

**ANNA UNIVERSITY, CHENNAI**  
**AFFILIATED INSTITUTIONS**  
**M.ARCH.**  
**REGULATIONS – 2017**  
**CHOICE BASED CREDIT SYSTEM**

**PROGRAMME EDUCATIONAL OBJECTIVES (PEOs) :**

- I. To provide students with additional knowledge and skills as an architect/ researcher/ teacher.
- II. To enable students to add value to the process of architectural design by incorporating depth in already existing fields of study relevant to architecture.
- III. To enable students to widen the scope of their professional abilities through additional fields of study that would enhance their knowledge in intellectual, creative, technical, social and environmental realms.
- IV. to enable students to take independent, informed and innovative decisions within the discipline of architecture.
- V. to enable students to contribute to larger society through their future career as architect/ researcher/ teacher.

**PROGRAMME OUTCOMES (POs):**

On successful completion of the programme,

1. Graduates will demonstrate an all round skill in design and research.
2. Graduates will be able to identify additional parameters/ issues within the context of architectural design and resolve them.
3. Graduate will be able to resolve architectural problems with due consideration to urban issues and environmental issues.
4. Graduates will be able to bring technical expertise in analysis and synthesis.
5. Graduates will be able to apply cutting edge methods/ tools/ approaches in the resolution of problems.
6. Graduates will be able to bring critical thinking in the consideration of any aspect of design.
7. Graduates will be able to identify problems or create design solutions in a holistic manner.
8. Graduates will be able to contribute further to society through their design/research/ teaching.

Programme Educational Objectives	Programme Outcomes							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
I	✓							
II		✓						
III			✓	✓	✓	✓		
IV							✓	
V								✓

			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	
YEAR 1	SEM 1	Urban Conservation			✓						
		Urban Design - Theory and Practice			✓						
		Contemporary Processes in Architectural Design					✓				
		Elective I									
		Urban Morphology			✓						
		Advanced Architectural Design Studio I		✓							
	SEM 2	Sustainable Design - Principles and Practice			✓						
		Performance Evaluation of Buildings				✓					
		Research Methodologies in Architecture						✓			
		Elective II									
		Building Information Modeling				✓					
		Advanced Architectural Design Studio II		✓							
YEAR 2	SEM 3	Contemporary Architectural Theory and Practice						✓			
		Elective III									
		Elective IV									
		Advanced Architectural Design Studio III		✓							
		Project Phase I- Dissertation	✓								
	SEM 4	Elective V									
		Professional training									
		Project Phase II- Thesis	✓						✓	✓	

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**CURRICULA AND SYLLABI FOR I TO IV SEMESTERS**

**SEMESTER I**

S. No.	Course Code	Course Title	Category	Contact Periods	L	T	P/S	C
<b>THEORY</b>								
1.	MH5101	Urban Conservation	PC	3	3	0	0	3
2.	MH5102	Urban Design - Theory and Practice	HS	3	3	0	0	3
3.	MH5103	Contemporary Processes in Architectural Design	PC	3	3	0	0	3
4.		Professional Elective I	PE	3	3	0	0	3
<b>STUDIO</b>								
5.	MH5111	Urban Morphology	PC	6	0	0	6	3
6.	MH5112	Advanced Architectural Design Studio I	PC	10	0	0	10	5
<b>TOTAL</b>				<b>28</b>	<b>12</b>	<b>0</b>	<b>16</b>	<b>20</b>

**SEMESTER II**

S. No.	Course Code	Course Title	Category	Contact Periods	L	T	P/S	C
1.	MH5201	Sustainable Design - Principles and Practice	PC	3	3	0	0	3
2.	MH5251	Research Methodologies in Architecture	PC	3	3	0	0	3
3.		Professional Elective II	PE	3	3	0	0	3
4.	MH5221	Performance Evaluation of Buildings	PAEC	4	2	0	2	3
<b>STUDIO</b>								
5.	MH5281	Building Information Modeling	PAEC	6	0	0	6	3
6.	MH5211	Advanced Architectural Design Studio II	PC	10	0	0	10	5
<b>TOTAL</b>				<b>29</b>	<b>11</b>	<b>0</b>	<b>18</b>	<b>20</b>

### SEMESTER III

S. No.	Course Code	Course Title	Category	Contact Periods	L	T	P/S	C	Pre-requisites	
<b>THEORY</b>										
1.	MH5301	Contemporary Architectural Theory and Practice	HS	3	3	0	0	3	<b>Pass in Advanced Architectural Design Studio I (Sem I)</b>	
2.	MH5351	Arbitration and Advanced Professional Practice	PAEC	3	3	0	0	3		
3.		Professional Elective III	PE	3	3	0	0	3		
4.		Professional Elective IV	PE	3	3	0	0	3		
<b>STUDIO</b>										
5.	MH5311	Project Phase I - Dissertation	PC	6	0	0	6	3		
6.	MH5312	Advanced Architectural Design Studio III	PC	10	0	0	10	5		
<b>TOTAL</b>				<b>28</b>	<b>12</b>	<b>0</b>	<b>16</b>	<b>20</b>		

### SEMESTER IV

S. No.	Course Code	Course Title	Category	Contact Periods	L	T	P/S	C	Pre-requisites	
1.		Professional Elective V**	PE	x	x	x	x	3	<b>Pass in Advanced Architectural Design Studio II &amp; III , Project Phase I : Dissertation</b>	
<b>STUDIO</b>										
2.	MH5411	Professional training*	PAEC	-	-	-	-	2		
3.	MH5412	Project Phase II- Thesis	PC	20	0	0	20	10		
<b>TOTAL</b>				<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>15</b>		

\*Professional Training of duration minimum 4 weeks full time or 8 weeks part time to be done in a firm specializing in any area(s) related to the Professional Core courses during semester vacation.

\*\* Type of Course as per detailed Elective Curriculum and Syllabus

**TOTAL NO OF CREDITS: 75**

**PROFESSIONAL ELECTIVES (PE)****ELECTIVE – I**

S. No.	Course Code	Course Title	Category	Contact Periods	L	T	P/S	C
1.	MH5001	Anthropology and Architecture	PE	3	3	0	0	3
2.	MH5002	Architecture and Critical Theory	PE	3	3	0	0	3

**ELECTIVE – II**

S. No.	Course Code	Course Title	Category	Contact Periods	L	T	P/S	C
1.	MH5003	Services in High Rise Buildings	PE	3	3	0	0	3
2.	MH5004	Building Management and Control Systems	PE	3	3	0	0	3

**ELECTIVE – III**

S. No.	Course Code	Course Title	Category	Contact Periods	L	T	P/S	C
1.	EA5191	Sustainable and Green Buildings	PE	3	3	0	0	3
2.	MH5005	Material Conservation	PE	3	3	0	0	3

**ELECTIVE – IV**

S. No.	Course Code	Course Title	Category	Contact Periods	L	T	P/S	C
1.	MH5006	Emerging Practices in Housing	PE	3	3	0	0	3
2.	MH5007	Landscape Urbanism	PE	3	3	0	0	3

**ELECTIVE – V**

S. No.	Course Code	Course Title	Category	Contact Periods	L	T	P/S	C
1.	MH5008	GIS Modelling in Urban Planning	PE	3	3	0	0	3
2.	MH5009	Explorations in Architectural Form	PE	4	2	0	2	3
3.	MH5071	Web Design and Portfolio Production	PE	6	0	0	6	3

**HUMANITIES SCIENCE (HS)**

S. No.	Course Code	Course Title	Category	Contact Periods	L	T	P/S	C
1.	MH5102	Urban Design - Theory and Practice	HS	3	3	0	0	3
2.	MH5301	Contemporary Architectural Theory and Practice	HS	3	3	0	0	3

**PROFESSIONAL CORE (PC)**

<b>S. No.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Category</b>	<b>Contact Periods</b>	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>C</b>
1.	MH5101	Urban Conservation	PC	3	3	0	0	3
2.	MH5103	Contemporary Processes in Architectural Design	PC	3	3	0	0	3
3.	MH5111	Urban Morphology	PC	6	0	0	6	3
4.	MH5112	Advanced Architectural Design Studio I	PC	10	0	0	10	5
5.	MH5201	Sustainable Design - Principles and Practice	PC	3	3	0	0	3
6.	MH5211	Advanced Architectural Design Studio II	PC	10	0	0	10	5
7.	MH5251	Research Methodologies in Architecture	PC	3	3	0	0	3
8.	MH5311	Project Phase I- Dissertation	PC	6	0	0	6	3
9.	MH5312	Advanced Architectural Design Studio III	PC	10	0	0	10	5
10.	MH5412	Project Phase II- Thesis	PC	20	0	0	20	10

**PROFESSIONAL ABILITY ENHANCEABILITY COURSE (PAEC)**

<b>S. No.</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Category</b>	<b>Contact Periods</b>	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>C</b>
1.	MH5221	Performance Evaluation of Buildings	PAEC	4	2	0	2	3
2.	MH5281	Building Information Modeling	PAEC	6	0	0	6	3
3.	MH5351	Arbitration and Advanced Professional Practice	PAEC	3	3	0	0	3
4.	MH5411	Professional training	PAEC	-	-	-	-	2

**OBJECTIVES**

- To introduce the idea of conservation as enhancing quality of life, as effective planning strategy, as means of particularization of place and as a way to address issues of memory and identity.
- To give an overview of current status of conservation in India and introduce issues and practices of urban conservation at various levels and scales.

