RIMT UNIVERSITY MANDIGOBINDGARH

PUNJAB

STUDY SCHEME & SYLLABUS

For

B.ARCHITECTURE

(FIRST to SECOND Semester)

Program Code: BAR

Syllabus Applicable For Admission in 2017

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SECTION 1

Vision & Mission of the University

VISION

To become one of the most preferred learning places a centre of excellence to promote and nurture future leaders who would facilitate in desired change in the society

MISSION

M1: To impart teaching and learning through cutting edge technologies supported by the world class infrastructure

M2: To empower and transform young minds into capable leaders and responsible citizens of India instilled with high ethical and moral values

SECTION 2

Vision and Mission of the Department

VISION

To contribute to the society through excellence in scientific and technical education and research. To contribute the country by providing globally competent Architects capable of working in an inter-disciplinary environment which foster spirits of innovation, entrepreneurship and leadership. To support industry for growth, being the valuable resource for them, and remain a role model for others in the field of Architecture.

MISSION

M1: To provide a high-quality educational experience for undergraduate students that enables them to become leaders in their chosen professions and to make them globally competitive Architects.

M2: To create, explore, and develop innovations in Architecture through undergraduate and graduate research. To develop linkages with world class organizations and educational institutions in India and abroad for excellence in teaching, research and consultancy practices.

SECTION 3

About the Program

Architecture Department was established in 2004 with the inception of the institute to produce high quality Architects. The programme entails the designing and planning of residences, factories, office buildings, and other constructions.It requires a solid understanding of key concepts including building science. Architects apply these and other ideas in the design and analysis of a site.

SECTION 4

Program Educational Objectives (PEOs), Program Outcomes (POs) and Program Specific Outcomes (PSOs)

The PEOs are **broad statements** that describe the career and professional accomplishments that the program is preparing its graduates to achieve in two years subsequent to receiving the degree. The PEOs of the 'Bachelor of Architecture' program are as follows

PE01 To prepare graduates for employment in the architectural profession at career-entry levels; leading to licensure as an architect.

PEO2 To prepare graduates to continue their education in a post graduate, Master of Architecture program.

PEO3 To be able to work with, lead & engage big and small teams comprising diverse people in terms of gender, nationality, region, language, culture & beliefs. To understand stated and unstated differences of views, beliefs & customs in diverse & inter disciplinary team settings

PEO4 To be able to continuously learn and update one's knowledge, engage in lifelong learning habits and acquire latest knowledge to perform in current work settings

PEO5 To continuously strive for justice, ethics, equality, honesty, and integrity both in personal and professional pursuits. Able to understand and conduct in a way that is responsible and respectful.

Programme Specific Objectives (PSOs) are **specific statements** that describe the professional career accomplishments that the program is designed for. The PSOs of the 'Bachelor of Architecture' are as follows:

PSO1- Identify, analyze, design and develop solutions to Architectural design problems of practical importance to society.

PSO2- Our graduates will have incremental skills to enhance employability in Architecture and other allied professions.

PSO3- Demonstrate practices learned through internship and solve the problem using technical knowhow acquired and research.

Programme Outcomes (POs) are **attributes of the post-graduates** of the programme that are indicative of the graduates' ability and competence to work as a business professional upon post-graduation. Program Outcomes are statements that describe what students are expected to know or be able to do by the time of post-graduation. They must relate to knowledge and skills that the students acquire from the programme. The achievement of all outcomes indicates that the student is well prepared to achieve the program educational objectives down the road. POs designed for 'Bachelor of Architecture' are as follows:

PO1 Architectural Knowledge: Acquire a wide range of Professional architectural knowledge which will help them to practice as an architect. Students will be equipped with gaining knowledge of architecture as well as allied fields like environmental science, landscape design, Photography, architectural writing which can be further enhanced by doing specialization.

PO2 Problem Solving: Through education, we emphasize the power of discovery and the foundation of critical and analytic thinking. We foster creativity, challenge the boundaries of knowledge and cultivate independence of mind through unique interdisciplinary partnerships. Ours is a proud culture of innovation, collaboration and discovery that has transformational impact on the society.

PO3 Design development: Systematic exploration of architectural design through sequential development in the complexity of design issues. Systematically Integration of all other allied subjects at different levels depending upon the objectives to be achieved. Identify, formulate, Precedent studies in form of case studies, literature study for analysis and inferences to reach

conceptualization for particular design project. Considerations of climatic studies, sustainability, environmental issues, structural detailing, byelaws and norm etc to develop a design solution. Holistic development of students in terms of Architectural design, required skills (communication skills, presentation skills, model making skills) and professional capabilities and discipline.

PO4 Conduct Investigations: RIMT College of architecture endeavours to integrate education, research and service so that each enriches and extends the others. This integration promotes academic excellence and nurtures innovation and scholarly development in our students. We are committed to overall academic excellence through exploration of diverse contexts and innovations through collaborative research. Use research based knowledge and research methods including experiments, analysis and interpretation of data and synthesis of information to arrive at a conclusion. Respect for cultural and social diversities is linked to academic excellence. We hold ourselves to the highest standards of ethics, as a beacon for our community and the world.

PO5 Use of Modern tool: Application of appropriate techniques, resources and modern tools including prediction and modelling to derive at solutions, Use of various presentation techniques to explain the solutions.

PO6 Socially Responsible Architects: RIMT College of architecture advances knowledge, addresses pressing societal needs and creates an academic environment enriched through diverse perspectives where all individuals can flourish. We seek to serve society through our students by educating and passing on to students a renewable set of skills and commitment to social engagement being an architect.

PO7 Environment and Sustainability: Making students sensitive towards varied aspects of Built Environment. Understand impact of the professional architectural design solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.

PO8 Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the architectural professional practice.

PO9 Individual and teamwork: Function effectively as an individual and as member or leader in diverse teams and in multidisciplinary settings.

PO10 Communication: Communicate effectively on architectural issues with the architectural fraternity, community and society at large, able to write effective reports, design documentation, make effective presentations, give and receive instructions.

PO11 Project management and Finance: Demonstrate knowledge and understanding of architectural design management principles and apply these in individual work, as a member and leader in team, to manage projects and in multidisciplinary environment.

PO12 Lifelong learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

The following sections describe the requirements for earning a Post-graduate degree in Architecture and its break-down in terms of University Core courses, Program Core courses and electives at both the University and the Program levels.

SECTION 5

Curriculum / Scheme with Examination Grading Scheme

EXAMINATION GRADING SCHEME

Marks Percentage	Grade	Grade Point	Qualitative Meaning
80-100	O	10	Outstanding
70-79	A^+	9	Excellent
60-69	A	8	Very Good
55-59	B^+	7	Good
50-54	B	6	Above Average
45-49	C	5	Average
40-44	P	4	Fail
0-39	F	0	Fail
ABSENT	AB	0	Fail

Percentage Calculation: CGPA *10

B. ARCHITECTURE (1stYEAR)

1ST SEMESTER		Hrs.				Marks			Credits	External Exam Remarks / Duration
Subject Code	Subject Name	L	T	P	S	Int	Ext	Total		
BARC1101	Architectural Design& Theory - I	1	0	2	4	150	150	300	6	6 Hrs(Evaluation by External Viva -voce)
BARC1102	Building Construction -I	1	0	2	2	100	100	200	4	4 Hrs
BARC1103	Building Materials-I	2	0	0	0	50	50	100	2	3Hrs
BARC1104	Architectural Drawing - I	1	0	2	0	50	50	100	2	4Hrs
BARC1105	Structure Systems - I	1	2	0	0	50	50	100	2	No Exam (Evaluation by External Viva -voce)
BARC1106	Visual Communication - I	0	0	2	0	25	25	50	1	No Exam (Evaluation by External Viva -voce)
BARC1107	Architectural Communication Skills - I	2	0	0	0	50	50	100	2	3Hrs.
BARC1108	Model Making-I	1	1	3	0	75	75	150	3	No Exam (Evaluation by External Viva -voce)
TOTAL	**Contact Hrs. = 29**	**9**	**3**	**11**	**6**	**550**	**550**	**1100**	**22**	

*Educational Tour of duration up to 04 days during the semester shall be undertaken

B. ARCHITECTURE (1st YEAR)

2ND SEMESTER		Hrs.				Marks			Credits	External Exam Remarks / Duration
Subject Code	Subject Name	L	T	P	S	Int	Ext	Total		
BARC1201	Architectural Design - II	1	0	2	4	150	150	300	6	6 Hrs(Evaluation by External Viva -voce)
BARC1202	Building Construction -II	1	0	2	2	100	100	200	4	4 Hrs
BARC1203	Building Materials-II	2	0	0	0	50	50	100	2	3Hrs
BARC1204	Architectural Drawing - II	1	0	2	0	50	50	100	2	4Hrs
BARC1205	Structure Systems - II	1	2	0	0	50	50	100	2	No Exam (Evaluation by External Viva -voce)
BARC1206	Visual Communication - II	0	0	2	0	25	25	50	1	3 Hrs
BARC1207	Software Skills - I	1	0	2	0	50	50	100	2	No Exam (Evaluation by External Viva -voce)
TOTAL	**Contact Hrs. =25**	**7**	**2**	**10**	**6**	**475**	**475**	**950**	**19**	

