CHANDIGARH COLLEGE OF ARCHITECTURE SECTOR

12, CHANDIGARH

MASTERS IN ARCHITECTURE

SCHEME OF EXAMINATION AND SYLLABUS OF M.ARCH. PROGRAMME

For The Session-2024-2025

SEMESTER–I

Objective: To develop an understanding of Sustainable Design Principles and their subsequent application in design.

Courses	Course no.	Subject	Hours per week			Assessment				Proposed Credit
			S	L	T	Internal	Exam.	Jury	Total	
Studio	**M.Arch-I/ST-01**	**Architectural Design Studio: Sustainable Design**	12	-	-	300	-	200	**500**	**10**
Core	**M.Arch-I/C-01**	**Sustainable Built Environment and Architecture**	-	2	1	50	50	-	**100**	**02**
	M.Arch-I/C-02	**Research Methodology**	-	2	1	50	50	-	**100**	**02**
	M.Arch-I /C-03	**Lessons from Traditional Buildings**	-	2	1	50	50	-	**100**	**02**
Electives		*(Choice of Two Electives)*								
	M.Arch-I/EL-01	**Historic Building Materials And Structural Systems**	-	2	1	50	-	50	**100**	**02**
	M.Arch-I/EL-02	**Ecology and The Built Environment**	**-**	**2**	**1**	**50**	**-**	**50**	**100**	**02**
	M.Arch-I/EL-03	**Geographic Information System for Urban Design**	**-**	**2**	**1**	**50**	**-**	**50**	**100**	**02**
	M.Arch-I/EL-04	**Online Courses i.e. MOOCs/NPTEL Courses**	**The students will be having the choice to opt online MOOCs/NPTEL Courses from the below mentioned list.** • **Sustainable Architecture** • **Modern Indian Architecture** • **Building Materials And Composites** • **Architectural Acoustics**							**02**
Total			**12**	**10**	**5**	**-**	**-**	**-**	**1000**	**20**

S–Studio, T–Tutorial,

L-Lecture, R&D- Research and Development

SEMESTER-II

Objective: To develop an understanding of the theories and principles of Urban Design with respect to the historic modern city.

Courses	Course no.	Subject	Hours per week			Assessment				Proposed Credit
			S	L	T	Internal	Exam.	Jury	Total	
Studio	**M.Arch-II/ST-01**	**Architectural Design Studio: Urban Design**	12	-	-	300	-	200	**500**	**10**
Core	**M.Arch-II/C-01**	**Contemporary City and Concepts of Urban Form and Space**	-	2	1	50	50	-	**100**	**02**
	M.Arch-II /C-02	**Urban Infrastructure**	-	2	1	50	50	-	**100**	**02**
	M.Arch-II /C-03	**Cultural Anthropology**	-	2	1	50	50	-	**100**	**02**
Elective		*(Choice of Two Electives)*								
	M.Arch-II/EL-01	**Urban Economics**	-	2	1	50	-	50	**100**	**02**
	M.Arch-II/EL-02	**Disaster and Risk Management of the Built Environment**	-	2	1	50	-	50	**100**	**02**
	M.Arch-II/EL-03	**Principles of Building Envelope Design**	-	2	1	50	-	50	**100**	**02**
	M.Arch-II/EL-04	**Online Courses i.e. MOOCs/NPTEL Courses**	**The students will be having the choice to opt online MOOCs/NPTEL Courses from the below mentioned list.** • **User Interface Design** • **Structure, Form, and Architecture: The Synergy** • **Introduction to History of Architecture in India**							**02**
Total			**12**	**10**	**5**	**-**	**-**	**-**	**1000**	**20**

S–Studio, T–Tutorial,

L-Lecture, R&D- Research and Development

Semester –I

Architectural Design Studio: Sustainable Design M.Arch-I/ST-01

Hours per Week			Assessment				Credit
Studio	Lecture	Tutorial	Internal	Exam.	Jury	Total	
12	-	-	300		200	**500**	**10**

Objective:

To develop an understanding of the Principles of Sustainable Design using Passive and Active Strategies Site Planning shall be the main component of the design studio.

Course Content:

- The Studio will commence with an identified project area from the suggested list. The area shall be thoroughly documented, and analysis with reference to the principles of sustainable design, including physical as well as environmental sustainability. The key issues shall be based on a detailed analysis with respect to the principles of sustainability and the inherent context of the climate, site and environs of the project.
- Aspects such a sclimate responsive strategies, energy-conscious design, low carbon footprint, use of indigenous materials, appropriate low-cost technology, green building concept, adaptive re-use, retrofitting of existing buildings etc. may form the basis for the design strategies which will be demonstrated through tangible design demonstration of the entire project or a predetermined part of the project is of a regional level.
- *Suggested list of projects which could be undertaken: High School, midrise office complex, hotel cum convention centre, mid-rise housing, cultural complex, resort, healthcare, and higher education campuses.*

References:

1	GRIHAMANUAL VOL1-5	2010
2	Sustainable by Design: Methods for Holistic Housing, Basics, Strategies, Projects by Hans Drexler &Sebastian El Khouli	
	The Sustainable Sites Handbook: A Complete Guide to the Principles, Strategies, and Best Practices for Sustainable Landscapes byMeg Calkins	2011
4	Material Revolution: Sustainable Multi-Purpose Materials for Design and Architecture by Sascha Peters	2011
5	Cradle to Cradle: Remaking the Way We Make Things by William Mc Donough & Michael Braungart	2002

Semester -I

Sustainable Built Environment and Architecture M.Arch-I/C-01

Hours per Week			Assessment				Credit
Studio	Lecture	Tutorial	Internal	Exam.	Jury	Total	
-	2	1	50	50	-	**100**	**02**

Objective

- The objective of this course to examine, how the discourses on the built environment have impacted the environment globally?
- It will introduce students to the various paradigms of sustainability, such as the limits of resources, environmental health and toxic, environmental justice, sustainability, and urban environmentalism, and how these have impacted architecture.
- It will educate the students about Sustainable Architecture and examine the competing logics of Green buildings.