**UNIT I INTRODUCTION TO CONSERVATION 9**

Understanding Heritage-Types of Heritage- Heritage conservation : Need, Debate and purpose- Defining Conservation, Preservation and Adaptive reuse- Distinction between Architectural and Urban Conservation- International agencies like ICCROM, UNESCO AND their role in Conservation.

**UNIT II CONSERVATION IN INDIA 9**

Museum conservation – monument conservation and the role of Archeological Survey of India – role of INTACH – Central and state government policies and legislations – inventories and projects – select case studies – craft Issues of conservation –conservation project management - Case study of Keezhadi

**UNIT III CONSERVATION STRATEGIES 9**

Listing of monuments – documentation of historic structures – assessing architectural character – historic report – guidelines for preservation, rehabilitation and adaptive re-use of historic structures – seismic retrofit and disabled access /services additions to historic buildings – heritage site management.

**UNIT IV URBAN CONSERVATION 9**

Over view of urban history of India and Tamil Nadu – understanding the character and issues of historic cities – select case studies of sites like Thanjavur, Kumbakonam, Kanchipuram, Chettinad – historic districts and heritage precincts.

**UNIT V CONSERVATION AND URBAN PLANNING 9**

Norms for conservation of heritage buildings and sites as part of Development Regulations - Heritage districts - Conservation as a planning tool – financial incentives and planning tools such as TDR, (transferable development right) – Urban conservation and heritage tourism.

**TOTAL: 45 PERIODS****OUTCOMES**

- The students would gain an understanding of the need and benefits of urban conservation.
- The students would be sensitised as well as informed to carry forth this understanding in the realm of practice/ research.

**REFERENCES**

1. A Richer Heritage: Historic Preservation in the Twenty – First Century by Robert E. Stipe. Conservation Manual, Bernard Fielden
2. A.G.K. Menon ed. Conservation of Immoveable Sites, INTACH Publication, N.Delhi Seminar Issue on Urban Conservation.
3. B.K. Singh, State and Culture, Oxford, New Delhi.
4. Bernard Feilden, Conservation of Historic Buildings, 2nd Edition, Butterworth, 1994.
5. Christopher Brereton, The repair of Historic Buildings. Advice on principles and methods; English Heritage.
6. Donald Appleyard, The Conservation of European Cities, M.I.T. Press, Massachusetts.
7. INTACH, Conservation Briefs
8. James M. Fitch, Historic Preservation: Curatorial Management of the Built World by University Press of Virginia; Reprint edition (April 1, 1990)
9. M.S.Mathews, Conservation Engineering, Universität Karlsruhe, 1998

**OBJECTIVES**

- To introduce and enable understanding of various aspects of urbanism through historical and theoretical frameworks
- To understand issues of contemporary urban form.
- To understand the role of urban design interventions.

**UNIT I INTRODUCTION****12**

Introduction to origin and evolution of cities and urbanism- historic review of the development of the urban design discipline and principles.

**UNIT II READING THE URBAN FABRIC****9**

Introduction to different ways of reading and interpreting the urban fabric/ city such as imageability, typology, phenomenology, behavioral studies, diagramming-mapping

**UNIT III ISSUES OF CONTEMPORARY URBAN FORM****9**

Introduction to various issues and aspects that impinge on the urban condition today such as globalisation, digital revolution, contemporary processes, sustainability, splintering urbanism through changes in information and communication networks and transportation. Role of big data analytics in inclusive urbanism

**UNIT IV URBAN INTERVENTIONS- SUSTAINABLE DEVELOPMENT****9**

Sustainable development– Sustainable Cities Program - Revitalization of brown field sites- Transit Metropolis- Case Studies

**UNIT V URBAN INTERVENTIONS- RESTRUCTURING THE CITY****6**

Contemporary Processes in Urban Design- Place making in the Digital Age – Reconfiguring public realm – Urbanisation and Excursions on density.

**TOTAL: 45 PERIODS****OUTCOMES**

- Awareness of urbanism as a phenomenon.
- Knowledge about different ways of addressing urban issues.

**REFERENCES**

1. A.E.J. Morris, History of Urban Form before the Industrial Revolution, Prentice Hall 1996
2. Edmund Bacon, Design of Cities , Penguin, 1976
3. Gordon Cullen, The Concise Townscape, The Architectural Press, 1978
4. Kevin Lynch, Image of the City, MIT Press 1960.
5. Christian Norberg Schulz- Towards a Phenomenology of Architecture, Rizzoli New York, 1980
7. Charles Correa, Housing and Urbanisation, Thames and Hudson, 1999
8. Donald Appleyard, Kevin Lynch, John R. Myer, The View from the Road, MIT Press 1965
9. Gosling and Maitland, Urban Design, St. Martin's Press, 1984
10. Jonathan Barnett, An Introduction to Urban Design
11. Peter Calthorpe, Urbanism in the age of Climate Change, Island Press; 2 edition (June 1, 2013)
12. Thomas A, Horan, Digital Places: Building our city of bits, Urban Land Institute, 2000
13. Tridib Banerjee, Anastasia Loukaitou- Sideris, Companion to Urban Design, Routledge 2014
14. William J. Mitchell, City of Bits: Space, Place and the infobahn, MIT Press, 1996.



**OBJECTIVES:**

- 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.

**UNIT I INTRODUCTION 6**  
 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

**UNIT II 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

**UNIT III CONTEMPORARY PROCESS 12**  
 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

**UNIT IV GEOMETRIES AND SURFACES 12**  
 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.

**UNIT V CASE STUDIES 6**  
 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: 45 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. Ali Rahim, Contemporary Process in Architecture, John Wiley & Sons, 2000
2. Contemporary Techniques in Architecture, Halsted Press, 2002
3. Grey Lynn, The Folded, The Pliant and The Supple, Animate form
4. Marcos Novak, invisible Architecture: An Installation for the Greek Pavilion, Venice Biennale, 2000.
5. MOVE, UN Studio
6. Peter Eisenmann, Diagram: An Original Scene of Writing, Diagram Diaries
7. Rahul Mehrotra, Architecture in India: Since 1990, Hatje Cantz (November 30, 2011)
8. Walter Benjamin, Practices of Art in the Age of Mechanical Reproduction Colin press, 1977
9. William J Mitchell, the Logic of Architecture: Design, Computation and Cognition. MIT Press, Cambridge, 1995
10. Work of Architecture in the Age of Mechanical Reproduction, Differences MIT press,1997.

**MH5111**

**URBAN MORPHOLOGY**

**L T P/S C**  
**0 0 6 3**

**OBJECTIVES**

- To understand the phenomenon of urbanism through case studies engaging ideas, tools and techniques.

The course enables an understanding of urban morphology through applying ideas, methods and techniques of urban design to the practical study of the city. The various processes that influence the evolution of urbanism as well as the resultant morphology would be understood through the study. The city would be understood from different perspectives- climatic, historic, perceptual, social, density, economics, infrastructure systems etc., The role of architecture in shaping the city would also be studied in detail. Emerging tools for reading urbanism such as mapping and big data analytics will be explored in detail.

**TOTAL: 90 PERIODS**

**OUTCOME**

- Study of emerging urban processes would help understand the relationship between architecture and the city and thereby contextualize architectural design process.

**REFERENCES**

1. Carol L. Stimmel, Building Smart Cities: Analytics, ICT, and Design Thinking, Auerbach Publications (August 13, 2015)
2. Daniel G. Parolek, Karen Parolek, Paul C. Cram, Form Based Codes, John Wiley 2008
3. Donald Watson et al, Time Saver Standards for Urban Design, McGraw-Hill Education; 1 edition (March 14, 2003)
4. Jonathan Barrett, City Design, Routledge 2011
5. Malcolm Moore & Jon Rowland Eds, Urban Design Futures, Routledge, 2006
6. Martin Dodge, Rob Kitchin and Chris Perkins, Eds, The Map reader, John Wiley 2011
7. Project on the City, Great Leap Forward, Harvard Design School, 2001
8. Spiro Kostof, The City Shaped, Thames and Hudson, 1991
9. Tridib Banerjee, Anastasia Loukaitou- Sideris, Companion to Urban Design, Routledge 2014
10. Yes is More, Taschen, 2009

**MH5112**

**ADVANCED ARCHITECTURAL DESIGN STUDIO I**

**L T P/S C**  
**0 0 10 5**

**OBJECTIVES**

To engage in architectural design in the context of the city.