* Educational Tour of duration up to 04 days during the semester shall be undertake

B. ARCHITECTURE(2ndYEAR)

3RD SEMESTER		Hrs.				Marks			Credits	ExternalExamRemarks/Duration
Subject Code	SubjectName	L	T	P	S	Int	Ext	Total		
BARC301	Architectural Design-III	1	0	2	4	150	150	300	6	12Hrs(Evaluationby ExternalViva-voce)
BARC302	Building Construction&Materials-III	1	0	2	2	100	100	200	4	4Hrs
BARC303	ComputerGraphicSkills-I	1	0	2	0	50	50	100	2	NoExam(EvaluationbyExternalViva-voce)
BARC304	Structures in Architecture-III	1	2	0	0	50	50	100	2	3Hrs
BARC305	History of Architecture-III	2	0	0	0	50	50	100	2	3Hrs
BARC306	Building Science-II	2	0	0	0	50	50	100	2	3Hrs
BARC307	Building Technology-II	2	0	0	0	50	50	100	2	3Hrs
BARC308	Architectural Drawing-III	0	2	0	2	75	75	150	3	4Hrs
BARC309	ParametricArchitecture-II	0	0	2	0	50	0	50	1	NoExam,onlyInternals
TOTAL	**ContactHrs.=30**	**10**	**4**	**8**	**8**	**625**	**575**	**1200**	**24**	

4TH SEMESTER		Hrs.				Marks			Credits	External Exam Remarks/ Duration
Subject Code	SubjectName	L	T	P	S	Int	Ext	Total		
BARC401	Architectural Design-IV	1	0	2	4	150	150	300	6	12Hrs (Evaluation by External Viva-voce)
BARC402	Building Construction & Materials-IV	1	0	2	2	100	100	200	4	4Hrs
BARC403	Computer Graphic Skills-II	1	0	2	0	50	50	100	2	NoExam (Evaluation by External Viva-voce)
BARC404	Structures in Architecture-IV	1	2	0	0	50	50	100	2	3Hrs
BARC405	History of Architecture-IV	2	0	0	0	50	50	100	2	3Hrs
BARC406	Building Science-III	2	0	0	0	50	50	100	2	3Hrs
BARC407	Building Technology-III	2	0	0	0	50	50	100	2	3Hrs
BARC408	Measured Drawing	0	2	0	2	75	75	150	3	NoExam (Evaluation by ExternalViva-voce)
BARC409	Parametric Architecture-III	0	0	2	0	50	0	50	1	No Exam, only Internal
TOTAL	**ContactHrs.=30**	**10**	**4**	**8**	**8**	**625**	**575**	**1200**	**24**	

B. ARCHITECTURE (3rdYEAR)

5TH SEMESTER		Hrs.				Marks			Credits	External Exam Remarks/ Duration
Subject Code	SubjectName	L	T	P	S	Int	Ext	Total		
BARC501	Architectural Design-V	1	0	4	3	150	150	300	6	18Hrs(EvaluationbyExternalViva-voce)
BARC502	Building Construction & Materials-V	1	0	2	2	100	100	200	4	4Hrs
BARC503	Computer Graphic Skills-III	1	0	2	0	50	50	100	2	NoExam(Evaluationby ExternalViva -voce)
BARC504	Structures in Architecture-V	1	2	0	0	50	50	100	2	3Hrs
BARC505	History of Architecture-V	2	0	0	0	50	50	100	2	3Hrs
BARC506	Building Science-IV	2	0	0	0	50	50	100	2	3Hrs
BARC507	Building Technology-IV	2	0	0	0	50	50	100	2	3Hrs
BARC508	Working Drawing	0	2	0	2	75	75	150	3	NoExam(Evaluationby ExternalViva -voce)
BARC509	Parametric Architecture-IV	0	0	2	0	50	0	50	1	No Exam,onlyInternal
TOTAL	**ContactHrs.=31**	**10**	**4**	**10**	**7**	**625**	**575**	**1200**	**24**	

6TH SEMESTER		Hrs.				Marks			Credits	External Exam Remarks/ Duration
Subject Code	SubjectName	L	T	P	S	Int	Ext	Total		
BARC601	Architectural Design-VI	1	0	4	3	150	150	300	6	18Hrs(EvaluationbyExternalViva-voce)
BARC602	Building Construction&Materials-VI	1	0	2	2	100	100	200	4	4Hrs
BARC603	ComputerGraphicSkills-IV	1	0	2	0	50	50	100	2	No Exam(EvaluationbyExternalViva-voce)
BARC604	Structures in Architecture-VI	1	2	0	0	50	50	100	2	3Hrs
BARC605	History of Architecture-VI	2	0	0	0	50	50	100	2	3Hrs
BARC606	Urban & Regional Planning	2	0	0	0	50	50	100	2	3Hrs
BARC607	Building Technology-V	2	0	0	0	50	50	100	2	3Hrs
BARC608	Building Byelaws	2	0	0	0	50	50	100	2	3Hrs
BARC609`	Parametric Architecture-V	0	0	2	0	50	0	50	1	NoExam only Internal
TOTAL	**ContactHrs.=29**	**12**	**2**	**10**	**5**	**600**	**550**	**1150**	**23**	

B. ARCHITECTURE (4th YEAR)

7TH SEMESTER		Hrs.				Marks			Credits	External Exam Remarks/ Duration
Subject Code	SubjectName	L	T	P	S	Int	Ext	Total		
BARC701	Architectural Design-VII	1	0	4	3	150	150	300	6	18Hrs(Evaluationby ExternalViva-voce)
BARC702	Building Construction & Materials-VII	1	0	2	2	100	100	200	4	4Hrs
BARC703	Computer Graphic Skills-V	1	0	2	0	50	50	100	2	NoExam(Evaluationby ExternalViva-voce)
BARC704	Estimating &Costing	1	2	0	0	50	50	100	2	3Hrs
BARC705	Interior Design	2	0	0	0	50	50	100	2	3Hrs
BARC706	Urban Design	2	0	0	0	50	50	100	2	3Hrs
BARC707	Model Making	1	0	2	0	50	50	100	2	NoExam(Evaluationby ExternalViva-voce)
BARC708	Disaster Management	2	0	0	0	50	50	100	2	3Hrs
BARC709	Parametric Architecture-VI	1	0	2	0	100	0	100	2	No Exam, only Internal
TOTAL	**ContactHrs.=31**	**12**	**2**	**12**	**5**	**650**	**550**	**1200**	**24**	

8TH SEMESTER		Hrs.				Marks			Credits	External Exam Remarks/ Duration
SubjectCod	SubjectName	L	T	P	S	Int	Ext	Total		
BARC801	Practical Training (of 24 weeks Duration)	-	-	-	-	540	360	900	18	NoExam(EvaluationbyExternalViva-voce)
BARC802	Project Report	-	-	-	-	120	80	200	4	NoExam(EvaluationbyExternalViva-voce)
TOTAL		**-**	**-**	**-**	**-**	**660**	**440**	**1100**	**22**	

B. ARCHITECTURE (5th YEAR)

9TH SEMESTER		Hrs.				Marks			Credits	External Exam Remarks/ Duration
Subject Code	**Subject Name**	**L**	**T**	**P**	**S**	**Int**	**Ext**	**Total**		
BARC901	Architectural Design-VIII	2	0	2	7	250	250	500	10	No Exam, (Evaluation by External Viva on Portfolio)
BARC902	Research Methodology	2	0	0	0	50	50	100	2	3Hrs
BARC903	Construction Management	1	2	0	0	50	50	100	2	3Hrs
BARC904	Contemporary Theories in Architecture	2	0	0	0	50	50	100	2	3Hrs
BARC905	Professional Practice	2	0	0	0	50	50	100	2	3Hrs
BARC906 A/B	Elective I Product Design/ Furniture Design	1	0	2	0	50	50	100	2	3Hrs
BARC907 A/B	ElectiveII Housing / Traffic &Transport Planning/ Town Planning	1	0	2	0	50	50	100	2	3Hrs
BARC908 A/B	ElectiveIII Sikh Architecture/Hill Architecture	2	0	0	0	50	50	100	2	3Hrs
TOTAL	**ContactHrs.=28**	**13**	**2**	**6**	**7**	**600**	**600**	**1200**	**24**	

10TH SEMESTER		Hrs.				Marks			Credits	External Exam Remarks/ Duration
Subject Code	**Subject Name**	**L**	**T**	**P**	**S**	**Int**	**Ext**	**Total**		
BARC1001	Architectural Design–IX (Thesis Project)	4	0	4	12	450	450	900	18	NoExam(ExternalVivabyJury)
BARC1002 A/B	Elective I Real Estate Management/Architectural Journalism	2	0	0	0	50	50	100	2	3Hrs
BARC1003 A/B	ElectiveII Building Maintenance/Architectural Conservation	2	0	0	0	50	50	100	2	3Hrs
BARC1004 A/B	ElectiveIII Energy Efficient Buildings and Building Automation/Advanced Construction & Materials	2	0	0	0	50	50	100	2	3Hrs
TOTAL	**ContactHrs.=26**	**10**	**0**	**4**	**12**	**600**	**600**	**1200**	**24**	

B.ARCH.SEMESTER-I	BARC 1101	ARCHITECTURAL DESIGN & THEORY - 1	
Scheme of Teaching **L T P S Total** **1 0 2 4 7**	**Scheme of Examination (Marks)** **Internal External Total** **150 150 300**	**Duration of Examination** **6 Hours** **(Evaluation by External Viva - voce)**	**Credit** **6**

COURSE PREREQUISITES:

The student should have an aptitude to visualize 2-D and 3-D objects.

