

**UNIVERSITY OF PUNE**

**SYLLABUS FOR**

**MASTER IN ARCHITECTURE**

**M.ARCH (ENVIRONMENT)**

**(To be implemented w.e.f. A.Y. 2015-16)**

**FACULTY OF ENGINEERING**

**BOARD OF STUDIES IN ARCHITECTURE**

**PREAMBLE**

Environment, environment protection and all issues related to environment are today the most important issues for not only the government but for the common man also.

As architects we are responsible for a large amount of environment pollution right from manufacturing of building materials to creating a built environment. We are also one of the largest consumers of the energy resource when we add to the built Environment. The effect of the built environment has a considerable impact on the un-built environment. The environment left to our mercy is degrading due to insensitive approach of the professionals who matter.

This course aims at sensitizing the professionals to the environmental issues, global as well as site specific, focusing on the design approach, technology and economics to address them. The architects can play a major role in influencing the clients and authorities to practice energy conservation and contribute to environmental sustainability. For this an in depth knowledge and understanding of the environment we live in is very important

**COURSE OBJECTIVES:**

The curriculum has following areas of expertise:

**Region, Cities and Buildings :** The concept of environmental sustainability in the built environment is examined at various scales starting from the building scale transcending into urban scale.

**Context Specificity:** The focus is on the design of buildings in the Asian context. It develops an understanding of climate, regional variations and socio-economic factors peculiar to that region.

1. To equip architects to design environmentally sensitive buildings.
2. To develop a theoretical and practical understanding of environmental architecture from micro-level to macro-level.
3. To develop skills of architects to address the issues of climate change as well as develop competencies to manage and implement projects.

**SEMESTERWISE FOCUS:****SEMESTER 1:**

To understand how buildings behave, the physics behind it and to design buildings based on climate, passive design principles and thermal comfort. The students are also exposed to issues concerning sustainability at the planning level.

**SEMESTER 2:**

To develop environmental sensitivity at a larger urban scale. To understand how natural resources are utilised and managed. To study various technologies and systems to achieve energy efficiency with a focus on HVAC etc. To learn a methodical approach towards study and analysis through research and writing.

**SEMESTER 3:**

To design energy efficient buildings through a holistic understanding of systems for energy efficiency with a focus on renewable. To expose students to various tools to assess and measure sustainability.

**SEMESTER 4:**

To lay emphasis on faculty assisted but self-initiated learning process in environmental

architecture.

(25% of the total teaching hours in each semester are reserved for reflecting the institute's philosophy and its reflection in the design studio.)

## **RULES OF COURSE STRUCTURE FOR MASTER OF ARCHITECTURE, M.ARCH.(ENVIRONMENT)**

### **PROVISION OF INFRASTRUCTURE**

Course shall be conducted as per the guide lines laid down by the Council of Architecture, New Delhi, with respect to intake of students, class rooms, studios, laboratories, seminar rooms, library facilities, students' amenities and all the appurtenant requirements to carry out teaching activity effectively.

### **APPOINTMENT OF TEACHING AND SUPPORTING STAFF**

The appointment of teaching staff shall be made as per the norms laid down by C.O.A., New Delhi and other statutory bodies as applicable.

### **RULE NO. 1 : ELIGIBILITY CRITERIA**

A student seeking admission to Master of Architecture Course must have secured minimum 50% marks in aggregate in a Bachelor of Architecture degree course or equivalent courses recognized by the apex body with / without valid GATE score. The students with valid GATE score shall be given preference and the students without GATE score shall be considered subject to the vacancy.

### **RULE NO. 2 : SCHEME OF ASSESSMENT:**

A candidate, to be eligible for the Master's Degree in Architecture, will be required to appear for and pass examinations as under

1. First Year M. Arch: SEM I AND SEM II
2. Second Year M. Arch. : SEM II AND SEM IV

University will declare combined result of

- SEM I + SEM II at the end of First Year and
- SEM III + SEM IV at the end of Second Year

### **RULE NO. 3 : GRANTING OF TERM**

Academic year will consist of TWO SEMESTERS of 90 teaching days each. Sessional work/ assignments prepared by the students shall be continuously assessed by the Internal Teacher throughout the semester.

The candidate will be permitted to appear for the examinations at the end of each semester only if he/she keeps term at a college affiliated to the university and produces testimonials from the Principal for

1. 75% attendance in each head of passing of Theory and /or Sessional work as prescribed by the University.
2. Satisfactory completion of the Sessional Work prescribed for each subject and secured at least 50 % marks in the Internal Assessment for the same.
3. Good conduct.

### **RULE NO.4 : EXAMINATIONS**

At each examinations Theory Paper Sessional and Sessional and viva – voce based on Sessional Work

, as prescribed in the syllabus for the Examination at the end of each semester, shall constitute separate heads of passing.

**RULE NO. 5 : SESSIONAL WORK ASSESSMENT:**

In respect of Sessional work in First, Second, Third and Fourth semesters, target date shall be fixed for the completion of each assignment. All assignments shall be continuously assessed by the Internal Teacher during each semester.

b) For the First, Second, and Third Semester examinations, Sessional and Viva assessment will be done by an External Examiner, who is external to the college i.e. teacher from college other than one, whose students are being examined.

c) For Fourth Semester examination, external assessment shall be carried out by a professional not teaching in any of the Colleges under University of Pune.

d) An examiner for any of the subjects of examination shall have a minimum of 5 years of teaching / professional experience in his/her specific field of study.

**RULE NO. 6: PRE REQUISITES AND RULES OF A.T.K.T. FOR ADMISSION TO HIGHER CLASSES**

This course has been considered as an integrated one and students will be allowed to take admission to second, third and fourth semesters irrespective of number of subjects in which they are failing.

**RULE NO. 7 : CRITERIA FOR PASSING**

To pass the First and Second Year Examination, a candidate must obtain minimum 50 % marks in each paper, 50% in Sessional/Viva voce and 50% in aggregate.

**RULE NO. 8 : GRADING SYSTEM****Assessment and Grade Point Average****R-8.1 Marks/Grade/Grade Point**

A grade is assigned based on the total marks obtained by a student in all the heads of examination of the course. These grades, their equivalent grade points are given in Table 3.

The guidelines for conversion of marks to grades are given below.