Course Content:

UNIT I: Introduction

- Global warming and Climate change Risks
- **THE BRUNDTLAND REPORT (DISCUSSION)** .From One Earth to One World, A threatened Future, Towards Sustainable Development, Energy: Choices for the Environment, The Urban Challenge
- **THE RIO SUMMIT** Understanding Agenda, The efficient use of Earth's natural resources,**,** The Management of Human Settlements
- Convention on Climate Change and Convention on Biodiversity, Agenda 21, Earth Summit 2002, COP 21,etc
- Understanding sustainability from social, cultural, economic and ecological perspective
- Understanding of sustainability of built environment– Global and Indian perspective

UNIT-II: Sustainable Environment visions

- **CRADLE TO CRADLE** A Question of Design, Why Being Less Bad is no Good,
- **GANDHI'S ENVIRONMENTAL VISION** "Mahatma Gandhi and the Environmental Movement"
- **HASSAN FATHY, EGYPT AND LAURIE BAKER, INDIA:** Roles in sustainable development

UNIT-III Ecological Architecture And Environmental Design:

Buildings As Ecological Systems

- Understanding Sustainable, environmental, green and Ecological Terms
- Resource and Energy Conservation
- Life Cycle Design
- Water cycle and Conservation
- Humane Design-IAQ (Indoor Air Quality) and Sick building syndrome with reference to WHO guideline

UNIT IV: Sustainable Architecture, Green Building: Appropriate Technologies and Materials

- What is Appropriate Technology; Technologies in context; Man/machine context?
- Measuring the impact of building materials
- Low energy building and masonry materials
- Life cycle analysis
- Zero Carbon Footprint Building
- Green Rating systems and their premises

UNIT –V: ***Environmental governance: issues, theories and rationales***

- Environmental assessment methods
- Need for environmental governance
- Environmental ethics and building design, Social accountability
- Green globe certification, International organization for standardization, Global reporting initiative
- Global Initiatives - Millennium development goals; Corporate social responsibility, Carbon trading
- Finance - Global Environment Facility (GEF), Green Climate Fund (GCF)

UNIT VI: National Initiatives on Sustainability

- Sustainability missions – climate action, solar energy
- Energy regulations and incentives
- Regulatory bodies – BEE, MOEF
- Sustainable Building Guidelines and Ratings, Codes – GRIHA, IGBC-LEED, ECBC, BEE etc.
- Energy Rating of Appliance and Materials

UNIT VII: Green construction and environmental quality assessment Site management

- Environmental management of buildings
- Case studies which look at the environmental approach and renewable energy

Reccomended books:

McHarg, Ian L. *Design with Nature*. Garden City, N.Y.: Published for the
American Museum of Natural History by the Natural History Press, 1969.
From Shelter to Bioshelter to Gaia" In
Todd, Nancy. *A safe and sustainable world: the promise of ecological design*.
Washington D.C.: Island Press, 2005.
David. *Design on the Edge: The Making of a High-Performance Building*,
MIT Press, 2006.
Ecological architecture-a critical history by J. Steele

References:

1	Eco design - A Manual for Ecological design by Ken Yeang	2006
2	Ecohouse: A design Guide; Elsevier Architectural Press by Sue Roaf et all	2007
3	Green Building Construction by Thomas E Glavinich	2008
4	Green Architecture- Design for a Sustainable Future by Brenda and Robert Vale	1996
5	Best Practices in Sustainable Building Design	
6	Sustainable Infrastructure: The guide to green engineering and design by S. Bry Sarte	2010
7	Advanced Building Technologies for Sustainability by Asif Syed	2012
8	Sustainable Architecture and Urbanism by Dominique Gauzin-Muller	2002
9	Environmentally Sustainable Buildings Challenges and Policies by OECD (Organisation for Economic Co-Operation and Development)	2003
10	Building Sustainability in East Asia: Policy, Design and People by Vincent S. Cheng, Jimmy C. Tong	2017
11	Sustainable Buildings and Infrastructure: Paths to the Future by Annie Pearce, Yong Han Ahn	2012
12	"Environmental Management" by Kulkarni, V. and T. V. Ramchandra	2006
13	GRIHA MANUAL VOL 1-5	2010
14	Energy Conservation Building Code	

Notes for Examiners: Total 8 questions should be set taking at least one question from each Unit. Students shall be asked to attempt any Five questions.

Semester–I

Research Methodology **M.Arch-I/C-02**

Hours per Week			Assessment				Credit
Studio	Lecture	Tutorial	Internal	Exam.	Jury	Total	
-	02	1	50	50	-	**100**	**02**

Course Objective:

The course aims to develop a basic understanding of the research methodology for planning and architectural studies, which will undoubtedly impart knowledge about research design, methods, and techniques. This course will stimulate the students to develop a basic understanding of research methodology and its role in conducting quantitative and qualitative research. It will also motivate them to learn more about advanced research tools and techniques for planning and architectural studies.