COURSE OBJECTIVES:

- The student shall be able to learn the relationship between form and space.
- The student should be oriented towards development of visualization and expressional skills.

EXPECTED LEARNING OUTCOME:

Student shall be able to understand basic form and elements of Architectural Design.

Unit-I

PART - A (Theory)

- Introduction to Basic Design
- Elements of Design
- Principles of Design
- Objectives of Design

PART - B

- Interrelationship of Architectural Form and Space
- Anthropometry and its application in design. (including physically challenged)

Unit – II (Application and Experience)

- 2D compositions with basic geometric shapes, color, texture and pattern.
- Door elevation
- Carpet design
- Mural with geometrical shape
- Floor tile design & paving patterns.
- Sky line of city/village
- Experience in 3D Design, compositions with simple forms like cube, cuboids, cylinder, cone, prism etc.
- Compositions with 3-D Objects. (Black & white and colors).
- Exhibition stall/Kiosk.
- Check Post.
- Gardener's Hut.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC1101.1	Students will be able to understand basic form and elements of Architectural Design.
BARC1101.2	Orientation towards development of 2D & 3D composition by understanding the basic principles of design and utilize simple geometric shapes.
BARC1101.3	Design the public service zone through detailed measured drawings & sketches.
BARC1101.4	Design the space with furniture layout by understanding & learning the proportion of human body parts, activities.

REFERENCE BOOKS:

- V.S. Pramar, 'Design Fundamentals in Architecture', Somaiya Publications, 1973.
- Francis D.K. Ching, 'Architecture: Form, Space, and Order', Wiley Publications, 3rd Edn.
- Pandya Yatin, 'Elements of Space-Making, Mapin Publishing Pvt.'.
- Chiara, Joseph De, 'Time Saver Standards for Building Types', McGraw–Hill Professional Publishing, 2001.
- K.W. Smithies, 'Principals of Design in Architecture', Chapman & Hall, 1983.
- Harry N. Abrams, Rompilla, Ethel, 'Color for Interior Design'.

INSTRUCTIONS TO THE PAPER SETTER:

1. Four questions are to be set from unit-I, two from part A and two from part B and students will be required to attempt one question from each part.
2. Two questions are to be set from unit-II and students will be required to attempt only one question.

NOTE:

Evaluation is to be done through viva voce by external examiner appointed by the university at college and answer sheets should be retained at institute level.

B.ARCH.SEMESTER-I	BARC1102	BUILDING CONSTRUCTION -I	
Scheme of Teaching	Scheme of Examination (Marks)	Duration of Examination	Credit
L T P S Total 1 0 2 2 5	Internal External Total 100 100 200	4 Hours	4

COURSE OBJECTIVES:

To acquaint students about the handling and construction details of building materials.

EXPECTED LEARNING OUTCOME:

The students shall be able to understand the process of building construction, the components of a building.

Unit-I

- Type of Bats and closers of Brick Masonry.
- Bonds in Brick work (English, Flemish, Rattrap Bond) – 4 ½", 9", 13 ½" Thick.
- L-Junction, T-Junction in Brick Masonry (4 ½", 9", 13 ½" Thick.)
- Attached and Detached piers in Bricks

Unit – II

- Components of Arches, Types of Arches, and Arches in Brick work (Flat, Segmental and Semi-Circular)
- Stone masonry (Rubble & Ashlar)
- Construction of Brick Jalli wall

Unit – III

- Lintels, Sills, Coping, Threshold details, Stepped brick foundation, Plinth detail and D.P.C. details
- Section through a Single storey load bearing structure.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC1102.1	To introduce students to primary building materials and simple construction techniques as applicable to a low-rise building-three to four storied contemporary building.
BARC1102.2	To educate the students with construction details of various components of a small single storied building.
BARC1102.3	The students will apply the construction techniques involved in masonry work with different materials like brick, stone and composite materials in different locations like T- junctions, independent piers and corner junctions.
BARC1102.4	Students will understand the importance of various bonds through brick models and the assembling of these brick models in the form of courses and bonds. The subject will also introduce spread and stepped foundations in a building and their construction techniques.

REFERENCE BOOKS:

- W.B. Mckay, 'Building Construction'.
- B.C. Punmia, 'Building Construction'.
- Ching, D.K. Francis, 'Building Construction Illustrated'.
- Chudley, 'Construction Technology'.
- R. Barry, 'Construction of Buildings'.

INSTRUCTIONS TO THE PAPER SETTER:

1. The examiner is required to set a total of six questions with two questions from each UNIT.
2. The student is required to attempt any one question from each UNIT making a total of three questions.

B.ARCH.SEMESTER-I					BARC1103			BUILDING MATERIALS -I	
Scheme of Teaching					Scheme of Examination (Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3 Hours	2
2	0	0	0	2	50	50	100		

COURSE PREREQUISITES:

No Course Prerequisites

COURSE OBJECTIVES:

To acquaint students about the various building materials.

Elementary Building Materials

- The study of constituents, properties, types, available market forms and uses of following:
    - Bricks
    - Stones
    - Cement
    - Lime
    - Sand.
- The study of constituents, properties and uses of following:
    - Mortar
    - Lime Mortar
    - Cement Mortar
    - Surkhi
    - Mud Mortar

Surface Finishes

- Plastering
- Pointing

NOTE:

- Site visit to Brick Kiln /Construction site should be done.
- Market Survey for above said materials with respect to their availability, trade names, market rates etc.
- Site report should be evaluated and shall form part of the sessional work

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC1103.1	To introduce students to primary building materials for contemporary building.
BARC1103.2	To educate the students with application techniques of the material.
BARC1102.3	The students will apply the construction techniques involved in masonry work with different materials like brick, stone and composite materials.
BARC1103.4	Students will understand the importance building material t be used in construction.

REFERENCE BOOKS:

S.C. Rangwala, 'Engineering Materials'.

INSTRUCTIONS TO THE PAPER SETTER:

1. The examiner is required to set a total of 5 questions.
2. The student is required to attempt any 3 questions.

B.ARCH.SEMESTER-I					BARC1104			ARCHITECTURAL DRAWING -I	
Scheme of Teaching					Scheme of Examination (Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	4 Hours	2
1	0	2	0	3	50	50	100		

COURSE PREREQUISITES:

The students should have an aptitude to visualize 2D and 3D objects.

COURSE OBJECTIVES:

The students should be able to learn the basics of good drafting, lettering techniques and visualization of geometrical forms through plan, elevations and sections.

EXPECTED LEARNING OUTCOME:

The students shall be able to understand and draft 2-D and 3-D objects.

Unit – I

- Various types of lines used in Architectural Drawing.
- Lettering Techniques (Single and Double)
- Types of construction of plain and diagonal scales

Unit – II

- Orthographic projections of point, line, planes and solids in various positions in first Quadrant.
- Sections of solids example Cube, cuboids, cone, cylinder, pyramid, prism etc.
- Interpenetration of simple platonic solids.

Unit – III

- Isometric views of simple and complex forms.
- Axonometric views of simple forms.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC1104.1	Learning Architectural Drawing Development of Drafting skills for architectural drawings.
BARC1104.2	Study of reference planes, projectors, orthographic projections of objects in different positions &method of drawing the same.
BARC1104.3	Angular Projections: - Isometric and Axonometric fixing details.
BARC1104.4	Development of solids with voids, Interpenetration of solids, solids & voids , development of surface & section at a junction.

