PART-A	<p>CIA 1 :- UNIT- I, II,III</p> <p>CIA 2:- UNIT- IV,V.VI</p>	
PART-B	<p>Assignments: Students may undertake assignments from the suggestive list given below.</p> <p>1) Draft a short paper highlighting contemporary local issues and concerns of sustainable development, gender perspectives, etc.</p> <p>2) Present a Literature Review based paper on culture, lifestyles of India and other regions of the world in the context of sustainability and energy consumption.</p> <p>3) Documentation of examples of sustainable architecture and human settlements and real-life projects where the focus is on climate change, clean development mechanism, use of technology, etc. may be taken.</p>	
Text Books:		
1. Koenigsberger, O. H., Ingersoll, T. G., Mayhew, A., Szokolay, S. V., 1973. Manual of Tropical Housing and Building Part 1. Climatic Design, Orient Longman Pvt. Ltd.		
2. Sen Joy, Sustainable Urban Planning TERI, ISBN 9788179933244		
3. Krishnan, A. (ed.), Baker, N., Yannas, S., Szokolay, S., 2001. Climate Responsive Architecture – A Design Handbook for Energy Efficient Buildings, Tata McGraw-Hill Publishing Company Limited, New Delhi		
4. Kuppaswamy Ayengar, 2015, Sustainable Architecture Design - An overview, Routledge, ISBN: 978-1-315-75847-3 (ebk)		
Reference Books:		
1. Bob Doppelt, 2010, The Power of Sustainable Thinking, Earthscan, ISBN 9781849710794		
Energy Conservation and Building Code Givoni, B., 1969. Man, Climate and Architecture, Elsevier Publishing Company Limited.		

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2. Energy Conservation Building Code
3. Minke, Gernot and Bansal, N. K. 1988. Climatic Zones and Rural Housing in India, Kernforschungsanlage GmbH, Jülich.
4. National Building Code
5. Paul Appleby, 2010, Integrated Sustainable Design of Buildings, Earthscan, ISBN 9781849711173
6. Scott Drake, 2009, The Elements of Architecture - Principles of Environmental Performance in Buildings, Earthscan, ISBN 9781844077175
7. Szokolay, S. V., 2004. Introduction to Architectural Sciences: The Basis of Sustainable Design, Architectural Press, Oxford.
8. TERI, 2004. Sustainable Building Design Manual Volume 2, prepared under a European Union co-funded ASIA-URBS project under the leadership of Institut Catala d'Energia (Spain), The Energy & Resources Institute, India.
9. UNDP - SDG Booklet and other Publications
10. Vijay Kulkarni and T V Ramachandra, Environmental Management, TERI

E- Resources:

1. <http://www.thwink.org/sustain/glossary/SystemsThinking.htm>
2. <http://www.fao.org/docrep/006/ad424e/ad424e03.htm#TopOfPage>
- 3.

Topics for project based learning: Following is a suggestive list:

1. Study Visit to nearby rural community and understanding the lifestyle
2. Visit to historic forts (Like Chittorgarh, Jaigarh, Nahargarh and study the water systems, daylighting, passive design strategies etc.
3. Study of DEWATs and document possible landscape solutions its application
4. Visit to high technology buildings / Industry to study energy conservation methods

CO-PO Mapping:

Criteria for Mapping:

	CO 1	CO 2	CO 3	CO 4	CO 5	CO 6	CO 7	CO 8
PO 1	3	3	2	2	2	1	1	2
PO 2	3	2	3	2	1	3	2	0
PO 3	1	1	0	2	0	3	1	1
PO 4	1	0	3	3	0	0	0	0
PO 5	0	1	0	1	2	1	2	3
PO 6	1	1	0	0	2	1	0	0
PO 7	2	0	0	1	0	0	0	3
PO 8	0	0	0	0	0	1	0	2
PO 9	0	0	0	0	1	0	0	0

0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance

Course Code: ARC 602		
Name of Course: Sustainable Building Materials and Technology		
TEACHING SCHEME	EXAMINATION SCHEME	CREDITS ALLOCATED:
Theory: 3 Hours/ Week	End Semester Examination: 60 % Internal Assessment: 40 %	Theory: 3
Practical:2 Hours/ Week	End Semester Examination: 60 % Internal Assessment: 40 %	Practical/ Studio Work: 1
		Total: 4
Course Pre-requisites:		
	Basic knowledge of Construction materials.	
Course Objectives:		
	To develop an understanding of Building materials and construction techniques with respect to Sustainability.	
Course Outcomes:		
1	Explain the use of the traditional and conventional building materials which are cost-effective, environment friendly, and appropriate to the context of the site, climate, and culture.	
2	Demonstrate an understanding of the modern building materials developed using advanced technologies and testing methods.	
3	Understand the application of recycled building materials in the construction of sustainable buildings.	
4	Describe the basic provisions of the Bureau of Indian standards related to select building material.	
5	Understand the life cycle analysis of different building materials for appropriate usage of building materials.	
Course Content:		
UNIT-I	(Natural /Conventional Building materials) 1. Bamboo a. Traditional Methods b. Rope joints and split bamboo const. c. Bamboo as roofing, wall, and floor material. d. Insulation material and bamboo mats 2. Stone a. Traditional construction technology. b. Contemporary construction technology, 3. Mud a. Traditional and vernacular methods in India b. Rammed earth construction c. Auroville construction d. Mud/clay bricks (Manmade /Synthetic Building Materials)	(15 Hours)
UNIT-II	Polymers a. Polyurethane b. Styrene c. Teflon d. Epoxy floorings e. Different viny	(13 Hours)

UNIT-III	Hi-Tech Glass a. Electrochemical glass b. Nano-glass c. Dye-sensitive glass d. Low-e-glass e. Other types	(13 Hours)
UNIT-IV	Prefabricated and pre-engineered buildings and High-performance concrete	(13 Hours)
UNIT-V	Contemporary innovative building materials and their applications in Architecture. a. Carbon Fiber Reinforced Carbon/Plastics b. ACP & Alloys c. Aerogels and composites	(13 Hours)
UNIT-VI	Alternate building materials and construction technologies (Recycled materials) a. CLC Blocks (Cellular Light Weight Concrete) b. Fly ash Bricks c. AAC blocks d. Cement Fiberboard	(13 Hours)
Internal Assessment:		
PART-A	UNIT TEST-I:- UNIT- I, II, III UNIT TEST-II:- UNIT- IV, V, VI	
PART-B	Assignments: Students will perform theoretical/ experimental/ assignments from the suggestive list given below. 1) One workshop on compressed Earth Block or/and Bamboo Architecture 2) Write a research paper/ article or document indigenous /traditional construction techniques. 3) Write a research paper/article on contemporary materials and their construction techniques. 4) Make prototype models of Joinery details of Bamboo, wood, stone . 5) Write a research article on recycled material as a construction material. 6) Write a research article on Innovative Building Materials.	
Practical / Studio Work:		
PART-A	The term work shall consist of a minimum of four drawing sheets from the list below: 1) Construction details of Mud construction. 2) Construction details of Bamboo joints and construction details 3) Construction details of Stone in different regions. 4) Construction details of Hi-Tech Glass fixing in various architectural elements. 5) External wall sections with various materials for different climatic zones. 6) Construction details of Prefab and PEB structures.	
Text Books:		
<ul style="list-style-type: none"> Sustainable Construction: Green Building Design and Delivery, 5th Edition Building with Earth: Design and Technology of a Sustainable Gernot Minke Birkhauser Building with Stabilized Mud - K. S. Jagadish 		
Reference Books:		
<ul style="list-style-type: none"> Bureau of Indian Standards – relevant codes. □ □ □ Sustainability of Construction Materials, A volume in Wood head Publishing Series in Civil and Structural Engineering Edited by J. Khatib ISBN: 978-1-84569-349-7 National Building Code of India Product Manufacturers' manuals/specifications CPWD construction manual Compendium of indigenous innovative building materials and construction technologies 		

E- Resources:

- <https://bmtpc.org/topics.aspx?mid=549&Mid1=552>
- https://www.bpf.co.uk/sustainable_manufacturing/life-cycle-analysis-lca.aspx
- <https://www.kirbyinternational.com/userfiles/broucher/72206.KirbyTechnicalHandbook.pdf>

Topics for project based learning:

- Make a prototype with Compressed Earth Block machine and get it tested.
- Documentation of indigenous construction techniques in their home state.
- Documentation of local materials of a particular region.
- Making a prototype in Bamboo in a group.
- Documentation of materials and technology in nearby village.
- Designing one project with recycled materials.

CO-PO Mapping:

Criteria for Mapping:

	CO 1	CO 2	CO 3	CO 4	CO 5
PO 1	1	2	1	1	0
PO 2	3		3	0	1
PO 3	0	3	0	3	0
PO 4	2	0	0	0	0
PO 5	0	0	0	0	2
PO 6	0	0	0	1	0
PO 7	0	1	0	0	0
PO 8	0	0	1	0	3
PO 9	1	0	0	0	0

0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance

Course Code: ARC 603

Revised by Ar. Vivekanand Tiwari

Name of Course: Ecology and Environmental Management

TEACHING SCHEME	EXAMINATION SCHEME	CREDITS ALLOCATED:
Theory: 2 Hours/ Week	Total Marks Allocated: 100 End Semester Examination: 60 Internal Assessment: 40	Theory: 2
Studio / Practical: Hours / Week: 1 Hours/ Week	Total Marks Allocated: 00 End Semester Examination: 00 Internal Assessment: 00	Practical/ Studio Work: 1
		Total Credits: 2

Course Pre-requisites:

Graduation in any discipline and interest in Ecology and Environmental Studies

Course Objectives:

With global warming and environmental protection major areas of concern across nations, the environmental management course is a critical area of study for all Architects. This course thus aims to

Course Outcomes:		
1.	Explain the basic concepts of Ecology and different types of ecosystems in the context of the development of human habitat.	
2.	Describe ways of applying ecology-based principles to various areas like ecological restoration, urban areas, climate change, etc.	
3.	Identify and analyze environmental concerns related to the built environment both in rural and urban areas and suggest ways to implement sustainable solutions.	
4.	Understand the trickle-down effect of ecology and environment from macro to micro level at urban and neighborhood scale.	
5.	Explore the traditional wisdom for ecological and environmental management.	
6.	Apply the concept of Nature-based solutions and Environmental approaches in sustainable planning and design.	
Course Content:		
UNIT-I	I. Basic Concepts of Ecology and Ecosystems a) Ecological factors; Abiotic and Biotic b) Types of ecosystems, Productivity and biomass, factors affecting productivity c) Carrying capacity, Ecological footprints, Carbon balance	(04 Hours)
UNIT-II	II. Basic overview of a) Ecosystem services b) Environmental Monitoring and Resource Assessment (Tools & Techniques)	(04 Hours)
UNIT-III	III. Understanding of Environmental Impact Assessment (EIA) for a) Building Level development b) Large area development.	(06 Hours)
UNIT-IV	IV. Overview of ecological and environmental management with the help of selected case studies of notified Eco-sensitive Zones (India). a) Arid Region b) Hilly Region c) Coastal areas	(06 Hours)
UNIT-V	V. Nature-based solutions and Environmental approaches for development projects a) Role of microclimate in habitat planning b) Attention to Soil, Physiography, Geology, Water, Vegetation and Biodiversity (SPGWVB Model) in site planning c) Passive design strategies and development of built environment	(06 Hours)
UNIT-VI	VI. Neighbourhood planning based on Ecology and Environment a) Components of neighborhood ecosystem and Factors (Water, Wind, Physiography, Soil, Geology, Vegetation, & Biodiversity) controlling neighbourhood environment. b) Traditional wisdom and ecological management at the neighbourhood level.	(06 Hours)
Internal Assessment:		
PART- A	CIA 1 :- UNIT- I, II, III	
	CIA 2:- Unit IV and V	

PART-B	Suggestive Assignments: <u>Architecture) AY 2023-24</u> <ul style="list-style-type: none"> ● Assignments on the calculation of water for rainwater harvesting ● Case Study and report writing ● Term paper and seminar presentation
Practical / Studio Work:	
PART-A	The practical / studio work shall consist of the following: <ol style="list-style-type: none"> 1) Ecology and Environmental approach in the Site analysis in Architectural design process 2) Case studies of Ecological and Environmentally sensitive zones from the country's different regions. 3) Case studies of relevant Environmental Impact Assessment projects 4) Case studies of Nature-based passive design strategies and development of built environment
TERM WORK	The Term-work shall consist of a minimum of one term paper from the areas below: <ol style="list-style-type: none"> 1) Ecological and Environmental Management 2) Habitat Management 3) Urban Ecology and Ecological Planning 4) Ecological and Environmental sensitive zones
Text Books:	
1. David Lloyd Jones, 1998, Architecture and the Environment: Bioclimatic Building Design, London: Laurence King.	
2. Urban Ecology, Pramit Verma, Pardeep Singh and more	
3. Givoni, B., 1969. Man, Climate and Architecture, Elsevier Publishing Company Limited.	
4. Jain, Sharad K., Agarwal, Pushpendra K., Singh, Vijay P. 2007, Hydrology and Water Resources of India, Water Science and Technology Library, Vol. 57	
5. Minke, Gernot and Bansal, N. K. 1988. Climatic Zones and Rural Housing in India, Kernforschungsanlage GmbH, Jülich.	
Reference Books:	
1. Paul Appleby, 2010, Integrated Sustainable Design of Buildings, Earthscan, ISBN 978184971117	
2. Scott Drake, 2009, The Elements of Architecture - Principles of Environmental Performance in Buildings, Earthscan, ISBN 9781844077175	
3. Paul Appleby, 2010, Integrated Sustainable Design of Buildings, Earthscan, ISBN 978184971117	
4. Scott Drake, 2009, The Elements of Architecture - Principles of Environmental Performance in Buildings, Earthscan, ISBN 9781844077175	
E- Resources:	
1. Geological Survey of India website: gsi.gov.in	
2. Central Pollution Control Board publications related to water quality and treatment, available on https://www.cpcb.nic.in/	
3. Survey of India website, https://surveyofindia.gov.in/	
4. Ministry of Environment, Forest and Climate Change Website https://moef.gov.in	
Topics for project-based learning:	
a. Study of the urban and neighbourhood Environmental and Ecological system	
b. Assessing the Urban ecology at the settlement level	
c. Impact Assessment at neighbourhood and built environment	
d. Passive and Nature-based design development at site and building level	
CO-PO Mapping:	

Criteria for Mapping:						
	CO 1	CO 2	CO 3	CO 4	CO 5	CO 6
PO 1	0	0	3	1	0	0
PO 2	0	3	0	0	0	1
PO 3	0	1	0	3	0	0
PO 4	0	0	2	0	0	3
PO 5	3	0	0	0	3	0
PO 6	0	0	0	0	0	0
PO 7	2	0	1	0	0	0
PO 8	0	1	0	1	0	0
PO 9	1	0	0	0	2	0

0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance

Course Code: ARC 604		
Name of Course: Climatology and Building Physics		
TEACHING SCHEME	EXAMINATION SCHEME	CREDITS ALLOCATED:
Theory: 4 Hour/ Week	Total Marks Allocated: 100 End Semester Examination: 60 Internal Assessment: 40	Theory: 4
Studio / Practical: 0 Hours / Week	Total Marks Allocated: End Semester Examination: Internal Assessment:	Practical/ Studio Work:0
		Total Credits: 4
Course Pre-requisites:		
Graduation in Architecture / Science (with Physics) / Engineering		
Course Objectives:		
<p>A very important component of sustainability in buildings has to do with the fact that they have to respond to the climate in which they are sited. This course aims to cover the various climates, mainly in India, and the implications of each for building design in these respective climates.</p> <p>This course is closely connected to Energy Efficient Building Design and they should be in continuity, and if possible, led by the same faculty member.</p>		
Course Outcomes:		
1)	Describe the components of climate science applicable to the design of buildings and its immediate environment.	
2)	Describe various climatic zones in India, ways to apply the information while designing buildings and identify through secondary or primary research climatically responsive features used in contemporary buildings	
3)	Describe the basic concepts of heat transfer concerning buildings and point to strategies that need to be incorporated to achieve climatically appropriate buildings.	
4)	Explain the concepts of psychometry and human thermal comfort and its measurement.	
5)	Apply a basic understanding of heat transfer through buildings and calculate U values for different building skins.	
6)	Present an understanding of basic concepts and principles of building physics that are used by building	

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7)	Describe various aspects of solar geometry and solar radiation and its application for the design of buildings.	
8)	Explain the functions and mechanisms of ventilation	
Course Content:		
UNIT-I	<p>Introducing Climate Science: factors such as</p> <ol style="list-style-type: none"> Air temperature Air pressure Humidity Sky condition Solar radiation Night radiation Greenhouse effect Winds <ol style="list-style-type: none"> Condensation and precipitation Global warming and its effects <p>Describing Climate Zones of India:</p> <ol style="list-style-type: none"> Hot and Dry Warm and Humid Moderate Composite Cold – both Humid and Dry 	(8 Hours)
UNIT-II	<p>Psychometry:</p> <ol style="list-style-type: none"> Properties of Air and Humidity, Dew Point, Saturation, Absolute Humidity, Enthalpy, Sensible and Latent Heat, Specific Volume of Air Psychrometric Chart: Familiarization with the Chart, Mapping Climate on the Chart, Mapping processes of Evaporative Cooling, Chilling, Heating, Humidification on the Chart 	(8 Hours)
UNIT-III	<p>Human Thermal Comfort:</p> <ol style="list-style-type: none"> Main factors affecting thermal comfort: temperature, humidity, air velocity, radiation, metabolic level, and clothing Other factors: aging, expectation, adaptive comfort Human Thermal Comfort indices: Operative Temperature, Effective Temperature, Standard Effective Temperature, Tropical Summer Index, Adaptive Comfort, Predicted Mean Vote, ASHRAE provisions 	(8 Hours)
UNIT-IV	<p>Thermal Flows (with examples drawn from building applications):</p> <ol style="list-style-type: none"> Concepts of Heat Physics: Heat, Temperature, Thermal Mass and Capacity, Latent Heat Conduction Convection Radiation Evaporation <p>Steady-state Heat Transfer through Building Fabric:</p> <ol style="list-style-type: none"> Thermal Transmittance, Surface Resistance, Environmental Temperature U-value Thermal Resistance of Cavities Thermal Diffusivity Sol-Air Temperature 	(12 Hours)

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	<ul style="list-style-type: none"> f. Calculation of Steady State Heat Flow g. Calculation of Seasonal Heating and Cooling Demand for Fixed Inside Conditions in the Steady State (Degree-Day Method) 	
UNIT-V	Solar Geometry: <ul style="list-style-type: none"> a. Relationship of Earth and Sun b. Solar Movement, Sun Angles, Sun Path, Analytical and Graphical Determination, Discussion of Elliptical error, Variations of standard Time and Solar Time c. Solar Radiation: Measurement, Direct, Diffuse, and Global Radiation d. Surface properties of Materials concerning the Sun: Absorption, Transmission (for transparent surfaces), Reflection, Emissivity, and Emittance 	(6 Hours)
UNIT-VI	Ventilation, Air Movement, and Air Change: <ul style="list-style-type: none"> a. Functions of ventilation: Health, Thermal Comfort, Structural Cooling b. Mechanisms for Ventilation: Natural and Created Thermal Effects, Natural, and Created Pressure Differences Forced Ventilation, Air Recirculation 	(6 Hours)
Internal Assessment:		
PART-A	CIA 1 :- UNIT- I, II, III	
	CIA 2:- UNIT- IV, V, VI	
PART-B	Assignments: Students will perform theoretical/ experimental/ assignments from the suggestive list given below.	
	1) Paper on Human Thermal Comfort / Climates of India	
	2) Concept Tests on Physics concepts during the course delivery (no books allowed)	
	3) Assignment: Case studies of Existing Buildings in India in published Literature for identifying their Climate Responsive Features	
Practical / Studio Work:		
PART-A	The practical / studio work shall consist of the following:	
	1)	
	2)	
Text Books:		
Koenigsberger, O. H., Ingersoll, T. G., Mayhew, A., Szokolay, S. V., 1973. <i>Manual of Tropical Housing and Building Part I. Climatic Design</i> , Orient Longman Pvt. Ltd.		
Reference Books:		
1. Bureau of Indian Standards, 1987. <i>SP41(S&T): Handbook on Functional Requirements of Buildings (Other than Industrial Buildings)</i> , New Delhi. Company Limited, New Delhi.		
2. Bureau of Indian Standards, 2005. <i>National Building Code of India, Part 8: Building Services, Section 1: Lighting and Ventilation</i> , New Delhi.		
3. Givoni, B., 1969. <i>Man, Climate, and Architecture</i> , Elsevier Publishing Company Limited.		
4. Koenigsberger, O. H., Ingersoll, T. G., Mayhew, A., Szokolay, S. V., 1973. <i>Manual of Tropical Housing and Building Part I. Climatic Design</i> , Orient Longman Pvt. Ltd.		
5. Krishnan, A. (ed.), Baker, N., Yannas, S., Szokolay, S., 2001. <i>Climate Responsive Architecture – A Design Handbook for Energy Efficient Buildings</i> , Tata McGraw-Hill Publishing		
6. Minke, Gernot and Bansal, N. K. 1988. <i>Climatic Zones and Rural Housing in India</i> , Kernforschungsanlage GmbH, Jülich.		
7. Nayak, J. K., Prajapati, J. A., 2006. <i>Handbook on Energy Conscious Buildings</i> , Prepared under the interactive R&D Project No. 3/4(03)99-SEC between Indian Institute of Technology, Bombay, and Solar Energy Centre, Ministry of New and Renewable Energy, Government of India.		
8. Szokolay, S. V., 2004. <i>Introduction to Architectural Sciences: The Basis of Sustainable Design</i> ,		

