UNIVERSITY OF PUNE

COURSE STRUCTURE & SYLLABUS

FOR

MASTER OF ARCHITECTURE

M.ARCH. (Environmental Architecture)
Effective from June 2008

FACULTY OF ENGINEERING

BOARD OF STUDIES IN ARCHITECTURE

SYLLABUS OF

MASTER'S DEGREE IN ARCHITECTURE
M. ARCH. (Environmental 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 unbuilt 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 and 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

PROVISION OF INFRASTRUCTURE

The provision of infrastructure for Master's course shall be done as per the guidelines laid down by C.O.A./ University of Pune. regarding intake of students, classrooms, studios, laboratories, seminar rooms, library facility, students amenities and all the appurtenant requirements carry out teaching activity effectively.

APPOINTMENT OF TEACHING AND SUPPORTING STAFF :

The appointment of teaching staff shall be done as per the norms laid down by C.O.A / University of Pune. and other statutory bodies as applicable.

RULES OF COURSE STRUCTURE FOR MASTER OF ARCHITECTURE.

M.ARCH. (Environmental Architecture)

RULE NO. 1 : ELIGIBILITY CRITERIA

The student seeking admission to M. Arch. Course must have passed Bachelor's Examination in Architecture or equivalent course of recognized by the apex body securing minimum Higher Second Class with minimum 50% marks in aggregate and above 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 : SCEME OF ASSESSMENT:

A candidate to be eligible for the Masters 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 45 % 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:

a) 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 Fist, 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 Semeter examination, external assessment shall be carried out by a professional not teaching in any of the Colleges under University of Pune.

- **An examiner for any of the subjects of examination from First to Third semester 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

1. This course has been considered as an integrated on 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

THE CLASS SHALL BE AWARDED TO THE STUDENT ON THE AGGREGATE MARKS OBTAINED BY HIM IN FIRST AND SECOND YEAR TAKEN TOGETHER.

The award of class shall be as follows.

a) Aggregate 66% or more: First Class with Distinction.

b) Aggregate 60% or more but less than 66% marks: First Class
c) Aggregate 55% or more but less than 60% marks: Higher Second Class
d) Aggregate 50% or more but less than 55% marks: Second Class

RULE NO. 9 : 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. 10 : 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.

Name of Course : Master of Architecture (M. Arch)

ENVIRONMENTAL ARCHITECTURE

Course Structure

First Year M. Arch (ENV)

Semester – I

Sub Code	**Subject**	**Teaching Scheme (Lecture Periods of 45 min each)**			**Examination Scheme**					**Total Marks**	**Credits**
		Lecture	Studio/ Seminar/ Lab	Total	Paper	Sessional		Viva-Voce			
						Int	Ext.	Int.	Ext.		
	Socio Economic Aspects for Planning	3	1	4	75	25	-	-	-	100	2
	Urban and Regional Planning	3	1	4	75	25	-	-	-	100	2
	Housing, Environmental Planning and Policies	3	1	4	75	25	-	-	-	100	2
	Colloquium	2	2	4	-	50	50	-	-	100	2
	Elective I • Quantitative Research Methods	2	2	4	-	100				100	2
	Climate, Building Physics and Sustainable design studio	4	6	10	-	100	100	25	25	250	5
		17	**13**	**30**	**225**	**475**		**50**		**750**	**15**

*** The institute shall have freedom to offer any listed or additional topic for elective as per the availability of subject expert

Semester – II

Sub Code	Subject	Teaching Scheme (Lecture Periods of 45 min each)			Examination Scheme					Total Marks	Credits
		Lecture	Studio/ Seminar/ Lab	Total	Paper	Sessional		Viva-Voce			
						Int	Ext.	Int.	Ext.		
	Environmental Laws & Legislations	3	1	4	75	25	-	-	-	100	2
	Environmental management& Ecological land planning	3	1	4	75	25	-	-	-	100	2
	Sustainable Building Materials and Technologies	2	2	4	-	50	50	-	-	100	2
	Climate Responsive Building Design Principles	2	2	4	-	50	50	-	-	100	2
	Elective II • GIS and Remote Sensing • Software simulation tools for energy efficient buildings	2	2	4	-	100				100	2
	Sustainable design studio	2	6	10	-	100	100	25	25	250	5
		14	**16**	**30**	**150**	**550**		**50**		**750**	**15**