REFERENCE BOOKS:

- N.D. Bhatt, 'Engineering Drawing'.
- R.K. Dhawan, 'Engineering Drawing'.
- P.S. Gill, 'Engineering Drawing'.
- Ching Franc D.K., 'Architectural Graphics'.

INSTRUCTIONS TO PAPER SETTER:

1. Two questions are to be set from Unit-I & III and students will be required to attempt one question.
2. Three questions are to be set from Unit-II, students have to attempt two questions.

B.ARCH.SEMESTER-I					BARC1105			STRUCTURE SYSTEM -I	
Scheme of Teaching					Scheme of Examination (Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	NO EXAM (Evaluation by External Viva - voce)	2
1	2	0	0	3	50	50	100		

COURSE OBJECTIVES:

The teaching of this subject shall help the students:

- To be aware of basic principles applicable in various structural systems
- To understand the Role and Importance of Structures in a Built Environment.
- To create skill of applying the knowledge gained in building projects.

EXPECTED LEARNING OUTCOME:

The student shall be able to learn:

- The predominantly pictorial nature of an Architect's language.
- The physical-mechanical essence of the subject matter.
- The orientation of all Architectural efforts to Form and Space.

Unit – I

CELLULAR SYSTEM

1. Cell as a natural UNIT of space.
2. Cell transformation.
3. Polygonal Cellular Systems leading to evolution of Geodesic Domes
4. Applications of Cellular System in Building

Unit – II

BULK ACTIVE STRUCTURE SYSTEM

Structure acting mainly through material bulk and continuity i.e. Bulk active structure system / Section active structure systems:

1. Slabs (One way & Two way)
2. Beams (Simply supported, Cantilever, Continuous, Vierendale Girders)
3. Grid (Skew & Square Grid)
4. Columns

Unit – III

VECTOR-ACTIVE STRUCTURE SYSTEM

Structures acting mainly through Composition of Compression and Tension members such as Vector-active structure system /Co-active structure system:

1. Space frames
2. Trusses (Timber & Steel)
3. Domes (Ribbed & Geodesic)

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC1105.1	Student should have knowledge of domes design.
BARC1105.2	Students have knowledge of Polygonal Cellular Systems leading to evolution of Geodesic Domes
BARC1105.3	Students have knowledge of structural analysis of any building structure.
BARC1105.4	Form active Structures. – Tensile structures

RECOMMENDED BOOKS:

1. H. Engel, 'Structure Systems'.
2. Salvadori Mario, 'Building of Building'.
3. Butler Robert B., 'Architectural Engineering Design: Structural Systems'.
4. G.G. Schierle, 'Architectural Structure'.
5. Moore Fuller, 'Understanding Structure'.

B.ARCH.SEMESTER-I					BARC1106			VISUAL COMMUNICATION -I	
Scheme of Teaching					Scheme of Examination (Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	NO EXAM (Evaluation by External Viva - voce)	1
0	0	2	0	2	25	25	50		

COURSE PREREQUISITES:

The student should have an aptitude of using pencil and draw freehand 2-D and 3D objects/forms.

COURSE OBJECTIVES:

The student shall be able to learn the fundamental use and role of pencil and colour as a medium of rendering 2D & 3D forms.

EXPECTED LEARNING OUTCOME:

The student shall be able to learn the art of using the potential of pencil and colour as a tool of graphic communication.

Unit – I

- Different stroke as in pencil using various grades (HB, B, 2B, 3B, 4B, 5B, 6B, Charcoal pencil).
- Rendering of textures of different building materials in pencil.

Unit – II

- Free hand still life sketching in pencil of compositions of solids, cubes, cylinders and spheres showing the effect of light and shade on them.
- Free hands sketching in pencil, of scale elements like trees, shrubs, human figures, vehicles, lampposts etc.

Unit – III

- Introduction to colour theories and colour wheel.
- Various colour schemes, tints and shades.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC1106.1	Control over the pencil & technical pen's strokes. Able to draw freehand for quickly present an idea in a graphical form to non-technical peoples. it is a universal language, Architects use to communicate with other participants of a project.	
BARC1106.2	Understand the Graffiti, Poster, Mural, Logo, Composition & Calligraphy writing for developing Architectural hand.	
BARC1106.3	To understand the fundamentals of design as a basic creative activity,& the basics of architectural aesthetics. Representation 2D drawing of simple landscape features. Get awareness to produce creative thoughts that remain logical. Also get understanding Architectural Connotation in freehand sketching.	
BARC1106.4	A Comprehensive knowledge & understanding of the shading pattern of the object. light, exposure & color & their application in architecture. Also get understanding of outdoor free hand sketching which helps the architects to gain knowledge of insight & inspiration to express their observation, thoughts & feelings. Sketching of public spaces from memory stimulate creativity & open-ended thoughts, making the mind think in a different manner, forcing it to problem solve.	

REFERENCE BOOKS:

- Robert W. Gill, 'Rendering with Pen and Ink', Thames & Hudson London, **2008.**
- Jaxtheimer, **'**How to paint and Draw'.
- Jaccuelina, 'Graphic Illustrations in Black and White', Design Press, New York, 1991.
- Crowne Philip, 'Architectural Rendering', Rofovision S.A Switzerland, 1991.

INSTRUCTIONS TO THE PAPER SETTER:

The examiner is required to set a total of six questions with two questions from each UNIT. The student is required to attempt any one question from each UNIT making a total of three questions.

B.ARCH.SEMESTER-I					BARC1107			ARCHITECTURAL COMMUNICATION SKILLS -I	
Scheme of Teaching					Scheme of Examination (Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3 Hours	2
2	0	0	0	2	50	50	100		

COURSE PREREQUISITES:

Basic knowledge of English as a language up to 12th standard.

COURSE OBJECTIVES:

The objective is to help the students to become independent users of English language. Students should be able to understand spoken and written English language of varied complexity on most including some abstract topics; particularly for preparing Architectural reports. They must show awareness in the field and must be able to explain their views in a rational manner.

EXPECTED LEARNING OUTCOME:

The students shall be able to converse fluently, without strain with international speakers of English in an accent and lexis that is widely understood across the globe. They will be able to prepare Architectural reports and texts on their own and shall be able to communicate in a professional manner.

- **Reading:** Reading texts of varied complexity; speed reading for global and detailed meaning; processing factual and implied meanings
- **Vocabulary:** Building up and expansion of vocabulary; active use of Architectural vocabulary
- **Grammar:** Revising and practicing a prescribed set of grammar items; using grammar actively while processing or producing language
- **Writing:** The qualities of good writing; Learning the prescribed written expressions of conventional use; writing business letters, emails; Architectural reports, summaries and various forms of descriptive and argumentative essays related to buildings; poetry and prose

Unit – I (Reading)

The students will go through the reading texts themselves with the help of a dictionary or word power as given at the end of books. As they progress from one reading to another they should learn to read fast with greater degree of understanding of both concrete and abstract topics. While taking up the textbook lessons in the classroom, the teacher shall ensure that students can do the following:

- Identify the significant points and conclusions as given in the text.
- Handle large texts (even outside the prescribed book) with overall comprehension of the links between arguments and the finer distinction between stated and implied meanings.
- Generally, read the stance or the point of view of the writer and present it in the form of a summary
- Use the vocabulary learnt in the lessons (especially given in “word power“) productively in various writing tasks as suggested at the end of each lesson.

- Profitably use the grammatical items as discussed at the end of each lesson while producing language for communication.
- Besides the textbook, the teacher must insist that students extend their reading by taking up additional texts of their own choice

Unit – II (Writing)

The students must learn the language that expresses various cognitive functions that are frequently used in writing. With the help of the teacher who will give them adequate practice, the students should be able to:

- Convey information on concrete or abstract topics with clarity and precision.
- Write about objects or events with appropriate detail in both descriptive and narrative form.
- Explain ideas and build up arguments with adequate support in a convincing manner.
- Use language with some degree of flexibility in consideration to the reader.
- Produce effectively such forms of professional writing as business letter, emails, notes, memos, reports summaries etc.
- While teaching, the teacher must inculcate in students the habit of revising their writing. The teacher can also use and recommend the relevant sections of the following books for developing writing skills in students.

Unit – III (Architectural Reporting)

- The students must visit places of Architectural importance, buildings, gardens, monuments etc. and prepare visit reports. The parameters to be considered for report writing shall be location, history, concept and key elements of design
- Basic understanding and vocabulary of Architectural terms and features.
- Presentation of various site reports, case studies and methods of holding meetings.
- Preparation of press note of Architectural reports and events.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC1107.1	The course intends to build the required communication skills of the students having limited communicative abilities, so that they may communicate effectively in real-life situations
BARC1107.2	This will help the students to equip themselves for better performance in all subjects that require verbal communication and written explanations.
BARC1107.3	Introduce basis language skills for oral professional communication that enables effective conversation in the classroom and courteous but forceful participation in conferences and seminars, both as audience and for diverse audiences.