The studio will focus on architecture as being shaped by and shaping the urban context. The process of architectural design would be seen along with the aspects such as nature of cities, urban morphology, history, place, density, society, public realm, economy, climate and microclimate, ecology, legislation, finance. The design projects would become the site for taking positions on specific issues and developing these ideas to completion.

**OUTCOME**

- An ability to design buildings that respond to emerging urban conditions

**TOTAL: 150 PERIODS**

**OBJECTIVES**

- To sensitize the students to the importance of sustainable design
- To make students aware of the ways to sustainable design.
- To help student develop analytical abilities in the evaluation of buildings with respect to sustainability.

**UNIT I INTRODUCTION****9**

Basics of ecology, ecosystems, energy and material cycles in nature- function of ecosystem- Attitudes to sustainable architecture: a historical perspective- Concept of Sustainability and Sustainable Development - Carrying capacity, EIA- Global and local environmental issues- climate change, global warming, loss of bio-diversity, urban heat islands- Impact of construction sector on environment; Need, general premises and strategies for sustainable and green design

**UNIT II SUSTAINABLE PLANNING AND ARCHITECTURE****12**

E's of sustainability - Integrated approach to environmental design, Settlement level planning, Urban ecology, Urban planning considerations- Building and its interactions with the environment, general principles for minimizing environmental impact of buildings- Eco-mimicry as a design tool based on ecosystem analogy- The form of the house: the building as an analogy- Site planning considerations, working with climate: passive design principles, building envelope design, indoor environment quality-case studies.

**UNIT III ENERGY AND WATER MANAGEMENT IN BUILDINGS****6**

Energy management in buildings –reducing demand- relying on renewable energy- net zero/ energy plus buildings - photovoltaics and solar hot water systems- small scale wind systems and hydro power- Water management in buildings- water saving / demand management, water harvesting for recharge and use, reuse/ recycling

**UNIT IV ENVIRONMENTAL IMPACT OF BUILDING MATERIALS****6**

Impact of building materials- calculating embodied energy- impact of recycling, processing and time on embodied energy- embodied energy of different building materials, carbon foot print-considerations for choice of materials for low energy- life cycle analysis- optimizing construction, site management, post occupancy building management- Adaptive reuse, Brown field site development, construction and demolition waste management

**UNIT V POLICIES AND PRINCIPLES****12**

Basic understanding of Earth Summit, Kyoto protocol, UN frame work convention of climate change, national policies on sustainable and energy efficient development, The Energy Conservation Act, 2001 (Amendments 2010)- Main Amendments and its legal framework, Energy Conservation Building Code (ECBC), Environmental impact assessment (EIA) based on the Environmental Protection Act (EPA), 1986

**TOTAL: 45 PERIODS****OUTCOMES**

- An understanding on sustainability as applicable to architecture and planning.
- Knowledge on renewable energy and energy conservation through material usage.
- Ability to critically analyse buildings with respect to sustainability.

**REFERENCES**

1. Brenda and Robert Vale; Green Architecture- Design for a Sustainable Future; Thames and Hudson, 1996.
2. Daniel Vallero and Chris Brasier; Sustainable Design- The science of sustainability and Green Engineering; Wiley,2008

3. Jeanne Gang, *Reveal* : Studio Gang Architects, Princeton Architectural Press (23 March 2011)
4. Ken Yeang; *Eco design - A Manual for Ecological design*, Wiley- Academy,2006
5. Sue Roaf et all; *Ecohouse: A design Guide*; Elsevier Architectural Press, 2007
6. Thomas E Glavinich; *Green Building Construction*; Wiley, 2008

**MH5251                          RESEARCH METHODOLOGIES IN ARCHITECTURE                          L T P/S C**  
**3 0 0 3**

### **OBJECTIVES**

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

### **UNIT I                          INTRODUCTION                          9**

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

### **UNIT II                          RESEARCH PROCESS                          9**

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- illustration using research samples

### **UNIT III                          RESEARCHING AND DATA COLLECTION                          9**

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.

### **UNIT IV                          REPORT WRITING                          6**

Research writing in general- Components: referencing- writing the bibliography - developing the outline - presentation; etc.

### **UNIT V                          CASE STUDIES                          12**

Case studies in the relevant discipline illustrating how good research can be used from project inception to completion- review of research publications.

**TOTAL: 45 PERIODS**

### **OUTCOMES**

- The student will develop the skill to identify, decipher and interpret issues relating to architecture based on research enquiry methods.
- The student will gain knowledge of different methods of conducting research and research writing.

## REFERENCES

1. Iain Borden and Kaaterina Ruedi Ray ; The Dissertation: An Architecture Student's Handbook; Architectural Press; 2006
2. JA Smith, P Flowers, M Larkin -Interpretative Phenomenological Analysis: Theory, Method and Research (English) FIR Edition- Sage Publication -2009.
3. John W Creswell; Research design: Qualitative, Quantitative and Mixed Methods Approaches; Sage Publications; 2011.
4. Linda Groat and David Wang; Architectural Research Methods – 2<sup>nd</sup> edition ‘,John Wiley & Sons Inc,Hoboken,New Jersey, US , 2013.
5. Ranjith Kumar; Research Methodology- A step by step guide for beginners-3<sup>rd</sup> Edition ; Sage Publications;2011
6. Wayne C Booth; Joseph M Williams; Gregory G. Colomb; ‘The Craft of Research’ , 3<sup>rd</sup> Edition; Chicago guides to writing, editing and publishing;2008

**MH5221**

## **PERFORMANCE EVALUATION OF BUILDINGS**

**L T P/S C**  
**2 0 2 3**

### **OBJECTIVES**

- To investigate the simulation and audit techniques for assessing the energy performance, environmental response and impact of built form.

### **UNIT I INTRODUCTION TO BUILDING PERFORMANCE EVALUATION**

**6**

Emerging role of performance evaluation in building design and master planning- Performance audit and rating systems- GRIHA, LEED IGBC and BREEM Comparative analysis of green rating systems – Architectural Computation and performance audit- Introduction to Building performance simulation tools

### **UNIT II ENVIRONMENTAL ASSESSMENT METHODS AND MODELING FOR PASSIVE SYSTEMS**

**15**

Modeling and experimental techniques for building assessment/ evaluation and design – Basics of thermal comfort, solar shading/access/ control, day lighting, acoustics, air movement etc. – issues and opportunities with current assessment modes/ evaluation tools- Evaluation and assessment based on Building type/ function and program – Building performance with respect to function, program, micro climate, urban planning, envelope design, material – Computer studio and simulation-Mathematical models of heat and mass transfer phenomena through building components: transfer function methods and numerical methods – Models of radiative and convective heat transfer phenomena within buildings.

### **UNIT III POST OCCUPANCY EVALUATION OF BUILDINGS**

**15**

Purpose and components of Post occupancy evaluation (POE), Building performance bench marks, Occupant satisfaction, Indoor air quality, PPD & PMV analysis, Techniques and methods for post occupancy evaluation, Assessing existing buildings based on their energy and water usage.

### **UNIT IV ADVANCE BUILDING SIMULATION AND ENERGY MODELLING**

**15**

Integration of simulation tools with BIM, RAPID ENERGY MODELLING - Modelling and performance simulation of existing buildings – residential-institutional- design of a new residential building using energy simulation tools

**UNIT V SEMINAR AND CASE STUDY PRESENTATION****9**

Case study presentation of students on performance evaluation of a building identified by them and approved by the course faculty – Seminar on topics approved by the course faculty.

**TOTAL: 60 PERIODS****OUTCOMES**

- The students will gain knowledge on environmental assessment methods, audit and simulation techniques.
- Will add value to architectural design processes and equip students with energy modeling skills.

**REFERENCES**

1. Clarke, J.A., “Energy simulation in building design”, Adam Hilger Ltd, Bristol, 1985
2. Energy Audit of Building Systems – Moneef Krarti (Ph.D) – CRC Press 2000
3. ESRU, “ESP-r A Building Energy Simulation Environment; User Guide Version 9 Series. “ESRU Manual U 96/1, University of Strathclyde, Energy Systems Research Unit, Glasgow, 1996.
4. Givoni Baruch, “Passive and Low Energy Cooling of Buildings”, Van Nostrand Reinhold, New York, 1994.
5. <https://www.designbuilder.co.uk>
6. <https://www.iesve.com/>
7. Kabele, K., “Modeling and analyses of passive solar systems with computer simulation”, in Proc. Renewable energy sources, PP. 39 – 44, Czech Society for Energetics Kromeriz 1998 (in Czech)
8. Robert B. Bechtel and Arza Churchman “Handbook of Environmental Psychology”, John Wiley & Sons Inc., New York 2002

**MH5281****BUILDING INFORMATION MODELING****L T P/S C****0 0 6 3****OBJECTIVE**

- To equip students with skills and information to build comprehensive Building Information Models (BIM) using appropriate Digital software and Media.