*** The institute shall have freedom to offer any listed or additional topic for elective as per the availability of subject expert

Semester – III

Sub Code	Subject	Teaching Scheme (Lecture Periods of 45 min each)			Examination Scheme					Total Marks	Credits
		Lecture	Studio/ Seminar/ Lab	Total	Paper	Sessional		Viva-Voce			
						Int	Ext.	Int.	Ext.		
	Renewable Energy Systems and Environmental Technologies	3	1	4	75	25	-	-	-	100	2
	Environmental Impact Assessment	3	1	4	75	25	-	-	-	100	2
	Energy Efficient Building Services and Management	2	2	4	-	50	50	-	-	100	2
	Research Paper	2	2	4	-	50	50	-	-	100	2
	Elective III • Energy conservation Building Codes and Audits • Restoration of Ecologically Disturbed Sites • Conservation as a tool for sustainability	2	2	4	-	100				100	2
	Sustainable design studio	4	6	10	-	100	100	25	25	250	5
		16	**14**	**30**	**150**	**550**		**50**		**750**	**15**

*** The institute shall have freedom to offer any listed or additional topic for elective as per the availability of subject expert

Semester – IV

Sub Code	Subject	Teaching Scheme (Lecture Periods of 45 min each)			Examination Scheme					Total Marks	Credits
		Lecture	Studio/ Seminar/ Lab	Total	Paper	Sessional		Viva-Voce			
						Int	Ext.	Int.	Ext.		
	Professional Training ***	-	4	-	-	30	30	20	20	100	2
	Dissertation(Thesis)	2	24	26	-	300	300	25	25	650	13
		2	**28**	**30**		**660**		**90**		**750**	**15**

*** Professional training of 6 weeks full time or 12 weeks part time with the concerned office at any time during the semester as decided by the institution offering the course

Subject Code :			
Name of Subject:	**Socio-Economic Aspects for Planning**		
Teaching Scheme		**Examination Scheme**	**Marks**
Lecture Periods	**3**	**Paper**	**75**
Seminar	**1**	**Sessional Int.**	**25**
Lab	**-**	**Sessional Ext.**	**-**
Studio Periods	**-**	**Jury (Viva-Voce)**	**-**
Total Contact Periods/Week	**4**	**Total Marks**	**100**
		Total Credits	**2**

Objectives :

- To cover basic sociological aspects and theories and its application in the field of planning and development. The focus will be on social issues and problems in the contemporary Indian society, particularly the urban India. The course will be delivered mainly through class lectures. Open discussions and seminars will be held for detailed analysis and case study analysis and discussion.

I Sociology and planning

Sociology and its relation to planning, social theories and concepts of society, community, social culture, organization, urbanization and image of a city.
Planning of social life. Case of New Bombay etc.
Urban social focus, community participation.
Urban Environment management, issues of social infrastructure

II Economics for Planning

Definition and scope of Economics and its importance in urban, Regional planning. Micro Economics, macro Economics. Development of economic - Major land form.
Theory of demand, supply, productions, costs revenue.
Principle of taxation.
National Income Estimates, planning in India, Need, models, issues, plans.
Urbanization, industrialization, and policies.

Sesional Work:

Journal or Report covering the above mentioned theories and concepts

Sessional Assessment

Sessional work as stipulated above will be assessed internally for 25 marks

Examination Scheme:

The submission of sessional work will make the student eligible to appear for the Theory exam of 75 marks

Reference Books

Bottomore , T.B.P.Goode(eds) readings in Marxist Sociology,Oxford,Part 1
City and Grassroots:A Cross Cultural Theory of Urban Social Movements ,London
Castels ,Manuel
Essays on planning theory and education ,Oxford by Faludi
The Image of the City by K.Lynch, MIT Press
Economics by P.A.Samuelson
Economic Analysis and Policy in Underdeveloped countries by P.T.Bauer
Economic and social development by S.L.Sinha
Economic Development and planning in India K.N.Subramanya
Economic planning , principles , techniques ,and practices by A.N.Agarwal
Growth Economics by Amartya Sen

Subject Code :			
Name of Subject:	**Urban and Regional Planning**		
Teaching Scheme		**Examination Scheme**	**Marks**
Lecture Periods	**3**	**Paper**	**75**
Seminar	**1**	**Sessional Int.**	**25**
Lab	**-**	**Sessional Ext.**	**-**
Studio Periods	**-**	**Jury (Viva-Voce)**	**-**
Total Contact Periods/Week	**4**	**Total Marks**	**100**
		Total Credits	**2**

Objective:

- To introduce to the students various theories of planning and city design with relevant details of population projection etc. It also exposes the students to the importance of transportation planning and its interface with land use planning.

