THIAGARAJAR COLLEGE OF ENGINEERING

(A Government Aided Autonomous Institution affiliated to Anna University)

MADURAI – 625 015

CURRICULUM AND DETAILED SYLLABI

For

M.Arch DEGREE PROGRAMME

For the students admitted from the academic year 2018-2019 onwards

Department of Architecture, Thiagarajar College of Engineering, Madurai – 625015
(For the candidates admitted from 2018-2019)
Scheduling of Courses

<table>
<tr><th>SEM</th><th colspan="4">THEORY</th><th>STUDIO</th></tr>
<tr><td></td><td colspan="4">Compulsory Foundation Courses</td><td>Programme Core Courses</td></tr>
<tr><td>I</td><td>Contemporary Processes in Architectural Design</td><td>Urban Design Theories & Methodology</td><td>Climate Change Adaptation & Resilience</td><td>Structures & Services for Mega Buildings</td><td>Integrated Architectural Design I (6)</td></tr>
<tr><td></td><td colspan="2">Compulsory Foundation Courses</td><td>Elective Foundation Courses</td><td>Programme Elective</td><td></td></tr>
<tr><td>II</td><td>Research Methodology</td><td>Urban Renewal & Conservation</td><td rowspan="3">**Credits are to be earned

Elective foundations that could be chosen are as in Annex1</td><td rowspan="3">**Credits are to be earned

Program Elective that could be chosen are as in Annex 1</td><td>Integrated Architectural Design II (6)</td></tr>
<tr><td>III</td><td>Contemporary Architectural Trends</td><td>Urban Ecology</td><td>Dissertation

(5)</td></tr>
<tr><td>IV</td><td colspan="2"></td><td>Architectural Thesis (10)</td></tr>
</table>

Program Core Courses+ Compulsory Foundation Courses =27+ 24 =51 credits; ** Elective Foundation Courses + Program Elective = 9(min)to12(max) +6(min) to (12Max) =12(min) to 24(max) credits;

TOTAL CREDITS = 66 CREDITS MINIMUM

THIAGARAJAR COLLEGE OF ENGINEERING, MADURAI- 625 015
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CHOICE BASED CREDIT SYSTEM **Annexure – I**

Degree: M. Arch **Programme: General Architecture**

1. Compulsory Foundation Courses: **Total Credits to be earned: 24**

a. Architecture

S. No	Course Code	Name of the Course	Number of Hours / Week			Credit	Semester/ Pre-Requisite
			L	T	P		
THEORY							
1.	18GA110	Contemporary Processes in Architectural Design	3	-	-	3	I SEM ONLY
2.	18GA120	Urban Design Theories & Methodology	3	-	-	3	I SEM ONLY
3.	18GA130	Climate Change Adaptation & Resilience	3	-	-	3	I SEM ONLY
4.	18GA110	Structures & Services for Mega Buildings	3	-	-	3	I SEM ONLY
5.	18GA210	Research Methodology	3	-	-	3	II SEM ONLY
6.	18GA220	Urban Renewal & Conservation	3	-	-	3	II SEM ONLY
7.	18GA310	Contemporary Architectural Trends	3	-	-	3	III SEM ONLY
8.	18GA320	Urban Ecology	3	-	-	3	III SEM ONLY

2. Elective Foundation Courses: **Minimum Credits to be earned: 9**

a. Architecture

S. No	Course Code	Name of the Course	Number of Hours / Week			Credit	Semester	Pre-Requisite
			L	T	P			
THEORY								
1.	18GAFA0	Computer Applications in Architecture	3	-	-	3		
2.	18GAFB0	Sustainable Water Management	3	-	-	3		
3.	18GAFC0	Urban Transport and Policy	3	-	-	3		

3. Programme Core Courses: **Total Credits to be earned: 27**

S.No	Course Code	Name of the Course	Number of Hours / Week			Credit	Semester/ Pre-Requisite
			L	T	P		
STUDIO							
1.	I8GA150	Architectural Design I	-	-	12	6	I SEM
2.	I8GA230	Architectural Design II	-	-	12	6	II SEM

3.	I8GA330	Dissertation	-	-	10	5	III SEM
4.	I8GA410	Architectural Thesis	-	-	20	10	IV SEM

4. Programme Elective Courses: **Minimum Credits to be earned:6**

S. No	Course Code	Name of the Course	Number of Hours / Week			Credit	Semester/ Pre-Requisite
			L	T	P		
THEORY							
1.	18GAPA0	Disaster Mitigation and Management	3	-	-	3	II SEM AND ABOVE
2.	18GAPB0	Digital tools for Environmental Architecture	3	-	-	3	II SEM AND ABOVE
3.	18GAPC0	Design Research & Field Studies	3	-	-	3	III SEM AND ABOVE
4.	18GAPD0	Architecture & Critical Theory	3	-	-	3	III SEM AND ABOVE

18GA130 CLIMATE CHANGE ADAPTATION AND RESILIENCE L T P/S C

3 0 0 3

Preamble:

- To understand the effects and the impact of climate change on Global and Regional level.
- To understand Vulnerability Assessment Methods.
- To evaluate the range of possible adaptation strategies to increase its system's resilience and capacity to adapt to climate change.
- To understand the Policies of Government on Climate change Adaptability.

