CHANDIGARH COLLEGE OF ARCHITECTURE

SECTOR 12, CHANDIGARH

MASTERS IN ARCHITECTURE

SCHEME OF EXAMINATION AND SYLLABUS OF M. ARCH. PROGRAMME

For the session - 2021-2022

Semester – III

Objective: To develop an understanding of the Modern City.

Courses	Course no.	Subject	Hours per week				Assessment			
			S	L	T	R&D	Internal	Exam.	Jury	Total
Studio	**M.Arch-III /ST-03**	**Architectural Design Studio – Urban Habitat**	12	-	-	-	300	-	200	**500**
Core	**M.Arch-III /C-06**	**Principles & Policies of Housing**	-	2	1	-	50	50	-	**100**
	M.Arch-III /C-07	**Dissertation**	3		3		100	-	100	**200**
Elective		*Choice of Two Elective*								
	M.Arch-III /EL-08	**Services in High Rise Buildings**	-	2	1	-	50	-	50	**100**
	M.Arch-III /EL-09	**Construction Project Management**	-	2	1	-	50	-	50	**100**
	M.Arch-III /EL-10	**BIM & Computer Application**	-	2	1	-	50	-	50	**100**
Total			**15**	**6**	**6**	**-**	-	-	-	**1000**

S – Studio

L – Lecture

T – Tutorial

R&D – Research and Development

Semester – IV

Objective: To apply the knowledge gained in previous three semesters

Courses	Course no.	Subject	Hours per week				Assessment			
			S	L	T	R&D	Internal	Exam.	Jury	Total
Studio	**M.Arch-IV/ST-04**	**Thesis Project**	12	2	-	13	500	-	500	**1000**
Total			**12**	**2**	**-**	**13**	-	-	-	**1000**

SEMESTER -III

Principles & Policies of Housing **M. Arch-III /C-06**

Hours per Week				Assessment			
Studio	**Lecture**	**Tutorial**	**R&D**	**Internal**	**Exam.**	**Jury**	**Total**
	2	1		50	50		**100**

Objective:

- To understand the basics of housing policy, strategy, programs, legal and economic dimensions and their implications in planning
- To impart the knowledge and skills for preparation of rural/regional plan and formulation of city scale housing strategy and an understanding towards the process of generating a mass housing stock vis-à-vis its anthropological, social, fiscal and legislative implications

Course Content:

UNIT I: Introduction to Housing, Social and Economic Infrastructure

- Importance, need, problems and issues in housing
- Housing & Urbanization Significance of housing in National Development Goals
- Housing Design: housing typology, housing layouts, housing density, community facilities, housing norms and standards
- Current issues in housing: health and safety related issues in housing, social aspects of housing, built environment and human behavior, public and private sector housing development
- Housing for the Poor:issues in slums and squatter settlements, characteristics of rural housing, government initiatives for providing housing
- Rental housing in India: an overview, current practices and upcoming initiatives
- Co-operative housing: concept, evolution, structure of cooperative housing
- Housing in third world countries

UNIT II: Planning Regulations, Policies & Acts

- The National Housing Policy: Review, policy framework for urban and rural housing, UNHCS, World Bank and USAID
- Building byelaws &regulations
- Understanding Five Year Plans
- Affordable Housing Policy 2009, affordable housing in public private participation, role of central & state governments in the development of National Housing Stock
- Slum rehabilitation schemes and incentives, landless housing policy
- *Pradhan Mantri Awas Yojana, Rajiv Awas Yojana, AMRUT ,Indira Awas Yojana*
- The impact of resettlement policies and issues for the formulation of future resettlement policies
- Urban housing policy in India: context, shift and implications
- Institutions for housing finance and their role for subsidy in India such as HUDCO, HDFC, NHB,National Building Organization (NBO), Hindustan Prefab Limited, laws and acts on housing
- Access to land, Land Acquisition Act of India. Concept and techniques such as Land Pooling and Readjustment, Plot Reconstitution, etc. for acquiring land to meet future housing demands
- The Real Estate Act 2016
- National Housing Development Authority (amendments act) 2003, Housing act & building act, Emergency housing
- Acts- REPA(right to shelter), Landlord and Tenant (amendment) act no.21 of 2009, Town &Country Planning Act