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Architectural Press, Oxford.						
9. TERI, 2004. <i>Sustainable Building Design Manual Volume 2</i> , prepared under a European Union co-funded ASIA-URBS project under the leadership of Institut Catala d'Energia (Spain), The Energy & Resources Institute, India.						
E- Resources:						
1) https://archive.org/details/nationalbuilding01/in.gov.nbc.2016.vol1.digital/						
2) https://cpwd.gov.in/Publication/IGDBooklet.pdf						
3) http://www.plea-arch.org/wp-content/uploads/PLEA-Note-5-Climate-Analysis-lowre.pdf						
4) http://www.plea-arch.org/wp-content/uploads/PLEA-NOTE-1-SOLAR-GEOMETRY.pdf						
Topics for project based learning:						
5.						
CO-PO Mapping:						
Criteria for Mapping:						
	CO 1	CO 2	CO 3	CO 4	CO 5	CO 6,7,8
PO 1	0	0	0	0	0	0
PO 2	3	3	3	3	3	3
PO 3	3	3	3	3	3	3
PO 4	0	0	0	0	0	0
PO 5	3	3	3	3	3	3
PO 6	0	0	0	0	0	0
PO 7	0	0	0	0	0	0
PO 8	0	0	0	0	0	0
PO 9	0	0	0	0	0	0
0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance						

<i>(Prepared by Prof. Neeraj Gupta and revised in April 2018)</i>		
Course Code: ARC 605 (SA 5)		
Name of Course: Sustainable Architecture – Historical and Community Perspectives		
TEACHING SCHEME	EXAMINATION SCHEME	CREDITS ALLOCATED:
Theory: 2 Hour/ Week	Total Marks Allocated: 75 End Semester Examination: 45 Internal Assessment: 30	Theory: 2
Studio / Practical: 2*Hours / Week (*About 30 hours of self-learning sessions during the semester that may be spent on field study. This may include a tour to study any historic settlement)	Total Marks Allocated: 25 End Semester Examination: 15 Internal Assessment: 10	Practical/ Studio Work: 1
		Total Credits: 3
Course Pre-requisites:		
Graduation in any discipline interest in Art, Architecture and Cultural Studies		
Course Objectives and Outline:		
The architecture of the 20th century in India, barring few exceptional cases widely adopted forms, styles, and patterns seen in Western architecture. Contemporary architecture in India relies on hi-techs in building materials and engineering technologies that often waste energy, and cause physical and psychological harm in varying degrees to human beings.		

<p>On the contrary, compared to modern society, ancient people were more aware of the ecological importance and had greater reverence for nature. Vernacular architecture and historic buildings were based on natural laws and depend on natural forces to adapt to harsh climatic conditions and improve survival conditions. Thus, traditional community wisdom can provide us with rich and valuable technological experiences that can be a good reference point for modern-day architecture.</p>		
Course Outcomes:		
1	Present a general review of architecture from Vedic culture and concepts and planning principles of ancient and vernacular, and historical architecture that provide unique insights on the sustainable development of human habitat.	
2	Explain the concept and principles of Vastu-Shastra and Feng Shui and apply them while designing human habitat. and ancient Indian wisdom of Vastu Shastra practices, strategies, and implementation processes shape sustainable architecture.	
3	Explain the salient features of sustainable architecture and planning in forts, palaces, temples and monasteries in different climatic zones of India	
4	Document the vernacular and historical examples of development present them in the form of reports and presentations.	
5	Describe the historical and community perspectives on architecture and planning largely from the Indian context	
6	Undertake field studies using participatory approaches while interacting with communities and draw references from traditional community wisdom that could be applied in contemporary development of human habitat.	
Course Content:		
UNIT-I	a. Ancient and Historical perspectives in neighborhood planning and architecture from Vedic Culture b. Planning Principles of Ancient Indian cities - Overview of Mohan Jodaro, Harappa, Lothal, Dholavira, Varanasi, Thanjavur, Sisupalgarh (Kalinga)	(10 Hours)
UNIT-II	a. Concepts and basic principles of Vastu-Shastra, b. Overview of Feng-shui	(8 Hours)
UNIT-III	Sustainable Architecture in history – Forts, palaces, temples, monasteries, etc. in different climatic zones of India.	(12 Hours)
UNIT-IV	Planned Human Settlements and Towns of India: Overview of Jaipur, Hampi, Srirangam, Madurai, .	(12 Hours)
UNIT-V	Vernacular Architecture - Definition, the climatic response of vernacular architecture, architectural elements and indigenous construction techniques in distinct climatic zones of India.	(8 Hours)
UNIT-VI	a. Understanding principles of community participation for sustainable development of human habitat. b. Interaction with urban / rural communities using participatory approaches, methods and tools. c. Documentation of a rural/urban community using participatory approaches, methods, and tools.	(12 Hours)
Internal Assessment:		
PART-A	CIA 1 :- UNIT- I, II,III CIA 2:- UNIT- IV,V,VI	
PART-B	Assignments: Students will undertake assignments from the suggestive list given below. Paper(s) on Ancient Human Settlements / Vernacular Architecture of any region, Field Study: Visit a community in a group of 3-4 and using Participatory Learning and Action (PLA) approaches understand survival strategies of communities and document them in any medium of choice.	
Text Books:		
Reference Books:		
1. Kanji N.and Greenwood L.(2001) 'Participatory approaches to research and development in IIED: Learning from experience,' IIED: London		
2. Acharya P. K. 1933, 'Architecture of Mansara,' Oxford University press- Bombay Ch.5, p - 17.		

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3. Matsya Purana - B. Majumdar and another. Orienta publisher, Delhi, Ch.253, p-293.

4. Begde Prabhakar V. 1977, Ancient and Medieval Town planning in India, Sagar Publication- New Delhi, Ch.8, p - 81-100.

5. Energy Efficient buildings in India by Mili Majumdar (Teri)

E- Resources:

1. Updated scholarly papers related to sustainable architecture practices in India and around the world.

2. Updated articles on contemporary buildings inspired from ancient Indian constructions techniques should be explored

Topics for project based learning:

CO-PO Mapping:

	CO 1	CO 2	CO 3	CO 4	CO 5	CO 6
PO 1	3	3	0	0	1	0
PO 2	0	0	1	3	0	3
PO 3	2	0	0	0	3	0
PO 4	0	1	3	2	3	0
PO 5	0	0	0	0	0	2
PO 6	0	0	0	1	0	0
PO 7	1	2	0	0	0	0
PO 8	0	0	0	0	0	1
PO 9	0	1	0	0	0	0

Criteria for Mapping:
 0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance

Course Code: ARC 606 (DSA 1)		
Name of Course: Sustainable Architecture Design		
TEACHING SCHEME	EXAMINATION SCHEME	CREDITS ALLOCATED:
Theory: 1 Hour/ Week	Total Marks Allocated: 0 End Semester Examination: 0 Internal Assessment: 0	Theory: 0
Studio / Practical: 8 Hours / Week	Total Marks Allocated: 100 End Semester Examination: 60 Internal Assessment: 40	Practical/ Studio Work: 8
		Total Credits: 8

Course Pre-requisites:
Graduation in Architecture

Course Objectives and Outline:

There will be at least two studio exercises in this course. The first exercise will involve an understanding of local culture, social aspects of development, and wisdom of traditional and vernacular architecture. For this, students will study a rural/urban community using participatory approaches or undertake documentation of old town or any historic building(s).
The course coordinator may design the second exercise to adequately cover the application of various theory subjects taught during the semester, which may be an extension of the first exercise with a deeper study of any chosen dimension of sustainable architecture or a new documentation exercise or simulation of existing building designs. It could also be a small design that blends traditional wisdom with modern technologies in the contemporary context.
Note: To ensure complete harmony between theory subjects and design studio exercises, course instructors of the theory subjects shall be part of the design studio faculty team. Such faculty members will provide regular subject related inputs and periodically review the design efforts of the students in their specific context.

Course Outcomes:

1	Present a document of field studies that reflect local culture, vernacular and historic architecture and sensitivity to ecology and environment
2	Design a small or medium-sized real-life project applying the knowledge of theory subjects learned during the semester and other studies.

The studio hours of Design courses will involve one to one counseling, review, and feedback sessions. Students are also expected to undertake substantial self-work beyond the prescribed studio hours.

CO-PO Mapping:

	CO 1	CO 2
PO 1	3	3
PO 2	3	3
PO 3	0	3
PO 4	3	3
PO 5	0	3
PO 6	1	0
PO 7	3	3
PO 8	3	3
PO 9	0	3

Criteria for Mapping:
0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance

Course Code: ARC 607
Name of Course: Energy Efficient Building Design-Theory and Technologies

TEACHING SCHEME	EXAMINATION SCHEME	CREDITS ALLOCATED:
Theory: 4 Hour/ Week	Total Marks Allocated: 100 End Semester Examination: 60 Internal Assessment: 40	Theory: 4
Studio / Practical: 0 Hours / Week	Total Marks Allocated:	Practical/ Studio Work: 0

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End Semester Examination		
Internal Assessment:		
		Total Credits: 4
Course Pre-requisites:		
Graduation in Architecture / Science (with Physics) / Engineering		
Course Objectives:		
<p>This course applies the fundamental learning of its earlier companion course (ARC604: Climatology and Building Physics) to familiarize the learners with the Theory and Technologies of Energy Efficient Building Design, especially in the Indian context. The aim is to provide knowledge and skills that will help students design buildings that will exhibit a low operating energy demand, especially for heating, cooling, and lighting.</p> <p>Exercises during lecture sessions or beyond in this course are expected to create a familiarity with the technical concepts so that the students have well-rounded information of what is happening in practice as well as theory. It is encouraged, in the form of an assignment, to undertake secondary research on existing buildings in published literature and identify their energy efficient features — introduction to the relevant software.</p>		
Course Outcomes:		
1.	Explain the relevance of various climatic factors to undertake site analyses for developing climate-responsive site designs suitable for local conditions.	
2.	Explain the influence of a built form, building envelope, fenestration, and shading devices to develop climate responsive building design.	
3.	Describe the techniques and control devices ways of maximizing effective use of daylight while reducing the heat ingress.	
4.	Identify the passive/hybrid design strategies and techniques for reducing the energy demands of the buildings, especially in the context of heating and cooling.	
Course Content:		
UNIT-I	<ul style="list-style-type: none"> ● Climate Responsive Site Design: <ol style="list-style-type: none"> a. Site Planning and Selection factors b. Site Analysis: Landform, Density of Existing Built Area, Climate analysis (wind, sun, rain), Vegetation, Existing Infrastructure, Urban Context, Site potential. ● Climate Responsive Building Design: <ol style="list-style-type: none"> a. Built Form: Layout, Orientation, Surface Area/Volume Ratio, Zoning of Internal Spaces, Buffer Spaces, Location of Openings b. Building surface and fabric: Insulation, color, window size location, and details c. Building Envelope and Fenestration Design: Transmission through Walls and Roof, Transmission through Windows, Window orientation and size, Shading Coefficient, Solar Heat Gain Factor, Visible Light Transmittance, Glazing Types d. Design of Shading Devices: fins, overhangs, pergolas, green roofs and walls, space frames, façade shading e. Calculation and estimates of the effectiveness of the same (shadow angles, sun path analysis) f. Shading by plants and soil 	(11 Hours)

UNIT-II	<p><u><i>M. Arch. (Sustainable Architecture) AY 2023-24</i></u> Daylighting</p> <ul style="list-style-type: none"> a. Concepts (health and other benefits) b. Design skies: Uniform Luminance Sky Distribution, CIE Standard Overcast Sky Distribution, Clear Blue Sky Distribution, Tropical Design Sky c. Direct, diffuse and reflected components d. Design Parameters: Glare, critical indoor and outdoor luminance, daylight factor and its calculation and distribution e. Techniques of incorporating daylight in buildings: galleries, porches, courtyards, atria, light-pipe and shafts, lateral pass-through components (windows, translucent wall, curtain wall), zenithal pass-through components (north lights, clerestories, translucent roofs, skylights, domes and lanterns), global pass-through components (membrane envelope), optical daylighting, f. Control devices: conventional divisions, optical division, prismatic division, awnings, curtains, overhangs, light shelves, sills, fins, jalls, louvers and shutters, photochromatic and film controls 	(11 Hours)
UNIT-III	<p>Passive and Low Energy Heating Systems:</p> <ul style="list-style-type: none"> a. Principles and types: Direct Gain, Indirect Gain (Trombe walls, thermal storage walls), Isolated Gain (sunspaces, greenhouses, convective loops) b. Principles, advantages and disadvantages, control, and operating characteristics for each of the above systems 	(10 Hours)
UNIT-IV	<p>Passive and Low Energy Cooling Systems (based on shedding heat to air):</p> <ul style="list-style-type: none"> a. Principles and types: Comfort ventilation, selective ventilation, chimney, and stack exhaust, climates applicable, air circulation b. Design Factors Affecting Ventilation: Opening orientation, Size, Location, Internal Subdivision of Space, Cross Ventilation c. Ventilation coupled with thermal storage mass 	(6 Hours)
UNIT-V	<p>Passive and Low Energy Cooling Systems (based on shedding heat to evaporating water):</p> <ul style="list-style-type: none"> a. Principles of evaporation, climatic applicability b. Direct evaporative systems: Passive/manually watered pads, mechanical evaporative coolers, and air washers, passive downdraft evaporative cooling including downdraft chimneys c. Indirect evaporative systems: Roof ponds, roof films, ground-based ponds, mechanical two-stage, and three-stage evaporative systems d. Plant-based evapotranspiration systems 	(8 Hours)
UNIT-VI	<p>Passive and Low Energy Cooling Systems (based on shedding heat to the ground):</p> <ul style="list-style-type: none"> a. Principles of earth cooling, soil temperatures and its variation, climatic applicability b. Direct coupling of soil with buildings (berms, basements) c. Indirect coupling of soil with buildings (earth tunnels and pipes) d. Active coupling of soil with buildings (ground source heat pumps) e. Treatment of soil to change temperatures <p>Passive and Low Energy Cooling Systems (based on shedding heat to the sky):</p> <ul style="list-style-type: none"> a. Principles of night-sky radiation, climatic applicability 	(10 Hours)

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	b. Skytherm and night radiant systems
Internal Assessment:	
PART-A	CIA 1 :- UNIT- I, II, III
	CIA 2:- UNIT- IV, V, VI
PART-B	Assignments: Students will perform theoretical/ experimental/ assignments from the suggestive list given below.
	<p>1) Paper on Glare-free Daylight in Office Buildings</p> <p>Paper on a detailed Case Study of an Energy Efficient Building, including primary observation and research.</p> <p>Quiz / Tests on Low Energy Building Concepts covered during the course (no books allowed) Assignment: Case studies of Existing Buildings in India in published Literature for identifying their Energy Efficient Features</p> <p style="text-align: center;"><i>The instructor may consider an Open Book End of Semester Examination</i></p>
	2)
Practical / Studio Work:	
PART-A	The practical / studio work shall consist of the following:
	1)
	2)
	3)
Text Books:	
Reference Books:	
Ander, G. D., 2003. <i>Daylighting Performance and Design</i> (second edition), John Wiley & Sons Inc., New Jersey.	
Bureau of Indian Standards, 2005. <i>National Building Code of India, Part 8: Building Services, Section 1: Lighting and Ventilation</i> , New Delhi.	
Crosbie, M. J., 1998. <i>The Passive Solar Design and Construction Handbook</i> , John Wiley & Sons Inc., New York.	
Givoni, B., 1994. <i>Passive and Low Energy Cooling of Buildings</i> , John Wiley & Sons Inc., New York.	
Guzowski, M., 2000. <i>Daylighting for Sustainable design</i> , McGraw-Hill, New York.	
Majumdar, Mili (ed.), 2001. <i>Energy Efficient Buildings in India</i> , Tata Energy Research Institute and Ministry of Non-conventional Energy Sources, Government of India.	
Nayak, J. K., Prajapati, J. A., 2006. <i>Handbook on Energy Conscious Buildings</i> , Prepared under the interactive R&D Project No. 3/4(03)99-SEC between Indian Institute of Technology, Bombay, and Solar Energy Centre, Ministry of New and Renewable Energy, Government of India.	
Santamouris, M., 1996. <i>Passive Cooling of Buildings</i> , James & James (Science Publishers) Ltd., London.	
E- Resources:	
http://www.ijirset.com/upload/2017/july/37_IJIRSET_Paper_EATHE.pdf	
https://www.builditsolar.com/Projects/Cooling/EarthTemperatures.htm#:~:text=Soil%20Temperature,and%20depth%20in%20the%20earth.	

https://www.youtube.com/watch?v=BgOy3U34muY						
https://www.osti.gov/servlets/purl/5450077						
https://www.youtube.com/watch?v=BgOy3U34muY						
Topics for project based learning:						
CO-PO Mapping:						
Criteria for Mapping:						
	CO 1	CO 2	CO 3	CO 4	CO 5	CO 6
PO 1	0	0	0	0	NA	NA
PO 2	3	3	3	3	NA	NA
PO 3	0	0	0	0	NA	NA
PO 4	0	0	0	0	NA	NA
PO 5	3	3	3	3	NA	NA
PO 6	0	0	0	0	NA	NA
PO 7	0	0	0	0	NA	NA
PO 8	0	0	0	0	NA	NA
PO 9	0	0	0	0	NA	NA
0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance						

Course Code: <u>ARC 608,</u> Revised by Prof. Neeraj Gupta and Ar. Vivekanand Tiwari		
Name of Course: <u>Building Services and Waste Management</u>		
TEACHING SCHEME	EXAMINATION SCHEME	CREDITS ALLOCATED:
Theory: 3 Hour/ Week	Total Marks Allocated: 100 End Semester Examination: 60 Internal Assessment: 40	Theory: 3
Studio / Practical: 2 Hours / Week	Total Marks Allocated: 00 End Semester Examination: 00 Internal Assessment: 00	Practical/ Studio Work: 1
		Total Credits: 4
Course Pre-requisites:		
	Graduation in Architecture	
Course Objectives:		
	<p>This course aims to impart enough relevant information to students so that, as practitioners, they can work with a multidisciplinary team of consultants/experts and harness their design expertise and experience. The first part of this course will detail all building services, safety, security and management systems, and the methodology to integrate these services and systems to enhance the sustainability of the developmental projects and buildings. The second part deals with a critical area – Waste management. The focus is on treating waste as a resource. This course will look at solid and liquid wastes, their management, recycling, and reuse in this context. Moreover, the segregation and classification of waste through scientifically established waste management techniques would be encouraged as part of the design program. The efficacy of community participation in effective management, especially collection and segregation, waste reduction, use of recycled waste, etc., will be emphasized. In addition, the basic concept of Wto-E, i.e., waste-to-energy conversion and cradle-to-grave cycle, would be considered.</p>	
Course Outcomes:		
	At the end of this course, the students will be able to:	
1	Explain basic concepts and techniques related to the design of sustainable human habitat with the aim of Net Triple Zero - energy, water, and waste	
2	Demonstrate an understanding of basic concepts, principles, and terminology related to building services to apply them in architectural design independently or while working with consultants	
3	Describe the various components of MEP services with particular reference to green and other innovative technologies	
4	Demonstrate an understanding of basic concepts, principles, and terminology related to waste management to apply them in architectural design projects.	