CLIMATE CHANGE – INTRODUCTION **5**

Climate Change: Exploration on the science of climate change - Global warming- Green House Effect, Carbon stocks and flow, Causes of Climate Change, Anthropogenic drivers of climate change, Interaction of these factors at global and local scale – System dynamics, Evidences of climate change - Global predictions, India and climate change predictions, Complexities / Uncertainties of Climate change . Climate change and its impact on buildings, Effects on Humans and key processes, Impact and Vulnerability analysis – Outline key elements of a vulnerability assessment, Approaches and scope of vulnerability assessment- Developed countries vs. developing countries, Climate change and its social repercussions.

CLIMATE CHANGE ADAPTATION **9**

Climate adaptation vs. Mitigation vs. Resilience - Climate adaptation in Buildings – Reactive, Proactive;

Energy Efficient Technology – High performance building envelope- managing heat gain, wind loads, Energy efficient appliances, Carbon Efficient Lighting and HVAC, Efficient automation, Passive cooling, and lighting; New Technologies and Case Examples for each of these.

System Infrastructure Efficiency – Zero Energy Buildings, retrofitting; Case Examples for each of these; New Technologies and Case Examples for each of these.

International Initiatives to Support Climate Change Adaptation

CLIMATE CHANGE MITIGATION **9**

Climate Change Mitigation in Buildings – Sources of Emissions, Demand side mitigation, Supply side mitigation.

Carbon Efficiency - Switching to Fossil fuels – building requirements, Reduction of Building related emissions; New Technologies and Case Examples for each of these.

Service Demand Reduction – Carbon pricing, Property taxation related to Carbon emissions.

International mechanisms to support climate change mitigation and low carbon development.

CLIMATE RESILIENT BUILDINGS **12**

Defining climate resilient buildings, Design related components/actions for a resilient building, Data and Methods required for planning for resilience, Strategies for resilience in both building and Community scale to flooding, earthquakes, high wind, high temperature increase. Resilient Back up and Power systems; Extend Lighting services during Emergency; Resilient water systems, Resilient Heating, cooling and ventilation systems, Resilient storm water and grey water systems.

POLICY AND GOVERNANCE **6**

Governing climate change: actors, interests, challenges, The UNFCCC, Kyoto Protocol and Paris Agreement, Climate Change Policy Framework, main organizations and bodies that operate under the UNFCCC and its Kyoto Protocol, Main Issues and Negotiation Streams, Analyse key points relevant for a post 2020 climate change regime.

TOTAL **41** **PERIODS**

Outcome:

The Graduates will understand vulnerability Assessments and analysis.

The graduates will be able to integrate climate change adaptive and mitigation policies to overcome the impacts of climate change.

REFERENCES

1. Dealing with Climate Change- Edited by R.K.Pachauri.
2. The Challenge of Climate change,Daniel
3. Architecture in a Climate of Change, Peter F Smith.
4. Design for Climate Change- Bill Gething, William Gethering, Katie Puckett.
5. Solutions for Climate Change Challenges in the Built Environment, By Colin A. Booth, Felix N. Hammond, David G. Proverbs, Jessica Lamond.
6. Spatial Planning and Climate Change-By Elizabeth Wilson, Jake Piper.
7. Adapting Buildings and Cities for Climate Change-By David Crichton, Fergus Nicol, Sue Roaf.
8. Sustainable Building and Built Environments to Mitigate Climate Change in the Tropics-Practices and Approches- edited by Tri Harso Karyono, Robert Vale, Brenda Vale.

WEBLINKS

1. Climate Change Vulnerability Assessment Toolkit, http://www.lead.org.pk/attachments/vatoolkit.pdf ,

2. Approach to Design for Resilience to Climate Change Saja Kosanović, Branislav Folić and Ana Radivojević .
3. The implications of a changing climate for buildings, Elsevier, Building and Environment 55 (2012) 1–7.
4. Climate change and the city: Building capacity for urban adaptation Jeremy G. Carter , Gina Cavan, Angela Connelly, Simon Guy, John Handley, Aleksandra Kazmierczak, Progress in Planning 95 (2015) 1–66 .
5. Synergies between adaptation and mitigation in a nutshell, Bruno Locatelli, Climate Change and Forests in the Congo Basin.
6. Development and analysis of Climate Sensitivity and Climate Adaptation opportunities indices for buildings, Elsevier, Christopher R. Pyke, Sean McMahona, Larissa Larsen , Nicholas B. Rajkovich, Adam Rohloff .
7. Resilience: A Bridging Concept or a Dead End?, SIMIN DAVOUDI, Planning Theory & Practice, Vol. 13, No. 2, 299–333, June 2012.
8.

18GA120 URBAN THEORIES AND METHODOLOGY L T P/S C

3 0 0 3

Preamble:

- The objective of the course is to provide explanations of Urban Design terminologies, definitions and methodologies for shaping and understanding of urban form; derived from both theory and empirical evidence.
- This course provides an understanding of development theories and the circumstances in which they evolved. It traces the path of urbanization as a process and examines the spatial correspondence between urban patterns through space and time and connected development paradigms.
- The course aims to develop a common vocabulary and set of concepts with which to map, analyze, understand and explain the form, structure and development of the city.