**UNIT I INTRODUCTION TO THE FUNDAMENTALS****15**

Key concepts of BIM - reading and manipulating the software Interface - navigating within views - selection methods - the importance of levels and grids- creating walls, doors, windows, and components - working with essential modification commands and load family. Creating floors, ceilings, and stairs - working with type and instance parameters - importing CAD drawings - understanding the project browser and type properties palettes - adding sheets - inserting views onto sheets - adding dimensions and text to the mode and plotting

**UNIT II ADVANCED MODELING –FAMILY TYPES AND TOPOSURFACE MODELLING****20**

Creating curtain walls, schedules, details, a custom family, and family types - “flex” a family with family types and work with reference planes - creating rooms and an area plan - tag components - customize existing wall styles. Create and edit a toposurface, add site and parking components - draw label contours - work with phasing - understand groups and links - work with stacked walls - and learn the basics of rendering and create a project template.

**UNIT III RENDERING AND MATERIAL APPLICATION 20**  
 Choosing material for buildings- Creating custom walls, floors, and roofs - keynoting - working with mass elements - enhancing rendering with lighting - producing customized materials - Using sun and shadow settings - Walkthrough technique - adding decals - working with design options and worksets - and calculating energy analysis - managing revisions

**UNIT IV BIM FOR BUILDING ENERGY SIMULATION 30**  
 Energy simulation for conceptual BIM models using massing- Detailed modeling using design elements- Rapid energy modeling and simulation with Autodesk® Revit® Conceptual Energy Analysis features to simulate performance from within Revit Architecture -Use Autodesk® Green Building Studio® to produce energy consumption, carbon neutrality and renewable potential reports.

**UNIT V BIM FOR COST ESTIMATING, PROJECT PHASING AND ADMINISTRATION 5**  
 Introduction and theoretical information on the following topics- Model based Cost Estimating - Challenges in cost estimating with BIM- Cad geometrics vs BIM element description- Visual data models - Material substitutions and value engineering- detailed estimates and take off sheets- XML and automated cost estimate- project phasing and management- 4D modeling -BIM for project lifecycles.

**TOTAL: 90 PERIODS**

**OUTCOMES**

- This is a project-based course where students gain knowledge on the implementation of BIM concepts throughout the lifecycle of a building, from planning and design, to construction and operations.
- The students will learn about how to use BIM for building energy performance simulation, construction administration

**REFERENCES**

1. Eastman, C.; Teicholz, P.; Sacks, R.; Liston, K. (2008) BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors. New York: Wiley.
2. Ray Crotty;(2011) The Impact of Building Information Modelling: Transforming Construction. Spons Architecture Price Book.

**MH5211 ADVANCED ARCHITECTURAL DESIGN STUDIO II L T P/S C**  
**0 0 10 5**

**OBJECTIVES**

- To incorporate sustainability in architectural design at various scales.
- To balance varied technical and planning considerations in building design with aspects of sustainability.

The studio will focus on the challenges of incorporating sustainable principles into architectural design projects and typologies of increased complexity that are prevalent in the contemporary world. Aspects of planning, technology, services, density, height of construction, management would be examined along with considerations such as environmental performance, resource optimisation, ecological impact in order to produce a viable synthesis of diverging needs.

**TOTAL: 150 PERIODS**

**OUTCOME**

- An ability to balance human needs with environmental concerns in architectural design.

**OBJECTIVES**

- To look at contemporary architectural practices/ practitioners along with stated ideas/ theoretical writings in order to understand the relation between ideas/ theory and practice.
- To look at how architectural practices engage with issues/ conditions either as reaction to or as concurrence with contemporary world.
- To look at architecture and understand the larger forces/context that produces it
- To engage in architectural interpretation and criticism

**UNIT I                      ARCHITECTURE AND MEANING                      9**

Interpreting and analysing Ideas/ writings and works of architects that address the question of meaning- for example Bernard Tschumi, Peter Eisenman- Discussion of contemporary Iconic architecture/ Starchitecture through stated intent- for example Frank Gehry, Zaha Hadid, Daniel Libeskind- interpreting and analysing ideas and works of BIG architects

**UNIT II                      ARCHITECTURE AND CONTEXT                      9**

interpreting and analysing ideas/ writings and works of architects that address universals of architecture within a particular context- for example Zumthor, Murcutt, Siza, Barragan, Souto de Moura, Correa, Doshi - interpreting and analysing ideas/ writings and works of architects who address sustainability- for example Ken Yeang, William McDonough

**UNIT III                      ARCHITECTURAL FORM IN THE DIGITAL AGE                      9**

Interpreting and analysing ideas/ writings and works of architects that derive form through contemporary processes of design and engaging current technology- example Greg Lynn, ZHA, UNstudio, NOX, Novak, FOA

**UNIT IV                      ARCHITECTURE AND THE CITY                      9**

Interpreting and analysing Ideas/ writings and works of architects that engage with the city/ its issues- for example Rem Koolhaas, MVRDV

**UNIT V                      EMERGING ARCHITECTURAL PRACTICES IN INDIA                      9**

Study and analysis of emerging practices in India along with their stated ideals/ approaches/ writings in the context of the diverse interests and concerns of the contemporary world.

**TOTAL: 45 PERIODS**

**OUTCOME**

- A critical understanding of architectural ideas and practice prevalent in the contemporary world that would inform architectural ideals/ positions and design responses.

**REFERENCES**

1. B.V.Doshi, Paths Uncharted
2. Bjarke Ingels, Yes is More
3. Daniele Pauly, Barragan, Space and Shadow, Walls and Colour, Birkhauser 2002
4. Harry Francis Mallgrave and David Goodman, An Introduction to Architectural Theory- 1968 to the present, Wiley Blackwell 2011
5. Kate Nesbitt, Theorizing a New Agenda for Architecture, Princeton Architectural Press, 1996
6. Koolhaas, Rem, and Bruce Mau, S, M, L, XL. New York: Monacelli Press, 1995
7. Lynn, Greg. Animate Form. New York: Princeton Architectural Press, 1999
8. Michael Hays (ed) Architectural Theory since 1960, MIT Press, 2000
9. MVRDV, FARMAX
10. Rahul Mehrotra, Architecture in India since 1990
11. Steven Holl, Juhani Pallasmaa, Alberto Pérez Gómez, Questions of perception: phenomenology of architecture, William Stout, 2006
12. Tschumi, Bernard. Architecture and Disjunction. Cambridge, MA: MIT Press, 1994



**OBJECTIVES:**

- To provide exposure to the importance and intricacies of Arbitration as an Alternative Disputes Resolution (ADR) Mechanism.
- To learn the importance of various legislations and Acts as well as the relevance of 'Awards' and judgments given by courts.
- To enable the understanding of the roles and responsibilities of various professional bodies.
- To provide and exposure to the systems and proceeding of Arbitration.

**UNIT I IMPORTANCE OF ARBITRATION AS AN ALTERNATIVE DISPUTES RESOLUTION (ADR) MECHANISM 9**

Importance of Arbitration – Role of Arbitration in any contract agreement- Arbitration clause in any contract agreement - Rate of Architects, in Arbitration - Contracts Act of 1872, Limitation Act 1963 and Arbitration and conciliation Act 1996 its terms & Provisions - Costs involved for Arbitration.

**UNIT II APPOINTMENT OF ARBITRATORS - THEIR ROLES AND RESPONSIBILITIES, TECHNICAL TERMS AND COMMENTS 9**

How Arbitration proceedings are initialed - Reasons leading to Arbitration - Procedures and Communication - Composition of Arbitral Tribunal - Appointment of Arbitration and umpire - Interim Measures by Court / Arbitral Tribunal - Jurisdiction of Arbitral Tribunal - Conduct of Arbitral proceedings - Determination of Rules and procedure.

**UNIT III ARBITRAL PROCEEDINGS 9**

Place and language of proceedings - Claim statements and counter claim - Hearings and written proceedings - Experts and Assistance from courts - Form and contents of Arbitral Awards - Setting aside the Arbitral awards - Appeals, insolvency and Limitation - Misconduct of Arbitrator.

**UNIT IV PROJECT MANAGEMENT CONSULTANCY 9**

Introduction - practices and strategic issues related to construction project management - understanding of issues related to management of clients and other stakeholders involved in the delivery of a project.

**UNIT V PRACTICE AND CASE-STUDIES 9**

Emerging trends in Arbitration in India through Cases – Landmark awards and judgements by the various courts and judiciary - Case Studies in Project Management Consultancy.