UNIT III: Planning Aspects at City Level: Housing in Chandigarh

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- Social aspects of housing within various income groups
- Characteristics and problems of housing areas of Chandigarh
- Concept of HIG, LIG, EWS, SFS and other typology of housing – genesis and impact on the urban form of the city
- Role of government bodies :Chandigarh Housing Board, CBRI

References:

1	"Housing Sector in India; Issues, Opportunities and Challenges" by Balaji V. &Rajmanohar	2008
2	"High Density Housing; Concepts, Planning,Construction" by Christian Schittich(ed)	2004
3	"Key Urban Housing of the Twentieth Century", byFrench H.	2008
4	"Introduction to Social Housing", by Reeves P.	2005
5	"The Architecture of Affordable Housing", by Davis S.	1995
6	Modernity and Housing; Peter G. Rowe	
7	National Building Code	
8	National Housing and Habitat Policies, (urban), Govt. of India	1998,2007
9	URDPFI Guidelines, TCPO Publication(draft)	2014
10	Housing Sustainable Development and the Rural Poor: a study of Tamil Nadu; Bernhard Glaeser	
11	The Architecture of Affordable Housing; Sam Davis	

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 –III

Dissertation **M. Arch-III /C-07**

Hours per Week				Assessment			
Studio	**Lecture**	**Tutorial**	**R&D**	**Internal**	**Exam.**	**Jury**	**Total**
3		3		100		100	**200**

Objective:

This module seeks to enable students to formulate appropriate research methodologies and theoretical frameworks and eventually develop research skills in their chosen area (relevant from previous semesters).

This module shall help in undertaking independent research, and make informed architectural design decisions for their thesis in the subsequent IVth semester.

Course Content:

Students will undertake an individual research-led dissertation, in which comprehensive research related to one of the previous semester modules will be assessed through written dissertation work. The dissertation would be a length of 4000 to 5000 words with suitable graphics, data representations, references, footnotes and annotations. Students will have regular individual research-led tutorials with their appointed academic supervisor. Evaluation shall be done through presentations at various stages.

1. Topic Selection in consultation with appointed faculty
    a. Define objectives and scope
    b. Develop appropriate research questions
    c. Plan a methodology for the investigation
2. Critically review the appropriate literature
3. Collect data on relevant case studies and critically analyze it based on research questions
4. Interpret findings and critically evaluate the study

5. Make appropriate suggestions and recommendations such that it is a base for the thesis module in the next semester

Outcomes:

1. A knowledge and understanding of the different methodological approaches (interpretive-historical, qualitative or quantitative including experimentation, simulation and modeling).
2. Intellectual skills that allow them to demonstrate that they can
    a. Identify a suitable research topic
    b. Seek out, assimilate and critically evaluate published research/design works
    c. Develop approaches to data collection and frameworks for practical analysis
    d. Make sense of the data and analysis within the context of previous research and theory
    e. Critically reflect on changed scenarios as a result of the investigation, perform SWOT analysis and draw appropriate conclusions
3. Transferable skills that allow students to develop:
    a. The ability to formulate research questions in a manner that is relevant to and cognizant of their field of study
    b. The ability to carefully monitor one's own learning and draw upon other sources of knowledge and expertise as necessary

References:

1	Architectural research methods by Linda	2002
2	Design methods by J. Christopher	1980
3	Good research guide by MartynDenscombe	2003
4	Advanced Research Methods in Built Environment by A. and Ruddock	2008
5	Doing Qualitative Research: APractical Handbook by D. Silverman	1999
6	Social research: Issues, Methods and Process by Tim	2001

Semester – III

Services in High Rise Buildings **M. Arch-III /EL-08**

Hours per Week				Assessment			
Studio	**Lecture**	**Tutorial**	**R&D**	**Internal**	**Exam.**	**Jury**	**Total**
	2	1		50		50	**100**

Objective:

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

Course Content:

UNIT I: Introduction

- A brief description of evolution of high rise buildings
- 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
- Aspects and integration of services- Concepts of Intelligent Architecture and Building Automation

UNIT II: Water supply and waste disposal

- 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

- 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

- Security systems- Access Control and Perimeter Protection- CCTV Intruder alarms- passive fire safety- Fire Detection and Fire Alarm Systems- planning and design- NBC

Note: A case study exercise to understand the above concepts can be given and a report can be submitted along with a presentation made by the student at the end of the semester.