Grade	Grade	Percentage of	Remarks
O	10	90-100	Outstanding
A	9	80-89	Very Good
B	8	70-79	Good
C	7	60-69	Fair
D	6	50-59	Average
E	0	Below 50	Fail

**R-8.2 Passing Grade**

The grades **O, A, B, C, D**, are passing grades. A candidate acquiring any one of these grades in a course shall be declared as pass. And student shall earn the credits for a course only if the student gets passing grade in that course.

**R-8.3 E Grade**

The grade E shall be treated as a failure grade. The student with E grade will have to pass the concerned course by re-appearing for the examination. The student with E grade for any stage of the Project Work will have to carry out additional work/ improvement as suggested by the examiners and re-appe

ar for the examination.



**Rule No. 9. PERFORMANCE INDICES:****R-9.1 SGPA**

The performance of a student in a semester is indicated by a number called the Semester Grade Point Average (SGPA). The SGPA is the weighted average of the grade points obtained in all the courses, seminars and projects registered by the student during the semester.

(i) Semester Grade Point Average (SGPA) =

$$SGPA = \frac{\sum_{i=1}^p C_i G_i}{\sum_{i=1}^p C_i}$$

$$SGPA = \frac{\sum \text{Grade Points Earned} \times \text{Credits for each course}}{\text{Total Credits}}$$

For Example: suppose in a given semester a student has registered for five courses having credits C1, C2, C3, C4, C5 and his / her grade points in those courses are G1, G2, G3, G4, G5 respectively. Then students

$$SGPA = \frac{C1G1 + C2G2 + C3G3 + C4G4 + C5G5}{C1 + C2 + C3 + C4 + C5}$$

SGPA is calculated up to two decimal places by rounding off.

**R-9.2 CGPA**

The CGPA is the weighted average of the grade points obtained in all the courses, seminars and projects registered by the student since student is admitted to the college. It is calculated in the same manner as the SGPA.

**R-9.3** In case of a student clearing a failed course or improvement, the earlier grade would be replaced by the new grade in calculation of the SGPA and CGPA.

**Rule No. 10. RESULT:**

**R-10.1** Based on the performance of the student in the semester examinations, the University of Pune will declare the results and issue the Semester Grade sheets.

The University of Pune will issue a Degree Certificate and the final grade sheet of Semester I, II, III & IV, to the student, who is otherwise eligible for the award of Degree of Master of Architecture.

**R-10.2** The class shall be awarded to a student on the CGPA calculated based on all the four semesters. The award of the class shall be as per Table 4.

Sr. No.	CGPA	Class of the Degree awarded
1	7.75 or More than 7.75	First Class with Distinction
2	6.75 or more but less than 7.75	First Class
3	6.25 or more but less than 6.75	Higher Second Class
4	5.5 or more but less than 6.25	Second Class

**RULE NO. 11 : EXEMPTIONS AND SUPPLEMENTARY EXAMINATION**

In case a candidate fails and desires to appear again,

- a) He/she will be exempted from appearing in the head/s of passing in which he/she has passed.
- b) A candidate will have to appear for the examination of backlog subjects along with the examination of current semester.

**RULE NO. 12 : OTHER RULES:**

University/ affiliated colleges may frame additional rules and regulations or modify these regulations if required, and once approved by the University, they would be binding on the students.

**UNIVERSITY OF PUNE**  
**COURSE STRUCTURE MASTER IN ARCHITECTURE (Environment)**  
**[TO BE IMPLEMENTED W.E.F.ACADEMIC YEAR 2015 - 2016]**

<b>Credit Structure for M.ArchProgramme</b>					
Course work	Semester I	Semester II	Semester III	Semester IV	Total
Core courses	16	16	16	-	48
Elective Courses	2	2	2	-	6
Lab Courses + Supportive courses	7	7	3	-	17
Seminar	-	-	-	5	5
Project work	-	-	4	20	24
<b>Total</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>100</b>

<b>SEMESTER I M.ARCH (Environment)</b>														
Sub. Code	SUBJECT	Course	Hrs /wk	period/ wk	TEACHING SCHEME		EXAMINATION SCHEME							CREDITS
					Lect./Wk	Studio/Wk	Paper	Term work	SESSIONAL		Oral		Total	
									Int	Ext	Int	Ext		
L1	Environmental Design Studio I	Core	9	12	2	10	-	-	150	150	25	25	350	9
L2	Sustainable Development and Planning	Core	4	5	2	3	-	-	75	75	-	-	150	4
L3	Building Physics – I	Core	3	3	1	2	100	25	-	-	-	-	125	3
L4	Elective –I	Elective	2	2	1	1	-	100	-	-	-	-	100	2
L5	Software Simulation Tools	Lab/ Supportive	4	5	1	4	-	-	75	75	-	-	150	4
L6	Environmental Laws and Legislations	Supportive	3	3	2	1	100	25	-	-	-	-	125	3
<b>TOTAL (SEMESTER I)</b>			<b>25</b>	<b>30</b>	<b>09</b>	<b>21</b>	<b>200</b>	<b>150</b>	<b>300</b>	<b>300</b>	<b>25</b>	<b>25</b>	<b>1000</b>	<b>25</b>

<b>SEMESTER II M.ARCH (Environment)</b>														
Sub. Code	SUBJECT	Course	Hrs /wk	period/ wk	TEACHING SCHEME		EXAMINATION SCHEME							CREDITS
					Lect./Wk	Studio/Wk	Paper	Term Work	SESSIONAL		Oral		Total	
									Int	Ext	Int	Ext		

L7	Environmental Design Studio II	Core	9	12	2	10	-	-	150	150	25	25	350	9
L8	Natural Resource Management	Core	4	5	2	3	-	-	75	75	-	-	150	4
L9	Building Energy Management - I	Core	3	3	2	1	100	25	-	-	-	-	125	3
L10	Elective-II	Elective	2	2	1	1	-	100	-	-	-	-	100	2
L11	Building Physics - II	Lab/ Supportive	4	5	3	2	-	-	75	75	-	-	150	4
L12	Research - I	Supportive	3	3	2	1	100	25	-	-	-	-	125	3
TOTAL (SEMESTER I D)			25	30	12	18	200	150	300	300	25	25	1000	25

**SEMESTER III M.ARCH (Environment)**

Sub. Code	SUBJECT	Course	Hrs /wk	period/ wk	TEACHING SCHEME		EXAMINATION SCHEME						CREDITS	
					Lect./Wk	Studio/Wk	Paper	Term Work	SESSIONAL		Oral			Total
									Int	Ext	Int	Ext		
L13	Environment Design Studio III	Core	9	12	2	10	-	-	150	150	25	25	350	9
L14	Tools for Measuring Sustainability	Core	4	5	3	2	-	-	75	75	-	-	150	4
L15	Building Energy Management - II	Core	3	3	2	1	100	25	-	-	-	-	125	3
L16	Elective-III	Elective	2	2	1	1	-	100	-	-	-	-	100	2

L17	Professional Practice (Training*)	Project Work	4	-	-	-	-	-	50	50	25	25	150	4
L18	Environment Impact Assessment & Environmental Management	Supportive	3	3	2	1	100	25	-	-	-	-	125	3
TOTAL (SEMESTER I II)			25	25	10	15	200	150	275	275	50	50	1000	400

\*This includes Professional Training (40 full working days) to be undertaken during intermediate time between II & III Semester, details of which are mentioned in the detailed syllabus. The Oral Assessment of the same will be held at the end of Semester III.