Lectures

I Theories and Concepts of Urban and Regional Planning

Introduction to urban and regional planning (history and contemporary)
Settlements and their classification
Planning in India – and overview
Determinants of land use and planning process
Introduction to transport planning-Road network classification, road network planning principles, basics of transport engineering

II Techniques -

Urban economic analysis
Population studies
Planning norms and standards
Land Suitability analysis

Sesional Work:

Journal or Report covering the above mentioned theories and concepts

Sessional Assessment

Sessional work as stipulated above will be assessed internally for 25 marks

Examination Scheme:

The submission of sessional work will make the student eligible to appear for the Theory exam of 75 marks

Reference

A pattern Language by Alexander Christopher
Transportation Planning for Third World Countries by T H Dimitriou
Planning Theory by A Faludi
A reader in planning by A Faludi
The economics of Urban area by B Goodal
A good City Form by Kevin Lynch
Transportation and Town Leibrant Kurt
Transportation Planning by Kadiyali
Shirvani Hamid: Urban Design Process.

Subject Code :			
Name of Subject:	**Housing , Environmental Planning and Policies**		
Teaching Scheme		**Examination Scheme**	**Marks**
Lecture Periods	**3**	**Paper**	**75**
Seminar	**1**	**Sessional Int.**	**25**
Lab	**-**	**Sessional Ext.**	**-**
Studio Periods	**-**	**Jury (Viva-Voce)**	**-**
Total Contact Periods/Week	**4**	**Total Marks**	**100**
		Total Credits	**2**

Objective :

- Main objective is to introduce the concepts of Environmental Planning and the various emerging issues, also to provide an understanding and relevant techniques formulating urban housing strategies
- The course is aimed at creating awareness of the Environment

I Environmental Planning

Introduction to Environmental Planning ,Definition of environment, types of environment,, pollutants and their effects.

Ecosystem - types, components, energy flow, interactions is ecosystem.

Physical Environment - air environment, water environment, soil environment.

Environmental Policies and Programmes – International and National

II Housing

Housing - Relevance & scope of subject, housing stress, demand and supply.

Quantification of housing needs.

Financial aspect of housing - affordability economic Rent, etc.

Policies and protocols .

Sesional Work:

Journal or Report covering the above mentioned theories and concepts

Sessional Assessment

Sessional work as stipulated above will be assessed internally for 25 marks

Examination Scheme:

The submission of sessional work will make the student eligible to appear for the Theory exam of 75 marks

Reference Books

Environmental Biology, K C Agarwal Agro Botanical Publishers ,New Delhi

International law and the Environment ,Birnie ,P W & Boyle

Energy and Ecology ,David M Gates

Ecology and Environmental Planning ,Edington ,John

The Environment ,Public Health and Human Ecology consideration for Economic Development

Environmental Policies and Programs in India , Saksena ,K.D.

Subject Code :			
Name of Subject:	**Colloquium I**		
Teaching Scheme		**Examination Scheme**	**Marks**
Lecture Periods	**2**	**Paper**	**-**
Seminar	**2**	**Sessional Int.**	**50**
Lab	**-**	**Sessional Ext.**	**50**
Studio Periods	**-**	**Jury (Viva-Voce)**	**-**
Total Contact Periods/Week	**4**	**Total Marks**	**100**
		Total Credits	2

Objective

- To inculcate research techniques, report writing techniques and presentation techniques
- The student will choose any topic of interest i.e. subjects covered in the first semester and present a colloquium

Sessional work:

Assignment will be in the form of project work submitted as a report.This report could be done individually or in a group.

Sessional Assessment:

Sessional work as stipulated above will be assessed internally and externally with equal weightage of 50 marks.

Subject Code :			
Name of Subject:	**Elective I**		
Teaching Scheme		**Examination Scheme**	**Marks**
Lecture Periods	**2**	**Paper**	**-**
Seminar	**2**	**Sessional Int.**	**100**
Lab	**-**	**Sessional Ext.**	**-**
Studio Periods	**-**	**Jury (Viva-Voce)**	**-**
Total Contact Periods/Week	**2**	**Total Marks**	**100**
		Total Credits	2

Objective:

- Is to provide understanding of the application of quantitative research methods and techniques to analyze planning problems. Data collection, analysis and interpretation are focused on. The course also highlights the various types of data available for planners and its sources in India.