Case Studies of High Rise buildings and skyscrapers through appropriate examples can include the works of Norman Foster; Ove Arup; Ken Yeang, etc. as suggestive authors of high-rise ideas.

References:

1	Mechanical and Electrical by William J. Mcguinness, Benjamin Stein and John S. Reynolds	1980
2	Time-Saver Standards for Architectural Design Data by Donald Watson, Michael J. Crosbie and John Hancock Callender	1997
3	Electrical and Mechanical Services in High Rise Buildings Design and Estimation Manual by A K Mittal	2001
4	Fire Safety Issues in High-Rise Residential Buildings: escape routes design and specification by YahyaMohamadYatim	2011
5	High-Rise Manual by Johann Eisele and Ellen Kloft	2003

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 –III

Construction Project Management M. Arch-III /EL-09

Hours per Week				Assessment			
Studio	**Lecture**	**Tutorial**	**R&D**	**Internal**	**Exam.**	**Jury**	**Total**
	2	1		50		50	**100**

Objective:

To manage people, equipment, materials, built environment and assets, as well as roles overseeing technological processes including managerial aspects related to the design, construction and maintenance of buildings and civil infrastructure.

Course Content:

Unit I: Network Techniques

Introduction to network techniques; use of computer aided CPM and PERT for planning, Scheduling andcontrol of construction works; Computerized network scheduling and bar charts; Errors in networks;Types of nodes and node numbering systems.

Unit II: Construction Planning

- Planning of construction and site facilities using networks; Preparation of construction schedules for jobs, materials, equipment, labour and budgets using CPM
- Project costing,construction law, engineering project management, construction site operations, introduction to risk and due diligence

Unit III:

- Environmental sustainability in construction , international construction, engineering project control , location-based management for construction, procurement and risk management in projects, resource planning and management
- Construction equipmentsand methods: Equipments for earth construction and application; concrete construction; aggregate production

- Concrete: production, handling and placement; mixers, vibrations and temperature control

Unit IV:

- Principles of sustainability, maintenance management of engineering assets, risk perception and analysis, risk management, quantitative risk modeling.
- Control on construction
- Construction quality control and inspection; significance of variability in estimation of risk; construction cost control; crashing of networks

References:

1	Construction, Planning Management by Srivastava	1999
2	Construction Planning, Equipments and Methods by Peurifoy, R.L	1996
3	Construction Performance Control by Networks by Ahuja, H.N	
4	Project management with CPM & PERT by Moder and Philipese	1970
5	The due diligence Handbook – Corporate Governance, Risk Management & Business Planning by Linda S. Spedding	2009

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- III

BIM and Computer Application **M. Arch-III /EL-10**

Hours per Week				Assessment			
Studio	**Lecture**	**Tutorial**	**R&D**	**Internal**	**Exam.**	**Jury**	**Total**
	2	1		50		50	**100**

Objective:

To acquire a comprehensive base of knowledge in BIM (Building Information Modelling) and its application in Architecture

Course Content:

Unit I: Introduction to BIM

- Introduction to Revit Architecture and explaining core concepts of Revit
- Application of Revit for a sample residential project, with sun path diagrams, site details and analysis, annotations, and plotting a sheet
- Revit Element Hierarchy:
    - Category>Family>Type>Instance:
    - Introduction to Model Elements, Datum Elements, View Elements, View specific elements, Annotation, Detail Elements
- Basic user interface:
    - Ribbon: Architecture, Annotation, Modify, View etc
    - Context Changing Ribbon, Options bar, Quick Access Bar, Properties Pallet, Viewport Options Bar, Viewport Quick toggle Bar
- Customize User Interface
- 2D Views, 3d Views, Camera, Camera settings, Rendered viewport display settings, Sun study, Sections
- Selections and Selections toggles
- Revit Options Customization
- Templates - Metric and Imperial, Setting up New Project