Introduction to urban design **6**

Origin of urban Design, Scope and objectives of urban design; its relation with architecture and urban planning. The various tangible and intangible factors which as basis for urban design theories and principles - Feeling and remembering a space - Perception of city form and pattern - Mental mapping - Jon Lang's Basic Human Needs – Meeting Safety Security Needs in Urban Spaces - Understanding, organizing and articulation of spaces of Residential, Commercial, Parks and Industrial spaces - Qualities of Asian Cities

Urban Design Theories **5**

Introduction to theories of urban design- Place making-Place theory, linkage theory etc,- - Privacy, Territoriality and Proxemic theory, Urban scale; Intimate, Urbane and Monumental. Human scale and Generic scale in Urban Design

Urban Design Methods, Practices and Process **30**

Kevin Lynch's Image of the city, Clearance Perry and his Neighbourhood concept, Oscar Newmans concepts of Defensible spaces , Jane Jacobs and her ideas of community, Gordon Cullen and his city perception, Camillo Sitte and his artistic principles of town design, Christopher Alexander's pattern language of community living, C.O. Doxiadis's Ekistics and the Science of human settlement, Patrick Geddes and his theories of planning, Daniel Burnham and his city Beautiful, Colin Rowe and his critical analysis of the origins, ideologies and shortcomings of Modernist city planning, Rob Krier and his concepts of Urban space, Peter Calthorpe and his concepts of Ecology and Community, Ian L.McHarg and His Design with Nature, Rusong Wang and his principles of urban system regulation, Charles Correa and his essays on the issues of India, Archana Gupta and Anshuman Gupta's celebration of Indian Public Spaces, Susan Parnell and Sophie Oldfield's Critical urbanism and the Global South.

Urban design process in the era of globalization and smart growth – New Urbanism.

TOTAL **41 PERIODS**

Learning Outcome:

- Students are exposed to different methodological approaches, technologies and foundation theories of urban design.
- Students are exposed to terminologies and concepts of urban design, different methodological approaches and their manifestations

Text Book

1. Paul. D. Spriregen, "On the art of designing cites" M.I.T. Press, Cambridge 1968

2. Lynch. Kevin, "The Image of the city" M.I.T. Press Cambridge 1960

3 Gordon Cullen - The concise TOWNSCAPE - The Architectural Press - 1978.

4. Bacon. Edmund "Design of Cities", Thames & Hudson, London, 1967

5. Urban Design – A typology of procedures and products – Jon Lang

6. Urban open spaces – Helen Woolley

7. Safe cities – Gerda R. Wekerle

8. Urban Design – Jon Lang and others

Reference Books

1. Lawrence Halprin - CITIES - Reinhold Publishing Corporation N.Y. 1964.

2. Gosling and Maitland - URBAN DESIGN - St. Martin's Press, 1984.

3. Jonathan Barnett - An Introduction to Urban Design - Harper & Row, Publishers, N.Y., 1982

18GA110	**CONTEMPORARY PROCESSES IN ARCHITECTURE DESIGN**	**L T P/S C**
		3 0 0 3

Preamble:

- To investigate the contemporary theories of media and their influence on the perception of space and architecture.
- To provide an overview of various contemporary design processes and its relation to computation.

INTRODUCTION **4**

Investigation of contemporary theories of media and their influence on the perception of space and architecture. Technology and Art – Technology and Architecture – Technology as Rhetoric – Digital Technology and Architecture

ASPECT OF DIGITAL ARCHITECTURE **9**

Aspects of Digital Architecture – Design and Computation – Difference between Digital Process and Non-Digital Process – Architecture and Cyber Space – Qualities of the new space – Issues of Aesthetics and Authorship of Design – Increased Automatism and its influence on Architectural Form and Space

CONTEMPORARY PROCESS **9**

Overview of various Contemporary design process and it relation to computation: Diagrams – Diagrammatic Reasoning – Diagrams and Design Process – Animation and Design – Digital Hybrid Design Protocols – Concept of Emergence - Introduction to Cellular Automata and Architectural applications – Genetic algorithms and Design Computation

GEOMETRIES AND SURFACES **9**

Fractal Geometry and their properties – Architectural applications - Works of Zvi Hecker – Shape Grammar - Shapes, rules and Label - Shape Grammar as analytical and synthetic tools- Combining

Shape grammar and Genetic algorithm to optimize architectural solutions - Hyper Surface– Introduction to Hyper surface and concepts of Liquid architecture.

CASE STUDIES **10**

Case studies- Study, understanding and analysis of known examples at the national and international levels which demonstrates the contemporary theories of media and their influence on the perception of space and architecture, contemporary design processes and its relation to computation.