*** The institute shall have freedom to offer any listed or additional topic for elective as per the availability of subject expert

Quantitative Research Methods

I Research Theory

Simple descriptive statistics.
Probability and sampling.
Population projection.
Measures of Association.
Hypothesis testing.
Data collection and presentation.
Sources of data in India.

II Analysis Theory

Correlation and Regression, Time series, Analysis, index numbers.
Linear programming.
Input and Output Analysis

Sessional work:

Assignment will be in the form of a journal or small project showing the application of the methods

Examination Scheme:

Sessional work will be assessed internally for 100marks

Reference Books

Statistics in Theory and Practice by L R Connors and Morreu
Urban Planning Analysis ,Methods and models by Kruckerberg and Silvers
Statistics and urban planning by William Ken
Elements of Statistics by E B Mode

Subject Code :			
Name of Subject:	**Climate, Building Physics and Sustainable Design Studio I**		
Teaching Scheme		**Examination Scheme**	**Marks**
Lecture Periods	**4**	**Paper**	
Seminar	**-**	**Sessional Int.**	**100**
Lab/ Studio	**6**	**Sessional Ext.**	**100**
		Jury(Viva-Voce) Int	**25**
		Jury(Viva-Voce) Ext	**25**
Total Contact Periods/Week	**10**	**Total Marks**	**250**
		Total Credits	**5**

Objective:

- The aim of the course is to introduce the students to climate as an important aspect of sustainable design, to understand in depth the factors affecting comfort and creation of comfort conditions and the building physics associated with it.

I Climate and Comfort

Global , macro and micro level climate (global warming, greenhouse effect etc.)
Elements of climate and its quantification
Earth's energy balance
Climatic data and its interpretation

II Building Physics

Energy balance of human and built environment
Thermal Environment
Aqueous Environment
Adaptive model of thermal comfort and its application to sustainable design of buildings

Sessional Work:

A journal covering the above theories to be prepared.
Analysis of a building in terms of its thermal properties, comfort factors etc. as an individual assignment in form of a report
Design of a small unit taking into consideration the above.

Sessional assessment:

Sessional work as stipulated above will be assessed internally and externally with equal weightage of 100 marks. Viva shall be conducted jointly by the external and internal examiners with equal weightage of 25 marks

Reference Books

Manual of Tropical housing and climate by Koenisberger
Climate responsive architecture by Arvind Krishnan
Climate Design: Energy Efficient building principles and practices by Watson Donalt
Man, Climate and Architecture , B.Givoni

Subject Code : EA207			
Name of Subject:	Environmental Laws & Legislations		
Teaching Scheme		Examination Scheme	Marks
Lecture Periods	3	Paper	75
Seminar	1	Sessional Int.	25
Lab	-	Sessional Ext.	-
Studio Periods	-	Jury (Viva-Voce)	-
Total Contact Periods/Week	4	Total Marks	100
		Total Credits	2

Objective:

- The aim is to introduce the students to the existing environment laws and legislations in India.

I Environmetal Laws and Legislations

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 Acr, 1991.
Environmental Notifications: Costal 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.

Sesional Work:

Journal or Report covering the above mentioned theories and concepts

Sessional Assessment

Sessional work as stipulated above will be assessed internally for 25 marks

Examination Scheme:

The submission of sessional work will make the student eligible to appear for the Theory exam of 75 marks

Reference Books

International law and the Environment ,Birnie,P W & Boyle
Environmental Policies and Programs in India ,Saksena, K.D
India Development Report IGIDR 97

Subject Code :			
Name of Subject:	**Environmental Management & Ecological Land Planning**		
Teaching Scheme		**Examination Scheme**	**Marks**
Lecture Periods	**3**	**Paper**	**75**
Seminar	**1**	**Sessional Int.**	**25**
Lab	**-**	**Sessional Ext.**	**-**
Studio Periods	**-**	**Jury (Viva-Voce)**	**-**
Total Contact Periods/Week	**4**	**Total Marks**	**100**
		Total Credits	**2**

Objective:

- The aim of this course is to make the students understand the various environmental management systems. To make the students understand the importance of land planning for sustainability, resource planning and allocation and protection of natural resources and their use for sustainability

I Environmental management

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

II Ecological Land Planning

Preservation and protection of important sensitive areas
Rehabilitation of degraded sites
Development of sites/ land in accordance to their environmental properties.
Plant Material and its importance in Eco System preservation

Sesional Work:

Journal or Report covering the above mentioned theories and concepts

Sessional Assessment

Sessional work as stipulated above will be assessed internally for 25 marks

Examination Scheme:

The submission of sessional work will make the student eligible to appear for the Theory exam of 75 marks

Reference Books

Cerver Francisco a: world of landscape architects: world of environmental design. Ganduxer,
Cerver Francisco Asensio: Environmental restoration landscape.
Cever Francisco a: Elements of landscape world of environment.
Mukherjee Pippa: Nature Guides Common Trees Of India. Worldwide Fund For Nature
Papanek Victor: Green Imperative Ecology
Ethics In Design. Thames And Hudson,
Randhawa M S: Flowering Trees. India
Environmental analysis for land use and site planning. By Marsh Williams M. (MC Grew hill (1978)
Climate Change and Biodiversity-Edited by Thomas Lovejoy and Lee Hannah-TERI publication
Landscape Planning and Environmental Applications-By M.W.Marsh
River Ecology-by Prakash Gole

Subject Code :			
Name of Subject:	Sustainable Building Materials and Technologies		
Teaching Scheme		Examination Scheme	Marks
Lecture Periods	2	Paper	
Seminar	2	Sessional Int.	50
Lab	-	Sessional Ext.	50
Studio Periods	-	Jury (Viva-Voce)	-
Total Contact Periods/Week	4	Total Marks	100
		Total Credits	2

Objectives:

- To introduce concepts of Eco Friendly building materials and alternative methods of building construction and energy efficient construction.

I Eco Friendly Building Materials

Environmental impact of building materials
Eco Friendly building materials, their composition, production and recycling, physical properties etc.
Embodied energy of materials like steel, flyash bricks, gypsum, eco-boards etc.
Life Cycle assessment of materials

II Sustainable Building Technologies

Introduction to alternative building technologies: Traditional, Curtain Walls, Pre-fabrication and Modular etc.

Sessional Work:

A written journal explaining all the above mentioned principles.
Case studies to understand the practical application of the various materials and technologies

Sessional Assessment: Sessional work as stipulated above will be assessed internally and externally with equal weightage of 50 marks.

Reference Books

Green Architecture, Design for a sustainable future
Energy efficient buildings by Wagner Walter
Architecture, Engineering and Environment by Hawkes Dean and Foster Wayne
The architecture of Energy by Hawkes Dean and Owets Janet
Manual of Tropical housing and climate by Koenisberger
Design for Environment by Mackenzie
Energy Efficient Buildings in India by Milli Mujumdar
Earth Construction by Houben Hugo
Green Building Materials by Ross Spiegel and Dru Meadows
Publications from - CBRI - Roorkee

- IDC - Mumbai
- NID - Ahmedabad

Subject Code :			
Name of Subject:	Climate Responsive Building Design Principles		
Teaching Scheme		Examination Scheme	Marks
Lecture Periods	2	Paper	-
Seminar	2	Sessional Int.	50
Lab	-	Sessional Ext.	50
Studio Periods	-	Jury (Viva-Voce)	-
Total Contact Periods/Week	2	Total Marks	100
		Total Credits	2

Objective

- To introduce the students to the Lighting Environment and the Acoustical Environment

I Daylighting

Climate and Light, The daylight factor concept, Design Variables, and Supplementary Artificial Lighting

II Accoustical Environment

Principals of Sound, Noise Control and Auditorium acoustics.

Sessional work:

Assignment will be in the form of project work submitted in the form of a report

Sessional Assessment:

Sessional work as stipulated above will be assessed internally and externally with equal weightage of 50 marks.