**TOTAL: 45 PERIODS****OUTCOMES:**

- The student will be familiar with the various legal systems that are in force and the methods of handling disputes.
- The student will understand the role and responsibility and the ethical standards that govern an architectural practice.

**REFERENCES:**

1. Abdul RazzakRumane, Quality Tools for Managing Construction Projects, Taylor & Francis Group; ISBN13-9781466552142.
2. Dr. Roshan H. NamavatiProfessional Practice, 2001 Edition.
3. K.G. Krishnamurthy, S.V. Ravindra: Professional Practice, Prentice Hall India Learning Private Limited (2014).
4. Prof. MadhavDeobhakta and Architect MeeraDeobhakta; Architectural Practice India, 2nd Edition, 2008.
5. Prof. MadhavDeobhakta; Arbitration for Architects and Project Managers, 2011.

**MH5311**

**PROJECT PHASE I - DISSERTATION**

**L T P/S C**  
**0 0 6 3**

**OBJECTIVES:**

- To expose the students to the various thrust areas in architecture.
- To inculcate the spirit of research in architecture by providing opportunities to read on various issues.
- To expose the students to the finer details of technical writing.
- To provide a platform for a prelude to the 'Design Thesis'.

Dissertation is best expressed as 'Design in text'. It offers an opportunity to look at the research component in architecture in various thrust areas such as history, theory, design and other value based aspects through texts. Students are encouraged to choose any topic of their interest. This may range from analyzing and a critique of the works of an architect, ideologies and philosophies of architects that get transformed spatially, history, typological architecture, sustainability issues and so on. the dissertation must comprise of an aim, the objectives, the scope and limitations of their dissertation, hypothesis (if any), methodology followed by extensive review of literature through references and documentation. The analysis of the work must be substantiated either empirically or through extensive arguments. A dissertation could also be a Thesis preparation course and gives the student scope for independent study and opportunity to explore specific area of interest which will form the basis of his/ her design thesis project in the next semester. The topic will have to be approved at the start of the semester and reviewed periodically to a jury at the end of the semester.

**TOTAL: 90 PERIODS**

**OUTCOME**

- A Dissertation book which is based on accepted norms of technical writing.
- An understanding leading to formation of thesis ideas.

**REFERENCES:**

1. Iain Borden and Kaaterina Ruedi; The Dissertation: An Architecture Student's Handbook; Architectural Press; 2000.
2. John W Creswell; Research design: Qualitative, Quantitative and Mixed Methods Approaches;
3. Linda Grant and David Wang, Architectural Research Methods, John Wiley Sons 2001.
4. Ranjith Kumar; Research Methodology- A step by step guide for beginners; Sage Publications; 2005.
5. Wayne C Booth; Joseph M Williams; Gregory G. Colomb; The Craft of Research, 2nd Edition; Chicago guides to writing, editing and publishing.

**MH5312**

**ADVANCED ARCHITECTURAL DESIGN STUDIO III**

**L T P/S C**  
**0 0 10 5**

**OBJECTIVES:**

- To understand contemporary processes and tools in architectural design.
- To integrate the processes and tools in the design of projects, including those with increased complexity of parameters.

The design studio will focus on the role of emerging tools and processes for understanding of complex and macro forces in the realm of the built environment as well as designing within this context. It would explore relationships between user group activity, movement, landform and urban form using diagramming and mapping tools to come up with creative prescriptions of certain projected scenarios.

The studio will also emphasize on collaborative learning processes. The projects would be of macro scale involving large campus/ township oriented architectural projects as well as architectural design interventions in the urban context.

**TOTAL: 150 PERIODS**

**OUTCOME**

- Students would be aware of contemporary processes and tools of design.
- Students would use these processes and tools in the design projects to identify and address specific aspects of the project, as well as integrate complexity of connections and issues.

**MH5412**

**PROJECT PHASE II - THESIS**

**L T P/S C  
0 0 20 10**

**OBJECTIVES**

- To integrate the knowledge gained in the previous semesters with respect to issues/ tools of architectural design at a more advanced level.
- To understand and identify issues appropriate to a particular project or area of architecture, through independent thinking as well as to design in a manner appropriate to the project context.

The students will synthesize the areas of knowledge, skills and techniques acquired in the various courses of the previous semesters through a thesis project of their choice. This thesis project would be a design project with a strong research component. The project would desirably extend the critical position developed within the theory and studio projects as well as dissertation. The scale of the project could extend from individual site to settlement levels. The initial process shall be rigorous, incorporating background research on the topic, case studies, documentation of project issues, context, site and building information, programming. The process would culminate in design interventions at scales appropriate to the topic. The project shall desirably have the potential to serve as a starting point for practice and/ or further research. Students will submit a detailed proposal on their topic of interest(s). The Proposal shall be approved by the thesis review committee. The thesis project will be reviewed periodically by the review committee. At the end of the semester, the final thesis will be submitted and presented through a viva voce examination before a jury.

**TOTAL: 300 PERIODS**

**OUTCOME**

- Students would be able to integrate various contemporary/ advanced issues and techniques into the architectural design process.
- Students would be able to identify and go in depth into specific and appropriate aspects relating to the discipline of architecture and reflect this in the realm of design.

**MH5001**

**ANTHROPOLOGY AND ARCHITECTURE**

**L T P/S C  
3 0 0 3**

**OBJECTIVES:**

- To understand the relationship between society and the making of the built environment.
- To understand phenomenology and the role of meaning in built form.
- To look at place making from the architectural as well as urban design point of view.

<b>UNIT I</b>	<b>RELATIONSHIP BETWEEN CULTURE, SOCIETY, ANTHROPOLOGY AND ARCHITECTURE</b>	<b>6</b>
Concepts of culture, society, politics and anthropology – relation between society and built environment – introduction to cultural anthropology view of architecture.		
<b>UNIT II</b>	<b>ANTHROPOLOGY OF TRADITIONAL ARCHITECTURE</b>	<b>10</b>
Architecture as a Process – kinship and house societies – perceptions of built form – conceptions of space – symbolism and technology – study of the above through case study of traditional architecture in India, Asia and Africa.		
<b>UNIT III</b>	<b>ANTHROPOLOGY AND PLACE MAKING</b>	<b>15</b>
Conditions of modernity –Fragmentation of society – Heidegger and notions of dwelling – C Noeberg Schultz and notions of Genius Loci Rapoport and studies on the meaning of built environment – Joseph Rykwert and the idea of house – Bollnow and idea of space – Jan Pieper and the notions of sacred space.		
<b>UNIT IV</b>	<b>AN OVER VIEW OF URBAN ANTHROPOLOGY</b>	<b>6</b>
Meaning of urban studies and urban anthropology – role of cities – urban ethnography, primary units, major components and units of integration – anthropology and contemporary urban issues.		
<b>UNIT V</b>	<b>SEMINAR</b>	<b>8</b>
Students would make presentations exploring the relevance and impact of anthropological studies on contemporary architecture and design through readings/case studies. The proposal must be discussed with course faculty prior to presentation.		

**TOTAL: 45 PERIODS**

**OUTCOME**

- A comprehensive understanding of architecture and urbanism as expressions of particular societies in time and place.

**REFERENCES**

1. Claire Melhuish (ed); Architecture and Anthropology – AD Vol 66 No 11/12 Nov - 1996
2. Edwin James; Anthropology of the City; Prentice Hall; 1977.
3. F Bollnow; Mann, Bensch and Raum, Stuttgart; 1963.
4. J Carstern and S H Jones; About the house: Levi Strauss and Beyond; Cambridge University Press; 1955.
5. Joseph Rykwert – Idea of a Town: The Anthropology of Urban Form in Rome; 1976.
6. Joseph Rykwert; On Adams house in Paradise; MIT Press 1987
7. Nold Egenter; The review of the Primitive in Architecture – Architectural Anthropology – Research Series Vol. I and II; Structura Mundi; 1992 and 1996.
8. Roxanna Wasterson; The living House Anthropology of Architecture in S E Asia; Oxford Press.

**MH5002**

**ARCHITECTURE AND CRITICAL THEORY**

<b>L</b>	<b>T</b>	<b>P/S</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**OBJECTIVES**

- To introduce the idea of architecture as enmeshed in society and a product of larger socio-cultural processes, and not as autonomous object within a hermetically sealed discipline.
- To introduce the various interdisciplinary critical theories and explain their interpretation of architecture.