SEMESTER IV M.ARCH (Environment)														
Sub. Code	SUBJECT	Course	Hrs /wk	period/ wk	TEACHING SCHEME		EXAMINATION SCHEME						CREDITS	
					Lect/Wk	Studio/Wk	Paper	TW	SESSIONAL		Oral			Total
									Int	Ext	Int	Ext		
L19	Environmental Architectural Project	Project Work	20	22	5	17	-	-	300	300	100	100	800	20
L20	Research-II	Seminar	5	8	1	7	-	-	100	100	-	-	200	5
TOTAL (SEMESTER IV)			25	30	6	24	-	-	400	400	100	100	1000	25

\*\*25% of the total teaching hours is reserved for reflecting the institute's philosophy and its reflection in the design studio

**SEMESTER –I**

<b>ENVIRONMENTAL DESIGN STUDIO-I</b>			
<b>Subject Code -</b>			
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Hours / Week	9	Paper	Nil
Lectures/ week	2	Term work	Nil
Studio Periods/ week	10	Sessional (Internal)	150
		Sessional (external)	150
<b>Total Contact Periods/ week</b>	<b>12</b>	Oral (Internal)	25
		Oral (External)	25
<b>Total Credits</b>	<b>9</b>	<b>Total Marks</b>	<b>350</b>

**Objective**

To understand and analyze, climate and its elements at both micro and macro level and design projects of varied scales with passive strategies.

**Course contents**

**Urban Scale:** application of ambient level strategies mainly the Sun and Wind to a given design of urban/ macro level. E.g. - Townships & SEZ.

**Site Scale:** Design of a small unit to respond to building level element and strategies like wall, roof, facade design etc.

**Sessional/Term Work**

Design outcome for both projects will be assessed as per the project brief

**Assessment**

The sessional work as stipulated above will be assessed internally and externally with equal weightage of 150 marks each for sessional work along with external jury of equal weightage of 25 marks each for Viva –voce and a consolidated list of both will be submitted to the university.

**Recommended Readings**

1. G.K.Brown and Mark DeKay ; *Sun, Wind and Light*, John Wiley and Sons, INC
2. O.H.Koenigsberger; *Manual of Tropical Housing & Building*, University Press
3. Arvind Krishnan: *Climate Responsive Architecture*
4. Bansal. N; *Passive building design*, London
5. Givoni; *Man, Climate and Architecture*

<b>SUSTAINABLE DEVELOPMENT AND PLANNING</b>			
<b>Subject Code -</b>			
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Hours / Week	4	Paper	Nil
Lectures/ week	2	Term work	Nil
Studio Periods/ week	3	Sessional (Internal)	75
		Sessional (external)	75
<b>Total Contact Periods/ week</b>	<b>5</b>	Oral (Internal)	Nil
		Oral (External)	Nil
<b>Total Credits</b>	<b>4</b>	<b>Total Marks</b>	<b>150</b>

### Objective

1. To introduce the students with the scale of macro planning and its relationship with micro level planning (site planning).
2. To develop an understanding to mitigate climate change issues at neighbourhood level and to expose to the steps involved in sustainable urban design projects.
3. To expose the students with the cross sectoral relationship between various components of urban planning, viz. transportation planning, land suitability analysis, infrastructure planning and socio-economic planning.
4. Introduce the concept of environmental planning and expose to the emerging concepts in sustainable planning like, smart city concept, eco-city concept, etc.

### Course contents

1. Introduction to the theory of social planning and study various examples of socially inclusive planning projects, community participation in planning process, etc.
2. Study examples / case studies of social infrastructure planning (Chandigarh, Ghandinagar, Naya Raipur, Navi Mumbai, etc.)
3. Principles of urban planning, classifications of human settlements (Indian context) and study national planning standards like UDPFI guidelines,
4. Broad Theory of transportation planning and road network theory and principles,
5. Environmental policies and initiatives – national and international,
6. Housing theory and policies in India,
7. Theory and principles of sustainable planning,
8. Issues and tools of sustainable urban design and neighbourhood planning,
9. Case study analysis of smart cities, eco-cities (national and international)

### Sessional/Term Work

Formulating sustainable strategies for an existing city at macro level (city level) and at micro level (neighbourhood level). Group submission based on above exercise, Seminar / presentation of various aspects, issues of sustainable development (individual assignment).



### **Assessment**

The sessional work along with external jury as stipulated above will be assessed internally and externally with equal weightage of 75 marks each and a consolidated list of both will be submitted to the university.

### **Recommended Readings**

1. Stephen Wheeler; *Planning for Sustainability*,
2. Simon Presner, *Principles for Sustainability*
3. Cecilia Tacoli; *Urban Linkages*
4. Monto & Ganesh; *Sustainability by human settlements*
5. Sampson; *The WTO and sustainable development*
6. *Achieving sustainable cities in SE Asia region*
7. Antonio Layards; *Planning for Sustainable future*
8. D Farr; *Sustainable Urbanism*
9. Tifiin J; *Transport communications*
10. Brain; *Transport in Cities*
11. K.Lynch; *The Image of the City*, MIT Press
12. Edington John; *Ecology and Environmental Planning*
13. Alexander Christopher; *A pattern Language The Environment ,Public Health and Human Ecology consideration for Economic Development.*

<b>BUILDING PHYSICS - I</b>			
<b>Subject Code -</b>			
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Hours / Week	3	Paper	100
Lectures/ week	1	Term work	25
Studio Periods/ week	2	Sessional (Internal)	Nil
		Sessional (external)	Nil
<b>Total Contact Periods/ week</b>	<b>3</b>	Oral (Internal)	Nil
		Oral (External)	Nil
<b>Total Credits</b>	<b>3</b>	<b>Total Marks</b>	<b>125</b>

### Objective

The aim of the course is to introduce climatic parameters and to understand in depth the factors affecting comfort and strategies that lead to around/outside and inside the built space.