TOTAL **41 PERIODS**

OUTCOMES:

- Understanding of the effect of contemporary theories of media on contemporary architectural design.
- Understanding of various contemporary design process and their relation to computation

REFERENCES:

1. Peter Eisenmann, Diagram: An Original Scene of Writing, Diagram Diaries

2. MOVE, UN Studio

3. Grey Lynn, The Folded, The Pliant and The Supple, Animate form

4. Contemporary Techniques in Architecture, Halsted Press, 2002

5. Ali Rahim, Contemporary Process in Architecture, John Wiley & Sons, 2000.

6. Walter Benjamin, Practices of Art in the Age of Mechanical Reproduction Colin press, 1977

7. Work of Architecture in the Age of Mechanical Reproduction, Differences MIT press,1997.

8. William J Mitchell, the Logic of Architecture: Design, Computation and Cognition. MIT Press, Cambridge, 1995

9. Marcos Novak, invisible Architecture: An Installation for the Greek Pavilion, Venice Biennale, 2000.

Preamble

Category	L	T	P	C
CFC	3	0	0	3

To introduce the importance of critical inquiry as a way of gaining knowledge and expose to the various forms of research and research methodologies/processes.To engage this understanding in the specific field of architectural research.

Prerequisite

Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Develop the skill to identify, decipher and interpret issues relating to architecture based on research enquiry methods.	**Understand**
CO2	Analyse different methods of conducting research and research writing.	**Analyse**
CO3	Redefine a social Problem into a Research Problem, generate a methodology to prove it and convert it into technical /Popular Reports.	**Apply, Analyse and Create**

Course Level Assessment Questions

Course Outcome 1 (CO1):

1. Enumerate the types of Research and Illustrate with examples.
2. Discuss the Research Process in detail.

Course Outcome 2 (CO2)

1. Analyse different methods of conducting Research and suggest a suitable method for a particular Research.
2. Discuss in detail the criteria for selecting a sampling procedure.

Course Outcome 3 (CO3)

1. Redefine a social issue into a Research Problem and create a Methodology to solve it.
2. Write a detailed Technical and Popular report for a Research.

Syllabus

INTRODUCTION- Basic research issues and concepts- orientation to research process- types of research: historical, qualitative, co-relational, experimental, simulation and modeling, logical argumentation, case study and mixed methods- illustration using research samples -**RESEARCH PROCESS -**Elements of Research process: finding a topic- writing an introduction- stating a purpose of study identifying key research questions and hypotheses- reviewing literature- using theory- defining, delimiting and stating the significance of the study, advanced methods and procedures for data collection and analysis-sampling design- Implications of a sample design-steps in sampling design-Criteria for selecting a sampling Procedure – Characteristics of Good sample design-Different types of Sample Designs – Standard Error- Illustration using research samples. **RESEARCHING AND DATA COLLECTION -**Measurement and Scaling Techniques-Measurement Scales – Source of Error in Measurement- Tests of Sound Measurement – Technique of developing Measurement Tools –Scaling –Meaning of Scaling- Scale Classification Bases- Important Scaling Techniques –Data Collection- Library and archives- Internet: New information and the role of internet; finding and evaluating sources- misuse- test for reliability- ethics Methods of data collection- From primary sources: observation and recording, interviews structured and unstructured, questionnaire, open ended and close ended questions and the advantages, sampling- Problems encountered in collecting data from secondary sources.

INTERPRETATION AND REPORT WRITING Technique of Interpretation –Precaution in Interpretation - Research writing: Different steps in Report writing –Layout of the Research Reoprt – Types of Reports- Oral presentation- Precautions for Writing Reports. **CASE STUDIES** Case studies illustrating how good research can be used from project inception to Completion- review of research publications.

References

1. Linda Groat and David Wang; Architectural Research Methods – 2nd edition ‘,John Wiley & Sons Inc,Hoboken,New Jersey, US , 2013.

2. Wayne C Booth; Joseph M Williams; Gregory G. Colomb; ‘The Craft of Research’ , 3rd Edition; Chicago guides to writing, editing and publishing;2008

3. Iain Borden and Kaaterina Ruedi Ray ; The Dissertation: An Architecture Student’s Handbook; Architectural Press; 2006

4. Ranjith Kumar; Research Methodology- A step by step guide for beginners-3rd Edition ; Sage Publications;2011

5. John W Creswell; Research design: Qualitative, Quantitative and Mixed Methods Approaches; Sage Publications; 2011.

6. JA Smith, P Flowers, M Larkin -Interpretative Phenomenological Analysis: Theory, Method and Research (English) FIR Edition- Sage Publication -2009.

Course Contents and Lecture Schedule

	Topic	No. of lectures
1	**INTRODUCTION**	**9**
1.1	Basic research issues and concepts	1
1.2	Orientation to research process	2
1.3	Types of research: historical, qualitative, co-relational, experimental, simulation and modeling, logical argumentation, case study and mixed methods	4
1.4	Illustration using research samples	2
2	**RESEARCH PROCESS**	**12**
2.1	Elements of Research process: finding a topic- writing an introduction	2
2.2	stating a purpose of study identifying key research questions and hypotheses	2
2.3	Reviewing literature- using theory- defining, delimiting and stating the significance of the study	2
2.4	Advanced methods and procedures for data collection and analysis	2
2.5	Sampling design- Implications of a sample design-steps in sampling design-Criteria for selecting a sampling Procedure	2
2.6	Characteristics of Good sample design-Different types of Sample Designs – Standard Error- Illustration using research samples.	2
3	**RESEARCHING AND DATA COLLECTION**	**12**
3.1	Measurement and Scaling Techniques- Measurement Scales – Source of Error in Measurement	3
3.2	Tests of Sound Measurement – Technique of developing Measurement Tools	2
3.3	Scaling –Meaning of Scaling- Scale Classification Bases- Important Scaling Techniques	2
3.4	Data Collection- Library and archives- Internet: New information and the role of internet; finding and evaluating sources- misuse- test for reliability- ethics	2
3.5	Methods of data collection- From primary sources: observation and recording, interviews structured and unstructured, questionnaire, open ended and close ended	3