<b>UNIT I</b>	<b>INTRODUCTION</b>	<b>6</b>
Definition of theory - Architectural theory and its nature, purpose and its relation to practice - overview of some traditional architectural theories- context for the rise of more critical theories in architecture – Introduction to Critical Theory- Architecture and Critical Theory.		
<b>UNIT II</b>	<b>POWER AND GENDER IN ARCHITECTURE</b>	<b>9</b>
Definition of power- Forms of power- ideas of power and society, power-knowledge- postcolonialism- Colonialism in India as a form of dominance- architecture and urbanism of colonialism in India- Indo-Saracenic architecture- New Delhi as part of imperial vision- Power in the built environment at various scales- Case studies in the contemporary world- Introduction to the idea of gender and space- Case studies.		
<b>UNIT III</b>	<b>PLACE AND ARCHITECTURE</b>	<b>9</b>
Modernity, modern architecture and issues of particularity, place and context - Critical Regionalism and architectures of resistance- Phenomenology in architecture- placemaking.		
<b>UNIT IV</b>	<b>MEANING IN ARCHITECTURE</b>	<b>12</b>
Architecture as communication and representation- introduction to linguistic concepts of semiotics, structuralism, post structuralism and deconstruction- debates on modern, postmodern and deconstructivist architecture with reference to these concepts- Conditions of late capitalism- Society of spectacle- Architecture as spectacle and seduction.		
<b>UNIT V</b>	<b>ARCHITECTURE IN THE AGE OF GLOBALISATION AND DIGITAL TECHNOLOGY</b>	<b>9</b>
Influence of globalisation and digital revolution on architectural processes- global/ regional debates- contemporary issues in architecture in India.		

**TOTAL: 45 PERIODS**

#### **OUTCOMES**

- The students would gain an understanding of architecture as an integral production of society as well as engage in critical thinking to interpret architecture.
- The students' awareness through this course would inform their future practice/ research/ teaching.

#### **REFERENCES**

1. Anthony D. King, Colonial Urban Development, Routledge & Paul, London, 1976
2. Christian Norberg Schulz- Towards a Phenomenology of Architecture, Rizzoli New York, 1980
3. Guy Debord. Society of Spectacle,
4. Harry Francis Mallgrave and David Goodman, An Introduction to Architectural Theory- 1968 to the present, Wiley Blackwell 2011
5. Ian Borden & Jane Rendell,(ed), Intersections, Routledge 2000
6. Jane Rendell, Barbara Penner, Iain Borden, Gender Space Architecture, Routledge, 2000
7. Kate Nesbitt, Theorizing a New Agenda for Architecture, Princeton Architectural Press, 1996
8. Kim Dovey, Framing Places: Mediating Power in Built Form, Routledge 1999.
9. Michael Hays (ed) Architectural Theory since 1960, MIT Press, 2000
10. Neil Leach (ed) Rethinking Architecture, Routledge 2000
11. Neil Leach, Anaesthetics of Architecture, MIT Press 1999,
12. Paul Allan Johnson, Theory of Architecture, Routledge 2000
13. Thomas Metcalf, An Imperial vision, Oxford, 2002
14. William J. Mitchell, City of Bits: Space, Place and the infobahn, MIT Press, 1996

**OBJECTIVES**

- This course will examine various services in high rise buildings.
- Understand how services integration can translate into an intelligent and energy efficient system which will enable sustainability of the structure.

**UNIT I INTRODUCTION****3**

Standards of high Rise buildings- Indian Standards and Global Standards on High Rise Buildings; Introduction to various services; their significance with regards to High Rise Buildings; Some examples of Buildings and services used in them A brief on evolution of High Rise Buildings. Aspects and Integration of services- Concepts of Intelligence Architecture and Building Automation

**UNIT II WATER SUPPLY AND WASTE DISPOSAL****9**

Water supply and waste water collection systems- water storage and distribution systems- Planning and Design- Selection of pumps- rain water harvesting – Sewage collection systems and recycling of water- solid waste disposal . “Some latest Trends Observation, NBC’s recommendations. in these areas can be included.

**UNIT III HVAC, ELECTRICAL AND MECHANICAL SYSTEMS****15**

Natural and Mechanical Ventilation systems- Air conditioning systems and load estimation- Planning and design for efficiency-Basic concepts- Automation and Energy Management- concepts. Natural lighting systems- Energy efficiency in lighting systems- load and distribution- Planning and Design for energy efficiency- Automation- basic concepts , Glass and Glazing system for natural lighting. Types of elevators, systems and services- Lobby design- Escalators- safety principles, Some latest Trends, NBC’s recommendations

**UNIT IV SAFETY AND SECURITY****6**

Security systems- Access Control and Perimeter Protection- CCTV Intruder alarms- Passive fire safety- Fire Detection and Fire Alarm Systems- Planning and Design- NBC- Some latest Trends

**UNIT V CASE STUDIES****12**

Case Studies of High Rise buildings and skyscrapers through appropriate examples- Norman Foster; Ove Arup; Ken Yeang, etc.

**TOTAL: 45 PERIODS****OUTCOME**

Students can apply some or all of these services in one of their design projects.

**REFERENCES**

1. A K Mittal, Electrical and Mechanical Services in High Rise Buildings Design and Estimation Manual, 2001
2. Donald Watson, Michael J. Crosbie and John Hancock Callender, Time-Saver Standards for Architectural Design Data, Mcgraw – Hill International Editions, 1997.
3. Johann Eisele and Ellen Kloft, High-Rise Manual, Birkhäuser-Publishers for Architecture, 2003
4. William J. Mcguinness, Benjamin Stein and John S. Reynolds, Mechanical and Electrical Equipment for Buildings, John Wiley & Sons, Inc. 1980.
5. Yahya Mohamad Yatim, Fire Safety Issues in High-Rise Residential Buildings: escape routes Design and specification, Lambert Academic Publishing, 2011

**OBJECTIVES:**

- This course provides a detailed exposure to students regarding the design & application in the field of life safety, electronic security & services automation requirements.
- To expose the students to the mandatory and inevitable integration of building management systems in building construction.

**UNIT I SAFETY SYSTEMS – FIRE ALARM & PUBLIC ADDRESS SYSTEM 9**

Objective of a Fire Alarm System, essential components of a Fire Alarm System, Type of detection technology currently in use and Statutory Standards to be followed in design. Explanation of the essential Clauses of the codes, and various types of Technologies employed in the Fire Alarm System, basic knowledge on how a Fire Alarm system works, designed and installed.

Objective of a Public Address System, essential components of a Public Address System, various types of technologies currently in use and design guidelines to be followed and basic knowledge on how a Public Address System works, is designed and installed.

**UNIT II SAFETY SYSTEMS – FIRE SUPPRESSION SYSTEM 9**

Objective of a Fire Suppression System, Explanation on Fire triangle, Essential Components of a Fire Suppression System, different type of Fire Suppression Systems, detailed design criteria for Hand held extinguishers Wet Riser, Sprinkler Systems and various gas Based Fire Suppression System, and Type of Statutory Standards followed in Suppression, Explanation on the essential Clauses and Basic Knowledge on how a Fire Suppression System works, is designed and installed.

**UNIT III SECURITY SYSTEMS – ACCESS CONTROL SYSTEM AND INTRUDER ALARM SYSTEM 9**

Introduction to Access Control, Intruder Alarm, Essential Components of each System, and Various types of Technologies employed in the system, Basic knowledge as how they work, are designed and installed.

**UNIT IV SECURITY SYSTEMS – CCTV AND PERIMETER PROTECTION 6**

Introduction to CCTV, Perimeter protection system, Essential Components of each System, and Various types of Technologies employed in the system, Basic knowledge as how they work, are designed and installed.

**UNIT V INTEGRATED BUILDING MANAGEMENT SYSTEM 12**

The objective of the Integrated Building Management System (IBMS), the list of utility, safety & security systems that are generally monitored & controlled through IBMS, the various components of IBMS, types of integration with the utility, Safety & security systems, explanation in detail on how each utility, safety & security system is integrated to IBMS, details of various parameters that can be monitored & controlled on each utility, safety & security system and the basic knowledge on how they work, are designed and installed.

**TOTAL: 45 PERIODS****OUTCOME:**

- To ensure that every architect understands & designs the buildings that facilitates safe, code compliant, secure & comfortable buildings for the occupants

**REFERENCES:**

1. Building Automation Systems – A Practical Guide to Selection and Implementation, Maurice Eyke
2. Bureau of Indian Standards IS2189, IS2190, IS15105, IS13039.
3. CCTV Surveillance, Herman Kruegle.

4. Fire Suppression Detection System, John L. Bryan.
5. National Building Code of India 2005 (Part IV)
6. Rules for Automatic sprinkler Installation – second edition – Pub: Tariff Advisory Committee.
7. Security Systems and Intruder Alarm System, Vivian Capel.
8. The Principles and Practice of Closed Circuit Television, Mike Constant & Peter Turnbull

<b>EA5191</b>	<b>SUSTAINABLE AND GREEN BUILDINGS</b>	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**OBJECTIVES:**

- To sensitize the students to the various aspects of sustainable and green building design in the context of global warming and climate change and to address the very process and tools of design to enable architecture that is environmentally friendly and sustainable.