Course Content:

Unit 1

Introduction; Types of Research; Research Methods vs. Research Methodology; Issues and Challenges in Planning and Architectural Research

Research Process; Research Writing Basics of Literature Review; Bibliometric Analysis; Systematic Literature Review; Meta-Analysis; Referencing

Unit-2

Types of Data in Research; Measurement and Scaling Techniques; Types of Surveys

Sample Size; Sampling Techniques; Sources of Data; Preparation of Survey Questionnaire

Methods of Data Collection; Ethics in Data Management and Use; Similarity vs. Plagiarism

Processing of Data and Database Management; Interpreting Data; Descriptive Statistics; Representation of Data and Inferences

Unit -3

Hypothesis Testing; Parametric Tests; Non-parametric Tests

Quantitative Research Approach; Case Studies on Quantitative Research

Qualitative Research Approach; Case Studies on Qualitative Research

Mixed Method Research Approach and Case Study; Spatial Methods in Planning Research and Case Study; Behavioral Research Methods

Unit -4

Simulation Research; Big Data Research; Role of AI-ML in Architecture and Planning Research; Programing Language and Software; Emerging Research Potential in Planning and Architecture

Books and references:

1. Kothari, C. R. (2009). Research Methodology – Methods and Techniques, New Age International Publishers.
2. Ewing, R. and Park, K. (2020). Basic Quantitative Research Methods for Urban Planners, Routledge Taylor & Francis.
3. Silva, A. E., Heasley, P., Harries, N., Broeck, P. V. (2015). The Routledge Handbook of Planning Research Methods, Routledge Taylor & Francis.
4. Jonker, J. and Pennink, B. (2010). The Essence of Research Methodology: A Concise Guide for Master and PhD Students in Management Science, Springer.
5. Thomas E. Scruggs, Margo A. Mastropieri (2006) Applications of Research Methodology, Elsevier.
6. Wang, X. and Hofe V. R. (2007). Research Methods in Urban and Regional Planning, Springer.

Notes for Examiners: Total 8 questions should be set taking atleast one question from each Unit. Students shall be asked to attempt any five questions.

Semester -I

Lessons from Traditional Buildings M. Arch-I /C-03

Hours per Week			Assessment				Credit
Studio	Lecture	Tutorial	Internal	Exam.	Jury	Total	
-	2	1	50	50	-	**100**	**02**

Objective:
To acquaint the student with the sustainable nature of traditional and vernacular built environments. Students will explore the meaning and classification of Traditional and Vernacular Architecture, and, build up an understanding of various aspects of their sustainability, such as material and technology, resource management, response to landscape, etc.

Course Content:

Unit I:Traditional Architecture
Definition and Meaning, Historical context, Theories and Philosophies of traditional architecture, Importance and relevance of traditional architecture in modern context

Unit II:Vernacular Architecture
Definition and Meaning, Historical context, Theories and Philosophies of Vernacular architecture, Importance and relevance of traditional architecture in modern context

Unit III:Case Studies
Focusing on sustainable aspects of materials and technology, resource management, response to landscape, etc. for vernacular and traditional buildings

Unit IV:Application
Integration of passive and active strategies/technologies learned from the above applied in design studio or any other project having more than 1 acre site area.

References:

1	Lessons from Vernacular Architecture (Hardcover) by SimosYannas(Editor)	2009
2	Vernacular Architecture: Towards a Sustainable FutureC. Mileto, F. Vegas, L. García Soriano, V. Cristini	2014
3	Building with Earth: Design and Technology of a Sustainable Architecture byGernotMinke	2006
4	Vassigh, S., Ozer, E. and Spiegelhalter, T., “Best Practices inSustainable Building Design”, J. Ross Publishing.	2012
5	Syed A., “Advanced Building Technologies for Sustainability”, JohnWiley and Sons.	2012
6	ASHRAE 90.1 Energy Standard for buildings except low-rise residential buildings	2013

Notes for Examiners: Total 8 questions should be set taking at least one question from each Unit. Students shall be asked to attempt any Five questions.

Semester -I

Historic Building Materials and Structural Systems M. Arch-I /EL-01

Hours per Week			Assessment				Credit
Studio	**Lecture**	**Tutorial**	**Internal**	**Exam.**	**Jury**	**Total**	
-	2	1	50	-	50	**100**	**02**

Objective:

This course provides an introduction to the practical and technical aspects of the methodical study of historic building systems and related conservation techniques. This includes details of the characterization and behavioral aspects of materials; structural performance of historic buildings, deterioration processes and conservation interventions.

Course Content:

UNIT I

- Traditional building materials used in India, from pre historic times till date: Earth, clay, stone, brick, timber, bamboo, lime, iron, metals and glass
- Materials used in structural, non – structural and decorative applications: mortars, renders, paints and plasters, additives and stabilizers
- Categorization of materials as organic and inorganic, mixture of both and compound materials: physical, chemical and mechanical properties
- Common binding materials, their properties and techniques of preparation

UNIT II

- Process of identification of defects: Field investigations, field-tests, standard test methods, equipment used for detecting and measuring common problems in historic buildings
- Diagnosis and assessment of defects and common problems in historic building materials
- Remedial measures for common material defects in historic structures. Cleaning and maintenance of historic building fabric

UNIT III

- Introduction to historic building technology, structure and construction systems
- Problems in historic buildings due to alteration in material properties and performance
- Theory of structures and analysis of structural components of historic buildings: Load transfer systems, support systems, spanning systems, infill material, strength and weakness of traditional building technologies and composite structural systems (foundations, arches, domes, vaults, columns, beams, roofing etc)