REFERENCE BOOKS:

1. Vandana R. Singh, 'The Written Word', Oxford University Press, New Delhi.
2. K.K. Ramchandran, et al, 'Business Communication', Macmillan, New Delhi.

3. Swati Samantaray, 'Business Communication and Communicative English', Sultan Chand, New Delhi.
4. S.P. Dhanavel, 'English and Communication Skills for Students of Science and Engineering (with audio CD)'.

INSTRUCTIONS TO THE PAPER SETTER:

1. One compulsory question containing 6 questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus
2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit)

B.ARCH.SEMESTER-I					BARC1108			MODEL MAKING -I	
Scheme of Teaching					Scheme of Examination (Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	NO EXAM (Evaluation by External Viva - voce)	3
1	1	3	0	4	75	75	150		

COURSE OBJECTIVES:

To acquaint the students with the knowledge of carpentry and joinery. To make the students aware of various model making techniques using different materials.

EXPECTED LEARNING OUTCOME:

Students should be able to understand carpentry and joinery techniques and various model making methods using different materials.

Unit - I

Introduction to Carpentry Joints:

- Measuring, cutting and sawing of natural wood in workshop
- Tools used in carpentry
- Different types of joints in carpentry and their models in wood

Unit - II

Preparations of Model:

- Introduction to various materials used in making Architectural models.
- Exercise shall be based on preparation of block models and a detailed model of a small structure including Hardscape and Softscape and scale elements like lamp posts, trees, street furniture etc.

Unit - III

Development of Surfaces:

- Methods for development of surfaces of solids and other forms in different materials like clay, thermocole, mount board, paper, acrylic sheet, ivory sheet etc.
- Sculpture making with **Plaster of Paris** using casting and carving and **Clay** using pinching coiling and slab techniques.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC1108.1	To understand the constraints and complexities and versatility of joinery in carpentry.
BARC1108.2	Introduce different techniques of model making in various materials and basic processes for fabrication and assembly of simple building components.
BARC1108.3	The aim of this subject is to familiarize students with different types of materials and manufacturing techniques for creating art forms/ models.

RECOMMENDED BOOKS:

1. H.S. Bawa, 'Carpentry- A Complete Guide',
2. Miller, 'Carpentry and Construction'.

B.ARCH.SEMESTER-II	BARC 1201	ARCHITECTURAL DESIGN - II	
Scheme of Teaching **L T P S Total** **1 0 2 4 7**	**Scheme of Examination (Marks)** **Internal External Total** **150 150 300**	**Duration of Examination** **6 Hours** **(Evaluation by External Viva - voce)**	**Credit** **6**

COURSE PREREQUISITES:

The student should have the basic knowledge of anthropometric data and the relationship of form, space and function.

COURSE OBJECTIVES:

They should be able to understand the design process of small scale buildings, function and standards. The student must be able to understand relationship between site and built form.

EXPECTED LEARNING OUTCOME:

Student shall be able to understand and appreciate the constraints in the Architectural design of a small scale building with reference to function, form and site.

CONTENTS:

Study and design of small scale buildings based on space standards like circulation, furniture-size, clearances, heights, light, ventilation etc. Systematic introduction and study of issues related to function and physical form in relation to site and surroundings. The design exercises may include:

- Study of habitable space / house.
- Design of studio apartments or house.
- Highway side/ roadside café/fast food outlets with landscape and parking.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC1201.1	**Simplicity to Complexity** Learning of aesthetic qualities but with more emphasis architectural and functional aspects.
BARC1201.2	Understanding interrelationship of different activities on basis of the nature, proximity, circulation & their compatibility.
BARC1201.3	Dealing with composite activity as major design project for understanding of architectural design.Understanding Complexity in circulation- and pattern of horizontals as well as vertical movement.
BARC1201.4	Learning Integration in terms of facilitation, plan form, volume, concept and space organization. Understanding Climatic consideration for the design, orientation of building on site, simple concepts of sun shading devices, and their application in elevations as functional / aesthetic solutions.

RECOMMENDED BOOKS:

- Chiara, Joseph De, 'Time Saver Standards for Building Types', McGraw–Hill Professional Publishing, 2001.
- Ching, D.K. Francis, 'Architectural Form, Space and Order', Van Nost rand Reinhold International Thomson Publishing, Inc.: New York, 1996.
- R. Scott, 'Design Fundamentals', Publisher-RoBARC1t E. Krieger Publishing Company.
- E & OE- 'Architects Hand Book and Planning'.3.

INSTRUCTIONS TO THE PAPER SETTER:

- One compulsory question is to be set from the entire syllabus.
- The topic of the project is to be displayed on College / Institute Notice Board ten days in advance.

NOTE:

- Evaluation is to be done through viva voce by external examiner appointed by the university at college level.
- Answer sheets after the university exam shall be retained at college level for the viva-voce.

B.ARCH.SEMESTER-II	BARC 1202	BUILDING CONSTRUCTION – II	
Scheme of Teaching	**Scheme of Examination (Marks)**	**Duration of Examination**	**Credit**
L T P S Total	**Internal External Total**	**4 Hours**	**4**
1 0 2 2 5	**100 100 200**		

COURSE PREREQUISITES:

Students should have knowledge of Basic Materials and their application in building construction.

COURSE OBJECTIVES:

To acquaint the students with building components and their construction methods.

EXPECTED LEARNING OUTCOME:

Students shall be able to know the detailing and sequence of activities for the execution of a building.

UNIT – I

FOUNDATION AND DAMP PROOF COURSE

- Type of foundations and its important details.
- Application of Damp Proof Course, its material and laying methods.
- Detailing of Horizontal and Vertical D.P.C.

UNIT –II

DOORS AND WINDOWS

- Types of Doors, Design and Construction details of Framed, Ledged, Braced and Battened Door, Flush Door, Wire Mesh Door, Paneled Door.
- Types of Windows in Timber, Design and Construction Details of Casement, Bay, Clear storey, Corner window etc.

UNIT – III

TYPES OF ROOFS AND FLOORS

- R.C.C, R.B.C Roof, Jack Arch Roof.
- Concepts of Water Proofing and Thermal Insulation of Roofs.
- Types of Floors.

- Section through double storey of load bearing and framed structure including stairs.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC1202.1	Get familiarize with manufacturing process / properties / availability / usage of materials & methods of construction in buildings.	
BARC1202.2	Knowing Usability & suitability of different types of partitions.	
BARC1202.3	Understand various application details of materials with respect to durability, functionality, aesthetics, maintenance etc.	
BARC1202.4	Understand selection of elements relevant to site conditions.	

NOTE:

Field visits to study the complete process of laying of foundation, D.P.C, construction details of Doors, Windows, Roofs and Floors to understand them in detail.

RECOMMENDED BOOKS:

- S.C. Rangwala, 'Engineering Materials'.
- B.C. Punmia, 'Building Construction'.
- W.B. Mckay, 'Building Construction'.
- Watson, Don A., 'Construction Materials and Process', McGraw Hill.

REFERENCE BOOKS:

- Ching, D.K. Francis, 'Building Construction Illustrated'.
- Chudley, 'Construction Technology'.
- R. BARC1ry, 'Construction of Buildings'.

INSTRUCTIONS TO THE PAPER SETTER:

The examiner is required to set a total of six questions with two questions from each unit. The student is required to attempt any one question from each unit making a total of three questions.

B.ARCH.SEMESTER-II	BARC 1203	BUILDING MATERIALS – II	
Scheme of Teaching	**Scheme of Examination (Marks)**	**Duration of Examination**	**Credit**
L T P S Total	**Internal External Total**	**3 Hours**	**2**
2 0 0 0 2	**50 50 100**		

COURSE OBJECTIVES:

To make the students aware about the basic types and characteristics of soil and also to acquaint them about various surface finishes applied to a building.

EXPECTED LEARNING OUTCOME:

Students shall be able to understand basic behavior of soil w.r.t, foundations. The students shall also achieve the knowledge of various finishes to be applied to building surface.

UNIT – I

Soil

- Type and characteristics of Soil: Classification of soils: as per particle size, texture.
- Bearing capacity of soil – basic definitions, factors affecting bearing capacity of soils, different methods of calculation of bearing capacity of soil.
- Suitability of soil for foundations.

UNIT – II

Iron, Steel, Aluminum, Glass, Plastics

- Classification, Composition, Properties, Applications and Market form of all the building materials.