Reference Books

Manual of Tropical housing and climate by Koenisberger
Climate responsive architecture by Arvind Krishnan
Manual of solar passive architecture - by Nayak J.K. R. Hazra J. Prajapati.
Sun Wind and Light-Architecture Design Strategies-by G.Z.Brown and Mark Dekay
Detailing for Accoustics-Duncan Templeton and Peter Lord
Acoustics in the building environment, Advice for the design team-Edited by Duncan Templeton
Accoustical Design of Concert halls and theatres-By William Lassen Jordan
Day Light in Architecture by Benjamin H.Evans,AIA
Daylighting Design and Analysis by Claude L.Robbins
The Lit Environment – by Derek Phillips

Subject Code :			
Name of Subject:	**Elective II**		
Teaching Scheme		**Examination Scheme**	**Marks**
Lecture Periods	**2**	**Paper**	**-**
Seminar	**-**	**Sessional Int.**	**100**
Lab	**-**	**Sessional Ext.**	
Studio Periods	**2**	**Jury (Viva-Voce)**	**-**
Total Contact Periods/Week	**4**	**Total Marks**	**100**
		Total Credits	**2**

Objective:

- The course will introduce overview of remote sensing, aerial photography etc. The main objective of this course is to create an awareness and interest among the students in recent remote sensing techniques and working knowledge in application of GIS.

Or

- The course will introduce software simulation tools like ECO TECH /ENERGY PLUS or any other software tool for energy efficient buildings.

*** The institute shall have freedom to offer any listed or additional topic for elective as per the availability of subject expert

Sessional Work:

Assignment will be in form of project work. (individual / group) related to any one of the topics mentioned above

Sessional Assessment: Sessional work as stipulated above will be assessed internally for 100 marks.

Reference Books

Introductory digital Image processing: A Remote Sensing Perspective, John R. Jensen
Land use Planning and Remote Sensing, David T. Lindgren
Remote sensing and interpretation by Thomas m Lilles and Kiefer

Subject Code :			
Name of Subject:	**Sustainable Design Studio II**		
Teaching Scheme		**Examination Scheme**	**Marks**
Lecture Periods	**2**	**Paper**	**-**
Seminar	**-**	**Sessional Int.**	**100**
Lab	**-**	**Sessional Ext.**	**100**
Studio Periods	**8**	**Jury (Viva-Voce) Int.**	**25**
		Jury (Viva-Voce) Ext.	**25**
Total Contact Periods/Week	**10**	**Total Marks**	**250**
		Total Credits	**5**

Objective

- To apply the design principles for energy efficiency and sustainable development

I Studio :Project Description

Design of a commercial building/hotel in terms of energy efficiency and sustainable principles.
Or
Planning Studio to apply the Environment Planning at the urban scale and generating the Environment Management Plan for the same

Sessional Assessment:
Sessional work as stipulated above will be assessed internally and externally with equal weightage of 100 marks. Viva voce(oral) shall be conducted jointly by the external and internal examiners with equal weightage of 25 marks

Reference Books

Green Architecture, Design for a sustainable future
Energy efficient buildings by Wagner Walter
Energy Efficient Buildings in India by Milli Mujumdar

Subject Code :	**Renewable & Alternate Energy Systems and Environmental**		
Name of Subject:	**Technologies**		
Teaching Scheme		**Examination Scheme**	**Marks**
Lecture Periods	**3**	**Paper**	**75**
Seminar	**1**	**Sessional Int.**	**25**
Lab	**-**	**Sessional Ext.**	**-**
Studio Periods	**-**	**Jury (Viva-Voce)**	**-**
Total Contact Periods/Week	**4**	**Total Marks**	**100**
		Credits	**2**

Objective:

- Renewable energy sources (RES) such as wind, hydro, solar and biomass are gaining an increasingly important role in assisting in environmental protection and improving security of energy supply. It aims at introducing the students to various forms of renewable energy sources and appropriate technologies for harnessing them for our benefit.
- To introduce environmental technologies for waste management, water management and waste to energy ,at city and building project level

I Renewable &Alternate Energy Systems

Energy scenario in India
Solar energy, its potential, technology and integration with building Design
Wind Energy, its potential, technology and integration with building Design
Bio Mass, its potential, technology and integration with building Design, Nuclear Energy
CNG and LPG and its potentials.