	questions and the advantages, sampling- Problems encountered in collecting data from secondary sources.	
4	**INTERPRETATION AND REPORT WRITING**	**6**
4.1	Technique of Interpretation ,Precaution in Interpretation	1
4.2	Research writing: Different steps in Report writing –Layout of the Research Reoprt	3
4.3	Types of Reports- Oral presentation- Precautions for Writing Reports.	2
5	**CASE STUDIES**	**6**
5.1	Case studies illustrating how good research can be used from project inception to Completion	3
5.2	Review of research Publications	3

TOTAL NO OF HOURS **45**

Course Designers:

1. Dr.Jinu kitchley -hodarch@tce.edu
2. Ar.R.Meena Kumari - rmiarch@tce.edu

18GA220 URBAN RENEWAL AND CONSERVATION Category L T P/S C

CFC 3 0 0 3

Preamble

Architecture being a multifaceted profession, it requires exposure to understand Architectural Conservation. The understanding of the principles of Urban Renewal that can be used as a design tool across various zones.

Prerequisite

Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1 Develop the skill to identify, decipher and interpret issues relating to architecture based on urban **Analyse, Apply and**

	conservation through Multidisciplinary approach.	**Create**
CO2	Gain knowledge of different methods for assessing architectural values and significance	**Analyse, Apply and Create**

Assessment Pattern

Bloom's Taxonomy	**Continuous Assessment** **Tests**	**Terminal Examination**
Understand	20	20
Analyse	20	20
Apply	30	30
Create	30	30

Course Level Assessment Questions

Course Outcome 1 (CO1):

1. Define Social Change.
2. What are the economic impacts of Urbanization in urban India?

Course Outcome 2 (CO2)

1. Explain the Process of Land Utilization patterns made in India?
2. What is meant by resource conservation? Explain in detail about the schemes for resource conservation.

Course Outcome 3 (CO3)

1. What is meant by resource conservation? Explain in detail about the schemes for resource conservation.

2. What is urban renewal? State the importance of urban renewal programme. Explain any one method of urban renewal in detail.

OBJECTIVES

1. To expose students to the multidisciplinary and interdisciplinary nature of conservation, so as to ensure students develop skills required to function as responsible professionals.

2. To stimulate and encourage development of rigorous and innovative methodologies of intellectual enquiry and research into the field of Architectural conservation through adoption of a combination of pedagogic methods which include studio exercises, laboratory experiments, special lectures, site visits and tutorials.

3. To focus on challenging real world conservation issues through site based studio exercises and 'hands on' practical experience in conservation through site visits, workshops and the summer training. This addresses all scales of heritage, through emerging theoretical, technical and management subjects, ensuring that students develop the ability to connect philosophy, theory and practice; and devise realistic, implementable and innovative conservation interventions.

4. To familiarise the students with the state of the art techniques in material conservation through laboratory experiments and laboratory exercises that contribute to improved conservation practices and processes on site.

5. To encourage inter-institutional collaboration with other academic and professional institutions and interaction with government bodies so as to contribute to effective policy making in conservation; and through grounded research strengthen the profession, and increase awareness regarding the discipline of conservation.

6. To encourage community outreach, and enhance academic interface with civil society and communities for a more broad based and rooted participatory approach towards conservation of our heritage assets.

Syllabus

History of Architecture Conservation Movement in India- Scope of Architectural Conservation in Indian context - definitions and terminologies : historicity, value, authenticity, transformation etc, including traditional vocabularies for conservations - interventions such as reuse, rehabilitation, preservation, restoration, up gradation, retrofitting, revitalization, regeneration and redevelopment of historic cities and areas. - Morphology of a historic settlement and its associated region - parameters / system that shape the historic settlements and their Architectural form ; the city shaped in Indian context. Historic enclaves, their values, present condition and context. Techniques used in preparation of Conservation plans - site visit, inventories, typology, analysis, socio-economic surveys. - Definition of Urban Renewal - need of Urban Renewal in Indian context - integrated approach to conservatory Urban renewal - Socio-economic and cultural context, landscape, planning process and tourism. Heritage tourism and conservation. Discussion on recent conservation practice by difficult agencies. Institution frame work for urban conservation and renewal strategies - inner city regeneration, adaptive reuse, infill development etc in programmes like JNNURM, SMART CITY MISSION etc. Approaches in the world - New York, Chester, Cairo.

REFERENCES

1.M. Feilden, Bernard; Conservation of Historic Buildings; Published by Architectural Press; 3rd Edition, 2003.
2. Ashworth, G.J. & Tunbridge, J.E.; the Tourist – Historic City; Pub. Published by Belhaven Press, London and New York.
3. Latham, Derek; Creative Re-use of Buildings; Published by Donhead, Edition, 2007.
4. W. Install, Donald & Associates; Chester – A Study in Conservation; Published by London Her Majesty's Stationery Office, Edition 1968.
5. K. Parajuli, Yogeshwar; Bhaktapur Development Project – Experience in Preservation and Restoration in a Medieval Town; Edition 1974-85
6. Cohen, Nahoum; Urban Planning Conservation and Preservation, Published by McGraw Hill, Edition 2001.