UNIT – III

Water Proofing

- Water Proofing: Water Proofing materials (liquid, semi-liquid and solid) – Composition, Properties, Applications.
- Surface Finishes: White wash, Distemper, Paints and Varnishes – Types, Applications, Suitability, Advantages and Disadvantages.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC1203.1	Upon completion of the curriculum, the student shall have acquired the concept of various components of buildings & materials used and methods of construction. The student shall acquire knowledge in both conventional as well as contemporary building practices.
BARC1203.2	To learn properties of various construction materials like waterproofing materials, clay used as flooring materials and timber used in the building industry.
BARC1203.3	Students will also learn about water proofing methods and techniques at all building levels and a detailed study of construction building materials like concrete, clay used for flooring materials and timber.
BARC1203.4	The subject will act as direct aid for Design exercises which involves requirement of knowledge of architectural drawings for small projects in the current semester.

NOTE:

Market surveys shall be done by the students for the complete range of Materials and finishes available in the market under different trade names to study their properties, uses etc.

RECOMMENDED BOOKS:

- K.R. Arora, 'Soil Mechanics and foundation Engineering'.
- S.C. Rangwala, 'Engineering Materials'.
- Singh Bharat and ParkashShamsher, 'Soil Mechanics and Foundation Engineering'.
- Parbin Singh, 'Engineering and Geology', S.K. Kataria and Sons.

INSTRUCTIONS TO THE PAPER SETTER:

One compulsory question containing 6 questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus.

B.ARCH.SEMESTER-II	BARC 1204	ARCHITECTURAL DRAWING - II	
Scheme of Teaching	**Scheme of Examination (Marks)**	**Duration of Examination**	**Credit**
L T P S Total	**Internal External Total**	**4 Hours**	**2**
1 0 2 0 3	**50 50 100**		

COURSE PREREQUISITES:

The students should have a basic understanding of Orthographic projections and isometric views.

COURSE OBJECTIVES:

- The students should be able to visualize and convert his/her thoughts and ideas of design into 3-D forms.
- The students should be able to construct Perspective views from plan and elevations and show Sciography in plan and elevations only.

EXPECTED LEARNING OUTCOME:

The students shall be able to draw perspectives of various forms and show Sciography in plans and elevations.

UNIT – I

PERSPECTIVE

- Introduction to basic concepts of perspective making.
- Construction of one-point perspective of simple and complex objects.
- Construction of two-point perspective of simple and complex objects.
- Construction of interior perspectives (one point).

UNIT – II

SCIOGRAPHY

- Basics of sciography and its application in the field of architecture.
- Construction of sciography (shades and shadows) in plan and elevation only.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC1204.1	Learning Architectural Drawing Development of Drafting skills for architectural drawings.
BARC1204.2	Students will understand the concepts of different perspective
BARC1204.3	Study of perspective views: interiors views (one point), different type of objects (two point).
BARC1204.4	Development of sciography and its application in the field of architecture (shades and shadows)

RECOMMENDED BOOKS:

- Ching, D.K. Franc, 'Architectural Graphics'.
- Robert W. Gill, 'Rendering with Pen and Ink'.

INSTRUCTIONS TO THE PAPER SETTER:

- Three questions are to be set form Unit-I and students shall be required to attempt any two questions.
- Two questions are to be set from Unit-II and students shall have to attempt any one question.

B.ARCH.SEMESTER-II	BARC 1205	STRUCTURE SYSTEM - II	
Scheme of Teaching **L T P S Total** **1 2 0 0 3**	**Scheme of Examination (Marks)** **Internal External Total** **50 50 100**	**Duration of Examination** **NO EXAM** **(Evaluation by External Viva - voce)**	**Credit** **2**

COURSE PREREQUISITES:

The student should have an understanding of the mechanism of forces through Cellular Structure System, Bulk Active Structure System & Vector Active Structure System.

COURSE OBJECTIVES:

The teaching of this subject shall help the students:

- To learn about basic principles applicable in various structural systems.
- To understand the Role and Importance of Structure in Built Environment.
- To apply the knowledge gained in an applied project and to make buildings structurally safe.

EXPECTED LEARNING OUTCOME:

Emphasis shall be laid on learning by doing by making of 3-D models to give the students an idea of different spatial experience. The student shall be able to learn:

- The predominantly pictorial nature of an Architect's language.
- The physical-mechanical essence of the subject matter.
- The orientation of all Architectural efforts to Form and Space.

UNIT – I

Form Active Structure System

- Cable Structures (Roofs, Bridges etc.)
- Tents Structures
- Pneumatic Structure

UNIT – II

Surface active Structure System:

- Shells
- Folded Plates

UNIT – III

Biomimicry

- Introduction to Biomimicry
- Study and Analysis of Case Studies on Biomimicry
- Its Application in Design

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC1205.1	Student should have knowledge of Cable, Tents, Pneumatic Structure	
BARC1205.2	Students have knowledge of Shells	
BARC1205.3	Students have knowledge of Biomimicry	
BARC1205.4	Form active Structures. – Tensile structures	

RECOMMENDED BOOKS:

- H. Engel, 'Structure Systems'.
- Salvadori Mario, 'Building of Building'.
- B. Butler Robert, 'Architectural Engineering Design: Structural Systems'.
- G. Schierle, 'Architectural Structure'.
- Moore Fuller, 'Understanding Structure'.
- Michael Pawlyn, 'Biomimicry in Architecture'.

B.ARCH.SEMESTER-II	BARC 1206	VISUAL COMMUNICATION - II	
Scheme of Teaching	**Scheme of Examination (Marks)**	**Duration of Examination**	**Credit**
L T P S Total	**Internal External Total**	**3 Hours**	**1**
0 0 2 0 2	**25 25 50**		

COURSE PREREQUISITES:

The student should have an ability to draw and render freehand 2-D and 3D objects/forms in pencil and should be able to understand colour theories.

COURSE OBJECTIVES:

To develop conceptual and perceptual skills of students in different colour media and techniques.

EXPECTED LEARNING OUTCOME:

Teaching of the subject shall help students to understand the fundamental use of colour mediums to add realism in sketches and perspectives.

UNIT – I

- Use of various colouring mediums i.e., pencil colours, oil pastels, crayons and water colours etc.
- Outdoor free hand sketching of trees, shrubs, simple buildings, human figures, automobiles etc. in colour (water colours, pencil colours and poster colours).
- Sketching and rendering of various scenes such as milk booth, bus stop, cafeteria, petrol pump, village, and garden and like scene.

UNIT – II

- Writing styles in calligraphy.
- Rendering of plan, elevations and sections in any colour medium.
- Rendering of perspective views in all colour mediums.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC1206.1	Understand about Color wheel. Different Color schemes & their implement in Architecture to embellish, highlight, illuminate & separate spaces & also to transmit sensation & comfort.
BARC1206.2	Understand the rendering of different textures with different medium. It can help to decide them for structural development & create connection between various elements. Learn Sketching & Rendering of different elements of Street furniture made from different angles-Plan, elevation, Perspective .
BARC1206.3	Get awareness to produce creative thoughts that remain logical. Free hand sketching helps the architects to gain understanding, insight & inspiration to express their observation, thoughts & feelings .it stimulate creativity & open-ended thoughts, making the mind think in a different manner, forcing it to problem solve.
BARC1206.4	A Comprehensive knowledge & understanding of light, exposure & color & their application in architectural lighting. Develop critical understanding of documenting & capturing architecture through photography. Also create an awareness regarding the effectiveness of photography in design communication.

RECOMMENDED BOOKS:

- Robert W. Gill, 'Rendering with Pen and Ink', Thames & Hudson London, 2008.
- Jaxtheimer, 'How to Paint and Draw'.
- Ching, D.K. Frank Francis, 'Architectural Graphics', 5th Edn., Van NostrandRunhold,2009
- Crowne Philip, 'Architectural Rendering', Rofovision S.A. Switzerland, 1991

INSTRUCTIONS TO THE PAPER SETTER:

- The examiner is required to set five questions, three from UNIT – I and two from UNIT – II.
- The students are required to attempt two questions from UNIT – I and one question from UNIT – II making a total of three questions.

B.ARCH.SEMESTER-II	BARC 1207	SOFTWARE SKILLS	
Scheme of Teaching **L T P S Total** **1 0 2 0 3**	**Scheme of Examination (Marks)** **Internal External Total** **50 50 100**	**No Examination** **NO EXAM** **(Evaluation by External Viva - voce)**	**Credit** **2**

COURSE PREREQUISITES:

The students should have a basic understanding of computer.

COURSE OBJECTIVES:

The students should utilize their semester break to make themselves aware of the role and importance of Computers in the field of Architecture.

EXPECTED LEARNING OUTCOME:

Student shall be able to understand the Auto Cad as a Computer Aided Drafting Technique.

CONTENTS:

- Introduction to Auto Cad and Units.
- Basic commands like copy, paste, stretch, offset, move fillet, extend, trim and other 2D commands.
- Drawing the basic Plans, Sections, and Elevations.
- Basic Text writing and dimensioning of the Plans, Elevation and Sections.
- Basic hatching of the elements in the Plans, Elevations and Sections.
- Introduction to Layers and line type settings.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC1207.1	Developing skills in non-graphic applications of computer as required for architectural profession.
BARC1207.2	Office management such as word processing,
BARC1207.3	Spreadsheets, presentation skills and data base.
BARC1207.4	Employ this learning in all their future studies through 2nd to 7th Semester. as well during their Internship in an Architect‘s Office and in their Project (Thesis) work of 10th Semester as well.