5	Describe the RR Approach and various technologies for scientifically managing waste as a resource with the involvement of different stakeholders	
6	Understanding the integration and implementation benefits of innovative, passive and traditional approaches in combination with contemporary technologies.	
Course Content:		
PART A (2 Credits): Building services		
UNIT-I	Electrical Services A. Introduction to basic concepts B. Low voltage systems, Building management systems C. Building Sensors for natural forces, fire, etc D. Introduction to smart grids E. Equipment and their specifications F. Low-cost and sustainable technologies G. Innovative local design techniques (through live case studies)	(10 Hours)
UNIT-II	HVAC systems and services A. Introduction to basic concepts. B. Building Automation and performance monitoring systems C. Equipment and their specifications D. Low-cost and green technologies E. Innovative local design techniques (through live case studies)	(10 Hours)
UNIT-III	Sanitary, Plumbing fittings and Fire Fighting systems A. Historical perspectives and Introduction to basic concepts B. Different valves and their working principle C. Basic sanitary and plumbing fittings and their specifications as per standards D. Low-cost and green technologies E. Innovative local design techniques (through live case studies) F. Basics of fire fighting at the building level G. Overview of NBC standards for fire fighting for different kinds of buildings	(12 Hours)
PART B (2 Credits): Waste Management		
UNIT-IV	Innovative local design techniques (through live case studies) A. Introduction to Waste management B. Wastes generated by Human Habitat – Solid, liquid and Gaseous C. Types of Wastes- Municipal, Industrial, Agricultural, Toxic, Bio-Medical, Hazardous, Electronic, Radioactive, etc. D. Overview of laws /rules governing waste management in India E. Importance of Community participation in waste management F. Impact on health and sanitation	(.. Hours)
UNIT-V	Municipal Solid Waste management A. Cradle-to-Cradle cycle of municipal waste – segregation at source, storage, transportation, disposal, and processing B. Waste management in India– Current scenario, challenges, responses, and pitfalls C. Waste management under challenging terrains – hilly areas, high rainfall areas, waterfronts, etc. D. Overview of waste management from other parts of the world E. Contemporary Technologies and infrastructure for waste management F. Designing infrastructure for efficient and effective solid waste management from generation point to final disposal - Waste bins, collection rooms, transport mechanisms, landfill sites, incinerators, composting, etc. G. Designing a collection system for waste in different types of building structures H. Financial Models for Waste management I. Role of NGOs in effective waste management, sanitation, and health	(.. Hours)
UNIT-VI	Waste as a Resource A. Recycling Industrial, agricultural and municipal waste B. Recycling waste as an alternative material for buildings, landscapes, and other products. Study of innovative practices for the use of recycled material C. Specifications and construction methods for using recycled waste. D. Demonstrative architecture and landscape using waste	(.. Hours)

	<p><u>M. Arch (Sustainable Architecture) AY 2023-24</u></p> <p>vermicomposting</p> <p>F. Liquid waste from residential and commercial buildings recycling and reuse, Sewerage treatment plants</p> <p>Energy from Waste</p> <p>A. Biological and Thermal energy options</p> <p>B. Energy from sanitary landfills</p> <p>C. Refuse-derived fuel and other options</p>	
Internal Assessment:		
PART-A	CIA 1 :- UNIT- I, II, III	
	CIA 2:- UNIT- IV, V, VI	
PART-B	Assignments: Students will perform theoretical/ experimental/ assignments from the representative list below.	
	1) Building level case study and documentation	
	2) Field visit-based documentation,	
	3) Analysis and presentation of the existing system	
	4) Literature review of available technologies using secondary sources	
	5) Overview of standards and recommended standard practices	
Practical / Studio Work:		
PART-A	The practical / studio work shall consist of the following:	
	1) Application of theoretical learning in the ongoing design studio exercises	
	2) Preparation of conceptual model on specified scales	
	3) Use basic software to integrate services at the building level.	
	4) Practical session on electrical Layout, lighting design, fire fighting services and waste management at the building level.	
Text Books:		
Reference Books:		
1. Ravindrarajah, R.S, Tam. T.C. Properties of concrete made with crushed concrete coarse aggregate, - Magazine of Concrete Research, Vol-37, March 1985.		
2. Arceivala. S.J., "Wastewater Treatment for pollution Control"- Tata-McGraw Hill, New Delhi, 1986		
3. ERM.UK Municipal Solid Waste Management, Study for the MMA-Vol-1 Interim Report, August-1995		
4. R.Ambalavanan and A.Roja "Feasibility Studies on Utilization of Waste lime, Gypsum with Fly Ash - The Indian concrete Journal – Vol. – 70 Nov-1996.		
5. Municipal Solid Waste (Handling & Management) Rules 2016		
6. T V Ramachandra, Management of Municipal Solid Waste, TERI		
7. Rakesh Kumar and R N Singh, Municipal Water and Wastewater Treatment, TERI		
8. Sampa Chakrabarti, Treatment of Urban Solid Waste: engineering and integrated Management, TERI		
9. BioMedical Waste (Handling & Management) Rules		
10. Report of Ranganath Mishra Committee on recycling of PET.		
11. Waste Management World: ISWA Publication		
12. Indian Standard codes for electrical Layout		
13. Indian Standard codes for Fire Safety Norms		
14. NBC (selected sections)		
15. Plumber's manual by GmBH as per Uniform plumbing code of India		
16. Survey of vendor sites related to equipment specifications and current requirement		
E- Resources:		
Topics for project based learning:		
CO-PO Mapping:		

	CO 1	CO 2	CO 3	CO 4
PO 1	3	3	3	3
PO 2	1	3	3	3
PO 3	1	3	3	3
PO 4	3	2	2	2
PO 5	0	0	0	1
PO 6	3	2	2	2
PO 7	3	3	3	3
PO 8	3	3	3	3
PO 9	1	1	1	2

Criteria for Mapping:

0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance

course Code: ARC 701, Revised by Professor Neeraj Gupta and Ar. Vivekanand Tiwari

Name of Course: Economic, Legal, and Policy Framework for Sustainable Architecture

TEACHING SCHEME

EXAMINATION SCHEME

CREDITS ALLOCATED:

<u>M.Arch. (Sustainable Architecture) AY 2023-24</u>		
Theory: 4 Hours/Week	Total Marks Allocated: 100 End Semester Examination: 60 Internal Assessment: 40	
Studio / Practical: Hours / Week: 0 Hours/ Week	Total Marks Allocated:00 End Semester Examination: 00 Internal Assessment: 00	
	Total Credits: 4	
Course Pre-requisites:		
1.	Successful completion of 1st Semester of the M.Arch. (Sustainable Architecture)/ MSc. Environmental Science	
Course Objectives:		
1.	<p>With the world facing both human-made and natural disasters, it is important to understand the regulatory and policy framework for the development of human settlements and how economy and development is to be balanced with environmental concerns. Economics of Sustainable Architecture needs to be understood, taking the full life cycle perspective.</p> <p>The course aims to present an overview of major issues related to governance, policy framework, and economics of development and how they support sustainable architecture. It will help students to understand the ground realities associated with the regulatory and economic environment of development implement sustainable design of the built environment.</p>	
Course Outcomes:		
1.	Describe the economic approaches to sustainable development.	
2.	Explain various phases of Project life cycle in the context of the social sector and infrastructure development projects.	
3.	Explain the concept of various types of feasibility studies for development projects.	
4.	Identify and describe the current government policies and schemes related to infrastructure, development of human habitat.	
5.	Describe the broad objectives and applications of environment-related legislation that directly related to architecture, urban development, building construction and built heritage zone.	
6.	Describe the broad objectives and applications of environment-related legislation that directly relate to urban environment, natural conservation and solid waste management.	
Course Content:		
UNIT-I	I. Economic approaches to measure sustainable development: a. Measuring Wealth and Well Being b. Types of Capital: Social capital, Human Capital, Man Made Capital	(8 Hours)
UNIT-II	II. Project Life Cycle – Technical, Financial, Economic, Social and Institutional feasibility of developmental projects,	(8 Hours)
UNIT-III	III. Concepts related to project financing: Rate of return, Payback period Social cost-benefit analysis	(10 Hours)
UNIT-IV	IV. Overview of Central Government policies and schemes concerning housing and urban infrastructure finance, town planning, heritage conservation, etc. (e.g., SMART cities, HRIDAY, AMRUT)	(10 Hours)
UNIT-V	V. Overview of the following Acts and regulations related to Environmental Legislations (Introduction, understanding of objectives and applicability) a. Environment Protection Act of 1986 b. Air (Prevention and Control of Pollution) Act c. Water (Prevention and Control of Pollution) Act	(12 Hours)
UNIT-VI	VI. Overview of the following Acts and regulations relevant to Housing, Building construction, and Waste management (Introduction, understanding of objectives and applicability) a. The Real Estate (Regulation and Development) Act b. Building Construction Workers Act 1996 c. Hazardous Waste Management and Handling Rules / Biomedical Rules / Solid Waste Management Rules	(12 Hours)
Internal Assessment:		
PART- A	CIA 1 :- UNIT- I, III,V (Part a)	

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PART-B	Suggestive Assignments: <ul style="list-style-type: none">● Papers are dealing with the economic aspects of sustainability, international treaties, etc. Quiz / Test examining basic legal understanding (only bare acts allowed)● Case Studies and report writing on the Relevance of Environmental legislations in development projects
Practical / Studio Work:	
PART-A	The practical / studio work shall consist of the following: <ol style="list-style-type: none">1)2)
TERM WORK	The Term-work shall consist of a minimum of one term paper from the areas below: <ul style="list-style-type: none">● Term paper on Economic approaches to measuring sustainable development,● Term Paper on Project Life Cycle, Project financing, Rate of return, Payback period, Social cost-benefit analysis, etc● Term paper on relevance of various Environmental Legislations
Text Books:	
a.	Urban Social Capital: Civil Society and City Life by Gregory W. Streich and Joseph D. Lewandowski
b.	Social Capital, Resilience and Adaptation on Small Islands: Climate Change on the Isles of Scilly (Climate Change Management) by Jan Petzold
c.	Construction Project management, Theory & Practice by Kumar Neeraj Jha
d.	Construction Planning And Management by P.S. Gahlot and B. M. Dhir
e.	Construction project management: from project conception to completion by Piyush Bhandari
f.	Soil and Groundwater Pollution: Fundamentals, Risk Assessment and Legislation: 4 (Soil & Environment) by Alexander J.B. Zehnder
g.	Development of Environmental Laws in India by Kanchi Kohli and Manju Menon
Reference Books:	
1.	<i>Construction and Project Management 2Ed (PB 2018)</i>
2.	Project Management Absolute Beginner's Guide by Author: Greg Horine
3.	Project Management Case Studies By Author: Harold Kerzner
4.	Environmental law and policy in India (oip) by Divan Shyam and Rosencranz Armin
5.	Social Auditing of Environmental Laws in India by Nomita Aggarwal
E- Resources:	
Gazette Notification of	
a.	The Real Estate (Regulation and Development) Act
b.	Building Construction Workers Act 1996
c.	Ancient Monuments and Archaeological Sites and Remains Act
d.	Environment Protection Act of 1986
e.	Air (Prevention and Control of Pollution) Act
f.	Water (Prevention and Control of Pollution) Act
g.	Indian Forest Act, Wildlife Act
h.	Hazardous Waste Management and Handling Rules / Biomedical Rules / Solid Waste Management Rules
i.	Environment Tribunal Act
Topics for project based learning:	
11.	Project Work: A group of students (3-4) will choose/propose a developmental project and prepare a Project Report on a topic given by the instructor.
CO-PO Mapping:	

Criteria for Mapping:

	CO 1	CO 2	CO 3	CO 4	CO 5	CO 6
PO 1	3	3	3	3	3	3
PO 2	1	3	2	3	1	2
PO 3	1	3	3	2	1	1
PO 4	3	2	2	2	3	3
PO 5	0	0	0	1	1	1
PO 6	3	2	2	2	3	3
PO 7	3	3	3	3	3	2
PO 8	3	3	3	3	2	3
PO 9	1	1	1	2	3	3

0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance

Course Code: ARC 702 (DSA 3)

Name of Course: Summer Project

M.Arch. (Sustainable Architecture) AY 2023-24

Course Code: ARC 705 (DSA 6)

Name of Course: Sustainable Architecture Masters Design Thesis

TEACHING SCHEME	EXAMINATION SCHEME	CREDITS ALLOCATED:
L-S-T per week: Self Study Course with intermittent guidance ** ** This is largely a self-study project course with formal classes limited to two one week review and feedback studios as may be decided by the HoD.	Total Marks Allocated: 0 End Semester Examination: 0 Internal Assessment: 0	Theory: 0
	Total Marks Allocated: 100 End Semester Examination: 60 Internal Assessment: 40	Practical/ Studio Work: 10
		Total Credits: 10

Course Pre-requisites:

Successful Completion of 1st Semester of the Programme

Course Objectives and Outline:

The master's design thesis will be a real-life design project that shall be carried out under the supervision of an internal guide and a practicing Architect as a professional external guide.

The design thesis will be presented in the form of a report of about 100 pages presenting the theoretical and technological framework of design and Architectural presentation drawings supported by other materials as may be required to explain the project.

The student will make a formal presentation of about 45 to 60 minutes before a formal jury constituting of internal and external experts who shall after viva-voce evaluate the designs and presentation and award marks/grades.

Course Outcomes:

- 1 Work in a team to undertake studies related to neighborhood planning and large area Development and present the documentation before a group of experts.
- 2 Demonstrate understanding of campus planning, sustainable settlement planning, landscape design, and the statutory framework related to waste management, environmental protection, and sustainability through a large-scale project.

The studio hours of Design courses will involve one to one counseling, review, and feedback sessions. Students are also expected to undertake substantial self-work beyond the prescribed studio hours.

CO-PO Mapping:

	CO 1	CO 2
PO 1	3	3
PO 2	3	3
PO 3	1	3
PO 4	3	3
PO 5	0	3
PO 6	1	0
PO 7	3	3
PO 8	3	3
PO 9	0	3

Criteria for Mapping:

0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance

TEACHING SCHEME	EXAMINATION SCHEME	CREDITS ALLOCATED:
Theory: 0 Hour/ Week	Total Marks Allocated: 0 End Semester Examination: 0 Internal Assessment: 0	Theory: 0
Studio / Practical: 3 [#] Hours / Week <i>(This is in addition to self-work during the summer break)</i>	Total Marks Allocated: 100 End Semester Examination: 60 Internal Assessment: 40	Practical/ Studio Work: 2
		Total Credits: 2

Course Pre-requisites:

Successful completion of courses equal to a minimum of 28 credits during the 1st and 2nd semesters of the M. Arch. Programme

Course Objectives:

The students will do active fieldwork and secondary studies during the summer break after the end of the second semester. In the third semester, students will spend about three hours per week spread over the semester or in two to three stretches in workshop mode, depending on logistics and availability of internal and external experts.

Students are expected to take up an enabling summer project with prior approval that helps them gather knowledge and understanding to be applied to a Master Design Thesis and Dissertation. These could be intensive documentation projects or Action Research projects or projects involving the community in sustainable architecture. The students may also undertake an internship with an organization working towards sustainable development and submit a work report. The student will choose a faculty guide from the University or outside (duly approved by the Dean of the School) and undertake work under their supervision and guidance. The students will be given face-to-face or e-mentoring support, including periodic reviews by their guides/university faculty.

Course Outcomes:

1	Document and present good practices of sustainable architecture through primary research and field studies or while working in an organization working towards sustainable development and architecture.
2	Prepare a formal long report/document and present the documentation before a group of experts.

NOTE: The students will present a formal report and make presentations before a panel of experts in the third semester. The credits of this work will be counted in the third semester.

The studio hours of Design/Project/Dissertation courses will involve one-to-one counseling, review, and feedback sessions. Students are also expected to undertake substantial self-work beyond the prescribed studio hours.

CO-PO Mapping:

Criteria for Mapping:

	CO 1	CO 2
PO 1	3	3
PO 2	3	3
PO 3	1	3
PO 4	3	3
PO 5	1	3
PO 6	0	0
PO 7	3	3
PO 8	3	3
PO 9		3

0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance

Course Code: ARC 710 (SA 8)

(Prepared by Prof. Neeraj Gupta)

Name of Course: Seminar Course

TEACHING SCHEME	EXAMINATION SCHEME	CREDITS ALLOCATED:
Theory: 0 Hour/ Week	Total Marks Allocated: 0 End Semester Examination: 0 Internal Assessment: 0	Theory: 0
Studio / Practical: About 30 hours of learning sessions	Total Marks Allocated: 100 End Semester Examination: 60 Internal Assessment: 40	Practical/ Studio Work: 2
		Total Credits: 2

Course Pre-requisites: <u>M.Arch. (Sustainable Architecture) AY 2023-24</u>		
Graduation in any Discipline with basic computer skills in word processing and desktop presentations		
Course Objectives:		
<p>Students of architecture learn the art of presenting designs before the jury at the undergraduate level. However, there is a gap in their skills to analyze the information drawn after systematic literature research and present evidence-based arguments. This course aims to bridge this gap, develop critical thinking ability among the students, the capacity to synthesize information from different sources and communicate with academic rigor and integrity.</p> <p>The course will allow them to explore complex real-world issues with differing and multiple perspectives by reading articles, research studies, and philosophical texts and listening to experts on varied subjects.</p> <p>This course will help students develop the competence to present logical and evidence-based perspectives after analyzing available literature and interacting with experts and empirical studies. They will be able to develop their perspectives and deliver oral and visual presentations before a large heterogeneous group of people.</p>		
Approach to Learning:		
The approach planned is that of exploration and self-discovery by the students through prescribed readings, attending guest lectures, participate in seminars and webinars, listen, and view talks, read books and research papers, and experiencing artistic works and performances.		
Course Outcomes:		
1	Apply an effective strategy to undertake a literature survey through the university library and other resources.	
2	Identify, explore, and use reliable internet resources and e-database to gather information and perspectives related to a given topic.	
3	Evaluate multiple perspectives and synthesize ideas.	
4	Work individually or in teams to present evidence-based arguments through essays/articles/papers and	
5	Make effective presentations and interact with diverse groups.	
Course Content:		
UNIT-I	Paper/Article/Book Review: The faculty guide/course coordinator(s) will, within one week of the commencement of the course, identify and provide a book or two research papers to summarize and to comment. Faculty will give due consideration to the student's area of interest and the overall objectives of the course.	(10 Hours)
UNIT-II	Seminars / Talks by External Experts: The faculty guide/course coordinator will advise the student to participate and then present a synoptic note of the talk. This will include major points made by the expert and the learning drawn by the student.	(10 Hours)
UNIT-III	Presentation: Each student will make at least one well-researched presentation on any topic of interest selected with approval of the course coordinator(s)/HoD. The presentation will of about 30-35 minutes duration, followed by questions and discussions.	(10 Hours)
Internal Assessment:		
PART-A	CIA 1 :- UNIT- I, II	
	CIA 2:- UNIT- III	

<u>M. Arch. (Sustainable Architecture) AY 2023-24</u>	
PART-B	<p>Formative and Summative Assessment</p> <p>The course instructor or coordinator(s) and/or faculty member nominated by the HoD will assess the participation and submittals during the course, based on the evaluation criterion made available to the students well in advance. As an indicative list, the assessment will be made on the quality of research, thoroughness of reading, ability to link wide and varied topics, quality of analysis, and ability to craft and coherently present an argument.</p> <p>A panel of faculty members/experts will base the summative assessment on the formal presentation by the student. If logistics permits, the panel will have at least one expert from outside the department/school/university.</p>
Practical / Studio Work:	
PART-A	<p>1) Reading a book related to students' topic and summarizing/</p> <p>2) Organize a panel of experts or peers to discuss various facets of the seminar topic. Students can prepare questions and engage in the discussion.</p> <p>3) Provide real-world case studies relevant to the seminar topic. Students can analyze the cases, identify key issues, and propose solutions or strategies.</p> <p>Conduct brainstorming sessions where students generate ideas, solutions, or innovations related to the seminar topic.</p>
Text Books:	
Reference Books:	
How to Run Seminars & Workshops: Presentation Skills for Consultants, Trainers and Teachers Paperback – Import, 2 September 2005 by Robert L. Jolles (Author)	
Seminar Success - Your Complete Guide to Planning Your Seminar or Training Workshop Kindle Edition by Steven Angel (Editor)	
Conducting Seminars and Tutorials, 53 Interesting Ways by Hannah Strawson-VIVA BOOKS PRIVATE LIMITED- Paperback (English, Paperback, Hannah Strawson)	
E- Resources:	
Topics for project based learning:	
CO-PO Mapping:	

Criteria for Mapping:					
	CO 1	CO 2	CO 3	CO 4	CO 5
PO 1	0	1	2	0	1
PO 2	2	0	0	0	0
PO 3	0	0	0	1	2
PO 4	0	0	2	0	0
PO 5	1	0	0	0	0
PO 6	0	1	0	2	0
PO 7	3	0	0	3	3
PO 8	3	3	3	0	3
PO 9	3	3	3	3	3

0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance

Course Code: ARC 609 (DSA2)		
Name of Course: Sustainable Architecture Design II		
TEACHING SCHEME	EXAMINATION SCHEME	CREDITS ALLOCATED:
Theory: 1 Hour/ Week	Total Marks Allocated: 0 End Semester Examination: 0 Internal Assessment: 0	Theory: 0
Studio / Practical: 10 Hours / Week	Total Marks Allocated: 100 End Semester Examination: 60 Internal Assessment: 40	Practical/ Studio Work: 10
		Total Credits: 10

Course Pre-requisites:

Successful completion of courses equal to a minimum 28 credits during 1st & 2nd semester of the M. Arch. Programme

Course Objectives and Outline:

The Design Studio Exercises of this semester will focus on Technology-Driven Buildings in the modern context. The focus of the design exercise will be on services and creatively applying Architectural Design Principles to make buildings more effective and efficient in terms of energy, water, and waste.