### Course contents

#### Climate Analysis

Earth-Sun relationship, Global Climate, Elements of Climate, Climatic zones in India, Analysis of macro & micro climate. Interpretation of climatic data through Climate Data, Solar Path Charts, Psychometric Charts, Bioclimatic charts.

#### Principles of Thermal Design

Thermal quantities, Heat exchange in buildings, balance point temperature and periodic heat flow.

#### Vernacular and Contemporary Case Studies & Appraisal

#### Design Strategies (Outdoor and Indoor)

Modifications of Architectural elements for thermal comfort-orientation, Open spaces, built spaces, building envelope, fenestrations, shading devices, roofs, walls etc. Natural ventilation, Cross ventilation, stack ventilation etc.

#### Instruments:

Use of instruments like data loggers/ anemometer for thermal/ wind data recording and carrying out related studies/exercises.

#### Sessional/Term Work

Journal with exercises to elaborate the above mentioned theories and concepts.

#### Assessment

The term work in the form of notes/ assignments, as stipulated above will be assessed internally with weightage of 25 marks. Theory examination based on the aforesaid course outline for this subject will be conducted for 100 marks.

#### Recommended Readings

1. G.K.Brown and Mark DeKay ; *Sun, Wind and Light*, John Wiley and Sons, INC
2. O.H.Koenigsberger; *Manual of Tropical Housing & Building*, University Press

3. Arvind Krishnan: *Climate Responsive Architecture*
4. Bansal. N; *Passive building design*, London
5. Givoni; *Man, Climate and Architecture*

<b>ELECTIVE- I</b>			
<b>Subject Code -</b>			
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Hours / Week	2	Paper	Nil
Lectures/ week	1	Term work	100
Studio Periods/ week	1	Sessional (Internal)	Nil
		Sessional (external)	Nil
<b>Total Contact Periods/ week</b>	<b>2</b>	Oral (Internal)	Nil
		Oral (External)	Nil
<b>Total Credits</b>	<b>2</b>	<b>Total Marks</b>	<b>100</b>

### Objective

To understand theories, concerns and values in the areas with respect to one of the following as per student's inclination and to develop awareness towards the same in reference to Environmental Design.

### Course contents

Individual college may offer the students one or more topics, depending upon the availability of experts and resource material. The colleges will have the opportunity to focus on one or more of the following topics:

1. Geographic Information System (GIS) as a planning tool
2. Conservation as a tool for sustainability
3. Environmental Profiling

Detailed syllabus for all topics will be finalized by individual college in consultation with expert faculty, considering the time and marks allotted to the subject.

### Sessional/Term Work

Assignment will be in the form of individual study of a topic related to any one of the subject based on availability of experts, which will be presented by the student in the form of an audio-visual presentation and a report on the same.

### Assessment

The term work as stipulated above will be assessed internally out of 100 marks.

### Recommended Readings

All books/ Journals/ Magazines/ unpublished/published research/websites related to the topic selected by the individual student

<b>SOFTWARE SIMULATION TOOLS</b>			
<b>Subject Code -</b>			
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Hours / Week	4	Paper	Nil
Lectures/ week	1	Term work	Nil
Studio Periods/ week	4	Sessional (Internal)	75
		Sessional (external)	75
<b>Total Contact Periods/ week</b>	<b>5</b>	Oral (Internal)	Nil
		Oral (External)	Nil
<b>Total Credits</b>	<b>4</b>	<b>Total Marks</b>	<b>150</b>

### Objective

The objective is to introduce environmental simulation software like Ecotect, Design Builder and IES. The software skills shall be used for various applications like lighting, thermal comfort of spaces, energy calculations along with other parameters like climate, materials selection and shadow analysis. AI so overall internet and cyber security will be introduced to the students as part of the curriculum.

### Course contents

**Overview of Energy Simulation Software and Introduction:** Hands-on experience of modeling in the software along with introductory parameters and their studies like: Climatic analysis, shadow analysis, material selection etc

**Lighting:** Calculations and inferences for day lighting and application of artificial lighting along with its analysis

**Thermal Comfort:** Calculations for thermal comfort of spaces and its associated parameters like heat gains-losses, temperature profiles, fabric gains-losses, ventilation etc

**Add-on Software:** Introduction and Hands-on with allied and compatible software like Radiance, PMV, Solar Tool etc

### Sessional/Term Work

Report with individual exercises for various parameters of the taught software as per break-up of module.

### Assessment

Sessional work as stipulated above will be assessed equally internally and externally for 75 marks each

### Recommended Readings

1. Help Manuals
2. Video Tutorials

<b>ENVIRONMENTAL LAWS AND LEGISLATIONS</b>			
<b>Subject Code -</b>			
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Hours / Week	3	Paper	100
Lectures/ week	2	Term work	25
Studio Periods/ week	1	Sessional (Internal)	Nil
		Sessional (external)	Nil
<b>Total Contact Periods/ week</b>	<b>3</b>	Oral (Internal)	Nil
		Oral (External)	Nil
<b>Total Credits</b>	<b>3</b>	<b>Total Marks</b>	<b>125</b>

### Objective

The aim is to introduce the students to the existing international developments, environment laws and legislations in India.

### Course contents

**Public Health and Safety:** Remedies under law of torts, law of crimes and other common law remedies.

**The Constitution of India:** Salient features, Fundamental Rights and Directive Principles of State Policy, Writ petitions, Public Interest Litigations.

**Environmental laws and legislations:** Water Act, 1974, Air Act, 1981, Environment Protection Act, 1986, Energy Conservation Act, 2001, Public Liability Insurance Act, 1991 and Biodiversity Act 2002.

**Environmental Notifications and Rules:** Coastal Regulation Zones, Dahanu taluka Eco-Fragile Area, Environment Impact Assessment of Development Projects, Matheran Eco-Sensitive Zones, Bio-Medical Waste (M&H) Rules, 1998, Hazardous Waste (M&H) Rules, 1989, Municipal Solid Waste (M&H) Rules, 2000.

### Sessional/Term Work

Studies taken up by students individually and/or in groups will be presented and submitted along with compilation of study material in the form of reports/ notes/ assignments.