7. Menon, A.G.K. & Thapar, B.K.; Historic Towns and Heritage Zones; Published by INTACH, Edition 2002.
8. Petruccioli , Attilio; After Amnesia – Learning from the Islamic Mediterranean Urban Fabric; Published by ICAR, Edition 2009.
9. J. Larkham, Peter; Conservation and the City; Published by Rout Ledge. London and New York, 1st edition 1996.

Course Contents and Lecture Schedule

Module No.	Topic	No. of Lectures
1.	**HISTORY AND THEORY OF CONSERVATION 15**	
1.1	History of Architecture Conservation Movement in India.	3
1.2	Scope of Architectural Conservation in Indian context	3
1.3	Definitions and terminologies : historicity, value, authenticity, transformation etc, including traditional vocabularies for conservations.	3
1.4	Interventions such as reuse, rehabilitation, preservation, restoration, up gradation, retrofitting, revitalization, regeneration and redevelopment of historic cities and areas.	6
2.	**CONSERVATION TECHNIQUES 15**	
2.1	Morphology of a historic settlement and its associated region.	3
2.2	Parameters / system that shape the historic settlements and their Architectural form.	3
2.3	The city shaped in Indian context. Historic enclaves, their values, present condition and context.	3
2.4	Techniques used in preparation of Conservation plans - site visit, inventories, typology, analysis, socio-economic surveys.	6
3.	**URBAN CONSERVATION 15**	
3.1	Definition of Urban Renewal - need of Urban Renewal in Indian context.	1
3.2	Integrated approach to conservatory Urban renewal.	1
3.3	Socio-economic and cultural context, landscape, planning process and tourism.	3
3.4	Heritage tourism and conservation. Discussion on recent conservation practice by difficult agencies.	3
3.5	Institution frame work for urban conservation and renewal strategies.	2
3.6	Inner city regeneration, adaptive reuse, infill development etc	3

	in programmes like JNNURM, SMART CITY MISSION etc.	
3.7	Approaches in the world - New York, Chester, Cairo.	2
	TOTAL NO OF HOURS	**45**

10.

Greffe, Xavier; Managing our Cultural Heritage; Published by Aryan Books International, N.D. 1st edition 2001.

11. The Future of Asia's Past – Preservation of the Architectural Heritage of Asia; Published by The Getty Conservation Institute, Edition 1995.
12. Pederson, Arthur; Managing Tourism at World Heritage Sites; Published by UNESCO World Heritage Centre, Edition 2002.
13. International Charters for Conservation and Restoration, Published by ICOMOS.
14. Burrows, G.S.; Chichester – A Study in Conservation; Published by London Her Majesty's Stationery Office; Edition 1968.

18GAFB0 **SUSTAINABLE WATER MANAGEMENT**

Preamble

Category	L	T	P	Credit
EFC	3	0	0	3

To introduce concepts of water management from traditional settlements. To expose the students towards the water management practices and their importance at macro, micro and built form level.

Prerequisite

Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Develop the knowledge water management techniques in ancient periods.	**Understand**

CO2	Analyse the water management at macro level and micro level.	**Analyse**
CO3	Apply the obtained knowledge in the area of water management at building level and site level.	**Apply, Analyse and Create**

Assessment Pattern

Bloom's Taxonomy	**Continuous Assessment** **Tests**	**Terminal Examination**
Understand	20	20
Apply	40	40
Analyse	20	20
Create	20	20

Course Level Assessment Questions

Course Outcome 1 (CO1):

1.what are the traditional water management practices followed in various climatic zones of the world?

2. Explain the Traditional Architecture of wells in different parts of India through case examples.

Course Outcome 2 (CO2)

1. Analyse the principles of sustainable watershed development and give suggestions for Planning of settlements and large campuses?

2.Analyse the Management of water supply, sanitation and drainage for large campuses.

3.Analyse the various Rain water harvesting techniques that can be applied for buildings

Course Outcome 3 (CO3)

1.what are the methods of Reuse of grey water?
2. what are the various natural waste water treatment methods?

Syllabus

WATER MANAGEMENT – HISTORICAL PERSPECTIVE - Traditional community wisdom regarding water management from different climatic zones of the world - Traditional Architecture of wells in Rajasthan, Gujarat, Tamilnadu – Stepped Wells, Baoris, Tankas, etc. **WATER MANAGEMENT – MACRO LEVEL -** Management of the water cycle as a single system - Management of water supply, sanitation and drainage - Social imperatives, environmental

considerations and economic challenges - Technological options for water management, recycling, reuse, conservation and treatment - Planning of settlements and large campuses based on principles of sustainable watershed development with water as a priority resource. **WATER MANAGEMENT – MICRO LEVEL -**Design for water conservation – Building and products - Designing building services, plumbing and sanitary design for effective water reuse, recycling, and recharge - Strategies for water pricing and its regulation - Rain water harvesting techniques – Basic Concepts, piping techniques and pit design for groundwater recharge wells. **STRATEGIES TO REDUCE WATER CONSUMPTION IN BUILDINGS-**Low flow plumbing fixtures for water efficient appliances - Rain water harvesting - Reuse of grey water for non potable uses - Wetlands for natural waste water treatment, use of wetlands for natural storm water and vegetated roof tops, (natural) renewable power source such as photo voltaic, solar hot water fuel cells etc.