There will be at least one minor exercise involving field studies and case studies. Thus, students will consolidate the learning of two core theory subjects taught during the semester - Energy Efficient Building Design – Theory and Technologies and Building Services and Waste Management. The studio exercise may be done individually or in small groups of 3-4 students as may be decided by the faculty member assigned to coordinate the studio.

One major design exercise will involve a Sustainable Architecture Design Project in a contemporary context that reflects a clear understanding of energy-efficient building designs, building services, and waste management practices. The students must be able to demonstrate their understanding of the latest technologies and building practices related to sustainable architecture.

Note: To ensure complete harmony between theory subjects and design studio exercises, course instructors of

~~the theory subjects may be available in the design studio to provide regular subject related inputs and periodically review the efforts of the students in their specific context.~~
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Course Outcomes:

- | | |
|---|---|
| 1 | Work in a team to undertake studies of contemporary buildings that are worthy examples of renewable energy technologies, complex building services, sustainable waste management, innovative eco-sensitive design, and present the documentation before a group of experts. |
| 2 | Design an Architecture project of substantive scale involving of building services and contemporary technologies and thus demonstrate an understanding of theory subjects learned during the previous semesters and other studies. |

The studio hours of Design courses will involve one to one counseling, review, and feedback sessions. Students are also expected to undertake substantial self-work beyond the prescribed studio hours.

CO-PO Mapping:

	CO 1	CO 2
PO 1	3	3
PO 2	3	3
PO 3	0	3
PO 4	3	3
PO 5	0	3
PO 6	1	0
PO 7	3	3
PO 8	3	3
PO 9	0	3

Criteria for Mapping:

0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance

Course Code: ARC 703		
Name of Course: Dissertation		
TEACHING SCHEME	EXAMINATION SCHEME	CREDITS ALLOCATED:
Theory: 0 Hour/ Week	Total Marks Allocated: 0 End Semester Examination: 0 Internal Assessment: 0	Theory: 0
Studio / Practical: Self Study Course with intermittent guidance	Total Marks Allocated: 100 End Semester Examination: 60 Internal Assessment: 40	Practical/ Studio Work: 16
		Total Credits: 16

Course Pre-requisites:

Successful Completion of 1st, 2nd and 3rd Semester of M.Arch. Programme

Course Objectives and Outline:

Each Student will identify a topic and undertake primary research or an intensive documentation exercise as may be guided by the instructor and prepare a report running into around 100 pages of the main body (excluding supportive pages and annexure). Students will have to submit the soft copy and the hardbound report in duplicate to the department.

Formal presentation (face-to-face or video-conferencing in exceptional cases) and viva voce examination will be conducted by a Jury consisting of Internal and external experts as part of the summative assessment.

Course Outcomes:

- 1 Identify a topic of interest for research or documentation that individual knowledge base related to sustainable architecture and development.
- 2 Undertake systematic literature survey on a given topic.
- 3 Develop a research methodology and carry out field studies and surveys
- 4 Use technology to prepare dissertation reports and presentations
- 5 Effectively present their ideas and research work before a panel of experts and in public forums.

The University policy related to plagiarism shall be applicable.

The studio hours of design/project and dissertation courses will involve one to one counseling, review, and feedback sessions. Students are also expected to undertake substantial self-work beyond the prescribed studio hours.

CO-PO Mapping:

	CO 1	CO 2	CO 3	CO 4	CO 5
PO 1	3	0	3	0	1
PO 2	0	0	0	1	0
PO 3	0	1	0	0	2
PO 4	1	0	0	0	0
PO 5	0	2	1	3	1
PO 6	0	0	0	0	0
PO 7	3	3	3	1	3
PO 8	1	0	3	3	3
PO 9	3	0	3	0	0

Criteria for Mapping:

0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance

Course Code: ARC 711

(Prepared by Dr. Sanjeev Vidyarthi)

Name of Course: Research Methods in Architecture

TEACHING SCHEME	EXAMINATION SCHEME	CREDITS ALLOCATED:
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Theory: 2 Hours/ Week	<u>M.Arch. (Sustainable Architecture) AY 2023-24</u> Total Marks Allocated: 100 End Semester Examination: 60 Internal Assessment: 2X20	Theory: 2
Studio / Practical/Field study: Hours/ Week -0	Total Marks Allocated: Nil End Semester Examination: Nil Internal Assessment: Nil	Practical/ Studio Work/Fieldwork: N
		Total Credits: 2

Course Pre-requisites:

Successful completion of 1st Semester of the M.Arch. (Sustainable Architecture)

Course Objectives:

This course will enable the students to understand the research methodology and research design in architectural research.

Course Outcomes: On completion of the programme participants will be able to

1	Identify a potential research topic related to sustainability in the built environment and present an overview of the research design process, and frame a research question.
2	Describe the conceptual and analytical frameworks for the literature review
3	Explain various methods commonly used for research in Architecture and identify pertinent methods for their research
4	Develop a strategy for field work
5	Present a brief research proposal before a panel of experts.

Approach to Learning:

The approach plan is based on a series of 32 interactive lecture sessions by the experts and exploration and self-study by the students through prescribed readings.

Course Content:

UNIT-I	Introduction: <ul style="list-style-type: none"> Defining and operationalizing sustainability in the built environment identifying and measuring changes over time in the built environment the significance of research in studying built environments Research overview: research design process, elements, and principles of research design framing a meaningful and feasible research question 	(8 Hours)
UNIT-II	Scientific Review of Literature <ul style="list-style-type: none"> Importance of literature review, drawing relevant insights and highlighting contextual arguments from existing scholarship Methods of Literature review Building conceptual and analytical frameworks 	(8 Hours)
UNIT-III	Research Framework <ul style="list-style-type: none"> Importance of hypothesis in research design, conceiving and framing a meaningful hypothesis Research methods: Commonly used research methods for studying built environments 	(10 Hours)
UNIT-IV	Research methods Quantitative Research: Survey <ul style="list-style-type: none"> Designing a research strategy for fieldwork, paying attention to local contexts and regional variations Design of Survey Questionnaire: Design, evaluation and validation Individual exercise –Designing a questionnaire based on previous tutorial followed by survey design Qualitative Research: Case study <ul style="list-style-type: none"> Design and selection of study area Methods of data interpretation, representation, and validation 	(10 Hours)
UNIT-V	Research Proposal <ul style="list-style-type: none"> Composing the research proposal, bringing the research design elements together 	(10 Hours)

UNIT-VI	<u>Arch. (Sustainable Architecture) AY 2023-24</u>					(10 Hours)
	<ul style="list-style-type: none"> Presenting a research proposal, obtaining and incorporating peer feedback 					
Formative & Summative Assessment:						
PART-A	CIA 1 :- UNIT- I, II & III					
	CIA 2:- UNIT- IV & V & VI					
	The faculty will make an assessment based on the written exams /submittals/presentation during the course. At the end of each unit the students will perform a small exercise on basis of the learning of the tutorial under the guidance of the instructor. Also, an end of semester exam will be scheduled as decided by the course instructor.					
PART-B	Assignments: Students will perform the below listed individual exercises for respective units.					
UNIT-I	articulating potential research topics, feasible cases, and identifying an appropriate research question					
UNIT-II	Identifying relevant literature, distinguishing and composing conceptual and analytical frameworks in line with the research question					
UNIT-III	Conceiving relevant hypothesis and identifying pertinent research methods in continuation of previous tutorials.					
UNIT-IV	Drawing a research frame work stating the research methodology					
UNIT-V	Composing the research proposal by building upon previous tutorials followed by designing an appropriate research strategy					
UNIT-VI	The final presentation of individual work in oral and written formats.					
Text Books:						
Research Methodology: Methods and Techniques by C. R. Kothari						
Reference Books and Reports:						
Basic Quantitative Research Methods for Urban Planners by Reid Ewing and Keunhyun Park						
Doing Research in Urban and Regional Planning: Lessons in Practical Methods by Diana Mac Callum, Courtney Babb, Carey Curtis						
Research Methods in Urban and Regional Planning by Xinhao Wang, Rainer Hofe						
Social research Techniques for Planners by Thomas L. Burton, Gordon E. Cherry						
Case Study Research and Applications: Design and Methods by Robert K. Yin						
E- Resources:						
Odongo, J. and Ma, D. (2021) Perspectives in Urban Planning Research: Methods and Tools. Current Urban Studies, 9, 759-778. doi: 10.4236/cus.2021.94045.						
Roggema, R. (2017) Research by Design: Proposition for a Methodological Approach, <i>Urban Sci.</i> 2017, 1(1), 2; https://doi.org/10.3390/urbansci1010002						
CO-PO Mapping:						
Criteria for Mapping:						
	CO 1	CO 2	CO 3	CO 4	CO 5	
PO 1	2	2	3	3	3	
PO 2	2	2	2	3	3	
PO 3	1	1	2	2	3	
PO 4	2	2	3	3	3	
PO 5	1	2	3	3	3	
PO 6	0	0	1	1	2	
PO 7	1	3	3	3	3	
PO 8	3	3	3	3	3	
PO 9	3	3	3	3	3	
0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance						

Course Code: ARC 712		Revised by Ar. Vivekanand Tiwari
Name of Course: Water Management		
TEACHING SCHEME	EXAMINATION SCHEME	CREDITS ALLOCATED:
Theory: 2 Hours/ Week	Total Marks Allocated: 100 End Semester Examination: 60 Internal Assessment: 40	Theory: 2
Studio / Practical: Hours / Week: 1 Hours/ Week	Total Marks Allocated: 00 End Semester Examination: 00 Internal Assessment: 00	Practical/ Studio Work: 1
		Total Credits: 2
Course Pre-requisites:		
2.	Successful completion of 1st Semester of the M.Arch. (Sustainable Architecture)/ MSc. Environmental Science	
Course Objectives:		
2.	<p>With the growth of population and the development of the economy and society, water has become a rare resource in the whole world. Optimizing the allocation of water is an essential content of sustainable development. This course thus brings to focus concepts related to resource-oriented water conservancy that takes the optimized allocation of resources and the balance of environmental ecology as the system target.</p> <p>Concerning sustainable architecture, urban design, and settlement planning, it is prudent to the unified planning of atmospheric water, groundwater, underground water, and sewage and, on this basis, to scientifically develop, use, control, allocate, save, and protect water resources.</p>	
Course Outcomes:		
1)	Describe the need and importance of Management of Water for Architecture students.	
2)	Describe various systems for the treatment, supply, and drainage of water in the context of sustainable development of human habitat.	
3)	Describe traditional water harvesting and conservation methods used by communities in different climatic zones and geographic terrain.	
4)	Describe various facets of Architecture related to water systems in India with special emphasis on those regions where the water is in shortage.	
5)	Explain the approach to the planning of settlements and large campuses based on watersheds.	
6)	Identify various technological options and products for the efficient use of water in buildings.	
Course Content:		
UNIT-I	I. Overview of Water Management for Sustainable Architecture a) Water Cycle, b) Watershed, Drainage, and Runoff, c) Rainfall pattern d) Water consumption patterns and standards for different building typologies e) Water quality standards	(04 Hours)
UNIT-II	II. Traditional community wisdom, a) Based on climate zones b) Case studies from different states of India for example traditional water management systems in Rajasthan (Stepped Wells, Baoris, Tankas, etc)	(04 Hours)
UNIT-III	III. Role of surface water bodies, natural drainage, ponds, streams, lakes, and wetlands	(06 Hours)
UNIT-IV	IV. Effective water management: a) Storage of raw water, Treatment, Conservation, and Recycling b) Basic concept of Groundwater recharge pits, trenches, wells and constructed wetlands etc.	(06 Hours)
UNIT-V	V. Technological options and products for (Building Level), Rainwater harvesting techniques – Basic Concepts	(06 Hours)
UNIT-VI	VI. Planning of settlements and large campuses based on a) Water as a priority resource. b) Principles of sustainable watershed development	(06 Hours)

Internal Assessment:	
PART- A	CIA 1 :- UNIT- I, II, III CIA 2:- Unit III and IV
PART-B	Suggestive Assignments: <ul style="list-style-type: none"> • Assignments on the calculation of water for rainwater harvesting • Case Study and report writing • Term paper and seminar presentation
Practical / Studio Work:	
PART-A	The practical / studio work shall consist of the following: <ul style="list-style-type: none"> 3) Rainfall trend analysis 4) Site features and runoff analysis 5) Case studies of various examples from the different parts of India 6) Use of analytical tools and techniques 7) Hands-on exercise for runoff calculation and recharge and storage tank design
TERM WORK	The term work shall consist of a minimum of one term paper from the areas below: <ul style="list-style-type: none"> • Term paper on traditional practices of water management in urban neighbourhoods and rural settlements • The use of the tools and techniques and various approaches to ensure the following water management at the watershed level.
Text Books:	
h.	John Briscoe, R.P.S. Malik Editors, 2007, Handbook of Water Resources in India: Development, Management, and Strategies: OUP
i.	Urban Ecology, Prमित Verma, Pardeep Singh and more
j.	Ramaswamy R. Iyer, Editor, 2009, Water And The Laws In India: Sage Publications India Pvt. Ltd.,
k.	Jain, Sharad K., Agarwal, Pushpendra K., Singh, Vijay P. 2007, Hydrology and Water Resources of India, Water Science and Technology Library, Vol. 57
l.	Guy Honore, for, 2002, Principles and Practices of Integrated Watershed Management in India, Indo-German Bilateral Project
m.	Rao, K. Nageswara (Ed.), 2006, Water Resources Management: Realities and Challenges, Eastern Book Corpn.
n.	NATHANSON, JERRY A, 2002, Basic Environmental Technology: Water Supply, Waste Management, and Pollution Control; Prentice Hall
o.	Aaj Bhi Khare Hain Talab by Anupam Mishra
Reference Books:	
6.	Dr. B C Punmia, Ashok Kr Jain, Arun Kr Jain; Water Supply Engineering, Laxmi,
7.	Cunliffe, D. (ed) (2011). Water safety in buildings. Geneva, Switzerland, World Health Organization. ISBN-13 9789241548106.
8.	P.K. Singh Rainwater Harvesting, Macmillan Publishers India
9.	R.N. Athavale, 2003, Water Harvesting and Sustainable Supply in India, Rawat Publications
E- Resources:	
1.	Central Ground Water Board, Ministry of Jal Shakti, Department of Water Resources, RD &GR Government of India publication available on: cgwb.gov.in
2.	Central Pollution Control Board publications related to water quality and treatment, available on https://www.cpcb.nic.in/
3.	Water bodies information available on https://bhuvan-wbis.nrsc.gov.in/
4.	Rainfall information from https://mausam.imd.gov.in/
5.	UNEP Publications http://www.unep.or.jp/ietc/ws/index.asp
6.	http://pollution.researchtoday.net/books-pollution.htm
7.	https://washresources.wordpress.com/category/topics/water-supply-topics/water-distribution/
8.	http://www.cseindia.org/taxonomy/term/20167/menu

Topics for project based learning:						
Study of the urban and neighbourhood water management system						
Analyzing the water harvesting system at the site and building level						
Rainwater harvesting tools and techniques for recharge, management and recycling						
CO-PO Mapping:						
Criteria for Mapping:						
	CO 1	CO 2	CO 3	CO 4	CO 5	CO 6
PO 1	3	3	3	3	3	3
PO 2	1	3	3	3	1	1
PO 3	1	3	3	3	1	1
PO 4	3	2	2	2	3	3
PO 5	0	0	0	1	1	1
PO 6	3	2	2	2	3	3
PO 7	3	3	3	3	3	3
PO 8	3	3	3	3	3	3
PO 9	1	1	1	2	3	3
0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance						

Course Code: ARC 713, (Prepared by prof. Neeraj Gupta & Ar. Karan Barpete)		
Name of Course: Sustainable Urban Transportation: Basics of Transport Planning and Design at Neighborhood Level		
TEACHING SCHEME	EXAMINATION SCHEME	CREDITS ALLOCATED:
Theory: 2 Hours/ Week	Total Marks Allocated: 100 End Semester Examination: 60 Internal Assessment: 40	Theory: 2
Studio / Practical: Hours / Week: 2 Hours/ Week	Total Marks Allocated: 0 End Semester Examination: 0 Internal Assessment: 0	Practical/ Studio Work: 1
		Total Credits: 3
Course Pre-requisites:		
	Successful Completion of 1 st Semester of the M. Arch. Programme	
Course Objectives:		
<p>This course is an introductory course on transportation design for neighborhood-level projects. The main emphasis of this course is to educate the students on the importance of transportation in Architecture and help them learn basic transportation planning techniques that they can use in their designs. It also introduces urban mass transit systems like metro rail and BRTS and the design requirements that come with these projects.</p> <p>¹ All students will undertake a project as advised by the course instructor. For example, they may undertake accessibility and walkability analysis of a given project or their own design studio project of current or previous semester. This analysis will among other issues my include parking estimates and suitable location of parking based on the walkability analysis.</p>		
Course Outcomes:		

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1	Explain the fundamental principles of transportation in urban areas and within campus designs.	
2	Demonstrate a basic understanding of movement geometry in campus designs and specialized designs like metro stations, bus stations, and multi-modal interchanges.	
3	Use standards of transportation as described in IRC codes in their architectural designs.	
4	Design parking spaces for large scale buildings, campuses, and urban areas.	
5	Analyze traffic and movement data to create time-space prisms that can help architectural designs become more accessible and efficient.	
6	Understand and implement policies of Transit Oriented Development.	
Course Content:		
UNIT-I	Fundamentals of Transportation a) Overview of components of transport planning b) Understanding circulation and movement in a large area development project like Academic campus, district centers, residential neighborhoods, etc. c) Accessibility and Walkability - Calculating accessibility and walkability at a neighborhood scale using network analysis. Types of accessibility index – Reach metric, Gravity, Closeness metric, Straightness, and Betweenness metric. d) Optimizing transportation costs and energy use by designing ‘walkable’ campuses. (a Case study of campus planning; examples of the design of walkways, foot-over bridges, subways, pedestrian crossing, etc.).	(12 Hours)
UNIT-II	Streetscape and Community Planning a) Using the IRC codes for movement design within communities. Using IRC codes in conjunction with the streetscape. (a Case study of any large area development). b) Design for overcrowding and congestion. Speed calming techniques in streetscape and urban design. Use of Urban design to control movement. c) Figure out Bicycling requirements in a campus plan and inclusion of bicycle sharing within campuses – (Case study of campuses designed to promote bicycling).	(12 Hours)
UNIT-III	Parking a) The social cost of roadside parking. b) Techniques for maximizing the number of vehicles parked in a high-density settlement. Community design to avoid roadside parking. Estimation of parking requirements for residential, commercial, and public projects.	(10 Hours)
UNIT-IV	Introduction to Public Transportation Systems a) Understanding various forms of Mass Transit systems like Metro, Railway, Trams and Buses and Design requirements for the surface, elevated and underground stations.	(10 Hours)
UNIT-V	Transit Oriented Development (TOD) a) Introduction to National Urban Transport Policy b) Regulatory framework and building regulations for TOD c) Impact of mass transit systems on housing choices, housing price, and land value. d) Planning of commercial and retail establishments near airports, metro, rail, and bus stations according to TOD principles.	(10 Hours)
UNIT-VI	Research Potential in Transportation Planning and Design a) Showcasing contemporary research in this field. b) Future areas for researchers – A set of research questions need to be identified,	(10 Hours)

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Internal Assessment:	
PART- A	CIA 1 :- UNIT- I, II, III CIA 2:- Unit III and IV
PART-B	Suggestive Assignments: <ul style="list-style-type: none"> • Accessibility and walkability analysis of their present or previous semester design project. This will include parking estimates and identification of suitable location and design of parking based on the analysis.