### Assessment

The term work in the form of notes/ assignments, as stipulated above will be assessed internally with weightage of 25 marks. Theory examination based on the aforesaid course outline for this subject will be conducted for 100 marks.

**Recommended Readings**

1. Leela Krishnan; *Environmental Law in India*
2. Mehta M ; *Commentary on water and air pollution with environmental protection law*
3. Sarkar S; *Legal aspects of regulations in South Asia*
4. Chalifour N; *Land use law for sustainable development*
5. Birnie PW and Boyle; *International law and the Environment*
6. Saksena K.D ; *Environmental policies and programs in India*

## SEMESTER –II

<b>ENVIRONMENTAL DESIGN STUDIO-II</b>			
<b>Subject Code -</b>			
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Hours / Week	9	Paper	Nil
Lectures/ week	2	Term work	Nil
Studio Periods/ week	10	Sessional (Internal)	150
		Sessional (external)	150
<b>Total Contact Periods/ week</b>	<b>12</b>	Oral (Internal)	25
		Oral (External)	25
<b>Total Credits</b>	<b>9</b>	<b>Total Marks</b>	<b>350</b>

**Objective**

The purpose of this Studio is to involve the students in small urban / environmental planning projects where they will be able to apply the theoretical knowledge of environmental & sustainability planning to a specific project. The Studio will look at urban development and evolve an exercise that will address environmental issues arising in urban areas and search for solutions under urban environmental planning.

**Course contents**

Urban Environmental Assessments, Environmental Status Reporting and identification of environmental issues in urban areas.

Conceptual master planning for Sustainable Development of neighborhoods, eco-sensitive areas etc.

Detailed Micro planning for specific projects under the theme of Urban Environmental Planning, which may include River front development, ecological restoration projects, sustainable urban blocks, Heritage conservation for sustainability, Sustainable City Development Strategies etc.

**Sessional/Term Work**

Identification of area of intervention, Concept presentations for the same, technical drawing portfolio and report to elaborate the sustainable design scheme.

**Assessment**

The sessional work as stipulated above will be assessed internally and externally with equal weightage of 150 marks each for sessional work along with external jury of equal weightage of 25 marks each for Viva –voce and a consolidated list of both will be submitted to the university.

**Recommended Readings**

1. As recommended by faculty based on the exercise
2. Kevin Lynch, *Image of the City*



<b>NATURAL RESOURCE MANAGEMENT</b>			
<b>Subject Code -</b>			
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Hours / Week	4	Paper	Nil
Lectures/ week	2	Term work	Nil
Studio Periods/ week	3	Sessional (Internal)	75
		Sessional (external)	75
<b>Total Contact Periods/ week</b>	<b>5</b>	Oral (Internal)	Nil
		Oral (External)	Nil
<b>Total Credits</b>	<b>4</b>	<b>Total Marks</b>	<b>150</b>

### Objective

The purpose of this subject is to introduce to the students the basics of Ecological and Environmental systems, its importance and interdependence on each other. The students should be able to understand the importance of environmental systems and its relation with human development. The course gives an overview of environmental sciences and the natural resources available for sustainable human life.

### Course contents

#### Ecology

Concept of Ecosystem, Type of Ecosystems, Components of an ecosystem, Earth Biomes & Climate Zones, linkages and the cyclic flow of materials and energy.

Biotic and a biotic components of an Ecosystem, Introduction to the concepts of Biodiversity, Introduction to the Natural resources such as soil, water, air and material flows (Carbon cycle, Oxygen cycle, Water Cycle etc).

#### Environment

Overview of Environmental Sciences pertaining to the above, including assessments, mapping tools and methods etc.

Human interventions and ecosystem disturbances, Impacts of human activities on natural resources and biodiversity, changing of the ecosystem cycles etc.

Local, regional and global impacts on the Environment. Introduction to Air, water, land pollution; introduction to wasteland creation & barren land formation, soil erosion at regional level; Introduction to global environmental issues like Climate Change, Desertification, Global Warming, Ozone Depletion, Acid Rain etc.

#### Impacts of Urbanization on Ecology and Environment.

Water management, waste and land management systems

#### Sessional/ TermWork

Assignment will be in the form of notes/ assignments covering all the topics mentioned above with suitable examples, sketches and supportive material.

#### Assessment

The sessional work along with external jury as stipulated above will be assessed internally and externally

lly with equal weightage of 75 marks each and a consolidated list of both will be submitted to the university.

### **Recommended Readings**

1. Freeland ; *Changing Environment*,
2. Barbara Murck; *Environmental Science*
3. Benny Joseph, Dick Morris & Joanna; *Environmental Studies*
4. D.B.Murthy; *Environmental Awareness and Protection*
5. Frank Press; *EARTH*
6. Edward Kurmondy; *Concepts of ecology*
7. Cuggingham; *Environmental Science*

<b>BUILDING ENERGY MANAGEMENT - I</b>			
<b>Subject Code -</b>			
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Hours / Week	3	Paper	100
Lectures/ week	2	Term work	25
Studio Periods/ week	1	Sessional (Internal)	Nil
		Sessional (external)	Nil
<b>Total Contact Periods/ week</b>	<b>3</b>	Oral (Internal)	Nil
		Oral (External)	Nil
<b>Total Credits</b>	<b>3</b>	<b>Total Marks</b>	<b>125</b>

### Objective

To introduce the demand side of energy and its approach in planning building services and management of the energy systems.

### Course contents

#### Energy Efficient HVAC Systems

Air Cycle, Refrigerant cycle, Basics of Cooling load estimation. Types of systems to include unitary, central, CAV, VAC, VRF etc. air cooled, water cooled, and ducting design. Air conditioning system and components. Energy conservation measures and technologies.

#### Plumbing for Green Buildings

Pump types, factors affecting pump performance, efficient pump operation systems, flow control strategies. Energy conservation opportunities in pumping systems.

#### Energy Efficient Electrical Utilities

Electrical Energy basics, Electricity billing, Electrical load management and maximum demand control, Power factor improvement and its benefit.

### Sessional/Term Work

Studies taken up by students individually and/or in groups will be presented and submitted along with compilation of study material in the form of reports/ notes/ assignments.

### Assessment

The term work in the form of notes/ assignments, as stipulated above will be assessed internally with weightage of 25 marks. Theory examination based on the aforesaid course outline for this subject will be conducted for 100 marks.