**UNIT I INTRODUCTION 06**

Attitudes to architecture: a historical perspective- General premises and strategies for sustainable and green design- objectives and basis- Eco-mimicry as a design tool based on ecosystem analogy- theoretical basis for a sustainable and eco friendly design.

**UNIT II ECO HOUSE 12**

The form of the house: the building as an analogy- design from first principles: conserving energy; working with climate: passive solar design; minimizing new resources; respect for users; respect for site and holism- photovoltaics and solar hot water systems; water usage; small scale wind systems and hydro power; Case studies- design of eco houses: context specific.

**UNIT III ENVIRONMENTAL IMPACT OF BUILDING MATERIALS 09**

Measuring the impact of building materials- calculating embodied energy- recycling and embodied energy- processing and embodied energy- time and embodied energy- embodied energy of different building materials- low energy building and masonry materials- life cycle analysis- Case studies and analysis.

**UNIT IV GREEN CONSTRUCTION AND ENVIRONMENTAL QUALITY 12**

Sustainable architecture and Green Building: definition- Green building Evaluation Systems; LEED Certification and GRIHA; Green Globe Certification; Case studies which look at the environmental approach- renewable energy- controlling the water cycle- impact of materials on the environment – optimizing construction- site management- environmental management of buildings.

**UNIT V SUSTAINABLE AND GREEN BUILDING DESIGN CASE STUDIES 06**

Instrument and natural case studies to investigate and apply various studio exercises on Green Building Design.

**TOTAL: 45 PERIODS**

**OUTCOMES:**

- The students gain an understanding of the various aspects of sustainable and green building design.
- The students are able to comprehend the Green Building rating system.



## REFERENCES:

1. Brenda and Robert Vale; Green Architecture- Design for a Sustainable Future; Thames and Hudson; 1996
2. Daniel Vallerio and Chris Brasier; Sustainable Design- The science of sustainability and Green Engineering; Wiley; 2008
3. Catherine Slessor; Sustainable Architecture and High Technology- Eco Tech; Thames and Hudson; 1997
4. Dominique Gauzin- Muller; Sustainable architecture and Urbanism; Birkhauser; 2002.
5. Ken Yeang; Eco design - A Manual for Ecological design, Wiley- Academy; 2006
6. Sue Roaf et al; Ecohouse: A design Guide; Elsevier Architectural Press; 2007
7. Thomas E Glavinich; Green Building Construction; Wiley; 2008

**MH5005**

**MATERIAL CONSERVATION**

**L T P/S C**  
**3 0 0 3**

## OBJECTIVES

- To study materials, structural systems, buildings and elements produced by historical technologies in order to develop understanding of their evolutionary, chronological and stylistic context.
- To use this understanding to outline causes of deterioration and repair as well as look at the remedial and preventive measures that need to be taken to preserve the building fabric.

### **UNIT I CONSERVATION TECHNIQUES**

**9**

Decay of monuments – reasons to decay – restoration techniques – soil and structure conservation – cleaning of monuments – reconstruction of monuments- Decay Mapping -Quantifying techniques- Introduction to structural analysis.

### **UNIT II COMPOSITION, CHARACTERISTICS AND DETERIORATION OF MASONRY MATERIALS**

**9**

Brick- Stone- Composite masonry- causes for decay and deterioration- remedial measures- Introduction to the significance and use of the lime – working with lime – repairing and replacing plaster - Issues concerning terracotta and mud- use of consolidants.

### **UNIT III COMPOSITION, CHARACTERISTICS AND DETERIORATION OF OTHER STRUCTURAL MATERIALS**

**9**

Use and repair of iron and steel members – Understanding wood and timber structures / methods to conserving timber structures

### **UNIT IV CASE STUDIES**

**9**

Case studies at the national, international and state level conservation projects done by ASI, INTACH & Conservation Architects- assessment and evaluation.

### **UNIT V MATERIAL CONSERVATION AND ADAPTIVE REUSE**

**9**

Studio on Adaptive reuse/ restoration project / building in Existing fabric.

**TOTAL: 45 PERIODS**

## OUTCOMES

- A holistic understanding of the physical processes of building, including gaining knowledge about historical, material and cultural aspects.
- Gaining sensitivity and knowledge with respect to process of physical interventions in historic buildings.

## REFERENCES:

1. Bernard Feilden, Conservation of Historic Buildings, 2nd Edition, Butterworth, 1994.
2. Ernest Burden; Illustrated Dictionary of Architectural Preservation; McGraw hill 2003
3. J. Stanley Rabun; Structural Analysis of Historic buildings: Restoration, Preservation and Adaptive Reuse; Applications for Architects and Engineers; Wiley 2000
4. Kirk Urwin J.; Historic Preservation Handbook; Mc Graw hill 2003
5. Martin E Weaver; Conserving buildings: Guide to Techniques and materials, Revised Edition; Wiley; 1997

**MH5006**

**EMERGING PRACTICES IN HOUSING**

**L T P/S C**

**3 0 0 3**

## OBJECTIVE

- This course will examine the redefinition of contemporary housing within the contexts of multicultural cities due to globalisation.

### UNIT I INTRODUCTION

**9**

Introduction to this building type, from its industrial beginnings in London and Paris to New York City's Lower East Side and the 20th-century designs of Le Corbusier, Antonio Sant'Elia, and Mies van der Rohe to mention a few.

Investigation of contemporary life and its influence on space and architecture-Globalization and influences on economy- Alternate housing solutions: Commune, Co Housing, Cooperatives, etc.

### UNIT II SINGLE FAMILY, MULTI FAMILY HOUSING

**9**

Review of latest developments in single family and multi family housing by examining the works of Wiel Arets, Shigeru Ban, Ben van Berkel, Kees Christiaanse, Philippe Gazeau, Frank O. Gehry, Steven Holl, Hans Kollhoff, Morger & Degelo, , Jean Nouvel, Kas Oosterhuis, MVRDV

### UNIT III HIGH DENSITY HOUSING

**6**

Issues and concerns- Review of the current state of high density houses - the perspectives and future developments through a study of a few international projects.

### UNIT IV NEW FORMS OF LIVING AND HOUSING IN THE DIGITAL ERA

**6**

Hyper Housing- Multi cultural Housing- lab rooms and cyber homes- Network housing- hybrid buildings- individual sheltered residences; residence cities and bio homes for senior citizens- Works of UN Studio; FOA; OMA

### UNIT V DEFINITION OF HOUSING IN THE INDIAN CONTEXT

**15**

Design strategies in the context of Indian metropolitan cities will be explored through case studies

**TOTAL: 45 PERIODS**

## OUTCOME:

- The students will understand the latest development, issues and design strategies governing the Housing in National and international level.

## REFERENCES:

1. Adrienne Schmitz; Multifamily Housing Development Handbook; Urban Land Institute; 2001
2. Carles Bronto; Innovative Public Housing; Gingko Press; 2005
3. Jingmin ZHOU; Urban housing Forms; Architectural Press; 2005
4. Manuel Gausa and Jaime Salazer; Housing+ Single Family Housing; Birkhauser- Publishers for Architecture; 2005
5. Vincene Guillart; Sociopolis:Project for a city of the Future; ACTAR; 2004

**OBJECTIVE:**

To analyze the role of Landscape Urbanism – theory (texts) & practice (projects) in forming the contemporary city. To understand the evolution of a new urban morphology for contemporary cities adopting new models & strategies based on the Landscape of the city.