NOTE:

The small building plans which have been prepared by the student during this training period shall be evaluated by the subject teacher in the start of semester.

RECOMMENDED BOOKS:

AutoDesk , 'Auto Cad Manual 2012'.

B.ARCH.SEMESTER-III	BARC 301	ARCHITECTURE DESIGN - III	
Scheme of Teaching **L T P S Total** **1 0 2 4 7**	**Scheme of Examination (Marks)** **Internal External Total** **150 150 300**	**Duration of Examination** **6Hours (Evaluation by External Viva –voce)**	**Credit** **6**

Objectives:- To develop the design of small buildings with respect to site, landscape, climate and Socio-economic conditions in urban context & the application of anthropometrics .

Methodology: Any design competition relevant to the course and announced in the prevailing semester may be introduced as a design problem.
Site Analysis to be done with the help of Audio/Video presentations & Studio lectures. Designs may be developed individually or in groups.

Unit	Hours/Periods	Contents
I.	21	Design of a small House (up to 3 storeys) considering site orientation, prevailing wind direction and the use of local building materials Integration of form & function
II.	21	Design of public place like Exhibition Centre cum Artisan Haat.
III.	21	Design of public place like Post Office / Bank- Extension counters
IV.	21	Design of Nursery / Primary School (Playway to UKG)

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC301.1	To Use basic architectural principles of design of buildings, interior spaces, etc where the use of structural technologies (developed in other fields) is a starting point.
BARC301.2	Get a knowledge of gather, assess, record, and apply relevant information in Design of an architectural project
BARC301.3	Explore the relationship between the human behavior and the physical environment in buildings which are heavily serviced.
BARC301.4	Ability to design both site and building to accommodate individuals with varying physical abilities

NOTE:-

a) Design should be urban in cont External
(b) Method of construction includes Data collection and analysis, Site conditions, Form based, Climatic conditions, User requirements

Reference / Text Books:

- Time Saver Standards for Architectural Design Data – John Hancock Callender.
- Ching, F.D.K., "Design Drawing", Van Nostrand Reinhold. 2.
- V.S.Pramar, Design Fundamentals in Architecture, Somaiya Publications Pvt. Ltd., New Delhi, 1973.
- Neufert, P., "Architects Data", 3rd Ed., Blackwell Science.
- Watson, D. (Editor), "Time-saver Standards for Architectural Design: Technical Data for Professional Practice", 8th Ed., McGraw-Hill.
- Francis D.K.Ching, Architecture Form, Space and Order, Van Nostrand Reinhold Company, New York, 1979.
- Structure in Nature- Strategy for Design – Peter Pearce
- Patterns in Nature- Peter Streens
- Lidwell,William,Holden,Kestina,Butler,Jill," Universal Principles Of Design", Rockport-Publications, Massachussets

Guidelines to teacher:-

- Case study and library study should be conducted as and when required.
- Provision for physically challenged persons should be incorporated in design solutions.
- Exercises to be taken up to emphasis the significance of the user in the process of design.
- For end semester exam, marks would be awarded on basis of EXTERNAL VIVA-VOCE of both the Design Portfolio & the End-Sem. Ans. Sheet

University examination pattern:

- The Question Paper is of Max. 150 Marks.
- The Design Problem has to be informed to the students a week in advance .
- The students are expected to present their designs in simple plans & views .
- They are not required to adhere to Measured Drawings; i.e; they will make presentation drawings only.

B.ARCH. SEMESTER-III					BARC302			BUILDING CONSTRUCTION & MATERIALS - III	
Scheme of Teaching					Scheme of Examination (Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	4 Hours	4
1	0	2	2	5	100	100	200		

Objectves:-:

- To introduce and familiarize the students with constituents, manufacturing process/ availability/ properties/characteristics/defects/ classifications and usage of traditional building materials and their use in simple building work.
- To make students understand and appreciate the various methods of building construction in coordination with the building materials and science related to them

Methodology:-

- Introduction to materials and construction through lectures and studio exercises.
- Site visits to gain knowledge about construction details.
- Introduction to some basic construction methods and elements.

Unit	Hours/Periods	Contents
I.	15	• Timber: Manufacturing process and qualities of Decorative & commercial Plywood including Ply-Board, Block Boards, Particle Boards, Wood Wool, Cement Board, Gypsum Board, Fiber Board Compressed Straw Board, Veneers, Laminates, Cement Fiber Board. • Glass as a building material. Classification, Composition, Properties and Use of Glass.Character and uses of various types of Glass - Plate Glass, Wired Glass, Foam Glass, Laminated Glass, Tinted Glass, Glass Wool, Glass Block, Fiber Glass, Crinkle Glass, Toughened Glass, Obscured Glass
II.	15	• Joinery details in wood – Doors and windows • Detailing of log huts
III.	15	• Staircase: Types and Designs + details of wooden stairs
IV.	15	• Section of a Double Storied Building: Through toilet and staircase showing the details of foundation, Floor, Window, Lintel, Chajja, RCC Roof, and Parapet.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC302.1	Various market forms of material like wood/Timber etc.
BARC302.2	Properties of material and their use in building.
BARC302.3	Knowledge of manufacturing process of different types of material used in building construction.
BARC302.4	Usage, advantages and disadvantages can be learned.

Text books:

1. R Barry, Building Construction, East West Press, New Delhi, 1999.
2. Er. M.K.Gupta, Practical Handbook on BUILDING CONSTRUCTION Paperback – 2014
3. T. D. Ahuja, G. S. Birdie, A Text books of Building Construction and Construction Materials 4th Edition .

Reference Books:

1. Don A. Watson, Construction Materials and Processes, McGraw Hill Co., 1972.
2. W.B.Mckay, 'Building Construction', Vol.1, 2, 3, Longmans, U.K. 1981.
3. R.Chudley, 'Building Construction Handbook', British Library Cataloguing in Publication Data, London, 1990.
4. Dr S P Bindra Arora, Text books on Building Construction
5. Sushil Kumar, Building Construction.

General guidelines for the teacher:

- To introduce the students to primary building materials and their applications in building construction.
- To cultivate personal observation and self learning in the students, site visits should be conducted so as to cover the given syllabus.
- Students will observe measure, sketch and annotate what they see at site and submit a site visit report to the teachers concerned for evaluation. This award shall form part and parcel of the sessional work for internal assessment.

University Examination Pattern:

The Question Paper is of Max. 100 Marks.

- Part A -10 short type questions of 4 Marks, covering entire syllabus
- Part B -4 Questions of 15 marks each to be attempted out of a total of 8 questions set from all the four units.
- The answer sheets will be marked on the basis of external viva-voce

B.ARCH. SEM-III					BARC303			COMP. GRAPHIC SKILLS-I
Scheme of Teaching					**Scheme of Examination**			**Duration of Exam**	**Credit**
L	**T**	**P**	**S**	**Total**	**Internal**	**External**	**Total**	**No Exam (Evaluation by External Viva –voce)**	**2**
1	**0**	**2**	**0**	**3**	**50**	**50**	**100**		

Objectives: Introduction and the use of software available for architectural applications.

Methodology: Integration of practical exercises along with the design studio project.

Unit	Hours/Periods	Contents
I.	12	• Basic commands like copy, paste, stretch, offset, move fillet, extend, trim and other useful 2D commands. • Basic Text writing and dimensioning of the Plans,
II.	12	• 2D drafting in Auto Cad • Drawing the basic Plans, Sections, and Elevations.
III.	12	• Elevation and Sections • Hatching and filling of the Walls in the Plans, Elevations and Sections. • Basic rendering in the Auto Cad and in other Software in 2D.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC303.1	Visualize building / transform sketches and 2 dimensional CAD drawings to 3 d render. Dimensional building models and walkthrough.
BARC303.2	Execute photo realistic rendering of the building project.
BARC303.3	Prepare walkthroughs.
BARC303.4	Students also learn working with plan, elevation ,sections.

Text /Reference Books:

- Goldenberg, Joseph, Autocad Architecture 2008 – Comprehensive Tutorial Autodesk 2008
- AutoDesk , “Auto Cad Manual 2012”
- Google, “Google Sketch up Manual”
- Aubin , Paul F, Mastering Auto CAD Architecture 2008.
- Elise, Moss , AutoCAD Architecture 2008 Fundamentlas Autodesk 2008.

Guidelines for the teachers: The teacher should demonstrate the commands**.**

University Examination Pattern:
The External jury will be of 50 Marks; i.e 25 marks for the portfolio/projects submitted & 25 marks for the final Viva.