UNIT II:

- **Datum Elements, View Elements, Basic Model Elements and Structural elements**
    - Levels, Grids
    - Witness lines
    - Columns and Structural Columns
    - Walls, Joints &transformation/edit commands (move, offset, extend, trim etc)
    - Loading Libraries, Doors, Windows, Components
    - Constraints and Dimensions
- **Advanced model elements,**
    - Floor, Slabs, Roofs, Ceilings, Projections/Extrusions
    - Stairs and Railings
    - Custom Model Elements, Walls customization
    - Curtain Walls, Grids and Mullions, Model Lines, Stacked walls, sweeps & reveals

UNIT III: Site Management, Files management and Teamwork

- Creating site topography, Importing survey plans
- Referencing and Importing CAD and Revit Projects
- Manage Links, Shared Coordinates and Teamwork

UNIT IV: View specific elements, Annotation, Detail Elements and Sheets

- Crop region, Cutaway views
- Adding, Numbering and Bounding Rooms,
- Schedules, Tags, Images in Schedules, Key schedules and Modify schedules
- Array, Detail callout, Detail components, Dimensions, Legends, Regions, Symbols, Texts
- Adding Sheets, Guide Grid and Placeholders

References:

1	Mastering Revit, Omura G.	2009
2	BIM Handbook : A guide to Building Information Modelling by Eastmen C., Tiecholz P., Sacks R.	2008
3	The Impact of Building Information Modelling : Transforming Construction by Ray Crotty	2011

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

Semester- IV

Thesis Project **M. Arch-IV /ST-04**

Hours per Week				Assessment			
Studio	**Lecture**	**Tutorial**	**R&D**	**Internal**	**Exam.**	**Jury**	**Total**
12	2		13	500		500	**1000**

Objective:

To apply the discipline and skills of the programme based on the research findings from the dissertation that shall enable the student to make informed professional decisions.

Course Content:

The thesis semester is a continuation to the previous dissertation module each student has attempted. The thesis is the culmination of work done on the dissertation and is considered to be of prime importance in the M.Arch course.

The thesis shall be based on the content of the previous semesters and the technical knowledge gained from the entire course which may include the simulations, analysis and /or design.

Each student is allocated a thesis supervisor, from within the faculty, who is responsible for academic guidance through the process, but can have a co-supervisor from the relevant field. The overall program would be co-ordinated by a Thesis Co-ordinator. A detailed program for the thesis would be prepared by the Thesis Co-ordinator, in due course.

At the end of the semester each student is expected to submit all the research findings and design interpretations as per the requirements and specifications of the department.

The department shall schedule a date for the viva-voce as per the academic calendar.

4th SEMESTER M.ARCH THESIS STUDIO

Periods per week: 12

Maximum Marks

Sessional work	:	500
Examination	:	500

Objective

To use and synthesize knowledge of various disciplines (Sustainable Architecture, Urban Design, Housing design) in the previous three semesters in an architectural project of the students' own choice.

Content

A. The thesis project will comprise the following:

- An illustrated report, which will include the validity and scope of the chosen project, methodology, prototype studies, site analysis, client's and architect's briefs, delineation of program and design criteria.
- A fully worked-out design proposal including consideration of site planning structures, services, and any other aspects/specific to the project.

B. Stages of Work:

1) STAGE 1 - APPROVAL OF THESIS TOPIC.
2) STAGE 2 – SYNOPSIS
3) STAGE 3 - LITERATURE REVIEW AND PROTOTYPE STUDIES
4) STAGE 4 - CASE STUDIES
5) STAGE 5 - PROGRAM FORMULATION & SITE ANALYSIS
6) STAGE 6 - CONCEPT DESIGN & DESIGN PHILOSOPHY
7) STAGE 7 - DESIGN DEVELOPMENT 1
8) STAGE 8 - DESIGN DEVELOPMENT 2
9) STAGE 9 - PRE-FINAL DESIGN SUBMISSION
10) STAGE 10 - REPORT SUBMISSION
11) STAGE 11 - FINAL EXTERNAL EXAMINATION