Practical / Studio Work:	
PART-A	

TERM WORK	
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Text Books:

- City form lab, MIT. (2016, January 20). Urban network analysis toolbox. Retrieved from Urban network analysis: <http://cityform.mit.edu/projects/urban-network-analysis.html>
- Global Designing Cities Initiative. (2016). Global Street Design Guide. Island Press.
- Moughtin, C., (2003). Urban Design: Street and Square. Architectural Press.
- Robert Horonjeff, F. C. (n.d.). Planning and Design of Airports. McGraw Hill.
- Shoup, D. C., (2017). The High Cost of Free Parking. Routledge Traylor & Francis Group.
- Transport and Sustainability. (2014). Parking Issues and Policies (Vol. 5). (C. M. Stephen Ison, Ed.) Emerald Group Publishing Limited.
- Urban Land Institute II National Parking Association. (n.d.). The Dimensions of Parking.
- City form lab, MIT. (2016, January 20). Urban network analysis toolbox. Retrieved from Urban network analysis: <http://cityform.mit.edu/projects/urban-network-analysis.html>

Reference Books:

CO-PO Mapping:

Criteria for Mapping:

	CO 1	CO 2	CO 3	CO 4	CO 5	CO 6
PO 1	3	1	0	2	0	1
PO 2	3	0	0	1	0	2
PO 3	0	3	3	0	3	0
PO 4	0	0	3	2	0	2
PO 5	0	1	0	0	0	0
PO 6	1	0	1	1	0	0
PO 7	0	3	1	3	0	3
PO 8	0	0	1	0	1	0
PO 9	2	0	3	0	0	3

0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance

Course Code: ARC 714
Name of Course: Renewable Energy Technologies

TEACHING SCHEME	EXAMINATION SCHEME	CREDITS ALLOCATED:
Theory: 2 Hour/ Week Additional: - Working on	Total Marks Allocated: 100 End Semester Examination: 60	Theory: 2

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software (8 hours)	Internal Assessment: 40	
Studio / Practical:	Total Marks Allocated: End Semester Examination: Internal Assessment:	Practical/ Studio Work:
		Total Credits: 2
Course Pre-requisites: The students should have completed		
	5 years of B.Arch. Programme	
Course Objectives:		
	<p>This course will give a general understanding of the various renewable energy production technologies, especially with an emphasis on building integration in urban areas (mainly solar thermal and photovoltaic).</p> <p>Learners shall be able to understand the principles and applicability, and size and integrate solar thermal and photovoltaic systems in buildings. Also, they will be acquainted with other renewable sources with an emphasis on India.</p> <p>It is encouraged, in the form of an assignment, to undertake secondary research on existing buildings in published literature and identify their renewable energy sources.</p>	
Course Outcomes:		
1	Demonstrate understanding of basic concepts, principles, and terminology of different Renewable Energy production.	
2	Apply and size and integrate solar thermal and photovoltaic systems in buildings.	
3	Appraise various government schemes and incentives and economics of integration of renewable energy sources in built forms.	
Course Content:		
UNIT-I	Fundamentals: <ol style="list-style-type: none"> a. Force, energy, and power b. The first and second law of thermodynamics c. Types of renewable energy sources d. Firm and infirm sources 	(4 Theory hours)
UNIT-II	Solar thermal energy: <ol style="list-style-type: none"> a. Solar thermal flux and the greenhouse effect b. Types of collectors and components: flat plate, evacuated tube, concentrating, tracking, storage, plumbing, maintenance, controls and instrumentation c. Sizing, mounting, and angling of collectors, building integration d. Closed and open loop systems, active and passive systems e. Eco-model of ownership f. Maintenance and life-cycle cost, annual output estimation g. Solar Ponds h. Solar chimneys i. Applications: for heat, power, and combined <p>Economics of Renewable Energy Technologies (Solar photovoltaic energy) Contemporary Government schemes/ programs to give incentives for environmental up-gradation and energy efficiency.</p>	(6 Theory hours)
UNIT-III	Solar photovoltaic energy: <ol style="list-style-type: none"> a. History of the technology, operating principles, the structure of silicon cells b. Types of PV cells and components: crystalline, thin films, storage batteries, storage in water head, grid-interactive systems, stand-alone systems c. Sizing, mounting, and angling of collectors, building integration d. Operating characteristics 	(7 Theory hours) Additional: - Working on software (8 hours.)

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	<ul style="list-style-type: none"> e. Economics of Renewable Energy Technologies (Solar photovoltaic energy) f. Contemporary Government schemes/ programs to give incentives for environmental up-gradation and energy efficiency. g. Introduction and working on software dealing with sizing of the solar photovoltaic system 	
UNIT-IV	<p>Wind energy:</p> <ul style="list-style-type: none"> e. Wind flow, power density f. Types of turbines g. An estimate of wind turbine rating, annual output h. Integration with buildings i. Hybridization with solar photovoltaic <p>Economics of Renewable Energy Technologies (Wind Energy) Contemporary Government schemes/ programs to give incentives for environmental up- gradation and energy efficiency.</p>	(6 Theory hours)
UNIT-V	<p>Biomass energy:</p> <ul style="list-style-type: none"> j. Sources: woody and agriculture crops k. Energy from various types of wastes l. Biomass conversion: methanation, gasification, charcoal, incineration <p>Economics of Renewable Energy Technologies (Biomass energy) Contemporary Government schemes.</p>	(3 Theory hours)
UNIT-VI	<p>Other renewable energy sources and carriers:</p> <ul style="list-style-type: none"> m. Geothermal n. Tides o. Waves p. Biotechnological and algal storage q. Hydrogen and fuel cells 	(6 Theory hours)
Internal Assessment:		
PART-A	CIA 1 :- UNIT- I, II, III	
	CIA 2:- UNIT- IV, V, VI	
PART-B	Assignments: Students will perform theoretical/ experimental/ assignments from the suggestive list given below.	
	1) Undertake secondary research on existing buildings in published literature and identify their renewable energy sources	
	2) Paper on sizing solar hot water systems	
	3) Paper on sizing a solar photovoltaic system with batteries	
	4) Quiz / Test on Renewable Energy Concepts during the course delivery (no books allowed)	
	5) Assignment: Case studies of Existing Buildings in India in published Literature for identifying their Renewable Energy Features	
	6) Examination at the end of Semester may be an assignment followed by a presentation and viva voce or a routine exam or an open book exam as per the course instructor's decision.	
	7) Modelling of solar Photovoltaic system for a residential building having a connected load of 15 kW or more.	
Practical / Studio Work:		
PART-A		
Text Books:		
1. Textbook of Renewable Energy by S. C. Bhatia, R. K. Gupta		
Reference Books:		
a. Boyle, G., 2004. <i>Renewable Energy: Power for a Sustainable Future</i> (second edition), Oxford University Press, Oxford.		

b. Gevorkian, P., 2008. *Solar Power in Building Design: The Engineer's Complete Design Resource*, McGraw-Hill Companies Inc., USA.

c. Hodge, B. K., 2010. *Alternative Energy Systems and Applications*, John Wiley & Sons Inc., USA.

d. Kishore, V. V.N., 2008. *Renewable Energy Engineering and Technology*, TERI Press, New Delhi.

e. Solanki, C. S., 2009. *Renewable Energy Technologies: A Practical Guide for Beginners*, PHI Learning Pvt. Ltd., New Delhi.

f. TERI, 2004. *Sustainable Building Design Manual Volume 2*, prepared under a European Union co-funded ASIA-URBS project under the leadership of Institut Catala d'Energia (Spain), The Energy & Resources Institute, India

E- Resources:

<https://www.pvsyst.com/scientific-publications/>

<https://www.pvsyst.com/wp-content/uploads/2020/11/Article-PVSEC-2020.pdf>

Topics for project based learning:

Modelling of solar Photovoltaic system for a residential building having a connected load of 15 kW or more.

Study of existing solar rooftop systems within the University campus.

CO-PO Mapping:

Criteria for Mapping:

	CO 1	CO 2	CO 3	CO 4	CO 5	CO 6
PO 1	1	0	3	NA	NA	NA
PO 2	0	0	0	NA	NA	NA
PO 3	0	0	0	NA	NA	NA
PO 4	0	0	0	NA	NA	NA
PO 5	0	3	3	NA	NA	NA
PO 6	1	1	3	NA	NA	NA
PO 7	3	3	3	NA	NA	NA
PO 8	0	0	0	NA	NA	NA
PO 9	0	3	2	NA	NA	NA

0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance

Course Code: ARC 715 (Revised by Ar. Ritu B Rai – Revised in January 2019)		
Name of Course: Sustainable Neighborhood Planning and Urban Design		
TEACHING SCHEME	EXAMINATION SCHEME	CREDITS ALLOCATED:
Theory: 3 Hour/ Week	Total Marks Allocated: 100 End Semester Examination: 60 Internal Assessment: 40	Theory: 3
Studio / Practical: 0 Hour/ Week	Total Marks Allocated: 0 End Semester Examination: 0 Internal Assessment: 0	Practical/ Studio Work:0
		Total Credits: 3
Course Pre-requisites:		
	Graduation in any discipline and a basic understanding of the Environment, Sustainable Development, and interest in Architecture	
Course Objectives:		
	Given the rapid and haphazard growth of towns and cities and the associated problems of the environment, it is important to understand the macro and micro issues that connect the environment and human habitat. This course looks at the relationship between the built environment with the overall environment. Our ancient traditional wisdom has created a built environment that was responsive to climatic and other local conditions and aesthetically pleasing. Most of the human habitats that one comes across in villages are built on sustainable design principles. Thus, this course looks at strategies that have been in use since historical times to create sustainable neighborhoods. At the same time, it looks at how modern technology can be used to achieve the goals of sustainable development.	
Course Outcomes:		
1	Apply vernacular as well as modern urban design strategies that can mitigate the negative impacts of urban climate.	
2	Appreciate the role of efficient resource (water, waste, materials, energy) management in the development of a sustainable neighborhood.	
3	Demonstrate an understanding of the concepts of Urban renewal, different government schemes of slum Upgradation.	
4	Understand and implement URDPFI guidelines	
5	Integrate renewable energy resources and smart grid at the neighborhood scale.	
Course Content:		
UNIT-I	<ul style="list-style-type: none"> Climate-sensitive design in different climatic Zones of India Traditional design strategies of human habitats in India and other parts of the world with a special focus on resource management and built forms in response to harsh climatic conditions. 	(8 hours)
UNIT-II	<ul style="list-style-type: none"> Concepts and Principles related to “Eco-Village.” Urban pollutants and their impact on air, water, land, and microclimate; 	(8 hours)
UNIT-III	Impact of built density, building footprint, the urban form including height and geometry, the orientation of streets, etc. on microclimate, especially light, ventilation, and temperature.	(8 hours)
UNIT-IV	Improving environmental quality, energy efficiency, efficient resource management (soil, water, waste, and materials) through appropriate site selection, effective neighborhood planning and Urban design strategies; transport planning, land-use zoning strategies, landscape planning, etc.	(8 hours)
UNIT-V	Concepts related to urban renewal, namely inner city regeneration, revitalization of the "townships" and informal settlement/slum upgrading.	(8 hours)
UNIT-VI	Integrating renewable energy at the neighborhood scale, smart grids, the concept	(8 hours)

Internal Assessment:

PART-A	CIA 1 :- UNIT- I, II, III CIA 2:- UNIT- IV, V, VI
PART-B	Assignments: Suggestive assignments/tests / projects / papers: Research article on one of the Urban Pollutants of a city and its impact city or periurban areas of the city. Project Work: A group of students (3-4) will study a neighborhood or human settlement or existing campus and undertake its detailed study in the context of sustainability. The course instructor should design the topics that the collective output of the class can yield meaningful documentation on the specific topic/area/ building typology/ geographic region. One mid-semester exam may be replaced by formal presentation/viva voce by external /internal experts on the project work.
	Write a research article on how regeneration in a specific city has taken place by changed bye laws .
	Write a research article about one scarce resource in your region and what community /governance has done to manage this resource in that area.

Practical / Studio Work:

PART- A	Documentation of an old/medieval town settlement with respect to evolution, geographical hydrological, historical, socio-cultural, and economic considerations. Documentation of differently planned neighborhoods and critically analyzed with respect to urban form, climate, greens/open spaces, walkability, Material,water, waste, energy, and density.
	Prepare a 3 D model(on software of a neighbourhood of your city and evaluate walkability by virtue of street orientation /height geometry .

Text Books:

Reference Books:

- CIRIA, The SUDS Manual, CIRIA C 697
- Emmanuel., R., 2005. An urban approach to climate-sensitive design: strategies for the tropics, Span Press, Taylor, and Francis Group.
- UDPFI Guidelines, Part I and Part II, 1996, Ministry of Urban Development and Poverty Alleviation, Government of India.
- Life and Death of American Cities, by Jane Jacobs
- The Image of the City, by Kevin Lynch
- Public Spaces by Jahn Gehl

CO-PO Mapping:

	CO 1	CO 2	CO 3	CO 4	CO 5
PO 1	3	0	3	3	1
PO 2	3	1	0	0	0
PO 3	3	0	3	1	1
PO 4	0	0	3	3	0
PO 5	0	2	0	0	0
PO 6	2	1	1	0	2
PO 7	0	3	0	2	0
PO 8	1	0	1	0	0
PO 9	0	3	0	1	3

Criteria for Mapping:

0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance

Course Code: ARC 716		
Name of Course: Technical and Scientific Communication for Architects		
TEACHING SCHEME	EXAMINATION SCHEME	CREDITS ALLOCATED:
Theory: 3 Hour/ Week	Total Marks Allocated: 100 End Semester Examination: 60 Internal Assessment: 40	Theory: 3
Studio / Practical: 0 Hour/ Week	Total Marks Allocated: 0 End Semester Examination: 0 Internal Assessment: 0	Practical/ Studio Work:0
		Total Credits: 3
Course Pre-requisites:		
	Successful completion of B.Arch	
Course Objectives:		
	<p>Architect's prime language is drawings and sketches. During the undergraduate studies in Architecture, there was a very limited focus on writing skills to produce effective technical and scientific documents. With the technological changes in the recent past, design drawings and sketches are no longer sufficient for bidding for Architectural projects, justifying design decisions, or even for the execution of the project. These projects now require a scientific justification for design decisions and documentation of design. This course is designed to help you fill the knowledge gap and develop your writing skills.</p>	
Course Outcomes:		
1	Demonstrate an understanding of the basic principles and methods of scientific and technical writing.	
2	Write research papers, technical reports, dissertations, and other documents commonly used in scientific and technical fields and organizations.	
3	Demonstrate formal presentations and oral communication skills to effectively communicate scientific and technical information in seminars, conferences, and other public forums	

Course Content:		
UNIT-I	<p>Basics of Communication</p> <ul style="list-style-type: none"> ☐ Process of Communication ☐ Communication as a Social Behavior – Linguistic and Non-Linguistic Component. ☐ Distinctive features of Business, Technical and Scientific Communication ☐ Developing Project Documents - Converting design drawings to design documents. ☐ Using Appropriate Language ☐ Using search engines and other resources for research ☐ Importance of scientific indices and peer-reviewed journals 	(8 hours)
UNIT-II	<ul style="list-style-type: none"> ☐ Common Errors in the English Language - Tenses, Preposition, Subject-Verb Agreement, Determiners. ☐ Choosing appropriate Words - Abstract and Concrete words, Technical words and Acronyms, Gender Neutral Words, Words that stereotype by race, age, etc. ☐ Passive and Active Voice ☐ Construction of Sentences and Paragraphs 	(8 hours)
UNIT-III	<p>Writing Skills</p> <ul style="list-style-type: none"> ☐ Forms of Written Communication (Letters, emails, Business and Technical Reports, Press- releases, research papers, etc.) ☐ Process of Writing ☐ Structure of Technical and Scientific Reports, Synopsis, Dissertation, and Research Papers. ☐ Writing proposals for funding support 	(8 hours)
UNIT-IV	<ul style="list-style-type: none"> ☐ Legal Documentation – MoUs and Contracts ☐ Review of Literature ☐ Referencing – Overview of different styles ☐ Use of software for citation and bibliography; Developing your publication projects using free tools like Mendeley citation and library manager. ☐ Importance of Academic Integrity, Using plagiarism detecting software for clean writing. 	(8 hours)
UNIT-V	<p>Making Effective Presentations</p> <ul style="list-style-type: none"> ☐ Formatting reports and other documents for visual appeal – Structure, Fonts, Diagrams, pictures, tables, etc. ☐ Overview of Public Speaking – speaking in small groups, making formal presentations before experts, public seminars and paper presentations in conferences ☐ Identifying the right platform for presentation: Difference between conference proceedings and journal publications and their impacts. 	(8 hours)
UNIT-VI	<ul style="list-style-type: none"> ☐ Process of preparing formal presentations – Strategy, Developing Content, Preparing presentations. ☐ Making Effective Presentations - Using Visual Aids and Technology effectively, Audience analysis, Body Language 	(8 hours)

Internal Assessment:	
PART-A	CIA 1 :- UNIT- I, II, III CIA 2:- UNIT- IV, V, VI
PART-B	Assignments: Suggestive assignments / tests / projects / papers:

Practical / Studio Work:	
PART- A	

Text Books:	

Reference Books:	
<input type="checkbox"/>	Anderson, P .V. (2007). Technical communication: a reader-centered approach.
<input type="checkbox"/>	Aruna, K. (2010). Professional communication.
<input type="checkbox"/>	Becker, H. S., & Richards, P. (2007). Writing for social scientists: how to start and finish your thesis, book, or article.
<input type="checkbox"/>	Berger, A. A. (2008). Academic writer’s toolkit, the: a user’s manual.
<input type="checkbox"/>	Chaturvedi, P.D., and Chaturvedi Mukesh (2017). The Art and Science of Business Communication,
<input type="checkbox"/>	Lesikar, R.V. and Flatley, Marie E. (2005) Basic Business Communication; Skills for Empowering Internet Generation.
<input type="checkbox"/>	Osborn S., Osborn M., and Osborn R. (2008) Public Speaking Guidebook.
<input type="checkbox"/>	Raymond Murphy, Essential English Grammar- (A self-study reference and practice book for elementary students of English.)
<input type="checkbox"/>	Tyagi, Kavita, and Misra, Padma, (2011) Basic Technical Communication

CO-PO Mapping:				
	CO 1	CO 2	CO 3	
PO 1	0	0	2	
PO 2	0	1	0	
PO 3	0	0	1	
PO 4	1	2	0	
PO 5	0	0	1	
PO 6	3	3	0	
PO 7	3	3	3	
PO 8	0	3	3	
PO 9	2	0	0	

Criteria for Mapping:
0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance

TEACHING SCHEME	EXAMINATION SCHEME	CREDITS ALLOCATED:
Theory: 2 Hour/ Week	Total Marks Allocated: 100 End Semester Examination: 60 Internal Assessment: 40	Theory: 3
Studio / Practical:1 Hour/ Week	Total Marks Allocated: 0 End Semester Examination: 0 Internal Assessment: 0	Practical/ Studio Work:0
(About 42 learning sessions)		Total Credits: 3

Course Pre-requisites:

Successful completion of 1st semester of the master's Programme in Architecture, Science and Technology

Course Objectives:

This course intends to impart the knowledge of the basics of the science of project management in the field of sustainable architecture. The basic objective is to impart skills so that students can learn to execute projects while dealing with all organizational, technical, financial, human resource, and sustainability issues.

Course Outcomes:

- 1 Explain the fundamental principles of management and describe the various schools of management thoughts from historical to current times.
- 2 Demonstrate a basic understanding of Project Management, Project Planning and Project Financing
- 3 Develop a basic cash flow requirement for a simple building project.
- 4 Describe various phases of the Project Life Cycle.
- 5 Prepare bar charts and showing a list of activities in various phases of project management in the context of the implementation of sustainable architecture projects.