UNIT IV

- Common structural defects in historic buildings, cause and nature of distress: types of cracks, differential settlement, geo-technical issues
- Methodologies for inspection and diagnosis of structural defects: Introduction to various types of tests such as Destructive Tests (DT), Minor Destructive Tests (MDT), Non Destructive Tests (NDT),monitoring techniques, structural analysis techniques
- Conservation of historic building: Immediate temporary emergency measures for distressed buildings: shoring, underpinning, shuttering etc. Stabilization, consolidation, grouting, pointing, strengthening, retrofitting and replacement etc.
- Deterioration and conservation of 20^{th} century heritage structures in concrete and other modern materials

References:

1	The Repair of Historic Buildings: Advice on principles and methods (Aspects of Conservation) by Christopher Brereton (Author),,(Author) Christopher Bereton Philip (Editor) Whitbourn	
2	Maintaining and Repairing Old and Historic Buildings by John J. Cullinane	
3	Materials, Technologies and Practice in Historic Heritage Structures	
4	Materials & Skills for Historic Building Conservation	2008

Notes for Examiners: Total 8 questions should be set taking at least one question from each Unit. Students shall be asked to attempt any Five questions.

Semester -I

Ecology and the Built Environment M. Arch-I /EL-02

Hours per Week			Assessment				Credit
Studio	Lecture	Tutorial	Internal	Exam.	Jury	Total	
-	2	1	50	-	50	**100**	**02**

Objective:

- Introduction of basic understanding of ecology
- Understanding ecology and its relation to habitats - natural and man-made on regional scale
- Sensitizing to alternative models of environmental conservation

Course Content:

Unit I: Introduction

- Introduction to ecology & ecosystem services
- Ecology as a model
- The value of air, water and land
- Ecosystem integrity and environmental capacity

Unit II: Biodiversity and Urban Ecosystems

- Ecological pyramids, energy flows and productivity in eco-system
- Biogeochemical cycles, bio magnification
- Species and interspecies interactions
- Biodiversity and ecological equilibrium
- Urban ecosystem processes, urban climate, urban water cycle, urban nutrient dynamics

Unit III: Ecology and Habitation

- Ecological cybernetics - Relation to urban habitats
- Impact of natural and human influence
- Ecosystem-atmosphere interactions
- Urban heat island; urban wind pattern, aerosols and air pollution

Unit IV: Sustainable Built Environment

- Regional ecology and bio-urbanism
- Sustainable urban planning and development strategies
- Sustainable communities
- Conservation science, alternative development approaches, sustainable lifestyles
- Case studies

References:

1	Sustainable Design: Ecology, Architecture, and Planning by Daniel E. Williams	2007
2	Reshaping the Built Environment: Ecology, Ethics, and Economics by Charles J. Kibert	1999
3	Urban Ecosystems: Ecological Principles for the Built Environment by Frederick R. Adler, Colby J. Tanner	2013
4	Principles of Ecological Designs by Todd, N.J, and Todd, J	2004
5	Ecological Climatology by Bonan, G	2002
6	Tress of Chandigarh by Prof. Rajnish Wattas	

Notes for Examiners: Total 8 questions should be set taking at least one question from each Unit. Students shall be asked to attempt any Five questions.

Semester -I

Geographic Information System for Urban Design M. Arch-II /EL-03

Hours per Week			Assessment				Credit
Studio	Lecture	Tutorial	Internal	Exam.	Jury	Total	
-	2	1	50	-	50	**100**	**02**

Objectives:

The objective of the course is to develop an understanding of the basic GIS techniques, the range of analyses and their applications in various fields of design and planning.

Course content:

Unit I: INTRODUCTION TO GIS

- Concept of GIS
- Components of GIS
- Geographical features in GIS, Digital mapping
- Difference between raster and vector maps
- Data in GIS - spatial and attributes data

Unit II: CREATING DATA AND ANALYSIS

- ArcView of ArcGIS software
- Geo-referencing:
- Satellite imagery and topographical sheet
- Perform map to map and image to map transformation
- Digitization, query building
- Data Analysis

- Vector Data Analysis:
  - Perform buffering and overlay
- Spatial Analysis:
  - Preparing for analysis
  - Accessing Spatial Analyst and Data Exploration.
- Raster Data Analyst:
  - Perform a local operation
  - Perform a combine operation
  - Perform a neighborhood operation
  - Perform a zonal operation
- Editing Features:
  - Fixing errors by topology and other editing tools
  - Spatial Data Query, Attribute Data Query

Unit III: MODELLING AND ANALYSIS

- GIS data procurement
- Creating maps
- Data Display and Cartographic Representation:
- Make a Choropleth Map
- GIS Models and Modeling:
- Creating and Executing tools in Model Builder
- 3D Analysis:
- Creating Contours, Slope, Aspect, Relief
- Conversion of GIS data into various formats:
- Conversion of GIS data into CAD, KML format etc.
- Practical urban design exercises

REFERENCES:

1	Thinking about GIS: Geographic Information System Planning for Managers by Roger F. Tomlinson	2009
2	GIS in Land and Property Management by Martin P. Ralphs, Peter Wyatt	2003
3	Urban Planning and Development Applications of GIS by Said Easa, Yupo Chan	2000
4	Introduction to geographic information systems, kangtsungchang, Mc Graw Hill	2018

Notes for Examiners: The students will be assessed on the Practical projects covered in class through an Internal Viva-voce examination. No University wrltten examination in this subject to be conducted.