C. Schedule of submissions/examination

(Note: Commencement of the semester is considered as 0 week)

Stages of Work			Time allocated	Max. Marks
1.	**Sessional Work**			
(a)	Report			
	i)	Approval of thesis topic	1 week	
	ii)	Synopsis	1 week	25
	iii)	literature review and prototype studies	2 weeks	75
	iv)	Case studies	2 weeks	50
	v)	program formulation & site analysis	2 weeks	50
(b)	Evolution of Design			
	i)	Concept design & design philosophy	2 week	50
	ii)	Design development Stage-1	2 week	50
	iii)	Design development Stage-2	2 week	75
	iv)	Pre-final design submission	2 weeks	75
(c)	Final report		1 week	50
2.	**External Examination**		3 weeks	500

NOTE:

- Students are required to submit the Final Report, all final drawings and model/s in the standard format prescribed in the Thesis Program.
- Submissions for each stage are to be submitted one day before the date of Viva –voce/jury.

D. Teaching and Evaluation System:

1. The thesis studio will be conducted under the overall coordination of the Thesis Coordinator. In addition, two members of the Visiting Faculty would also be associated throughout the duration of the studio. Each student will be assigned a Thesis Guide who will supervise the progress of the student's work on a regular basis.

2. The Visiting Faculty (who are part of Thesis Studio team), the Thesis Coordinator and the concerned Thesis Guide will do approval of the thesis project/topic.

3. The student will have to submit an undertaking duly signed at each stage of the thesis to the effect that the contents of the submission are his/her original work and that all references have been duly acknowledged.

4. For all the stages (online mode/offline mode) submissions have to be submitted by 4:00 PM one day before the internal/external jury.

5. Jury/Viva voce of only those students will be conducted who have submitted their assignment for that particular stage on its scheduled time and date.

6. The students will be allowed to present only that works/drawings/write up to the internal/external jury (online/offline mode) which they have submitted for that particular stage on the scheduled date of submission. There should be no deviation in contents from the assignment submitted and the contents presented to the jury. The students are also required to submit a signed undertaking to this effect at each stage. In case there is any violation of this condition the student will not be awarded any marks for that stage.

   i) All stages of sessional work/internal assessment will be evaluated jointly by the entire studio team, thesis Coordinator, Visiting Faculty members, one/two external expert member (Special invitees) and the concerned thesis Guide.

   ii) In case the marks awarded by the thesis guide have a variation of more than 15 percent than the marks awarded by the one/two external expert member (Special invitees), then the marks awarded by the expert members will prevail for the calculation, and the marks awarded by the thesis guide will be ignored.

iii) Marks awarded at each stage will be based on the average of those awarded by all jury members. The decision of the Principal will be final in case of dispute/discrepancy.

iv) Jury for the External Examination will comprise the External Examiners appointed by the Panjab University. The average marks awarded by the external examiners will be considered for the external examination. This jury will be coordinated by the thesis Coordinator and the thesis guide of the student.

v) Students will be required to attend weekly reviews for their sessional and attendance.

vi) In view of the practical and creative nature of the thesis projects, the presence of the candidate at the viva voce examinations at all the prescribed stages shall be mandatory. If the candidate fails to appear in the viva voce examination at any stage, the thesis project submitted by him/her shall not be accepted.

vii) Candidate who fails to clear the thesis examination either in the periodic assessment or in the final examination can only be allowed to reappear with the regular batch of thesis students in the next academic year.

viii) Students, who fail to obtain pass marks in the periodic assessment, shall be required to change their thesis project.

NOTE:

1) Students will submit two copies of the final report on a standard format prescribed in the thesis program issued by the Thesis Coordinator, along with a soft copy of the report in Pdf format.

2) The students are also required to submit A-3 size copies of all the final drawings, photographs of the final model/models, and a soft copy of all the final drawings on a CD/DVD in Pdf format.

3) One copy of the report, the final drawings and models will be returned to the student after the declaration of the result.

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