Course Content:

UNIT-I	Fundamentals of Management – Concepts and Principles, Relevance and Application of Classical and Contemporary management thoughts for Construction Projects, Managerial Roles and Skills	(8 hours)
UNIT-II	Introduction to Project Management: Basic understanding of: a.Project Life Cycle for developmental projects and Infrastructure projects b.Types of Project Feasibility c.The Process Management Framework d.Project Organizations	(8 hours)
UNIT-III	Project Planning: Scheduling, Time management	(8 hours)
UNIT-IV	Project Financing a.Life Cycle Costs b.Cost-Benefit Analysis c.Overview of NPV, Time Value for Money, etc. d.Cash Flows e.Overview of project delivery models (Engineering Procurement and Construction, Public Private Partnership)	(8 hours)
UNIT-V	Project Management Phases: a.Pre – Construction Activities i.Surveys, studies, and documentation as required for sustainable architecture ii.Selection and Appointment of Consultants a. Preparing and responding to EoIs, RFPs, (samples to be studied) b. Design Briefs for Sustainable Architecture. (samples to be studied) iii.Overview of scope management.	(8 hours)
UNIT-VI	b. During – Construction Activities i. Managing Contracts with Consultants, contractors, vendors	(8 hours)

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	iii. Monitoring Projects from Architect's and Client's Perspective iv. Project Scheduling v. Basics of Project Risks c. Post Construction Phase Activities i. Taking / Handing over the site for occupation ii. Managing warranties and Guarantees iii. Checklists for Snags and Defects iv. Introduction to facility management

Internal Assessment:

PART-A	CIA 1 :- UNIT- I, II, III
	CIA 2:- UNIT- IV, V, VI

PART-B	Assignments: Suggestive assignments / tests / projects / papers: Assignment: Preparing project activity schedules, Cash flow, Preparing EOIs, Design Briefs, Paper on Cost-benefit analysis of a sustainable building Quiz / Class tests on safety, health and environment issues in project management, Teamwork and other HR issues.
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Practical / Studio Work:

PART- A	
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Text Books:

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Reference Books:

- Paul C. Dinsmore - PMP; Jeannette The AMA Handbook of Project AMACOM; 2nd edition,
- Turner, Simister, 2000, Gower Handbook of Project Management, Gower Publishing Ltd,
- Dr. Vasant Desai, 2009, Project Management, Himalaya Publishing House,
- K.K Chitkara, 1998 (reprinted-2009), Construction Project Management: Planning, Scheduling, and Control McGraw Hill,
- K.K Chitkara, 2001, Construction Project Management Techniques And Practice, McGraw Hill, 2001

CO-PO Mapping:

	CO 1	CO 2	CO 3	CO 4	CO 5
PO 1	0	0	1	0	0
PO 2	0	0	0	0	1
PO 3	0	1	2	1	0
PO 4	0	0	0	0	0
PO 5	1	0	0	0	0
PO 6	0	1	3	1	0
PO 7	3	0	3	3	2
PO 8	0	3	1	1	1
PO 9	3	0	0	3	3

Criteria for Mapping:

0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance

Course Code: ARC 719 (SAE 15)		
Name of Course: Sustainable Landscape Architecture <i>(Prepared by Ar. Mahesh Paliwal)</i>		
TEACHING SCHEME	EXAMINATION SCHEME	CREDITS ALLOCATED:
Theory: 3 Hour/ Week	Total Marks Allocated: 100 End Semester Examination: 60 Internal Assessment: 2x20	Theory: 3
Studio / Practical: Nil Hours / Week	Total Marks Allocated: End Semester Examination: Internal Assessment:	Practical/ Studio Work: Nil
		Total Credits: 3
Course Pre-requisites:		
	Successful Completion of 1st Semester of the M.Arch or 2nd Semester of M.Sc. Environmental Science Programme, and competency to read drawings.	
Course Objectives:		
	This course will cover the theory of landscape architecture, plants and design, landscape management/ economics, heritage, and cultural landscapes. The main emphasis of the total outcome of the course shall be site planning and landscape engineering.	
Course Outcomes:		
1	Present an overview of landscape design covering important historical cases in Indian and International context.	
2	Describe the Hierarchy of open spaces and the safety and security aspects in landscape design	
3	List eco-sensitive landscape building materials, and plant varieties	
4	Demonstrate an understanding of various aspects related to exclusive landscapes.	
5	Undertake ecological analysis of sites with regarding physiography, microclimatic conditions, soil, and local vegetation.	
Course Content:		
UNIT-I	Introduction to Landscape Architecture: Historical Landscape and Contemporary Landscape in Indian and International context.	(8 Hours)
UNIT-II	Ecological Analysis of Site with the following parameters Physiography (Slope and Relief) <ul style="list-style-type: none">● Soil● Geology	(10 Hours)

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	<ul style="list-style-type: none"> ● Vegetation ● Visual ● Microclimate 	
UNIT-III	Hierarchy of open space & Place Making <ul style="list-style-type: none"> ● City level ● Neighborhood-level ● Playfields: Indoor and Outdoor 	(8 Hours)
UNIT-IV	Security and Safety Aspects in Landscape Architecture <ul style="list-style-type: none"> ● Territorialism, broken window theory, mental mapping, neighborhood form index, activity generator and moderator ● Crime preventive environmental design 	(8Hours)
UNIT-V	Planting plan and Landscape Design <ul style="list-style-type: none"> ● Plant & features(Textures, colors, spread, heights) ● Understanding of Indigenous species ● Qualitative aspects of plants ● Thematic aspects of the use of plants in space 	(8 Hours)
UNIT-VI	Eco-sensitive Landscape design, details & Building Materials <ul style="list-style-type: none"> ● Interior and atrium Landscape ● Green roof and Green Walls ● Creating Microclimate 	(6 Hours)
Internal Assessment:		
PART-A	CIA 1 :- UNIT- I, II, III	
	CIA 2:- UNIT- IV, V, VI	
PART-B	Assignments: Students will perform theoretical/ practical/assignments from the suggestive list given below.	
	1) Present a Paper on plant ecology and stratification	
	2) Paper on landscape management on regional scale/biodiversity	
	3) Case studies of sustainable landscape designs/ biodiversity parts / regional parks/woodlands in different climatic zones.	
	4) Prepare a sequencing of work included in site development and give an oral presentation on respective urban design site.	
	5) Provide a conceptual landscape development plan for a give built form.	
	6) Provide a framework for crime preventive and user friendly landscape design for large area development.	
Practical / Studio Work:		
PART-A	The practical / studio work shall consist of the following:	
	The student's progress will be evaluated by the studio instructor of design project on basis of his/ her landscape approach integrated in the design.	
Text Books:		
	● Landscape Architecture by Simonds John Ormsbee	
	● Design with Nature, by Ian McHarg	
	● Landscape Architecture In India, A Reader by Mohammad Shahee	
	●	
Reference Books and reports		
	1. BIS codes and Landscape codes	
	2. Site Analysis: Informing Context-Sensitive and Sustainable Site Planning and Design by James A. LaGro Jr.	
	3. Need for resource-conscious landscaping by Prarthana Rao and Sabita Kaushal	
	4. A handbook of landscapes by CPWD India	
	5. Time Savers-Landscape Architecture	
	6. NBC	
	7. IGBC Green Landscape Rating System	
E- Resources:		
	1. Afon, A. O., & Adebara, T. M. (2019). Socio-cultural Utilization of Open Spaces in the Traditional Residential Neighborhood of. https://doi.org/10.1177/1206331219874698	
	2. Bridges, C. N., Prochnow, T. M., Wilkins, E. C., Porter, K. M. P., & Meyer, M. R. U. (2020). Examining the	

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 Implementation of Play Streets: A Systematic Review of the Grey Literature. *Journal of Public Health Management and Practice*, 26(3), E1–E10. <https://doi.org/10.1097/PHH.0000000000001015>

3. Broeck, B. K. Ten. (1984). Who uses our parks ? | An evaluation of the application of standards-based recreation planning methods for assessing neighborhood park needs in urban Missoula , Montana.
4. Emenike, A. I. (2016). Developing sustainable and liveable neighbourhoods : the role of public open spaces, 204(Sc). <https://doi.org/10.2495/SC160221>
5. Franck, K. A., & Paxson, L. (1989). Women and Urban Public space. In E. H. Altman, Irwin & Zube (Ed.), *Public places and Spaces* (pp. 121–146). Springer, Boston, MA. <https://doi.org/https://doi.org/10.1007/978-1-4684-5601-1>
6. Graif, C., Gladfelter, A. S., & Matthews, S. A. (2014). Urban poverty and neighborhood effects on crime: Incorporating spatial and network perspectives. *Sociology Compass*, 8(9), 1140–1155. <https://doi.org/10.1111/soc4.12199>

CO-PO Mapping:

	CO 1	CO 2	CO 3	CO 4	CO 5
PO 1	3	2	2	3	3
PO 2	3	3	0	0	2
PO 3	0	1	2	2	1
PO 4	1	0	0	1	0
PO 5	2	2	2	0	2
PO 6	0	1	0	0	1
PO 7	1	3	3	3	0
PO 8	1	0	0	0	2
PO 9	0	2	2	3	3

Criteria for Mapping:

0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance

Course Code: ARC 720

Name of Course: Green Building Certification

TEACHING SCHEME	EXAMINATION SCHEME	CREDITS ALLOCATED:
Theory: 2 Hour/ Week	Total Marks Allocated: 100 End Semester Examination: 60 Internal Assessment: 40	Theory: 2

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Studio / Practical: Nil	Total Marks Allocated: Nil	
	End Semester Examination: Nil Internal Assessment: Nil	
		Total Credits: 2

Course Pre-requisites:

	Successful Completion of 1st Semester of the M.Arch. or 2nd Semester of M.Sc. Environmental Science Programme and competency to read drawings
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Course Objectives & Outline:

We built our 'green' buildings thousands of years back. Traditional and vernacular architecture of India has always been designed to respond to local climatic conditions and use local building materials. The world holds in awe historic architecture of forts, palaces, and havelis where passive design techniques achieved thermal comfort. However, most of the contemporary architecture seems to rely on importing designs, materials, and technologies. The result is an array of glass-clad look-alike buildings in all cities. With increasing awareness about sustainability, more and more, organizations are looking for energy efficient buildings. Investors and corporations are now demanding green, certified buildings. The users are demanding healthier, and higher quality buildings and are willing to pay a higher price for such buildings.

Building regulations of many states encourage 'green buildings' and incentives like additional FAR is being offered to promote green certified buildings. In short, there is a demand for professionals who understand the green building rating systems and certifications and have basic knowledge of rating tools available in India.

The course will allow you to understand how the building regulations, codes, and green rating programs work. This course will help you develop competence to rate buildings using at least one of the rating systems used in India. You may be able to understand the financial considerations of green buildings.

Course Outcomes:

1	Describe what are 'green buildings' the financial considerations of green buildings and the concept of Life Cycle Costing
2	Describe various green certification systems used in different parts of the world.
3	Describe the IGBC Green Building Rating Systems
4	Work individually or in teams to evaluate a building based on GRIHA Rating systems.

Approach to Learning:

The approach planned is that of a series of interactive lecture sessions by experts and exploration and self-study by the students through prescribed readings like GRIHA manual, webinars, etc.

Course Content:

UNIT-I	Green Buildings – Definition, Financial Aspects, Life Cycle Costing.	(5 Hours)
UNIT-II	Introduction to Green Rating Systems used in different parts of the world: a. BREEAM b. CASBEE c. Green Star d. HK-BEAM e. LEED Rating system	(5 Hours)
UNIT-III	Indian Green Building Council Green Building Rating Systems: a. Introduction to different rating systems, for example for New Buildings, Existing Buildings, Homes, Campus, Townships, etc. b. Overview of Certification Procedure	(6 Hours)
UNIT-IV	Case Studies Of IGBC Registered/Rated Buildings	(5 Hours)
UNIT-V	GRIHA – The National Rating System a. Comprehensive Understanding of GRIHA Rating system, b. Underlying criterion and c. Rating procedure	(6 Hours)
UNIT-VI	Case Studies Of GRIHA Registered/Rated Buildings	(5 Hours)

Formative and Summative Assessment:				
PART-A	CIA 1 :- UNIT- I, II			
	CIA 2:- UNIT- III, IV			
PART-B	The faculty will make an assessment based on the written exams, quizzes, and submittals during the course. A panel of faculty members/experts will base the summative assessment on the formal presentation by the student on a given topic. Also, an end of semester exam may be scheduled as decided by the course instructor. If the logistics permit, the panel will have at least one expert from outside the department/school/university.			
Text Books:				
1. Handbook on Green Practices published by Indian Society of Heating Refrigerating and Air conditioning Engineers, 2009.				
2. Green Building Hand Book by Tom Woolley and Samkimings, 2009.				
Reference Books:				
1. Complete Guide to Green Buildings by Trish Riley				
2. Standard for the design for High-Performance Green Buildings by Kent Peterson, 2009				
3. GRIHA Manual, National Building Code, Energy Conservation Building Code				
4. Overview of green building rating tools.				
E- Resources:				
1. E-booklets of Indian Green Building Council (https://igbc.in/igbc/)				
2. E-booklets of GRIHA (https://www.grihaindia.org/)				
Topics for project based learning:				
1. Analysis of Existing IGBC/ GRIHA certified buildings in Indian context				
2. Analysis of new constructions based on IGBC/ Griha guidelines				
3. Simulation based studies for proposed design cases based on IGBC/ GRIHA guidelines				
CO-PO Mapping:				
Criteria for Mapping:				
	CO 1	CO 2	CO 3	CO 4
PO 1	0	0	0	0
PO 2	0	0	0	2
PO 3	0	0	0	2
PO 4	0	0	0	0
PO 5	2	0	0	2
PO 6	1	0	0	3
PO 7	0	0	0	0
PO 8	0	0	0	1
PO 9	0	0	0	3
0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance				

Course Code: ARC 721		
Name of Course: Basic Teaching Skills for Higher Education (Prepared by Prof. Neeraj Gupta)		
TEACHING SCHEME	EXAMINATION SCHEME	CREDITS ALLOCATED:
Theory: 30 Hours (Maybe distributed as per need)	Total Marks Allocated: 60 End Semester Examination: 40 Internal Assessment: 20	Theory: 2
Studio / Practical: 30 Hours (Maybe distributed as per need)	Total Marks Allocated: 40 End Semester Examination: 20 Internal Assessment: 20	Practical/ Studio Work: 1
		Total Credits: 3
Course Pre-requisites:		
Successful completion of 1st semester of the Masters's Programme in any discipline The course is open to all students of the Masters's and Ph.D. programs and teachers who are desirous of enhancing their teaching competencies.		
Course Description:		
This course, specially designed for persons aspiring to become teachers after their Master's and PhD programs, will equip them with the knowledge and skills necessary for effective teaching. Various teaching methods, like lectures, student seminars, group discussions, coaching, mentoring, and project work will be covered. The course will help learners to understand the nuances teaching-learning process, classroom management, and handling challenging situations. The course will also cover contemporary issues in higher education, like choice-based credit framework, design of learning events, evaluation and feedback, and various synchronous and asynchronous learning formats. Participants will also be able to practice teaching methods, make presentations, and receive feedback.		
Course Outcomes: On completion of the course, the participant will be able to		
1.	Describe the adult teaching-learning process, learning styles and attributes of effective teaching.	
2.	Describe the choice-based credit systems and write learning outcomes for a course	
3.	Identify suitable teaching methods, develop lesson plans, and use case studies, activities, and exercises in the classroom.	
4.	Make effective presentations using visual aids and online tools in classrooms and	
5.	Demonstrate enhanced competency in communicating with students and managing challenging behavior in classrooms.	
6.	Demonstrate ability to work in a team and organize events and support administrative work	
Approach to Learning:		
It is an intensive course that will rely on interactive lecture sessions, PowerPoint presentations, group discussions, role-		

plays, mock teaching, and facilitation sessions with video recording and feedback.

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Course Content:

UNIT-I	Overview of Adult Learning Theories <ul style="list-style-type: none"> ● Pedagogy vs. Andragogy ● Kolb’s Learning Cycle ● Learning Styles 	(6 Hours)
UNIT-II	Curriculum Design and Development <ul style="list-style-type: none"> ● Overview of Choice Based Credit System ● Basics of Curriculum Design ● Writing Learning Outcomes 	(8 Hours)
UNIT-III	Teaching Methods <ul style="list-style-type: none"> ● Traditional teaching strategies ● Activity-based teaching strategies ● Developing case studies, activities, and exercises ● Preparing Lesson Plans ● Formative and Summative Assessment, Using Evaluation Rubrics ● Supporting ‘Slow Learners’ 	(12 Hours)
UNIT-IV	Direct Teaching Skills <ol style="list-style-type: none"> 1) Using visual aids effectively – Black/White Boards, Flip Charts, Models, Computers and LCD projectors 2) Class Room Management <ol style="list-style-type: none"> i) Organizing the physical environment ii) Managing the lesson, activities, and interaction iii) Managing Behaviour, handling challenging situations iv) Managing Self v) Providing developmental and motivational feedback 3) Counseling and Mentoring 4) Guiding Design and Research-Based Projects 	(14 Hours)
UNIT-V	Designing and Delivering Effective Lectures <ul style="list-style-type: none"> ● Structuring contents ● Delivery methods ● Handling questions ● Introduction to MOOCs ● Role of Teacher in E-Learning 	(10 Hours)
UNIT-VI	Managerial Skills for teachers <ul style="list-style-type: none"> ● Role of a University Teacher – (Academic, Administrative, Supportive) ● Effective Communication ● Leadership skills ● Organizing Seminars, Conferences and other Events, ● Managing Records 	(10 Hours)

Formative & Summative Assessment:

	CIA 1 :- UNIT- I, II, III
	CIA 2:- UNIT- IV, V, VI
	The Course instructor will make an assessment based on the written exams, submittals, quizzes and practical demonstrations during the course. The end-of-semester exam will consist of a practical session and a written theory paper.
	Assignments: Students will perform theoretical/ presentation/assignments from the suggested list below. The course instructor may modify /augment the list as per the requirements of the learner group.
	1) Writing Learning Outcomes
	2) Preparing Lesson Plans
	3) Designing an Evaluation Rubric
	4) Preparing a quiz/question paper for proctored and/or open-book exam
	5) Designing activity for classroom/field visit
	6) Preparing flyer/welcome/thank-you note for a conference
	7) Preparing a short report summarising a Lecture

Practical / Studio Work:

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The practical studio work may consist of, but not limited to the following:

- Making formal presentations using PowerPoint
- Presenting a lecture using the Whiteboard / Chalkboard
- Giving feedback on the presentation
- Using e-learning resources, scheduling and making an online presentation

Text Books:

- 1) Andragogy in Action: Applying Modern Principles of Adult Learning (The Jossey-Bass higher education series)
- 2) The Adult Learner: The Definitive Classic in Adult Education and Human Resource Development, Malcolm S. Knowles (Author), Elwood F. Holton III (Author), & 2 More
- 3) The modern practice of adult education: From pedagogy to andragogy by Shepherd Malcolm Knowles
- 4) Handbook on Formative and Summative Evaluation of Student Learning, Bloom B. S., Hastings J. T., Madaus G. F., Hastings, J. T., Baldwin, T. S. (1971).
- 5) PEDAGOGY, ANDRAGOGY AND ASSESSMENT; Arnab Chowdhury and Jayanta Mete
- 6) Progressive Studio Pedagogy Examples from Architecture and Allied Design Fields, Edited By Charlie Smith
- 7) Osborn S., Osborn M., and Osborn R. (2008) Public Speaking Guidebook.
- 8) Lesikar, R.V. and Flatley, Marie E. (2005) Basic Business Communication; Skills for Empowering Internet Generation.

Reference Books and Reports

- 1) The adult learner by Knowles, Malcolm S., Holton, Elwood F., Swanson, Richard A.
- 2) Assessment Tools for Mapping Learning Outcomes With Learning Objectives, G. R. Sinha
- 3) National Education Policy 2020
- 4) Reports and Guidelines issued by UGC and AIU from time to time
- 5) Teaching Online: A Practical Guide (College Teaching Series); Susan Ko, Steve Rossen
- 6) Places of Learning: Media, Architecture, Pedagogy by Elizabeth Ellsworth
- 7) Better Feedback for Better Teaching: A Practical Guide to Improving Classroom Observations;
- 8) Jeff Archer, Steven Cantrell, Steven L. Holtzman, & 3 more
- 9) Research Methodology, Mukul Gupta and Deepa Gupta
- 10) Giving Knowledge for Free - The Emergence Of Open Educational Resources, Organisation For Economic Co-Operation And Development
- 11) Public Speaking for College and Career, Hamilton Gregory
- 12) Talk Like TED: The 9 Public Speaking Secrets of the World's Top Minds, Carmine Gallo
- 13) Say It With Presentations, Gene Zelazny

E-Resources: Following indicative list may be updated and augmented by the course instructor

- 1) Ancient Education system of India <https://ncert.nic.in/textbook/pdf/heih111.pdf>
- 2) https://www.researchgate.net/publication/348644826_Andragogy_A_Theory_in_Practice_in_Higher_Education
- 3) https://www.researchgate.net/publication/352247541_Global_Research_on_Andragogy_A_Bibliometric_Analysis
- 4) Technology, Learning, and Individual Differences by Anne A. Ghost Bear
- 5) Education in Ancient India; Altekar A.S., e-book
- 6) <https://indianculture.gov.in/ebooks/education-ancient-india>

CO-PO Mapping

Course Code: ARC 722

Name of Course: Simulation and Modelling for Building Energy Performance

TEACHING SCHEME

EXAMINATION SCHEME

CREDITS ALLOCATED:

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Criteria for Mapping:

	CO 1	CO 2	CO 3	CO 4	CO 5	CO 6
PO 1	0	0	0	0	0	0
PO 2	0	0	0	0	0	0
PO 3	0	0	0	0	0	0
PO 4	1	0	1	2	2	3
PO 5	0	0	0	0	0	0
PO 6	0	0	0	0	0	0
PO 7	2	2	3	3	3	3
PO 8	3	3	3	3	3	3
PO 9	3	3	3	3	3	3

0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance

Theory: 2 Hours / Week	Total Marks Allocated: 45 <ul style="list-style-type: none"> End Semester Examination: 45 Internal Assessment: 30 	Theory: 2 (32 Interactive Lecture / Activity Sessions) ³
Studio / Practical: 1 Hours / Week	Total Marks Allocated: 25 <ul style="list-style-type: none"> End Semester Examination: 15 Internal Assessment: 10 	Practical/ Studio Work: 1
		Total Credits: 3

Course Pre-requisites: The students should have completed 5 years of B.Arch. Programme (minimum eligibility)

Course Objectives:
To develop the knowledge of whole building energy simulation for quantifying building energy performance and energy compliance procedure as per Energy Conservation Building Code.