Text Book

1. John Briscoe, R.P.S. Malik(Ed.), Handbook of Water Resources in India: Development, Management, and Strategies, Oxford University Press, 2007

2. Ramaswamy R. Iyer, Water and the laws in India, Sage Publications India Pvt. Ltd, 2009

3. Hydrology and Water Resources of India, Water Science and Technology Library, Vol. 57, Jain, Sharad K., Agarwal, Pushpendra K., Singh, Vijay P. Springer,2007

4. Guy Honore(Ed.), Principles and Practices of Integrated Watershed Management in India, Indo-German Bilateral Project, 2002

5. K. Nageswara (Ed.), Water Resources Management: Realities and Challenges, Eastern Book Corpn., 2006

6. Dr B C Punmia, Ashok Kr Jain, Arun Kr Jain; Water Supply Engineering, Laxmi, Cunliffe, D. (ed) (2011), Water safety in buildings, World Health Organization, Geneva, Switzerland, 2011

7. P.K. Singh, Rainwater Harvesting: Low cost indigenous and innovative technologies, Macmillan Publishers India, 2008 8. R.N. Athavale , Water Harvesting And Sustainable Supply In India, Rawat Publications, 2003

WEBSITES

1. http://www.unepfi.org/fileadmin/publications/water/chief_liquidity1_India.pdf

2. http://wrmin.nic.in 3. http://www.unicef.org/india/Final_Report.pdf

Course Contents and Lecture Schedule

S.No.	Topic	No. of lectures
1	**WATER MANAGEMENT – HISTORICAL PERSPECTIVE**	**9**
1.1	Traditional community wisdom regarding water management from different climatic zones of the world -	
1.2	Traditional Architecture of wells in Rajasthan, Gujarat, Tamilnadu – Stepped Wells, Baoris, Tankas, etc.	
2	**WATER MANAGEMENT – MACRO LEVEL**	**12**
2.1	Management of the water cycle as a single system - Management	

	of water supply, sanitation and drainage	
2.2	Social imperatives, environmental considerations and economic challenges	
2.3	Technological options for water management, recycling, reuse, conservation and treatment	
2.4	Planning of settlements and large campuses based on principles of sustainable watershed development with water as a priority resource	
3	**WATER MANAGEMENT – MICRO LEVEL** Design for water conservation – Building and products	**12**
3.1	Designing building services, plumbing and sanitary design for effective water reuse, recycling, and recharge	
3.2	Strategies for water pricing and its regulation - Rain water harvesting techniques	
3.3	Basic Concepts, piping techniques and pit design for groundwater recharge wells.	
4	**STRATEGIES TO REDUCE WATER CONSUMPTION IN BUILDINGS**	12
4.1	Low flow plumbing fixtures for water efficient appliances	
4.2	Rain water harvesting - Reuse of grey water for non potable uses -	
4.3	Wetlands for natural waste water treatment, use of wetlands for natural storm water and vegetated roof tops, (natural) renewable power source such as photo voltaic, solar hot water fuel cells etc.	

TOTAL NO OF HOURS **45**

Course Designers:

1. Dr.A.Madhumathi - madhu@tce.edu
2. Ar. S.Santhana Iyyappa Sundararaj - pothi@tce.edu

18GA230 INTEGRATED ARCHITECTURAL DESIGN II Category L T P/S C

PC 0 0 12 6

"The **Integrated Design Process** is a method used for the design and operations of sustainable built environments. It is a collaborative **process** that requires the whole project team to think of the entire

building and all of its systems together... It breaks down disciplinary boundaries and rejects linear planning and design processes that can lead to inefficient solutions."

Excerpt from the usgbc.org , May 2014

OBJECTIVE

- To engage in an architectural design in the context of the city, related to Pubic Architecture.
- To gain knowledge in design and operations of sustainable built environments.
- To understand and apply varied planning and technical considerations to integrate the services and structural systems in buildings.
- To understand performance analysis of buildings

The studio will help the student to develop the ability to integrate technical considerations while arriving at creative, sustainable solutions. The studio will focus on the challenges of incorporating services and structural systems in buildings and will aim to give a critical understanding to Architectural Practice in terms of life time cost and efficiency.

The scale of the projects could be City hall, Monumental Architecture, Traditional Hub, Multispecialty Hospitals, IT Nodes, etc

REFERENCES

1. Integrated Strategies in Architecture (Technologies of Architecture) 1st Edition
by Joan Zunde (Author), Hocine Bougdah (Author)

2. Johasin Eiselle & Ellen Klofr –High rise manual – Typology design construction & Technology - Birkhanser,Basel - Switzerland – 2003
3. Mathew Wells - Skyscrapers , Structure & Design - Lawrence King publishing London 2005.
4. Riewoldt (Otto) –Intelligent spaces –Architecture for the information age- Lawrence King , London -1997
5. Integrated Design Process, A Guideline for Sustainable and Solar-Optimised Building Design, IEA – International Energy Agency
6. Integrated Design Process Guide, By Alex Zimmerman, P. Eng.