Semester -I

Online Courses i.e. MOOCs/NPTEL Courses M.Arch-I/EL-04

Hours per Week			Assessment				Credit
Studio	Lecture	Tutorial	Internal	Exam.	Jury	Total	
-	-	-	-	-	-	-	02

The students will be having the choice to opt online MOOCs/NPTEL Courses from the below mentioned list.

- Sustainable Architecture
- Modern Indian Architecture
- Building Materials And Composites
- Architectural Acoustics

Semester –II

Architectural Design Studio II: Urban Design **M. Arch-II /ST-01**

Hours per Week			Assessment				Credit
Studio	Lecture	Tutorial	Internal	Exam.	Jury	Total	
12	-	-	300	-	200	**500**	**10**

Objective:

To develop insight into issues of urban design contexts

Course Content:

Projects taken up in Design Studio-II will focus on designing the public realm, particularly public urban space. The city should be a contemporary city experiencing pressures of new development. Projects will range from design of a new group of buildings of both single and multiple ownerships, application of urban legislation to larger areas, intervention in a given environment, to regeneration of historic environments.

- Study of the city in its regional, ecological and historical setting as a part of a larger level network
- An on-site urban design survey will be conducted in correlation with theory classes
- Existing image structure will be studied and proposals for a new structure, for a specific projected time period, would be made
- Within the framework of the proposed structure, an area under transition is identified for detailed design development, based on a programme using data collected on site and from secondary sources
- The programme is interpreted as a design exercise with report, drawings and models. The emphasis will be on contextual response and sensitive infill design at the urban level

The intent of the studio shall be to understand the current urban design practices in their urban context by a critical appraisal of the socio-cultural, economic aspects, public perception, imageability and townscape, sense of place, urban form, townscape, urban spaces, streetscapes, building forms and facades, public art and various other aspects.

Suggested Exercises:

- Analytical studies of traditional and contemporary public places
- Street design
- Riverfront development
- Urban renewal
- Sustainable urbanism and urban retrofitting in different contexts; Design Solutions for the contexts

Note:

1. Projects chosen must include all constituent elements of a public / urban space such as buildings of varied functions and ownerships, intermediate and surrounding open spaces, a variety of activities / uses / functions, vehicular and pedestrian traffic networks, utility infrastructure, etc.
2. It should be possible to generate / access sufficient data that will permit making of a complete the design proposal within the given timeframe.

References:

1	The Image of the City by Kevin Lynch	
2	A Pattern Language: Towns, Buildings, Construction by Christopher Alexander	
3	A New Theory of Urban Design by Christopher Alexander	
4	Drawing for Urban Design by Farrelly	2011
5	Sustainable urbanism and beyond: Rethinking cities for the future	2011
6	Street design: The Secret to great cities and towns	2012

Semester –II

Contemporary city and Concepts of Urban Form and Space M. Arch-II /C-01

Hours per Week			Assessment				Credit
Studio	Lecture	Tutorial	Internal	Exam.	Jury	Total	
-	2	1	50	50	-	**100**	**02**

Objective:

Main objective of this subject is to explore relationships between and within cities – the political, economic, and ecological life of contemporary urbanism. We will explore the creative ways that urban space and urban life can be transformed to build just and sustainable futures. Along the way It will explore a wide range of processes that shape and are shaped by contemporary urbanism, and forces (social movements, labor markets, finance capital, government policy, arts and culture, the environment, the media).

Course Content

UNIT I: Introduction

- General Introduction; Concepts and Definitions Introduction to Cities "Urbanism in Developed Countries: 1700-1980" and "The Urban Explosion in the Third World during the 20th Century", in Cities and economic development: From the dawn of history to the present.
- Cities of Europe, America and South east Asia
- What role do cities and urban space play in an era of globalization?
- Idea of Contemporary city and issues in contemporary cities
- The automobile explosion & the changing fabric of the contemporary city, the cross-cultural influences in city development and the city as an urban ecosystem and a human network – social structure and urban form.

UNIT-II Theories of city planning:

- The role of Patrick Geddes, Lewis Mumford and Jane Jacobs, in humanizing the contemporary city
- Built environment and Dioxides: overview of Ekistics
- Ebenezer Howard and Garden city movement
- Kevin Lynch and city image
- *Robert Moses, New York and the City as Infrastructure*

UNIT III: Understanding city form and how it is planned.

- Attitudes toward urban form: changing attitudes by communities and city makers: Jane Jacobs, Camillo Sitte, and Frederick Law Olmsted
- Principles for form – how do principles begin and why does it matter
- What is the role of urban designers? Jane Jacobs,
- The City Beautiful and The Congress for the New Urbanism: Frederick Olmsted, Daniel Burnham

UNIT-IV: Making communities within the city form

- Who lives in the contemporary city Power, inequality and social polarization, Gender, race and space, Intersectionality & positionality
- What kind of nature does the contemporary city build? What are the connections between social and ecological crises
- Public Places –theories and methods (Colin Rowe, Chris Alexander, Kevin Lynch)
- Community engagement and participatory planning
- Place making and design for public spaces: commodification of public spaces
- Urban lifestyle diversity and spaces of consumption in a city
- Pedestrian predominance as a factor of human comfort & performance of the city
- Social Access-territoriality, exclusion and inclusion, minority groups and the marginalized communities, child friendly cities and the geographies of disabilities
- *Urban Renewal: From Reconstruction to Preservation*, Density, diversity and innovation: what is density, and how is it related to diversity? How are density and diversity related to innovation?
- *Zoning: Regulating Urban Form & Development* Land Use + Zoning : Types of zoning, relationship of zoning to land use