Course Outcomes: The student will be able to

1	Describe various energy Efficiency compliance approaches for the building as per relevant Code/ standards.
2	Identify various input parameters for software used for building energy performance calculations.
3	Select and use appropriate software for whole building performance simulation and daylight simulation to show compliance of parameters given by ECBC /other relevant codes in the Indian context.
4	Identify and recommend various Energy Efficiency Measures (EEMs) for achieving the energy-efficient design of buildings.

Course Content:

UNIT-I	Fundamentals of Simulation <ul style="list-style-type: none"> a. General overview and Specific about Energy Simulation b. Types of Simulation – Whole Building / Component c. Case study – 1 – Overview (Walk thru one project) d. Geometry e. Weather file f. Construction g. Schedule h. HVAC / Lighting i. Basic data collection to start the simulation j. Converting '.epw weather' file into '.BIN file' 	(6 Theory hours)
UNIT-II	Shading and Massing Analysis of Architectural Forms.	(3 Theory hours, and 2 practical hours)
UNIT-III	Fundamentals of Daylight simulation <ul style="list-style-type: none"> a. Daylighting – 1 – Fenestration Size, Location, Material, Performance b. Artificial Lighting c. Useful daylight illuminance, Daylight autonomy d. Simulation for Skylight e. Application of UDI and Daylight Extent Factor 	(6 Theory hours, and 2 practical hours)
UNIT-IV	Natural Ventilation and Conditioned Building – Basic Systems	(5 Theory hours)
UNIT-V	Energy Simulation for ECBC <ul style="list-style-type: none"> • Prescriptive Method • Whole Building Performance Method 	(8 Theory hours.)
UNIT-VI	<ul style="list-style-type: none"> • Modelling of the building using the whole building performance method with the help of a software 	(4 Theory hours 12 Practical hours.)

Internal Assessment:

PART-A	CIA 1 :- UNIT- I, II, III
	CIA 2:- UNIT- IV, V, VI
PART-B	Assignments: Students will perform theoretical/ experimental/ assignments from the suggestive list given below.
	1) Working on the development of Templates
	2) Daylighting; Artificial Lighting
	3) HVAC – Natural Ventilation
	4) Analyzing Small Conditioned commercial building for their energy performance as per ECBC /ECBC+ /Super ECBC Compliance
	5) Analyzing Small Conditioned commercial buildings for their daylight performance, as per ECBC /ECBC+ /Super ECBC Compliance
6) Parametric Analysis	

Practical / Studio Work:

PART-A	The practical / studio work shall consist of the following:
	1) Modelling of a building showing ECBC/ECBC+/Super ECBC level compliance using the Whole Building Performance Method
	2) Modelling of a group of buildings showing ECBC/ECBC+/Super ECBC level compliance using the Whole Building Performance Method
	2) Manual Daylighting Compliance Method

Text Books:

- 1) Energy Conservation Building Code of India
- 2) Standard 90.1 - ASHRAE

Reference Books:

- 1) National Building Code of India
- 2) Bureau of Energy Efficiency Rating System
- 3) ECBC compliance of Prabha Bhavan, MNIT, Jaipur

E- Resources:

- 1) <https://beeindia.gov.in/content/ecbc-commercial>
- 2) https://beeindia.gov.in/sites/default/files/advagg_js/E-Book%20ECBC%20CODE%202017/index.html
- 3) <https://doe2.com/>
- 4) <https://www.ashrae.org/technical-resources/bookstore/standard-90-1>
- 5) https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-24863.pdf

Topics for project based learning:

Energy models of commercial buildings showing compliance with Energy Conservation Building Code.

CO-PO Mapping:

Criteria for Mapping:

	CO 1	CO 2	CO 3	CO 4	CO 5	CO 6
PO 1	0	0	0	0	NA	NA
PO 2	0	0	0	0	NA	NA
PO 3	0	0	0	0	NA	NA
PO 4	0	0	0	0	NA	NA
PO 5	0	3	3	3	NA	NA
PO 6	3	3	0	0	NA	NA
PO 7	1	2	0	3	NA	NA
PO 8	2	2	0	3	NA	NA
PO 9	3	3	3	3	NA	NA

0= No Relevance 1= Low Relevance 2= Medium Relevance 3= High Relevance

Course Code: ARC 723**Name of Course: Academic Research Writing (Prepared by Prof. Neeraj Gupta)**

TEACHING SCHEME	EXAMINATION SCHEME	CREDITS ALLOCATED:32
Theory: 32 Hours (Maybe distributed as per need)	Total Marks Allocated: 100 End Semester Examination: 60 Internal Assessment: 40	Theory: 2
Studio / Practical: 0 Hours (Maybe distributed as per need)	Total Marks Allocated: 0 End Semester Examination: 0 Internal Assessment: 0	Practical/ Studio Work: 0
		Total Credits: 2

Course Pre-requisites:

Graduation in any Discipline with working knowledge of word processing and desk top presentations.

Course Description:

It is an Ability Enhancement Compulsory Course and an important supportive part of Dissertation Course offered in Programme. This course aims to develop skills in professional and research writing and presentations. (The students are free to opt for a similar course through MOOC)

Course Outcomes: On completion of the course, the participant will be able to

7.	State the need of professional writing skills.
8.	Describe distinguishing features and structure of research writing and process of writing
9.	Identify different skills and patterns in writing a research papers with proper formatting
10.	write professional emails
11.	Develop effective presentation skills and public speaking in conferences

- **Approach to Learning:** An overview of academic research writing: the need, concern, and practice

It is an intensive course that will rely on interactive lecture sessions, PowerPoint presentations, group discussions, role-plays, mock teaching, and facilitation sessions with video-recording and feedback.

Course Content:

UNIT-I	Distinguishing Features of Research Writing <ul style="list-style-type: none"> ● Difference between informal and professional writing 	(5 Hours)
UNIT-II	Structure of Research Papers and Dissertation <ul style="list-style-type: none"> ● Type of reports and differences ● Structure of Report 	(6 Hours)
UNIT-III	Process of Writing – Planning – Writing – Revising – Presenting	(6 Hours)
UNIT-IV	Using Technology Effectively: <ul style="list-style-type: none"> ● Online research ● Referencing: Introduction to different styles, Use of software for creating ● Grammar Check ● Page-Making and Graphics 	(5 Hours)
UNIT-V	Making Presentations in Seminars and Conferences <ul style="list-style-type: none"> ● Using desk top presentation tools to create presentations ● Managing Time 	(5 Hours)
UNIT-VI	Writing Professional Mails and Letters.	(5 Hours)

Formative & Summative Assessment:

	CIA 1 :- UNIT- I, II, III
	CIA 2:- UNIT- IV, V, VI
	The Course instructor will make an assessment based on the written exams, submittals, quizzes and practical demonstrations during the course. The end-of-semester exam will consist of a practical session and a written theory paper.
	Assignments: Students will perform theoretical/ presentation/assignments from the suggested list below. The course instructor may modify /augment the list per the learner group's requirements.
	8) Writing different features of academic writing
	9) Designing a research, framing hypothesis and research questions

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- 10) Developing a research argument and stating the literature
- 11) Preparing an abstract for a conference/ research publication
- 12) Designing activity for classroom/field visit
- 13) Preparing a presentation for a conference
- 14) Writing a formal written communication

Practical / Studio Work:

The practical / studio work may consist of, but not limited to the following:
Each class module is divided into 30 minutes lecture followed by 15 minutes exercise may be written/ group discussion form. At the end of the course, each student is requested to present his/her research framework and seek feedback.

Text Books:

Research Methodology: Methods and Techniques by C. R. Kothari

Business Communication Today by Bovee Thrill Schatzman

A Manual for Writers of Research Papers, Theses, and Dissertations: Chicago Style for Students and Researchers by Kate L. Turabian, Wayne C. Booth, Gregory G. Colomb, and Joseph M. Williams

Osborn S., Osborn M., and Osborn R. (2008) Public Speaking Guidebook.

Lesikar, R.V. and Flatley, Marie E. (2005) Basic Business Communication; Skills for Empowering Internet Generation.

Reference Books and Reports

Writing for Academic Success. By Craswell

Mastering Academic Writing by Boba Samuels and Jordana Garbati

E-Resources: The following indicative list may be updated and augmented by the course instructor

<https://www.youtube.com/watch?v=aFwVf5a3pZM&t=1164s>

<https://www.youtube.com/watch?v=vtIzMaLkCaM>

ps://www.youtube.com/watch?v=jLPCdDp_LE0&t=1638s

<ps://www.youtube.com/watch?v=cMJWtNDqGzI>

Course code	UHV-II or HSMC (H-102)				
Category	Universal Human Values (UHV)				
Course Title	UNIVERSAL HUMAN VALUES-II: UNDERSTANDING HARMONY and ETHICAL HUMAN CONDUCT				
Scheme and Credits	L	T	P	C	Semester 1, 2, 3 or 4
	2	1	0	3	
Pre-requisites (if any)	None. Desirable – UHV-I: Universal Human Values-Introduction				

1. COURSES ON HUMAN VALUES

During the Induction Program, students would get an initial exposure to human values through Universal Human Values-I. This exposure is to be augmented by this compulsory full semester foundation course.

Objectives of UHV-II Course

This introductory course input is intended:

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1. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
 2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
 3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature.

Thus, this course is intended to provide a much-needed orientational input in value education to the young enquiring minds.

Salient Features of the Course

The salient features of this course are:

1. It presents a universal approach to value education by developing the right understanding of reality (i.e. a worldview of the reality “as it is”) through the process of self-exploration.
2. The whole course is presented in the form of a dialogue whereby a set of proposals about various aspects of the reality are presented and the students are encouraged to self-explore the proposals by verifying them on the basis of their natural acceptance within oneself and validate experientially in living.
3. The prime focus throughout the course is toward affecting a qualitative transformation in the life of the student rather than just a transfer of information.
4. While introducing the holistic worldview and its implications, a critical appraisal of the prevailing notions is also made to enable the students discern the difference on their own right.

Course Methodology

The methodology of this course is explorational and thus

1. universally adaptable. It involves a systematic and rational study of the human being vis-à-vis the rest of existence.
2. The course is in the form of 28 lectures (discussions) and 14 practice sessions.
3. It is free from any dogma or value prescriptions.
4. It is a process of self-investigation and self-exploration, and not of giving sermons. Whatever is found as truth or reality is stated as a proposal and the students are facilitated to verify it in their own right, based on their Natural Acceptance and subsequent Experiential Validation - the whole existence is the lab and every activity is a source of reflection.
5. This process of self-exploration takes the form of a dialogue between the teacher and the students to begin with, and then to continue within the student in every activity, leading to continuous self-evolution.
6. This self-exploration also enables them to critically evaluate their pre-conditionings and present beliefs.

2-COURSE TOPICS

The course has **28 lectures** and **14 tutorials** in 5 modules. The lectures and tutorials are of 1-hour duration. Tutorial sessions are to be used to explore and practice what has been proposed during the lecture sessions.

The Teacher's Manual provides the outline for lectures as well as practice sessions. The teacher is expected to present the issues to be discussed as propositions and encourage the students to have a dialogue.

The syllabus for the lectures and practice sessions is given below:

Module 1 – Introduction to Value Education (6 lectures and 3 tutorials for practice session)

Lecture 1: Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education)

Lecture 2: Understanding Value Education

Tutorial 1: Practice Session PS1 *Sharing about Oneself*

Lecture 3: Self-exploration as the Process for Value Education

Lecture 4: Continuous Happiness and Prosperity - the Basic Human Aspirations

Tutorial 2: Practice Session PS2 *Exploring Human Consciousness*

Lecture 5: Happiness and Prosperity - Current Scenario

Lecture 6: Method to Fulfil the Basic Human Aspirations

Tutorial 3: Practice Session PS3 *Exploring Natural Acceptance*

Expected outcome:

The students start exploring themselves: get comfortable with each other and with the teacher; they start appreciating the need and relevance for the course.

The students start finding that technical education without study of human values can generate more problems than solutions. They also start feeling that lack of understanding of human values is the root cause of most of the present-day problems; and a sustained solution could emerge only through understand

ding of value-based living. Any solution brought out through fear, temptation of dogma will not be sustainable.

The students are able to see that verification on the basic of natural acceptance and experiential validation through living is the only way to verify right or wrong, and referring to any external source like text or instrument or any other person cannot enable them to verify with authenticity; it will only develop assumptions.

The students are able to see that their practice in living is not in harmony with their natural acceptance most of the time, and all they need to do is to refer to their natural acceptance to overcome this disharmony.

The students are able to see that lack of right understanding leading to lack of relationship is the major cause of problems in their family and not the lack of physical facility in most of the cases, while they have given higher priority to earning of physical facility in their life giving less value to or even ignoring relationships and not being aware that right understanding is the most important requirement for any human being.

Module 2 – Harmony in the Human Being (6 lectures and 3 tutorials for practice session)

Lecture 7: Understanding Human being as the Co-existence of the Self and the Body

Lecture 8: Distinguishing between the Needs of the Self and the Body

Tutorial 4: Practice Session PS4 *Exploring the difference of Needs of Self and Body*

Lecture 9: The Body as an Instrument of the Self

Lecture 10: Understanding Harmony in the Self

Tutorial 5: Practice Session PS5 *Exploring Sources of Imagination in the Self*

Lecture 11: Harmony of the Self with the Body

Lecture 12: Programme to ensure self-regulation and Health

Tutorial 6: Practice Session PS6 *Exploring Harmony of Self with the Body*

Expected outcome:

The students are able to see that they can enlist their desires and the desires are not vague. Also they are able to relate their desires to „I“ and „Body“ distinctly. If any desire appears related to both, they are able to see that the feeling is related to I while the physical facility is related to the body. They are also able to see that „I“ and Body are two realities, and most of their desires are related to „I“ and not body, while their efforts are mostly centred on the fulfilment of the needs of the body assuming that it will meet the needs of „I“ too.

The students are able to see that all physical facility they are required for a limited time in a limited quantity. Also, they are able to see that in case of feelings, they want continuity of the naturally acceptable feelings and they do not want feelings which are not naturally acceptable even for a single moment.

The students are able to see that activities like understanding, desire, thought and selection are the activities of „I“ only the activities like breathing, palpitation of different parts of the body are fully the activities of the body with the acceptance of „I“ while the activities they do with their sense organs like hearing

through ears, seeing through eyes, sensing through touch, tasting through tongue and smelling through nose or the activities they do with their work organs like hands, legs etc. are such activities that require the participation of both „I“ and body.

The students become aware of their activities of „I“ and start finding their focus of attention at different moments. Also they are able to see that most of their desires are coming from outside (through preconditioning or sensation) and are not based on their natural acceptance

The students are able to list down activities related to proper upkeep of the body and practice them in their daily routine. They are also able to appreciate the plants wildly growing in and around the campus which can be beneficial in curing different diseases.

Module 3 – Harmony in the Family and Society (6 lectures and 3 tutorials for practice session)

Lecture 13: Harmony in the Family - the Basic Unit of Human Interaction

Lecture 14: 'Trust' - the Foundational Value in Relationship

Tutorial 7: Practice Session PS7 *Exploring the Feeling of Trust*

Lecture 15: 'Respect' – as the Right Evaluation

The students are able to see that their practice in living is not in harmony with their natural acceptance most of the time, and all they need to do is to refer to their natural acceptance to overcome this disharmony.

The students are able to see that lack of right understanding leading to lack of relationship is the major cause of problems in their family and not the lack of physical facility in most of the cases, while they have given higher priority to earning of physical facility in their life giving less value to or even ignoring relationships and not being aware that right understanding is the most important requirement for any human being.

Module 2 – Harmony in the Human Being (6 lectures and 3 tutorials for practice session)

Lecture 7: Understanding Human being as the Co-existence of the Self and the Body

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Lecture 10: Understanding Harmony in the Self

Tutorial 5: Practice Session PS5 *Exploring Sources of Imagination in the Self*

Lecture 11: Harmony of the Self with the Body

Lecture 12: Programme to ensure self-regulation and Health

Tutorial 6: Practice Session PS6 *Exploring Harmony of Self with the Body*

Expected outcome:

The students are able to see that they can enlist their desires and the desires are not vague. Also they are able to relate their desires to „I“ and „Body“ distinctly. If any desire appears related to both, they are able to see that the feeling is related to I while the physical facility is related to the body. They are also able to see that „I“ and Body are two realities, and most of their desires are related to „I“ and not body, while their efforts are mostly centred on the fulfilment of the needs of the body assuming that it will meet the needs of „I“ too.

The students are able to see that all physical facility they are required for a limited time in a limited quantity. Also, they are able to see that in case of feelings, they want continuity of the naturally acceptable feelings and they do not want feelings which are not naturally acceptable even for a single moment.

The students are able to see that activities like understanding, desire, thought and selection are the activities of „I“ only the activities like breathing, palpitation of different parts of the body are fully the activities of the body with the acceptance of „I“ while the activities they do with their sense organs like hearing through ears, seeing through eyes, sensing through touch, tasting through tongue and smelling through nose or the activities they do with their work organs like hands, legs etc. are such activities that require the participation of both „I“ and body.

The students become aware of their activities of „I“ and start finding their focus of attention at different moments. Also they are able to see that most of their desires are coming from outside (through preconditioning or sensation) and are not based on their natural acceptance

The students are able to list down activities related to proper upkeep of the body and practice them in their daily routine. They are also able to appreciate the plants wildly growing in and around the campus which can be beneficial in curing different diseases.

Module 3 – Harmony in the Family and Society (6 lectures and 3 tutorials for practice session)

Lecture 13: Harmony in the Family - the Basic Unit of Human Interaction

Lecture 14: 'Trust' - the Foundational Value in Relationship

Tutorial 7: Practice Session PS7 *Exploring the Feeling of Trust*

Lecture 15: 'Respect' – as the Right Evaluation

Tutorial 8: Practice Session PS8 *Exploring the Feeling of Respect*

Lecture 16: Other Feelings, Justice in Human-to-Human Relationship

Lecture 17: Understanding Harmony in the Society

Lecture 18: Vision for the Universal Human Order

Tutorial 9: Practice Session PS9 *Exploring Systems to fulfil Human Goal*

Expected outcome:

The students are able to note that the natural acceptance (intention) is always for living in harmony, only competence is lacking! We generally evaluate ourselves on the basis of our intention and others on the basis of their competence! We seldom look at our competence and others' intention as a result we conclude that I am a good person and other is a bad person.

The students are able to see that respect is right evaluation, and only right evaluation leads to fulfilment in relationship. Many present problems in the society are an outcome of differentiation (lack of understanding of respect), like gender biasness, generation gap, caste conflicts, class struggle, dominations through power play, communal violence, clash of isms and so on so forth. All these problems can be solved by realizing that the other is like me as he has the same natural acceptance, potential and program to ensure a happy and prosperous life for them and for others through he may have different body, physical facility or beliefs.

The students are able to use their creativity for education children. The students are able to see that they can play a role in providing value education for children. They are able to put in simple words the issues that are essential to understand for children and comprehensible to them. The students are able to develop an outline of holistic model for social science and compare it with the existing model.

Module 4 – Harmony in the Nature/Existence (4 lectures and 2 tutorials for practice session)

Lecture 19: Understanding Harmony in the Nature

Lecture 20: Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature

Tutorial 10: Practice Session PS10 *Exploring the Four Orders of Nature*

Lecture 21: Realizing Existence as Co-existence at All Levels

Lecture 22: The Holistic Perception of Harmony in Existence

Tutorial 11: Practice Session PS11 *Exploring Co-existence in Existence*

Expected outcome:

The students are able to differentiate between the characteristics and activities of different orders and study the mutual fulfilment among them. They are also able to see that human beings are not fulfilling to other orders today and need to take appropriate steps to ensure right participation (in terms of nurturing, protection and right utilization) in the nature.

The students feel confident that they can understand the whole existence; nothing is a mystery in this existence. They are also able to see the interconnectedness in the nature, and point out how different courses of study relate to the different units and levels. Also, they are able to make out how these courses can be made appropriate and holistic.

Module 5 – Implications of the Holistic Understanding – a Look at Professional Ethics (6 lectures and 3 tutorials for practice session)

Lecture 23: Natural Acceptance of Human Values

Lecture 24: Definitiveness of (Ethical) Human Conduct

Tutorial 12: Practice Session PS12 *Exploring Ethical Human Conduct*

Lecture 25: A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order

Lecture 26: Competence in Professional Ethics

Tutorial 13: Practice Session PS 13 *Exploring Humanistic Models in Education*

Lecture 27: Holistic Technologies, Production Systems and Management Models-Typical Case Studies

Lecture 28: Strategies for Transition towards Value-based Life and Profession

Tutorial 14: Practice Session PS 14 *Exploring Steps of Transition towards Universal Human Order*

Expected outcome:

The students are able to present sustainable solutions to the problems in society and nature. They are also able to see that these solutions are practicable and draw roadmaps to achieve them.

The students are able to grasp the right utilization of their knowledge in their streams of Technology/Engineering/Management/any other area of study to ensure mutual fulfilment. E.g. mutually enriching production system with rest of nature.