Course Designers:

1. Dr.Jinu kitchley -hodarch@tce.edu

18GAPB0 DIGITAL TOOLS FOR ENVIRONMENTAL ARCHITECTURE

Preamble

Category	L	T	P	Credit
PE	3	0	0	3

To provide exposure to

environmental performances & analysis tool based on climatic data models and data structure.

Prerequisite

Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand various climatic factors and their influence in building design	**Understand**
CO2	Analyse appropriate design elements, strategies, form for achieving thermal comfort in Buildings	**Apply and Analyse**
CO3	Gain knowledge on various analysis tool based on climatic data models and data structure.	**Apply**
CO4	Evaluate the Environmental Performance of Buildings through various simulation software	**Evaluate**

Assessment Pattern

Bloom's Taxonomy	Continuous Assessment Tests	Terminal Examination
Understand	20	20
Analyse	20	20
Apply	30	30
Evaluate	30	30

Course Level Assessment Questions

Course Outcome 1 (CO1):

1. List out the Climatic factors and Illustrate the role of any two factors with examples.
2. List down the advantages of Day lighting Techniques.

Course Outcome 2 (CO2)

1. Explain Stack effect in buildings.
2. Explain how you could integrate vegetation and water bodies in design as a measure to control thermal comfort in buildings.

Course Outcome 3 (CO3)

1. How will you generate analyse Climatic data for any given geographic location?
2. Discuss in detail ,the Role of Energy management systems in buildings.

Course Outcome 4 (CO4)

1. How will you perform Energy analysis in a simulation software.
2. Discuss in detail, how the application of a simulation software will be helpful in designing Environmentally friendly and Energy efficient Buildings.

Syllabus

ENVIRONMENTAL FACTORS Thermal performances of buildings; Comfort factors and measurements; Climatic design; Solar Control and shading devices, Louvre design; ventilation; introduction to lighting; units of light, colour, lamps, luminaries, Daylight design of general lighting schemes; Energy management and lighting . **SOLAR PASSIVE ARCHITECTURE** Heat transmission in buildings - bioclimatic classification - passive heating concept: direct heat gain - indirect heat gain - isolated gain and sunspaces-passive cooling concepts: evaporative cooling – radiative cooling - thermal comfort- concept of solar temperature and its significance -calculation of instantaneous heat gain through building envelope. **SIMULATION AND PERFORMANCE ANALYSIS TOOL** Introduction to Simulation Software, an environmental prediction software package in architecture. to study the simple and intuitive 3D modeling interface and to explore the range of analysis functions Generate and analyse climate data for any geographic location, predict microclimatic conditions on urban sites, perform shading, daylighting, airflow, heating and cooling simulation studies, predict indoor temperatures and other environmental conditions, calculate energy requirements and assess environmental impact and life costs of buildings. **SOLAR THERMAL ANALYSIS OF MODELS** Use of analytic tools and environmental design software for studying solar, thermal and lighting processes in and around real or virtual buildings

References

1. Garg H P., Prakesh J., Solar Energy: Fundamentals & Applications, Tata McGraw Hill, 2000.
2. Duffie, J.A. and Beckman, W.A., Solar Engineering of Thermal Processes, John Wiley, 1991.
3. Alan L Fahrenbruch and Richard H Bube, Fundamentals of Solar Cells: PV Solar Energy Conversion, Academic Press, 1983
4. Autodesk Ecotect Analysis 2010 Bible.

Course Contents and Lecture Schedule

S.No.	Topic	No. of lectures
1	**ENVIRONMENTAL FACTORS**	**8**
1.1	Thermal performances of buildings; Comfort factors and measurements; Climatic design;	
1.2	Solar Control and shading devices, Louvre design; ventilation;	
1.3	introduction to lighting; units of light, colour, lamps, luminaries, Daylight design of general lighting schemes; Energy management and lighting	

2	**SOLAR PASSIVE ARCHITECTURE**.	8
2.1	Heat transmission in buildings - bioclimatic classification - passive heating concept: direct heat gain - indirect heat gain - isolated gain and sunspaces-	
2.2	passive cooling concepts: evaporative cooling – radiative cooling - thermal comfort- concept of solar temperature and its significance -	
2.3	calculation of instantaneous heat gain through building envelope	
3	**SIMULATION AND PERFORMANCE ANALYSIS TOOL**	**20**
3.1	Introduction to Simulation Software, an environmental prediction software package in architecture. to study the simple and intuitive 3D modeling interface	
3.2	explore the range of analysis functions Generate and analyse climate data for any geographic location, predict microclimatic conditions on urban sites, perform shading, daylighting, airflow, heating and cooling simulation studies, predict indoor temperatures and other environmental conditions,	
3.3	calculate energy requirements and assess environmental impact and life costs of buildings.	
4	**SOLAR THERMAL ANALYSIS OF MODELS**	9
4.1	Use of analytic tools and environmental design software for studying solar, thermal and lighting processes in and around real or virtual buildings	

TOTAL NO OF HOURS **45**

Course Designers:

2. Dr.Jinu kitchley -hodarch@tce.edu
3. Dr.A.Madhumathi - madhu@tce.edu