### Recommended Readings

1. Turner and Doty; *Energy Management Handbook*.
2. Martin Greenwald; *Residential energy systems and climate control technology*.
3. Jan Kreider; *Solar heating design*.
4. Hegger and Fuchs; *Energy Manual*.
5. *Green awareness*, Ferris State University.

1. G.K.Brown and Mark DeKay; *Sun, Wind and Light*
2. Arvind Krishnan; *Climate Responsive Architecture*

<b>ELECTIVE-II</b>			
<b>Subject Code -</b>			
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Hours / Week	2	Paper	Nil
Lectures/ week	1	Term work	100
Studio Periods/ week	1	Sessional (Internal)	Nil
		Sessional (external)	Nil
<b>Total Contact Periods/ week</b>	<b>2</b>	Oral (Internal)	Nil
		Oral (External)	Nil
<b>Total Credits</b>	<b>2</b>	<b>Total Marks</b>	<b>100</b>

### Objective

To understand theories, concerns and values in the areas with respect to one of the following as per student's inclination and to develop awareness towards the same in reference to Environmental Architecture.

### Course contents

Individual college may offer the students one or more topics, depending upon the availability of experts and resource material. The colleges will have the opportunity to focus on one or more of the following topics:

1. Environmental Behaviour
2. Environmental Economics
3. Efficient Building Materials & Technologies

Detailed syllabus for all topics will be finalized by individual college in consultation with expert faculty, considering the time and marks allotted to the subject.

### Sessional/Term Work

Assignment will be in the form of individual study of a topic related to any one of the subject based on availability of experts, which will be presented by the student in the form of an audio-visual presentation and a report on the same.

### Assessment

The term work as stipulated above will be assessed internally out of 100 marks.

### Recommended Readings

All books/ Journals/ Magazines/ unpublished/published research/websites related to the topic selected by the individual student.

<b>BUILDING PHYSICS - II</b>			
<b>Subject Code -</b>			
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Hours / Week	4	Paper	Nil
Lectures/ week	3	Term work	Nil
Studio Periods/ week	2	Sessional (Internal)	75
		Sessional (external)	75
<b>Total Contact Periods/ week</b>	<b>5</b>	Oral (Internal)	Nil
		Oral (External)	Nil
<b>Total Credits</b>	<b>4</b>	<b>Total Marks</b>	<b>150</b>

### Objective

To introduce lighting and acoustic theory in association with environmental parameters and study its impact on a built space.

### Course contents

#### Day lighting and Architecture

Principles of day lighting, Photometric quantities, daylight factor, glare, prediction techniques, measurement and analysis of daylight, design strategies for day lighting.

#### Artificial Lighting

Need, Light sources and ballast systems, Luminaries and light distribution, lighting controls, building level controls and integration with daylight, use of instruments to measure lighting levels.

#### Lighting policies, Codes and Standards

Lighting and its impacts on health and environment, National Building Codes, Energy conservation building codes and standards of practice.

#### Acoustics

Terminologies, measurement and transmission, noise, reverberation time, passive and active noise control, design strategies for classroom, auditorium and amphitheatre acoustics.

### Sessional/Term Work

Studies taken up by students individually and/or in groups will be presented and submitted along with compilation of study material in the form of reports/ notes/ assignments.

### Assessment

The sessional work as stipulated above will be assessed internally and externally with equal weightage of 75 marks each and a consolidated list of both will be submitted to the university

### Recommended Readings

1. C Robbins; *Daylighting: Design and Analysis*
2. Helmut Koster; *Dynamic daylight Architecture*
3. Benjamin Evans; *Daylight in Architecture*

<b>RESEARCH –I</b>			
<b>Subject Code -</b>			
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Hours / Week	3	Paper	100
Lectures/ week	2	Term work	25
Studio Periods/ week	1	Sessional (Internal)	Nil
		Sessional (external)	Nil
<b>Total Contact Periods/ week</b>	<b>3</b>	Oral (Internal)	Nil
		Oral (External)	Nil
<b>Total Credits</b>	<b>3</b>	<b>Total Marks</b>	<b>125</b>

### Objective

To introduce methods and process of research in order to understand the significance of the same with reference to environmental architecture.

### Course contents

1. Introduction to the types of research and the process of formulating a research project
2. Introduction to research design, sampling types and methods etc.
3. Introduction to various methods of research, their relative advantages and disadvantages and their applications
4. Introduction to methods of data collection, analysis and presentation
5. Introduction to technical writing and presenting a research paper
6. Development of research writing and presentation skills

### Sessional/Term Work

To undertake a focused study based upon a research question and to present it in form of a research paper, compilation of study material, along with brief assignments demonstrating the steps in the research process.

### Assessment

The term work in the form of notes/ assignments, as stipulated above will be assessed internally with weightage of 25 marks. Theory examination based on the aforesaid course outline for this subject will be conducted for 100 marks.

### Recommended Readings

1. Creswell, J. W. *Research Design: Qualitative, quantitative and mixed methods approaches*, 2nd Ed., Thousand Oaks: Sage. 2003.
2. De Vaus, D. A. *Surveys in Social Research*, Jaipur :Rawat Publications. 2003
3. Groat, L. & Wang, D. *Architectural Research Methods*, NY: John Wiley and Sons Inc. 2002.
4. Kothari, C.R. *Research Methodology: Methods and Techniques*, New Delhi: WishwaPrakashan. 2005.
5. Sanoff, H. *Methods of Architectural Programming*, Dowden Hutchinson and Ross, Inc. Vol. 29, Community Development Series. 1977.

## SEMESTER-III

<b>ENVIRONMENT DESIGN STUDIO-III</b>			
<b>Subject Code -</b>			
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Hours / Week	9	Paper	Nil
Lectures/ week	2	Term work	Nil
Studio Periods/ week	10	Sessional (Internal)	150
		Sessional (external)	150
<b>Total Contact Periods/ week</b>	<b>12</b>	Oral (Internal)	25
		Oral (External)	25
<b>Total Credits</b>	<b>9</b>	<b>Total Marks</b>	<b>350</b>

**Objective**

To develop creative skills, abilities, judgment and control in the design of built environment. The student should be able to have a whole building design approach for energy efficiency.

**Course contents**

Design/Retrofitting of buildings/campuses for energy efficiency. Focus should be on buildings/campuses which are conventionally energy guzzlers.

**Sessional/Term Work**

Concept presentations, technical drawing portfolio and report to elaborate the design scheme as per the project brief.

**Assessment**

The sessional work as stipulated above will be assessed internally and externally with equal weightage of 150 marks each for sessional work along with external jury of equal weightage of 25 marks each for Viva –voce and a consolidated list of both will be submitted to the university.