- UNIT I LANDSCAPE URBANISM – AN INTRODUCTION 5**  
Background(what & why), the emergence of Landscape urbanism, characteristics, reevaluating landscape, history and driving forces, Landscape in practice: Defining competitions of landscape urbanism
- UNIT II LANDSCAPE (SUB) URBANISM IN THEORY AND PRACTICE 10**  
LU – a school of thought, Smart growth and LU, New Urbanism, Green Urbanism, From Critical Regionalism to Critical Pragmatism  
Practical limitations to innovation – Case study – The Wugong Urban Water (WUW) Landscape Structure Plan, The WUW project in relation to theory
- UNIT III LANDSCAPE URBANISM –PLANNING 6**  
Performative Processes – process cycles, processes engaged in design, a democratic urban environment, processes of planning – Surface Strategies – Contemporary Positions – Network city, New pragmatism, philosophy of world complexity, ecological design media – Evolution of Planning Ideals – from the modern to the contemporary, the rise of landscape urbanism
- UNIT IV SUSTAINABLE(SU) & ECOLOGICAL URBANISM (EU) 12**  
SU- Urban design with nature – The case for sustainable urbanism – Emerging thresholds – Sustainable neighborhoods – Time: The 2030 Community Challenge – Implementing sustainable urbanism – Rethinking cities for the future – Case studies  
EU- Historic roots and current trends, propositions and principles for the design of resilient cities, Cities – as habitats, part of the natural world, Urban ecosystems, The future of Urban Design.
- UNIT V ASIAN LANDSCAPE URBANISM 12**  
Emerging challenges, Relationship between Asian Urbanism and Landscape Urbanism – social & cultural aspects of Asian Urbanism – Landscape Urbanism in India – case studies Hampi, Goa

**TOTAL: 45 PERIODS****REFERENCES:**

1. Charles Waldheim, The Landscape Urbanism Reader (paperback)
2. Douglas Farr, Sustainable Urbanism – Urban design with nature, Wiley, John & Sons, Incorporated, November 2007.
3. [http://issuu.com/inde/docs/la31\\_surat/7?e=0](http://issuu.com/inde/docs/la31_surat/7?e=0)
4. [http://issuu.com/inde/docs/presentation\\_hampi\\_isola/1?e=0](http://issuu.com/inde/docs/presentation_hampi_isola/1?e=0)
5. [http://www.ibs.or.jp/sites/default/files/5\\_publish/09-India.pdf](http://www.ibs.or.jp/sites/default/files/5_publish/09-India.pdf)
6. Jan Gehl, Cities for people, Copyrighted material, September 6, 2010|ISBN-10:159726573X |ISBN-13:978-1597265737, Edition:2.  
Landscape practice Global Leader, Woods Bagot PO Box 58041, Dubai, UAE.
7. Landscape urbanism – large-scale architecture, ecological urban planning or a designerly research policy, GUNILLA LINDHOLM Senior lecturer, landscape architect, Department of Landscape Architecture, SLU, Alnarp, Sweden – Research paper
8. Mohsen Mostafavi, Ecological Urbanism, Harvard University, Graduate school of design, Lars Muller Publisher.
9. Peter Calthorpe, Urbanism in the age of climate change, Publication Date: June 1, 2013 |ISBN-10:159726721X| ISBN-13: 978-1597267212
10. Richard Weller, BOOM TOWN 2050 Scenarios for a rapidly growing city, UWA Publishing 2009.
11. Steven Velegrinis, Flux-scape: Emerging Challenges of Asian (Landscape) Urbanism,

12. Tigran Haas (Editor), Sustainable Urbanism and Beyond – Rethinking cities for the future, Rizzoli, NY, USA.

**MH5008**

**GIS MODELLING IN URBAN PLANNING**

**L T P/S C**  
**3 0 0 3**

**OBJECTIVE**

To examine the role and application of Geographic Information Systems in environmental design, community charities and other urban design projects.

**UNIT I INTRODUCTION**

**6**

GIS – Spatial data, non Spatial data, Plan, Map, Scale, Map Projection, GPS, GCP collection, Spectral signature curve, Image processing – Geo coding / Geo referencing, GIS software, Two tier architecture, Three tier architecture, Thin client, Thick client

**UNIT II DATABASE CONCEPTS**

**9**

Data structures, Databases, Files, Types of Tables, Table operations, Creating a Table, Accessing Records in a Table, Manipulating records in a Table, Modifying Table structure, Reports, Advantages of database, Primary key and data access, Composite primary key, Defining a primary key, Sorting, Indexing, Master Detail relationships, Types of relationships, Foreign key, Deleting, updating and adding records to linked tables, ER Diagram, Data Model – Physical, logical and conceptual.

**UNIT III SPATIAL DATA**

**9**

Comparative methods for obtaining images, Aerial Photograph, Satellite Imagery – High resolution imagery – LISS, PAN, MSS – Ortho rectification, Digitization – Layers, Digital Elevation model, Digital Terrain Modelling, Existing maps – Problems and Issues, Rubber sheeting, Digitization, overlay, union, intersection.

**UNIT IV INTRODUCTION TO GIS SOFTWARE**

**9**

Arc Info – Coverage – Arc, Node, Tics, Add, get, put, Map extent, edit, Topology creation – Clean, Build, Tables – Creating tables, updating tables, join, drop item, Export, Import, overlay, union, intersection, buffer.

**UNIT V MODELLING GIS PROJECTS FOR URBAN AREAS**

**12**

Preparation of Land use map, Land use suitability analysis, Screen design, Visual Basic application using Map objects.

**TOTAL: 45 PERIODS**

**OUTCOMES**

- The student will increase the knowledge on GIS and the various characteristics of Data.
- The student will accept the potential of GIS and develop integrated practice of using the GIS application with architecture.

**REFERENCES**

1. An Introduction to Data base Systems – C.J.Date
2. ESRI (1992) Understanding GIS, The Arc Info Methods, ESRI, USA
3. Fundamentals of Data base Management System by Elmasri & Navethi
4. Information systems for Urban Planning – Robert Laurini
5. Modelling our world – ESRI Press

MH5009

**EXPLORATIONS IN ARCHITECTURAL FORM**

L T P/S C  
2 0 2 3

**OBJECTIVE**

- To introduce contemporary ways and processes of generating architectural form through small design exercises.

**UNIT I          DIAGRAMMING**

12

Introduction to diagramming- history- traditional diagrams- contemporary diagramming processes as a tool to creative interpretation and design of architectural form- simple exercises in diagramming

**UNIT II          SHAPE GRAMMAR**

12

Introduction to shape grammar- applications of shape grammar- simple design exercises in shape grammar

**UNIT III          FRACTALS**

12

Introduction to Fractals- examples from nature and built environment- types of fractals- fractal creation, generators and initiators, direction and proportion- –simple design exercises in fractals

**UNIT IV          EVOLUTIONARY ALGORITHMS**

12

Introduction to evolutionary algorithms – evolutionary art- optimisation- synthesis of topology, geometry and component properties of a structure using genetic algorithm- simple design exercises based on evolutionary algorithm

**UNIT V          PARAMETRIC DESIGN**

12

Introduction to parametric design- concept of scripting- simple design exercises in parametric design

**TOTAL: 60 PERIODS**

**OUTCOME**

- The student will be able to explore architectural form through contemporary processes

**REFERENCES**

1. Bovill. C, Fractals in architecture and design, Birhauser, Boston, 1996.
2. Jane Burry, Mark Burry, The New Mathematics of Architecture, Thames & Hudson, 2012
3. Mark Garcia, The Diagrams of Architecture, Wiley 2010
4. Melanie Mitchell, An Introduction to Genetic Algorithms, MIT 1996
5. Peter Szalapaj, Contemporary Architecture and the Digital design Process, Architectural Press 2005
6. Stephen Todd and William Latham. Evolutionary Art and Computers, Academic Press, New York, 1992

MH5071

**WEB DESIGN AND PORTFOLIO PRODUCTION**

L T P/S C  
0 0 6 3

**UNIT I          INTRODUCTION TO WEB DESIGN**

15

Basics of web design – Introduction to software used for web design – ADOBE IMAGE READY, DREAMWEAVER, FLASH etc.

<b>UNIT II</b>	<b>STATIC PAGES</b>	<b>15</b>
Slice – URL in ADOBE IMAGEREADY. Creation and Editing of site map – layer, tables, frameset, - CSS style – Forms – tools like insert, roll over etc., in DREAMWEAVER		
<b>UNIT III</b>	<b>ANIMATION IN FLASH</b>	<b>15</b>
Introduction to MACROMEDIA FLASH, importing other file formats to Flash- saving and exporting Flash files, Frame by frame animation – Motion Tweening – Shape Tweening		
<b>UNIT IV</b>	<b>INTRODUCTION TO SCRIPTING</b>	<b>15</b>
Using Timeline – Frames –Key frames- Creating and using Symbols- Simple scripting in flash – Publishing SWF files		
<b>UNIT V</b>	<b>DEVELOPING A WEB SITE</b>	<b>30</b>
Using the skills and concepts learnt with the ADOBE IMAGEREADY, DREAMWEAVER, FLASH softwares . students will develop their portfolio in the form of web pages. These pages have to be uploaded in free public domains.		

**TOTAL: 90 PERIODS**

**REFERENCES**

1. Adobe Dreamweaver CS6 classroom in a book, Adobe creative team, 2012.
2. Adobe Flash CS3 professional on demand by Steve Johnson, Andy Anderson, Perspection inc, 2012.
3. Adobe Photoshop CS3 studio techniques, Ben Wilmore, 2012.
4. Flash Web Design, The Art of Motion Graph, Curtis Hillman, New Riders Publishing, Indianapolis, IN. U.S.A, 2000
5. M.E. Morris, and R.J. Hinrichs, Web Page Design, Prentice Hall, 1996.
6. Mark Von Wodtke, Mind over Media : Creative Thinking Skills for Electronic Media, McGraw-hill, New York, 1993
7. Photoshop 7 Bible Professional Edition, Wiley John & Son INC, New York, DekeMcClelland, 2000.