UNIT-V: Urban Form and Urban Space: Interrelationships that contributes to Place making in the City

- The ways of reading a city -1 using the tools of Urban Design delineated by Kevin Lynch
- Way finding using the imageability concept that makes some cities and parts of cities more legible than others
- Legibility as a tool for urban design explored in the city the student is a native of or familiar with. Understanding urban structure
- Reading a City-2 through Grain, Texture, Nolli Diagram with examples from historical evolution of city fabrics
- Urban form &space for various degrees of enclosure, human comfort and urban space, psychological effects in urban space design. How does a space become a place?
- Landscape as a tool for urban space design - the role of groundcover, foliage, plantation, water and other landscape elements as determinants of urban space and form

UNIT-VI: Urban Space Terminologies and Legislations

- Introduction to terminologies – Incentive Zoning, Planned Unit Development, Transfer Development Rights, bulk and height, zoning through examples and case studies Density,
- FAR,FSI, Zoning as advanced tools for urban form and massing
- Urban space design w.r.t. Legislations addressing sunlight, air exchange, human comfort, fire safety, seismic and other risks, contemporary building materials
- Documentation of a chosen urban space, historical or contemporary, using the vocabulary of urban design
- Redesign of the space using the learning of the subject. This can be chosen at the end of Unit 1 and periodically assessed

- Design codes for the contemporary city. Development of Mumbai, Calcutta, Delhi and other metropolitan cities, especially in South Asia

- Multi layered urbanities of the modern city. Their conflicts, contestations and hybridization
- The concept of world heritage cities- Brasilia, White City Tel Aviv, Le Havre –significance, Outstanding Universal Value and statement of integrity and authenticity. Notion and meaning of world heritage as a shared heritage of humanity
- Management of world heritage cities as repositories of cultural heritage

References:

1	A Pattern Language: Towns, Buildings, Construction by Christopher Alexander	
2	A New Theory of Urban Design by Christopher Alexander	
3	The Image of the City by Kevin Lynch	
4	Drawing for Urban Design by Farrelly	2011
5	Sustainable urbanism and beyond: Rethinking cities for the future	2011
6	Street design: The Secret to great cities and towns	2012
7	The history of the city" by Leonardo Bevenolo	
8	The Architecture of the City" by Aldo Rossi	
9	The Manhattan Transcript" by Bernard Tschumi (1976-1981)	
10	Landscapes of Change: Boccioni's "Stati d'animo" as a General Theory of Model	

Notes for Examiners: Total 8 questions should be set taking at least one question from each Unit. Students shall be asked to attempt any Five questions.

Semester –II

Urban Infrastructure **M. Arch-II /C-02**

Hours per Week			Assessment				Credit
Studio	**Lecture**	**Tutorial**	**Internal**	**Exam.**	**Jury**	**Total**	
-	02	01	50	50	-	**100**	**02**

Objective:

To familiarize the students with the physical infrastructures of an urban area, the management system, the modern methods of governance and financial requirement of urban development. At the end of the course, they will be ready to make a detailed project report for any development plan.

Course Content:

UNIT I: Transportation systems

- Technological characteristics of transport modes and systems; the nature of demand and supply of transport services; the spatial structure vis-a-vis the level and quality of transport supply systems
- Land use-transportation inter-relationships; transportation planning process; Travel demand forecasting
- Planning of public transport systems; intermediate public transport modes; Planning considerations for goods transportation; Traffic flow characteristics; Traffic analysis and design considerations; design of intersections; traffic signals and street lighting; local area traffic management
- Recent innovations in technologies and its probable impacts on future urban forms
- Environmental impacts of traffic; energy issues in transportation
- Government transport policies and evaluation of transportation proposals

UNIT II: Technologies for Water and Waste Management

- Water and wastes: General considerations, Role of water in life, Water crisis & causes, Concept of waste, Solid wastes & industrial effluents, Hazardous and toxic wastes, Natural cycles for zero waste systems, Eco sanitation, Water resources and management, Rainwater, runoff and ground water, Rainwater harvesting, Water storage and lifting devices
- Water and waste in the domestic sector, Drinking water and non-potable uses, Domestic wastewater recycling options, Domestic solid waste management
- Water audit, water conservation measures, Composting and its application, Water requirement and management in industries

UNIT III: Systems of local governments in India

- development administration of National, State and Local level and the process of decision-making, development and management
- Structure of implementing authorities: Improvement trusts, Development authorities, Metropolitan Development Authorities, and their relationship with local governments
- Public relation and citizen participation

UNIT IV: Urban finance

- Financial perspective of urban development (water supply and sewerages, land development and housing, transportation and road)
- Municipal fiscal administration: property tax administration, rent control system, user changes and pricing of public services

References:

1	Urban Transport Planning and Management : PratibhaDeshmukh, SBS Publishers and Distributors
2	Flexible Urban Transportation : Jonathan Lewis Gifford, Publisher: Elsevier
3	Alternative Water Sources and Wastewater Management : E. W. Bob Boulware, McGraw Hill Publishers,
4	Municipal Water and Waste Water Treatment : R. N. Singh and Rakesh Kumar, TERI (2006)
5	*A reconceptualisation of urban management: The administration of cities*, *their services, and their growth*: Irina Bačlija, Edwin Mellen Press, UK

Notes for Examiners: Total 8 questions should be set taking at least one question from each Unit. Students shall be asked to attempt any Five questions.