**Recommended Readings**

Case Studies and Other recommended reading based on the topic selected for the year and the project brief.



<b>TOOLS FOR MEASURING SUSTAINABILITY</b>			
<b>Subject Code -</b>			
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Hours / Week	4	Paper	-
Lectures/ week	3	Term work	-
Studio Periods/ week	2	Sessional (Internal)	75
		Sessional (external)	75
<b>Total Contact Periods/ week</b>	<b>5</b>	Oral (Internal)	Nil
		Oral (External)	Nil
<b>Total Credits</b>	<b>4</b>	<b>Total Marks</b>	<b>150</b>

### Objective

To introduce the various tools and methods associated with the field of environment and to prepare students for new skills and upcoming trends in the field of environment.

### Course contents

1. Energy Audit
2. Life Cycle Assessment
3. Carbon Footprint and Mapping
4. Green Building Rating Systems
5. Energy Conservation Building Codes

*\* This list is not exhaustive and further topics could be added if required over time.*

### Sessional/Term Work

Assignment will be in the form of notes/ assignments covering all the topics mentioned above with suitable examples, sketches and supportive material.

### Assessment

The sessional work along with external jury as stipulated above will be assessed internally and externally with equal weightage of 75 marks each and a consolidated list of both will be submitted to the university.

### Recommended Readings

GRIHA; *Griha Manual, Vol 1 to 5*, TERI Publication  
 IGBC Manuals, CII Publication  
 LEED Manuals  
 ECBC Manual  
 ECBC User Manual

<b>BUILDING ENERGY MANAGEMENT - II</b>			
<b>Subject Code -</b>			
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Hours / Week	3	Paper	100
Lectures/ week	2	Term work	25
Studio Periods/ week	1	Sessional (Internal)	Nil
		Sessional (external)	Nil
<b>Total Contact Periods/ week</b>	<b>3</b>	Oral (Internal)	Nil
		Oral (External)	Nil
<b>Total Credits</b>	<b>3</b>	<b>Total Marks</b>	<b>125</b>

### Objective

To introduce the supply side of energy and its integration with planning and design of buildings.

The purpose of this subject is to introduce the students, global energy scenario and various alternative in renewable sources. It aims at introducing the options of renewable resources and appropriate technologies for harnessing them for our benefit. To improve the energy security and ensure environment protection, these technologies are gaining importance in our day to day applicative lifestyle.

### Course contents

#### Energy Scenario

Current global scenario, Global meets  
Need at global, country, state and city level.  
Identification of resources at country and state level.

#### Conventional Source - limitations

The renewable comparative advantages,  
Renewable large scale production.

#### Solar Energy

Potential, Technology, Limitations  
Applications on generic level  
Building integration applications

#### Wind Energy

Potential, Technology, Limitations  
Applications on generic level  
Building integration applications

#### Bio Mass

Potential, Technology, Limitations  
Applications on generic level

#### Other resources

Geothermal, Tidal, Mechanical Nuclear Energy, Cogeneration

#### Bio fuels

Alternative Fuels, CNG & LPG

**Sessional/Term Work**

Studies taken up by students individually and/or in groups will be presented and submitted along with compilation of study material in the form of reports/ notes/ assignments.

**Assessment**

The term work in the form of notes/ assignments, as stipulated above will be assessed internally with weightage of 25 marks. Theory examination based on the aforesaid course outline for this subject will be conducted for 100 marks.

**Recommended Readings**

1. R.K. Narang; *Cleaner is cheaper*, TERI
2. VV Kishore ;*Renewable energy, engineering and technology*,TERI
3. Sophia and Stefen Behling; *Solar Power*
4. Martin Kalstchmitt; *Renewable Energy*
5. Ursula Eicher; *Solar technology and buildings*
6. Falk Antony; *Photovoltaic for Professionals*
7. Paul Gipe; *Wind Power*
8. *Renewable energy and Environment*, CEE Publication
9. *Renewable energy technology development and implications*, TERI
10. *Sustainable building Manual*, Vol 1 and 2, TERI
11. *Energy its use and the environment-Biomass*

**Journals/Periodicals**

12. Renewable energy
  13. Solar Online
- Down to Ear

<b>ELECTIVE - III</b>			
<b>Subject Code -</b>			
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Hours / Week	2	Paper	Nil
Lectures/ week	1	Term work	100
Studio Periods/ week	1	Sessional (Internal)	Nil
		Sessional (external)	Nil
<b>Total Contact Periods/ week</b>	<b>2</b>	Oral (Internal)	Nil
		Oral (External)	Nil
<b>Total Credits</b>	<b>2</b>	<b>Total Marks</b>	<b>100</b>

### **Objective**

To understand theories, concerns and values in the areas with respect to one of the following as per student's inclination and to develop awareness towards the same in reference to Environmental Design.

### **Course contents**

Individual college may offer the students one or more topics, depending upon the availability of experts and resource material. The colleges will have the opportunity to focus on one or more of the following topics:

1. Use of Parametric design tools for environmental design
2. Landscape Urbanism
3. Smart Cities

Detailed syllabus for all topics will be finalized by individual college in consultation with expert faculty, considering the time and marks allotted to the subject.

### **Sessional/Term Work**

Assignment will be in the form of individual study of a topic related to any one of the subject based on availability of experts, which will be presented by the student in the form of an audio-visual presentation and a report on the same.

### **Assessment**

The term work as stipulated above will be assessed internally out of 100 marks.

### **Recommended Readings**

All books/ Journals/ Magazines/ unpublished/published research/websites related to the topic selected by the individual student.

<b>ENVIRONMENTAL PROFESSIONAL PRACTICE</b>			
<b>Subject Code -</b>			
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Hours / Week	4	Paper	Nil
Lectures/ week	-	Term work	Nil
Studio Periods/ week	-	Sessional (Internal)	50
		Sessional (external)	50
<b>Total Contact Periods/ week</b>	-	Oral (Internal)	25
		Oral (External)	25
<b>Total Credits</b>	-	<b>Total Marks</b>	<b>150</b>

### Objective

To give an opportunity for learning and for development of skills related to practical aspects of the discipline of Environmental Architecture, by working in a firm/organization working in the field of environment.

### Course contents

This includes Professional Training (40 full working days) to be undertaken during intermediate time between II & III Semester. It involves working in associated fields of environment in India or abroad. The Oral Assessment of the same will be held at the end of Semester III.