II Environmental Technologies

Water Management Technologies
Waste Management Technologies
Waste to Energy Technologies

Sesional Work:

Journal or Report covering the above mentioned theories and concepts

Sessional Assessment

Sessional work as stipulated above will be assessed internally for 25 marks

Examination Scheme:

The submission of sessional work will make the student eligible to appear for the Theory exam of 75 marks

Reference

Solar Energy in Architecture and Urban Planning by Herzog Thomas
Solar Heating, Design Process by Kreider Jan F
Energy - Manual for college teachers (CEE publications)
Renewable Energy & Environment - A policy analysis for India (CEE publications)
Sustainable Building Design Manual-Volume I and II –TERI Publication
Municipal Water and Waste Water Treatment – by Rakesh Kumar and R N Singh,edited by T.V.Ramchandra
Natural Systems for Waste management & Treatment
Renewable Energy and Environment - A policy analysis for India. (Publication from CEE)

Subject Code :			
Name of Subject:	**Environmental Impact Assessment**		
Teaching Scheme		**Examination Scheme**	**Marks**
Lecture Periods	**2**	**Paper**	**-**
Seminar	**2**	**Sessional Int.**	**50**
Lab	**-**	**Sessional Ext.**	**50**
Studio Periods	**-**	**Jury (Viva-Voce)**	**-**
Total Contact Periods/Week	**4**	**Total Marks**	**100**
		Credits	**2**

Objective:

- The aim of the subject is to introduce the students to techniques for carrying out an assessment of the impact the environment will have on a project or in the planning of a settlement.

I EIA

Introduction to EIA.
Process of EIA and its application through a case study.
Calculate impacts and work out ways for its mitigation.
EIA as a strategic tool for sustainable development.

Sessional Work:

Journal or Report covering the above mentioned theories and concepts

Sessional Assessment

Sessional work as stipulated above will be assessed internally for 25 marks

Examination Scheme:

The submission of sessional work will make the student eligible to appear for the Theory exam of 75 marks

Reference Books

Methods of Environmental Imapct Assessments-Edited by Peter Morris and Ricky Therival
Eleven Years of the Environment Impact Assessment Notification 1994- How Effective Has it Been-by Kanchi Kohli and Manju Menon kalpavriksha Environmental Action Group.
Handbook of Environmental Analysis-Chemical Pollutants in Air,Water,Soil and Soil waste-By Pradyot Patnaik
Introduction to Environmental Analysis-by Roger Reeve

Subject Code :			
Name of Subject:	**Energy Efficient Building Services and Management**		
Teaching Scheme		**Examination Scheme**	**Marks**
Lecture Periods	**4**	**Paper**	**-**
Seminar	**-**	**Sessional Int.**	**50**
Lab	**-**	**Sessional Ext.**	**50**
Studio Periods	**4**	**Jury (Viva-Voce)**	**-**
Total Contact Periods/Week	**8**	**Total Marks**	**100**
		Credits	**2**

Objective:

- To introduce energy efficient approach in planning building services and management
- New technologies and high tech methods for energy efficiency.

I Energy Management

Introduction to Energy Efficient HVAC systems, Plumbing Design, Lighting, Mechanical and Electrical Utilities. Operations and Maintenance of Buildings for energy efficiency
Introduction to Energy Conservation Building Codes and Energy Audits

II High Tech Systems for Energy Efficiency

Introduction to Building Management Systems and Intelligent Buildings

Sessional Work:

A written journal explaining all the above mentioned principles.
Case study to understand the practical application of the various principles. Use of Acoustic Lab, performance analysis instruments

Sessional Assessment

Sessional work as stipulated above will be assessed internally and externally with equal weightage of 50 marks.

Reference Books

Principles of Air conditioning-By V.Paul Lang
Refrigeration and Airconditioning by Sarao, Gaabi and Singh
Water supply and Sanitary Engineering(Environmental Engineering)-by Rangwala
Plumbing Services and Design Guide –Compiled and published by Institute of Plumbing
Building Services and Equipment (Part I & Part II)-by F Hall
Mechanical and Electrical Systems in Construction and Architecture-by Frank R Dagostino
Advances in Tall Buildings-by Lynn S Beedle(Council of tall buildings and urban habitat)
Heating, Cooling and lighting design methods for architecture. By Lechor Worbert

Subject Code :			
Name of Subject:	**Research Paper**		
Teaching Scheme		**Examination Scheme**	**Marks**
Lecture Periods	**2**	**Paper**	**-**
Seminar	**2**	**Sessional Int.**	**50**
Lab	**-**	**Sessional Ext.**	**50**
Studio Periods	**-**	**Jury (Viva-Voce)**	**-**
Total Contact Periods/Week	**4**	**Total Marks**	**100**
		Credits	**2**

Objective:

- To understand the methodology for research
- To study in depth subject related to the individual dissertation. The students can interact with specialized resource persons.