Semester –II

Cultural Anthropology **M.Arch-II/C-03**

Hours per Week			Assessment				Credit
Studio	Lecture	Tutorial	Internal	Exam.	Jury	Total	
-	2	1	50	50	-	**100**	**02**

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

Course Content:

UNIT I: Relationship between Culture, Society, Anthropology and Architecture

- Concepts of culture, society, politics and anthropology – relation between society and built environment
- Introduction to cultural -anthropology view of architecture

UNIT II: Cultural Influence in Traditional Architecture

- Architecture as process – kinship, house and societies
- Perceptions of built form, conceptions of space, symbolism and technology
- Settlement plans: cultural perspective, villages – folk and folk culture – towns and cities
- Role of rituals and festivals in generating settlement patterns, Role of culture in cities and sacred complex – Rural and urban continuum

UNIT III: Culture and Place Making

- Conditions of modernity - fragmentation of society
- Studies on the meaning of built environment

UNIT IV: An overview of Cultural Influence on Urbanity

- Meaning of urban studies and urban patterns
- Role of cities – primary units, major components and units of integration – cultural evolution and contemporary urban issues

Note: Students would make presentations exploring the relevance and impact of cultural studies on contemporary architecture and design through readings/case studies.

References:

1	O F Bollnow; Mann, Bensch and Raum, Stuttgart	1963
2	Idea of a Town: The Anthropology of Urban Form in Rome, by Joseph Rykwert	1976
3	Anthropology of the City by Edwin James	1977
4	On Adams house in Paradise by Joseph Rykwert	1987
5	Architecture and Anthropology by Claire Melhuish	1996
6	The City Cultures Reader edited by M.Miles, Tim Hall and Ian Borden	
7	Privately Owned Public Spaces by Jerold S. Kayden	2000
8	Urban Geography – A global perspective by Michael Pacione	2009
9	Shaping Neighbourhoods for local health and global sustainability by Hugh Barton, Marcus Grant and Richard Guise	2010

Notes for Examiners: Total 8 questions should be set taking at least one question from each Unit. Students shall be asked to attempt any Five questions.

Semester –II

Urban Economics M.Arch-II/EL-01

Hours per Week			Assessment				Credit
Studio	Lecture	Tutorial	Internal	Exam.	Jury	Total	
-	2	1	50	-	50	**100**	**02**

Course Objective

This course shall look at market forces and other mechanisms related to the development of cities, land markets, public finance systems and aspects concerning managing and monitoring systems of urban growth.

Course Content

UNIT I

Urban land market and real estate market characteristics, Socio-economic and political factors influencing urban land markets, Urban land supply and demand conditions, Land pricing and transactions.

UNIT II

Techniques of land assembly: acquisition, readjustment, pooling, sharing, plot reconstitution, land lease, cooperative of landowners.

UNIT III

Local financial system in India: Taxation and fees, state and local fiscal relations, financing local fiscal services, local expenditure, capital budgeting, performance budgeting, Financial resource mobilization, Policies and programs of related institutions. Organizational structure and resources of local governments Non-government development organizations and their relationship with local government, Citizen Participation.

UNIT IV

Personnel management: Manpower planning, performance appraisal, motivational aspects. Behavior organization theory: authority and conflict, administration communication, leadership in administration, organizational changes. Techniques of Monitoring: Integrated reporting system, works standard oriented cost control, turnkey system, inventory cost control technique, unified status index technique.

References:

1	Urban land Economics / RATCHIFF, RICHARD U.
2	Urban Law Economics: Principle and Policy / HALLETT, GRAHAM
3	Planning for Profit / HOLDEN I & MALLORY K. PETER

Notes for Examiners: Total 8 questions should be set taking at least one question from each Unit. Students shall be asked to attempt any Five questions.

Semester –II

Disaster and Risk Management of the Built Environment M. Arch-II/EL-02

Hours per Week			Assessment				Credit
Studio	Lecture	Tutorial	Internal	Exam.	Jury	Total	
-	2	1	50	-	50	**100**	**02**

Objective:

To give a comprehensive overview on how existing buildings can be adapted and retrofitted to function sustainably

Course Content:

Unit I: Introduction

- Disasters: a Global View
- Understanding Disasters: Causes and Effects, Significance
- Disaster Profile of India: Regional and Seasonal
  - Disaster: Definition, Meaning, Factor and Significance
  - Difference between hazard and disaster
  - Natural and Manmade Disasters
  - Nature of disasters,
  - Causes and effects of Disasters
  - Climate change-Emissions and Global warming, impact on sea level in south Asian region Environmental disruptions and their impact on built environment.

Unit II: Risk Assessment, Reconstruction and Rehabilitation, in Disasters

- Risk- Its concept and analysis, Risk Reduction ,Vulnerability: Its concept and analysis, Strategic Development for Vulnerability Reduction
- Disaster Preparedness and Response - Disaster Preparedness: Concept and Nature, Disaster Preparedness Plan ,Prediction, Early Warnings and Safety Measures of Disaster
- Rehabilitation, Reconstruction and Recovery **-** Reconstruction and Rehabilitation as a Means of Development, Damage Assessment ,Post Disaster effects and Remedial Measures, Disaster Resistant House Construction, Dealing with Psychological issues, Long-term Counter Disaster Planning.