### Sessional/Term Work

Final submission will include compilation of the work done during the training in the form of A3 report. All hard copies need to be submitted with the signature of the head and the stamp of the firm, at the time of appearing for the viva-voce.

### Assessment

The sessional work as stipulated above will be assessed internally and externally with equal weightage of 50 marks each for sessional work along with external jury of equal weightage of 25 marks each for Viva – voce and a consolidated list of both will be submitted to the university.

### Recommended Readings

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<b>ENVIRONMENT IMPACT ASSESSMENT &amp; ENVIRONMENTAL MANAGEMENT</b>			
<b>Subject Code -</b>			
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Hours / Week	3	Paper	100
Lectures/ week	2	Term work	25
Studio Periods/ week	1	Sessional (Internal)	Nil
		Sessional (external)	Nil
<b>Total Contact Periods/ week</b>	<b>3</b>	Oral (Internal)	Nil
		Oral (External)	Nil
<b>Total Credits</b>	<b>3</b>	<b>Total Marks</b>	<b>125</b>

### Objective

The purpose of this subject is to introduce to the students the principles of Environmental Assessment s. The students should be able to understand the benefits of Environmental Impact Assessments (EIA) and the legal provisions for EIA studies in India. They should have the necessary knowledge of tools and methodologies of EIA studies and should be equipped to lead EIA teams.

Students are also exposed to Environmental Management systems, practices and methodology.

### Course contents

#### Environmental Impact Assessment:

##### **Introduction to Environmental Assessments**

This should include root, concept, definitions and perspectives, benefits and necessity of conducting EAs

##### **Legislative requirements of EIA studies in India**

##### **Planning & Management of EIA studies**

Team formation, expert identification etc

##### **Screening and Scoping**

##### **EIA Methodologies**

Matrices, checklists etc

##### **Prediction and Assessment of Impacts**

Introduction to be provided for all categories of impacts which may include: Air, Water, Soil and surface water, Noise, groundwater, biodiversity and habitats, cultural and heritage, socio-economic etc

Evaluation of Alternatives & Decision making for the Preferred Alternative

Environmental Management Plan, Mitigation measures and their Impacts

Structuring and Writing an EIA report

People's participation and involvement in EIA process

Introduction to Environmental Management

**Environmental Management:**

Environmental resource management  
Development of environmental management systems with focus on ISO14000  
Implementation of environmental management systems  
Energy management

**Sessional/TermWork**

Studies taken up by students individually and/or in groups will be presented and submitted along with compilation of study material in the form of reports/ notes/ assignments.

**Assessment**

The term work in the form of notes/ assignments, as stipulated above will be assessed internally with weightage of 25 marks. Theory examination based on the aforesaid course outline for this subject will be conducted for 100 marks.

**Recommended Readings**

1. Talwar; *Environmental management*,
2. Ramachandra; *Environmental management*
3. Petts Judith; *Handbook on Environmental Impact Assessment*
4. Y.Abhi & S.Jain; *Handbook on energy audit and environmental management*
5. Larry Canter, *Environmental Impact Assessment*
6. *Recommended EIA Reports from MoEF website*
7. MoEF, *Guidelines for EIA of Construction Projects*

## SEMESTER –IV

<b>ENVIRONMENTAL ARCHITECTURAL PROJECT</b>			
<b>Subject Code -</b>			
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Hours / Week	20	Paper	Nil
Lectures/ week	5	Term work	Nil
Studio Periods/ week	17	Sessional (Internal)	300
		Sessional (external)	300
<b>Total Contact Periods/ week</b>	<b>22</b>	Oral (Internal)	100
		Oral (External)	100
<b>Total Credits</b>	<b>20</b>	<b>Total Marks</b>	<b>800</b>

**Objective**

To give an opportunity to the student to explore a practical or conceptual project related to environmental planning or design and to come up with a policy and/ design level proposal for the same.

**Course contents**

The student has a choice to focus on the planning and policy aspect, or the dissertation could culminate in a design of a sustainable built form.

1. Each student is required to select an independent study with reference to a special topic in Environmental Architecture, before the end of third semester in consultation with the faculty members.
2. Identification of the project with its significance, scope and limitations
3. Programming research related to the project and evolving the project brief
4. Preparing a project proposal and presenting it in graphical and textual format.

**Sessional/Term Work**

The document including report, computer simulation results and technical drawing if required. The work will be in the form of necessary drawings to explain the project and its details. A comprehensive report of the project and the related study, will be submitted which will include the above drawings.

**Sessional Assessment**

The sessional work as stipulated above will be assessed internally and externally with equal weightage of 300 marks each for sessional work along with external jury of equal weightage of 100 marks each for Viva – voce and a consolidated list of both will be submitted to the university.

**Recommended Readings**

All books/ Journals/ Magazines/ unpublished/published research/websites related to the topic selected by the individual student.



<b>RESEARCH - II</b>			
<b>Subject Code -</b>			
<b>Teaching Scheme</b>		<b>Examination Scheme</b>	
Hours / Week	5	Paper	Nil
Lectures/ week	1	Term work	Nil
Studio Periods/ week	7	Sessional (Internal)	100
		Sessional (external)	100
<b>Total Contact Periods/ week</b>	<b>8</b>	Oral (Internal)	Nil
		Oral (External)	Nil
<b>Total Credits</b>	<b>5</b>	<b>Total Marks</b>	<b>200</b>

### Objective

To give an opportunity to explore and to study central issues related to environmental architecture from past, to the present day and future.

The topic of the research paper could be selected in a such way that it could help to develop an appropriate methodology and research approach related to the Environmental Architectural Project taken up in semester-IV.

### Course contents

The subject deals with selecting an appropriate topic from the field of environmental architecture or allied disciplines, for the theoretical exploration related and supportive to the selected dissertation topic.

### Sessional/Term Work

Unit-I- Research dissertation based upon the topic approved by the institute in around 5000 words, in format specified by the university.

Unit-II- The student shall of a paper (in a conference / journal) on a topic of his/ her choice on any subject, he/ she have learnt in the course curriculum. The paper necessarily should be first authored by the student during the course of study. The degree to the student will be awarded only after producing a proof of publication/ acceptance.

### Assessment

The sessional work as stipulated above will be assessed internally and externally with equal weightage of 100 marks each for sessional work and a consolidated list of both will be submitted to the university.

### Recommended Readings

All books/ Journals/ Magazines/ unpublished thesis related to the topic selected by the individual student.