The students are able to sincerely evaluate the course and share with their friends. They are also able to suggest measures to make the course more effective and relevant. They are also able to make use of their understanding in the course for the happy and prosperous family and society.

Guidelines and Content for Practice Sessions (Tutorials)

In order to connect the content of the proposals with practice (living), 14 practice sessions have been designed. The full set of practice sessions is available in the Teacher's Manual as well as the website.

Practice Sessions for Module 1 – Introduction to Value Education

- PS1 Sharing about Oneself
- PS2 Exploring Human Consciousness
- PS3 Exploring Natural Acceptance

Practice Sessions for Module 2 – Harmony in the Human Being

- PS4 Exploring the difference of Needs of Self and Body
- PS5 Exploring Sources of Imagination in the Self
- PS6 Exploring Harmony of Self with the Body

Practice Sessions for Module 3 – Harmony in the Family and Society

- PS7 Exploring the Feeling of Trust
- PS8 Exploring the Feeling of Respect
- PS9 Exploring Systems to fulfil Human Goal

Practice Sessions for Module 4 – Harmony in the Nature (Existence)

- PS10 Exploring the Four Orders of Nature
- PS11 Exploring Co-existence in Existence

Practice Sessions for Module 5 – Implications of the Holistic Understanding – a Look at Professional Ethics

- PS12 Exploring Ethical Human Conduct
- PS13 Exploring Humanistic Models in Education
- PS14 Exploring Steps of Transition towards Universal Human Order

As an example, PS 7 is a practice session in module 3 regarding trust. It is explained below:

PS 7: Form small groups in the class and in that group initiate dialogue and ask the eight questions related to trust. The eight questions are:

- 1a. Do I want to make myself happy?
- 1b. Am I able to make myself always happy?
- 2a. Do I want to make the other happy?
- 2b. Am I able to make the other always happy?

3a. Does the other want to make him happy?

4a. Does the other want to make me happy?

Intention (Natural Acceptance)

What is the answer?

3b. Is the other able to make him always happy?

4b. Is the other able to make me always happy?

Competence

What is the answer?

Let each student answer the questions for himself/herself and everyone else. Discuss the difference between intention and competence. Observe whether you evaluate your intention and competence as well as the others' intention and competence.

Expected outcome of PS 7: The students are able to see that the first four questions are related to our Natural Acceptance i.e. intention and the next four to our Competence. They are able to note that the intention is always correct, only competence is lacking! We generally evaluate ourselves on the basis of our intention and others on the basis of their competence! We seldom look at our competence and others' intention, as a result we conclude that I am a good person and other is a bad person.

3-READINGS:

3-1-Text Book and Teachers Manual

a. The Textbook

A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1

b. The Teacher's Manual

Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

3-2-Reference Books

1. JeevanVidya: EkParichaya, A Nagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. Small is Beautiful - E. F Schumacher.
6. Slow is Beautiful - Cecile Andrews
7. Economy of Permanence - J C Kumarappa
8. Bharat Mein Angreji Raj - Pandit Sunderlal
9. Rediscovering India - by Dharampal
10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland (English)
13. Gandhi - Romain Rolland (English)

4-MODE OF CONDUCT (L-T-P-C 2-1-0-3)

- Lecture hours are to be used for interactive discussion, placing the proposals about the topics at hand and motivating students to reflect, explore and verify them.
- Tutorial hours are to be used for practice sessions.
- While analysing and discussing the topic, the faculty mentor's role is in pointing to essential elements to help in sorting them out from the surface elements. In other words, help the students explore the important or critical elements.
- In the discussions, particularly during practice sessions (tutorials), the mentor encourages the student to connect with one's own self and do self-observation, self-reflection and self-exploration.
- Scenarios may be used to initiate discussion. The student is encouraged to take up "ordinary" situations rather than "extra-ordinary" situations. Such observations and their analyses are shared and discussed with other students and faculty mentor, in a group sitting.

Tutorials (experiments or practical) are important for the course. The difference is that the laboratory is everyday life, and practical are how you behave and work in real life. Depending on the nature of topics, worksheets, home assignment and/or activity are included. The practice sessions (tutorials) would also provide support to a student in performing actions commensurate to his/her beliefs. It is intended that this would lead to development of commitment, namely behaving and working based on basic human values.

It is recommended that this content be placed before the student as it is, in the form of a basic foundation course, without including anything else or excluding any part of this content. Additional content may be offered in separate, higher courses.

This course is to be taught by faculty from every teaching department.

Teacher preparation with a minimum exposure to at least one 8-day Faculty Development Program on Universal Human Values is deemed essential.

5- SUGGESTED ASSESSMENT:

This is a compulsory credit course. The assessment is to provide a fair state of development of the student, so participation in classroom discussions, self-assessment, peer assessment etc. will be used in evaluation.

Example:

Assessment by faculty mentor: 10 marks

Self-assessment: 10 marks

Assessment by peers: 10 marks

Socially relevant project/Group Activities/Assignments: 20 marks

Semester End Examination: 50 marks

The overall pass percentage is 40%. In case the student fails, he/she must repeat the course.

6- OUTCOME OF THE COURSE:

By the end of the course, students are expected to become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.

They would have better critical ability. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society). It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

Therefore, the course and further follow up is expected to positively impact common graduate attributes like:

1. Holistic vision of life
2. Socially responsible behaviour
3. Environmentally responsible work
4. Ethical human conduct
5. Having Competence and Capabilities for Maintaining Health and Hygiene
6. Appreciation and aspiration for excellence (merit) and gratitude for all

This is only an introductory foundational input. It would be desirable to follow it up by

- a) Faculty-student or mentor-mentee programs throughout their time with the institution
 - b) Higher level courses on human values in every aspect of living.
-

Tutorial 8: Practice Session PS8 *Exploring the Feeling of Respect*

Lecture 16: Other Feelings, Justice in Human-to-Human Relationship

Lecture 17: Understanding Harmony in the Society

Lecture 18: Vision for the Universal Human Order

Tutorial 9: Practice Session PS9 *Exploring Systems to fulfil Human Goal*

Expected outcome:

The students are able to note that the natural acceptance (intention) is always for living in harmony, only competence is lacking! We generally evaluate ourselves on the basis of our intention and others on the basis of their competence! We seldom look at our competence and others' intention as a result we conclude that I am a good person and other is a bad person.

The students are able to see that respect is right evaluation, and only right evaluation leads to fulfilment in relationship. Many present problems in the society are an outcome of differentiation (lack of understanding of respect), like gender biasness, generation gap, caste conflicts, class struggle, dominations through power play, communal violence, clash of isms and so on so forth. All these problems can be solved by realizing that the other is like me as he has the same natural acceptance, potential and program to ensure a happy and prosperous life for them and for others through he may have different body, physical facility or beliefs.

The students are able to use their creativity for education children. The students are able to see that they can play a role in providing value education for children. They are able to put in simple words the issues that are essential to understand for children and comprehensible to them. The students are able to develop an outline of holistic model for social science and compare it with the existing model.

Module 4 – Harmony in the Nature/Existence (4 lectures and 2 tutorials for practice session)

Lecture 19: Understanding Harmony in the Nature

Lecture 20: Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature

Tutorial 10: Practice Session PS10 *Exploring the Four Orders of Nature*

Lecture 21: Realizing Existence as Co-existence at All Levels

Lecture 22: The Holistic Perception of Harmony in Existence

Tutorial 11: Practice Session PS11 *Exploring Co-existence in Existence*

Expected outcome:

The students are able to differentiate between the characteristics and activities of different orders and study the mutual fulfilment among them. They are also able to see that human beings are not fulfilling to other orders today and need to take appropriate steps to ensure right participation (in terms of nurturing, protection and right utilization) in the nature.

The students feel confident that they can understand the whole existence; nothing is a mystery in this existence. They are also able to see the interconnectedness in the nature, and point out how different courses of study relate to the different units and levels. Also, they are able to make out how these courses can be made appropriate and holistic.

Module 5 – Implications of the Holistic Understanding – a Look at Professional Ethics (6 lectures and 3 tutorials for practice session)

Lecture 23: Natural Acceptance of Human Values

Lecture 24: Definitiveness of (Ethical) Human Conduct

Tutorial 12: Practice Session PS12 *Exploring Ethical Human Conduct*

Lecture 25: A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order

Lecture 26: Competence in Professional Ethics

Tutorial 13: Practice Session PS 13 *Exploring Humanistic Models in Education*

Lecture 27: Holistic Technologies, Production Systems and Management Models-Typical Case Studies

Lecture 28: Strategies for Transition towards Value-based Life and Profession

Tutorial 14: Practice Session PS 14 *Exploring Steps of Transition towards Universal Human Order*

Expected outcome:

The students are able to present sustainable solutions to the problems in society and nature. They are also able to see that these solutions are practicable and draw roadmaps to achieve them.

The students are able to grasp the right utilization of their knowledge in their streams of Technology/Engineering/Management/any other area of study to ensure mutual fulfilment. E.g. mutually enriching production system with rest of nature.

The students are able to sincerely evaluate the course and share with their friends. They are also able to suggest measures to make the course more effective and relevant. They are also able to make use of their understanding in the course for the happy and prosperous family and society.

Guidelines and Content for Practice Sessions (Tutorials)

In order to connect the content of the proposals with practice (living), 14 practice sessions have been designed. The full set of practice sessions is available in the Teacher's Manual as well as the website.

Practice Sessions for Module 1 – Introduction to Value Education

- PS1 Sharing about Oneself
- PS2 Exploring Human Consciousness
- PS3 Exploring Natural Acceptance

Practice Sessions for Module 2 – Harmony in the Human Being

- PS4 Exploring the difference of Needs of Self and Body
- PS5 Exploring Sources of Imagination in the Self
- PS6 Exploring Harmony of Self with the Body

Practice Sessions for Module 3 – Harmony in the Family and Society

- PS7 Exploring the Feeling of Trust
- PS8 Exploring the Feeling of Respect
- PS9 Exploring Systems to fulfil Human Goal

Practice Sessions for Module 4 – Harmony in the Nature (Existence)

- PS10 Exploring the Four Orders of Nature
- PS11 Exploring Co-existence in Existence

Practice Sessions for Module 5 – Implications of the Holistic Understanding – a Look at Professional Ethics

- PS12 Exploring Ethical Human Conduct
- PS13 Exploring Humanistic Models in Education
- PS14 Exploring Steps of Transition towards Universal Human Order

As an example, PS 7 is a practice session in module 3 regarding trust. It is explained below:

PS 7: Form small groups in the class and in that group initiate dialogue and ask the eight questions related to trust. The eight questions are:

- 1a. Do I want to make myself happy?
- 1b. Am I able to make myself always happy?
- 2a. Do I want to make the other happy?
- 2b. Am I able to make the other always happy?

3a. Does the other want to make him happy?

4a. Does the other want to make me happy?

Intention (Natural Acceptance)

What is the answer?

3b. Is the other able to make him always happy?

4b. Is the other able to make me always happy?

Competence

What is the answer?

Let each student answer the questions for himself/herself and everyone else. Discuss the difference between intention and competence. Observe whether you evaluate your intention and competence as well as the others' intention and competence.

Expected outcome of PS 7: The students are able to see that the first four questions are related to our Natural Acceptance i.e. intention and the next four to our Competence. They are able to note that the intention is always correct, only competence is lacking! We generally evaluate ourselves on the basis of our intention and others on the basis of their competence! We seldom look at our competence and others' intention, as a result we conclude that I am a good person and other is a bad person.

7-READINGS:

3-1-Text Book and Teachers Manual

c. The Textbook

A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1

d. The Teacher's Manual

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3-2-Reference Books

14. JeevanVidya: EkParichaya, A Nagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.
15. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
16. The Story of Stuff (Book).
17. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
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24. India Wins Freedom - Maulana Abdul Kalam Azad
25. Vivekananda - Romain Rolland (English)
26. Gandhi - Romain Rolland (English)

8-MODE OF CONDUCT (L-T-P-C 2-1-0-3)

- Lecture hours are to be used for interactive discussion, placing the proposals about the topics at hand and motivating students to reflect, explore and verify them.
- Tutorial hours are to be used for practice sessions.
- While analysing and discussing the topic, the faculty mentor's role is in pointing to essential elements to help in sorting them out from the surface elements. In other words, help the students explore the important or critical elements.
- In the discussions, particularly during practice sessions (tutorials), the mentor encourages the student to connect with one's own self and do self-observation, self-reflection and self-exploration.
- Scenarios may be used to initiate discussion. The student is encouraged to take up "ordinary" situations rather than "extra-ordinary" situations. Such observations and their analyses are shared and discussed with other students and faculty mentor, in a group sitting.

Tutorials (experiments or practical) are important for the course. The difference is that the laboratory is everyday life, and practical are how you behave and work in real life. Depending on the nature of topics, worksheets, home assignment and/or activity are included. The practice sessions (tutorials) would also provide support to a student in performing actions commensurate to his/her beliefs. It is intended that this would lead to development of commitment, namely behaving and working based on basic human values.

It is recommended that this content be placed before the student as it is, in the form of a basic foundation course, without including anything else or excluding any part of this content. Additional content may be offered in separate, higher courses.

This course is to be taught by faculty from every teaching department.

Teacher preparation with a minimum exposure to at least one 8-day Faculty Development Program on Universal Human Values is deemed essential.

9- SUGGESTED ASSESSMENT:

This is a compulsory credit course. The assessment is to provide a fair state of development of the student, so participation in classroom discussions, self-assessment, peer assessment etc. will be used in evaluation.

Example:

Assessment by faculty mentor: 10 marks

Self-assessment: 10 marks

Assessment by peers: 10 marks

Socially relevant project/Group Activities/Assignments: 20 marks

Semester End Examination: 50 marks

The overall pass percentage is 40%. In case the student fails, he/she must repeat the course.

10- OUTCOME OF THE COURSE:

By the end of the course, students are expected to become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.

They would have better critical ability. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society). It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

Therefore, the course and further follow up is expected to positively impact common graduate attributes like:

1. Holistic vision of life
2. Socially responsible behaviour
3. Environmentally responsible work
4. Ethical human conduct
5. Having Competence and Capabilities for Maintaining Health and Hygiene
6. Appreciation and aspiration for excellence (merit) and gratitude for all

This is only an introductory foundational input. It would be desirable to follow it up by

c) Faculty-student or mentor-mentee programs throughout their time with the institution

d) Higher level courses on human values in every aspect of living.

The students are able to see that their practice in living is not in harmony with their natural acceptance most of the time, and all they need to do is to refer to their natural acceptance to overcome this disharmony.

The students are able to see that lack of right understanding leading to lack of relationship is the major cause of problems in their family and not the lack of physical facility in most of the cases, while they have given higher priority to earning of physical facility in their life giving less value to or even ignoring relationships and not being aware that right understanding is the most important requirement for any human being.

Module 2 – Harmony in the Human Being (6 lectures and 3 tutorials for practice session)

Lecture 7: Understanding Human being as the Co-existence of the Self and the Body

Lecture 8: Distinguishing between the Needs of the Self and the Body

Tutorial 4: Practice Session PS4 *Exploring the difference of Needs of Self and Body*

Lecture 9: The Body as an Instrument of the Self

Lecture 10: Understanding Harmony in the Self

Tutorial 5: Practice Session PS5 *Exploring Sources of Imagination in the Self*

Lecture 11: Harmony of the Self with the Body

Lecture 12: Programme to ensure self-regulation and Health

Tutorial 6: Practice Session PS6 *Exploring Harmony of Self with the Body*

Expected outcome:

The students are able to see that they can enlist their desires and the desires are not vague. Also they are able to relate their desires to „I“ and „Body“ distinctly. If any desire appears related to both, they are able to see that the feeling is related to I while the physical facility is related to the body. They are also able to see that „I“ and Body are two realities, and most of their desires are related to „I“ and not body, while their efforts are mostly centred on the fulfilment of the needs of the body assuming that it will meet the needs of „I“ too.

The students are able to see that all physical facility they are required for a limited time in a limited quantity. Also, they are able to see that in case of feelings, they want continuity of the naturally acceptable feelings and they do not want feelings which are not naturally acceptable even for a single moment.

The students are able to see that activities like understanding, desire, thought and selection are the activities of „I“ only the activities like breathing, palpitation of different parts of the body are fully the activities of the body with the acceptance of „I“ while the activities they do with their sense organs like hearing through ears, seeing through eyes, sensing through touch, tasting through tongue and smelling through nose or the activities they do with their work organs like hands, legs etc. are such activities that require the participation of both „I“ and body.

The students become aware of their activities of „I“ and start finding their focus of attention at different moments. Also they are able to see that most of their desires are coming from outside (through preconditioning or sensation) and are not based on their natural acceptance

The students are able to list down activities related to proper upkeep of the body and practice them in their daily routine. They are also able to appreciate the plants wildly growing in and around the campus which can be beneficial in curing different diseases.

Module 3 – Harmony in the Family and Society (6 lectures and 3 tutorials for practice session)

Lecture 13: Harmony in the Family - the Basic Unit of Human Interaction

Lecture 14: 'Trust' - the Foundational Value in Relationship

Tutorial 7: Practice Session PS7 *Exploring the Feeling of Trust*

Lecture 15: 'Respect' – as the Right Evaluation

Tutorial 8: Practice Session PS8 *Exploring the Feeling of Respect*

Lecture 16: Other Feelings, Justice in Human-to-Human Relationship

Lecture 17: Understanding Harmony in the Society

Lecture 18: Vision for the Universal Human Order

Tutorial 9: Practice Session PS9 *Exploring Systems to fulfil Human Goal*

Expected outcome:

The students are able to note that the natural acceptance (intention) is always for living in harmony, only competence is lacking! We generally evaluate ourselves on the basis of our intention and others on the basis of their competence! We seldom look at our competence and others' intention as a result we conclude that I am a good person and other is a bad person.

The students are able to see that respect is right evaluation, and only right evaluation leads to fulfilment in relationship. Many present problems in the society are an outcome of differentiation (lack of understanding of respect), like gender biasness, generation gap, caste conflicts, class struggle, dominations through power play, communal violence, clash of isms and so on so forth. All these problems can be solved by realizing that the other is like me as he has the same natural acceptance, potential and program to ensure a happy and prosperous life for them and for others through he may have different body, physical facility or beliefs.

The students are able to use their creativity for education children. The students are able to see that they can play a role in providing value education for children. They are able to put in simple words the issues that are essential to understand for children and comprehensible to them. The students are able to develop an outline of holistic model for social science and compare it with the existing model.

Module 4 – Harmony in the Nature/Existence (4 lectures and 2 tutorials for practice session)

Lecture 19: Understanding Harmony in the Nature

Lecture 20: Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature

Tutorial 10: Practice Session PS10 *Exploring the Four Orders of Nature*

Lecture 21: Realizing Existence as Co-existence at All Levels

Lecture 22: The Holistic Perception of Harmony in Existence

Tutorial 11: Practice Session PS11 *Exploring Co-existence in Existence*

Expected outcome:

The students are able to differentiate between the characteristics and activities of different orders and study the mutual fulfilment among them. They are also able to see that human beings are not fulfilling to other orders today and need to take appropriate steps to ensure right participation (in terms of nurturing, protection and right utilization) in the nature.

The students feel confident that they can understand the whole existence; nothing is a mystery in this existence. They are also able to see the interconnectedness in the nature, and point out how different courses of study relate to the different units and levels. Also, they are able to make out how these courses can be made appropriate and holistic.

Module 5 – Implications of the Holistic Understanding – a Look at Professional Ethics (6 lectures and 3 tutorials for practice session)

Lecture 23: Natural Acceptance of Human Values

Lecture 24: Definitiveness of (Ethical) Human Conduct

Tutorial 12: Practice Session PS12 *Exploring Ethical Human Conduct*

Lecture 25: A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order

Lecture 26: Competence in Professional Ethics

Tutorial 13: Practice Session PS 13 *Exploring Humanistic Models in Education*

Lecture 27: Holistic Technologies, Production Systems and Management Models-Typical Case Studies

Lecture 28: Strategies for Transition towards Value-based Life and Profession

Tutorial 14: Practice Session PS 14 *Exploring Steps of Transition towards Universal Human Order*

Expected outcome:

The students are able to present sustainable solutions to the problems in society and nature. They are also able to see that these solutions are practicable and draw roadmaps to achieve them.

The students are able to grasp the right utilization of their knowledge in their streams of Technology/Engineering/Management/any other area of study to ensure mutual fulfillment. E.g., mutually enriching the production system with the rest of nature.

The students are able to sincerely evaluate the course and share with their friends. They are also able to suggest measures to make the course more effective and relevant. They are also able to make use of their understanding in the course for the happy and prosperous family and society.

Guidelines and Content for Practice Sessions (Tutorials)

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Intention (Natural Acceptance)

What is the answer?

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12- MODE OF CONDUCT (L-T-P-C 2-1-0-3)

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Example:

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marks
Semester End Examination: 50 marks

The overall pass percentage is 40%. In case the student fails, he/she must repeat the course.

14- OUTCOME OF THE COURSE:

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