Sessional Work:

Assignment will be in the from of an individual study project which is presented in the form of presentation and a written report of the same.

Sessional Assessment: Sessional work as stipulated above will be assessed internally and externally with a equal weightage of 50 marks.

Subject Code :			
Name of Subject:	**Elective III**		
Teaching Scheme		**Examination Scheme**	**Marks**
Lecture Periods	**2**	**Paper**	**-**
Seminar	**2**	**Sessional Int.**	**100**
Lab	**-**	**Sessional Ext.**	
Studio Periods	**-**	**Jury (Viva-Voce)**	**-**
Total Contact Periods/Week	**4**	**Total Marks**	**100**
		Total Credits	**2**

Objective:

- Energy conservation Building Codes and Audits
- Restoration of Ecologically Disturbed Sites
- Conservation as a tool for sustainability

*** The institute shall have freedom to offer any listed or additional topic for elective as per the availability of subject expert

Sessional Work:

Assignment will be in form of project work. (individual / group) related to any one of the topics mentioned above

Sessional Assessment: Sessional work as stipulated above will be assessed internally for 100 marks.

Subject Code :			
Name of Subject:	**Design Studio III**		
Teaching Scheme		**Examination Scheme**	**Marks**
Lecture Periods	**2**	**Paper**	**-**
Seminar	**-**	**Sessional Int.**	**100**
Lab	**-**	**Sessional Ext.**	**100**
Studio Periods	**10**	**Jury (Viva-Voce) Int.**	**25**
		Jury (Viva-Voce) Ext.	**25**
Total Contact Periods/Week	**12**	**Total Marks**	**250**
		Total Credits	**5**

Objective

- To apply the design principles for energy efficiency and sustainable development

Studio : **Project Description**

Design of a commercial building/hotel in terms of energy efficiency and sustainable principles.
Or
Planning Studio to apply the Environment Planning at the urban scale and generating the Environment Management Plan for the same

Sessional Assessment:
Sessional work as stipulated above will be assessed internally and externally with equal weightage of 100 marks. Viva voce (oral) shall be conducted jointly by the external and internal examiners with equal weightage of 25 marks

Reference Books
Green Architecture, Design for a sustainable future
Energy efficient buildings by Wagner Walter
Energy Efficient Buildings in India by Milli Mujumdar

Subject Code :			
Name of Subject:	**Professional Training**		
Teaching Scheme		**Examination Scheme**	**Marks**
Lecture Periods	**-**	**Paper**	**-**
Seminar	**-**	**Sessional Int.**	**30**
Lab	**-**	**Sessional Ext.**	**30**
Studio Periods	**4**	**Jury (Viva-Voce)Int.**	**20**
		Jury (Viva-Voce)Ext.	**20**
Total Contact Periods/Week	**4**	**Total Marks**	**100**
		Credits	**2**

Objective

- To give an insight into the practical applications of the technical know how.

*** The students will need to undertake professional training of 6 weeks full time or 12 weeks part time with the concerned office at any time during the semester as decided by the institution offering the course

Sessional Assessment:

Sessional work as stipulated above will be assessed internally and externally with equal weightage of 30 marks. Viva voce(oral) shall be conducted jointly by the external and internal examiners with equal weightage of 20 marks

Subject Code :			
Name of Subject:	Dissertation		
Teaching Scheme		Examination Scheme	Marks
Lecture Periods	2	Paper	-
Seminar	-	Sessional Int.	300
Lab	-	Sessional Ext.	300
Studio Periods	24	Jury (Viva-Voce) Int.	25
		Jury (Viva-Voce) Ext.	25
Total Contact Periods/Week	26	Total Marks	650
		Total Credits	13

Objective

- To undertake detailed research and analysis of design or planning area on a subject of the students choice related to environmental architecture.

I Dissertation

This subject gives an opportunity for the student to explore a practical or conceptual project to evolve a sound methodology and solution
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.
The Dissertation can also be in the form of designing a computer software for environment related issues.
The dissertation can be on any of the topics studied in the earlier semesters.

Sessional Assessment:
Sessional work as stipulated above will be assessed internally and externally with equal weightage of 300 marks. Viva voce(oral) shall be conducted jointly by the external and internal examiners with equal weightage of 25 marks