Unit III: Policy, Legal Framework

- Policies in Disasters- its significance, approaches, essential components, Formulations and coordination.
- Laws in Disaster Preparedness and Rehabilitation. Environmental Protection Act 1986; National Disaster Management Act 2005. Other Institutional / Legal Policies.
- National Agencies - National Disaster Management Cell, National Disaster Management Authority (NDMA), National and other civilian and non civilian Agencies
- State and District Level Agencies, State Disaster Management Authority
- (SDMA), District Disaster Management Authority (DDMA).Disaster

- Management cells at state level and District level,Role of Municipalities.
- International Agencies: United Nations and its specialized agencies like UNDP, FAO, WHO, AEC (Atomic Energy Commission), United Nations Disaster Management Cell etc

Unit IV: Informatics and Communication System in Disaster

- Role of information technology in Disasters,Disaster management Information System, Organizing and effective dissemination of information: feedback for improving information, Role of Information from disaster affected community.
- Role of Communication in Disasters. Types of communication in case of disasters –HAM radio, Satellite, Video Conferencing, Electronics devices, detailed study with practical.
- Data collection (Information extraction from images) and analysis and interpretation.
- Maps, Mapping techniques and its usefulness. .Mapping as a tool for risk assessment and damage evaluation GIS in the context of disaster.
- Remote Sensing: Fundamental of Remote Sensing, platform and sensors, image interpretation, digital image processing, microwave remote sensing, remote sensing application, Indian space programme, future satellites for disaster management;
- GIS: Introduction, definition of GIS, GIS and other information system, maps and spatial information, concept of space and spatial data, domains of spatial information system, elements of GIS (hardware, software, data and liveware), components of GIS (end use/management, data acquisition, data input, data storage & retrieval, data processing and analysis/modeling),

References:

1	Dr. Mrinalini Pandey ,Disaster Management, (Wiley India Pvt. Ltd)	2014
2	Tushar Bhattacharya ,Disaster Science and Management(McGraw Hill Education (India) Pvt. Ltd.)	2012

Notes for Examiners: Total 8 questions should be set taking at least one question from each Unit. Students shall be asked to attempt any Five questions.

Semester –II

Principles of Building Envelope Design M. Arch-II /EL-03

Hours per Week			Assessment				Credit
Studio	Lecture	Tutorial	Internal	Exam.	Jury	Total	
-	2	1	50	-	50	**100**	**02**

Objective:

- To understand the norms for building envelope, including thermal and acoustic performance requirements for walls, roofs, and windows for energy efficient design and construction of buildings
- To understand the energy performance standards for buildings, energy auditing and automation in various building services with integration for energy conservation

Course Content:

Unit I: Building Envelope

- Streets and buildings- room zoning- layer of shades, overhead shades – Solar organizations: heat producing zones, stratification zones, buffer zones, daylight zones
- Shape and enclosure: direct gain, sun-spaces, thermal storage walls, roof ponds, thermal collector walls, wind catchers, solar chimneys courtyards: size, shape, orientation, breezy andshady courtyards
- Estimation of skin heat flow, window solar gain, ventilation/ infiltration gain or loss
- Thermal behaviour of buildings: Introduction to concept of Effective Temperature – Corrected Effective Temperature- comfort zone – overheated period – design of shading devices
- Thermal properties of materials - resistance and conductance – transmittance – thermal gradient– periodic heat flow– time lag & decrement factor–thermal exchange in buildings– building heat gain and heat loss– thermal mass and insulation

UNIT II: Planning For Ventilation

Functions of ventilation – stack effect and its related calculations – provision for air movement – air flow through buildings – calculation of indoor air velocity – ventilation rate - orientation, external features, cross ventilation – position of openings, size of openings, controls of openings - air flow around buildings – humidity control

UNIT III: Day lighting

Principles of light- transmission, reflection and absorption – illumination – day lighting concepts - day lighting in the tropics – daylight requirements – daylight protractor – calculations – distribution of daylight

UNIT IV:

- **Acoustics -** Sound insulation strategies wrt outdoor context - Reverberation time, Echo, Noise transmission, Refraction, etc for various building typologies
- **Façade Technologies -**Sensor based, double envelopes, ventilated facades, smart facades, etc

References:

1	Manual of Tropical Housing and Building, Part 1 – Climatic Design by Koenigsberger	2004
2	Housing, Climate and Comfort by Martin Evans	1980
3	Climatic Responsive Architecture- A Design Handbook for Energy Efficient Buildings by Arvind Krishnan, Nick Baker, Simons Yannas, S V Szokolay	2001
4	Handbook on Functional Requirements of Buildings (Other than Industrial Buildings) by BIS	1987
5	Climate considerations in building and urban design by David Egan. M	1998
6	Green Building Materials A Guide to Product Selection and Specification, 3rd Edition	2010
7	Understanding Green Building Materials by Traci Rose Rider, Stacy Glass, Jessica McNaughton by Ross Spiegel.G	2011

Notes for Examiners: Total 8 questions should be set taking at least one question from each Unit. Students shall be asked to attempt any Five questions.

Semester-II

Online Courses i.e. MOOCs/NPTEL Courses M.Arch-II/EL-04

Hours per Week			Assessment				Credit
Studio	Lecture	Tutorial	Internal	Exam.	Jury	Total	
-	-	-	-	-	-	-	02

The students will be having the choice to opt online MOOCs/NPTEL Courses from the below mentioned list.

- User Interface Design
- Structure, Form, and Architecture: The Synergy
- Introduction to History of Architecture in India