B.ARCH. SEMESTER –III					BARC304			STRUCTURES IN ARCHITECTURE. - III	
Scheme of Teaching					Scheme of Exam			Duration of Examination	Credits
L	T	P	S	Total	Internal	External	Total	3 Hours	2
1	2	0	0	3	50	50	100		

Objectives:

To teach the fundamental aspects of indeterminacy with the help of thumb rules as applicable to simple Design problems.

Methodology:

Through class lectures, Presentations, site visits, case studies and making models & testing them. Study of behavior of structures through models and testing them for given load.

Unit	Hours/Periods	Contents
I.	9	Concept of structural indeterminacy & its application in structural system concepts of Soil Mechanics, soil bearing capacity. Design of foundation
II.	9	Arches-: Type & behavior of arches with history. Introduction to 3 hinged arches Frames-: In determinacy of frames will different end Condition.
III.	9	Introduction of Columns, basic principles , column buckling, Euler formula, slenderness ratio
IV.	9	Form active Structures. – Tensile structures

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC304.1	Understand RCC as structural material.
BARC304.2	Understand the behaviors of RCC structural members
BARC304.3	Be able to design simple structural members.
BARC304.4	Students have knowledge of structural analysis of any building structure.

Text books:

Understanding Concept Of Structural Analysis & Design- J.P.Parikh

Reference Books:

- Applied Mechanics - S.B.Junarkar & H.J.Shah
- Engineering Mechanics - R.S.Khurmi
- Mechanics of solids -M.N.Patel,P.V.Patel, C.S.Sanghvi, J.S.Thakur
- Structure in Architecture - Mario Salvadori
- Structures - Schodeck
- Elements of Structure – Morgan
- Structure and Design By G G Schierle, PhD, FAIA

General guidelines for the teacher:

- To introduce the students to the global building environment and the inherent design features
- Students will learn through models & case studies of structural systems
- The paper will be set by the external expert

University Examination Pattern:

- The Question Paper is of Max 50 Marks.
- 7 questions of 2 marks each (from the entire syllabus). There will be choice to answer any 5questions
- 8 Questions of 10 marks each (2 questions from each unit). There will be choice to answer any four questions,
- with at least 1 from each unit.

B.ARCH. SEM-III					BARC305			HISTORY OF ARCHITECTURE -III	
Scheme of Teaching					Scheme of Examination			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3 Hours	2
2	0	0	0	2	50	50	100		

Objectives:To provide the knowledge of the evolution of different architectural styles through study of Multi-Religious & Provincial World Architecture.

Methodology: Study of the evolution of different styles of Architecture from 600 CE to 1400CE until the Itallian Renaissance around the globe

Unit	Hours/Periods	Contents	Unit
I.	6	0600-0800 CE	• Rise of Islam in Arabia; Dome of Rock, Jerusalem & Great mosque of Samarra,iraq. • Pallavas & Chalukyas in India-Kailasnath Temple, Ellora; Mahavihara at Nalanda • Glimpses of Europe in 800 CE:Palatine Chapel • Mayan cities, Gulf of Mexico
II.	6	0800-1000 CE	• Rise of Rajputs: Sun Temple at Modhera, Kandariya Mahadev Temple, and Orissan temples- Lingaraja Temple, Rajarani Temple & Jain temples at Mount Abu • Pure Land Budhism in Japan: Phoenix Hall at Byodo-in • Germany: a new seed of power in Europe;St Michael in Hildesheim; Pisa Cathedral,Italy
III.	6	1000-1200 CE	• Seljuks' Madrasas in Turkey & Iwans in Iran, qubba in Morocco • Chola Dynasty's Vrah Vishnulok, Angkor Wat at Cambodia • Pagoda of Pagan, Burma • Seven capitals of Delhi:Alai Darwaza, Tomb of Ghiyasuddin Tughlaq • Sun Temple at Konarak, Orissa
IV.	6	1200-1400 CE	• Churches of High Middle ages in Europe: Notre Dame of Reims, France • Ming Dynasty's The Forbidden City,China • Timurid Dome of Bibi Khanum Friday mosque at Samarkand, Uzbekistan & at Gulbarga,India

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC305.1	The student will be able to understand impact of Islamic Architecture in India during Early Phase in 11th Century
BARC305.2	The student will be able to understand the development of Provincial Style of Architecture
BARC305.3	The student will be able to understand the Monumental Architecture of Mughal Style
BARC305.4	The student will be able to understand the influence of Colonial Architecture in British India and Its developments

Text /Reference Books:

- Ching, D K, A Global History of Architecture
- Parihar, S., “Some Aspects of Indo-Islamic Architecture”, Abhinav Publishers. 1999
- Fletcher, Banister Sir, History of Architecture
- Maheshwari, Sanjeev & Garg, Rajeev, Ancient Indian Architecture (From Blossom to Boom).
- A History of Architecture :- James Fergusan, John Willey
- Fergusan James, Willey John, “History of Indian & Eastern Architecture, Dodd, Mead & company 1899
- Tagdell Christopher, “The History of Architecture in India, Phaidon Press,1994

University Examination Pattern

- The Question Paper is of Max 50 Marks.
- 7 questions of 2 marks each (from the entire syllabus). There will be choice to answer any 5questions
- 8 Questions of 10 marks each (2 questions from each unit). There will be choice to answer any four questions, with at least 1 from each unit.

B.ARCH. SEMESTER-III					BARC306			BUILDING SCIENCE-I	
Scheme of Teaching					Scheme of Examination			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3 Hours	2
2	0	0	0	2	50	50	100		

Objectives:To familiarize the students with the design of ambient spaces and their surroundings.
the factors affecting the design and the use of optimum devices for creating comfort.

Unit	Hours/Periods	Contents
I.	6	• Introduction Definition, Scope and importance, Need for awareness • Natural Resources Renewable and Non Renewable Resources
II.	6	• Eco System Concept, Structure & Function of an Eco System, Flow of Energy, Types of Eco Systems
III.	6	• Environmental Pollution Definition, Causes, Effects, Types of Pollution, Control Measures to check different pollution • Social Issues, Wasteland Reclamation, Environmental Protection Act
IV.	6	• Environmental Impact Assessment : Introduction, Need and importance of EIA study, Process

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC306.1	To design building without harming our ecosystem.
BARC306.2	To make students aware of ozone depletion and greenhouse effect.
BARC306.3	Students shall maintain the inter-relationship between development and ecosystem.
BARC306.4	Understanding of Physical Geography, characteristic of land.

Text /Reference Books:

- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- Down to Earth, Centre for Science and Environment
- Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T.2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196

University Examination Pattern:

- The Question Paper is of Max 50 Marks.
- 7 questions of 2 marks each (from the entire syllabus). There will be choice to answer any 5questions

8 Questions of 10 marks each (2 questions from each unit). There will be choice to answer any four questions, with at least 1 from each unit.

B.ARCH. SEMESTER –III	BARC307	BUILDING TECHNOLOGY-I
Scheme of Teaching	**Scheme of Examination (Marks)**	**Duration of Exam.** / **Credit**
L T P S Total	**Internal External Total**	**3 Hours** / **2**
2 0 0 0 2	**50 50 100**	

Objective: To provide the knowledge of the basics of surveying and leveling and its applications in the field of building construction.
Methodology:-Demonstrations & lectures explaining the uses and application of Surveying instruments.

Unit	Hours/Periods	Contents
I.	**9**	• Introduction :- Different types of surveys. • Chain Surveying:-Principal of chain surveying description of different equipments, Methods of chaining and booking, selection of base line and stations, obstacles in chaining. Location of inaccessible points by chain, Ranging rods. • Prismatic Compass survey: -Description of Prismatic & surveyors compass methods of traversing, local attractions and its elimination, adjustment of closing error by graphical method.
II.	**9**	• Plane Table survey: - Description of different equipment, different methods of plane tabling, Strength of Fix, Two point and three point problems and their solutions • Theodolite Survey: Types of angular measurements, heights and distance ranges
III.	**9**	• Leveling: -Description of dumpy and tilting levels & leveling staves, methods of leveling, Sensitivity of bubble tube, setting out grade lines, permanent adjustment of leveling instruments. • Contouring: -Setting out contour gradient, different method of contouring. Simple earthwork calculations of areas and volumes
IV.	**9**	• Minor Instruments: - Box sextant, Hand level, Abney level, Plane meter, Ghat tracer etc. • Total Station - Introduction, Various components, Operation, Advantages/ Disadvantages

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC307.1	Interact technically with surveyors, Be able to prepare and interpret survey drawings
BARC307.2	Gain a broad understanding of Land Survey , Get accustoms with the angular and linear measurements
BARC307.3	Trained with recording the field information and necessary plot
BARC307.4	Contemporary issues and developments

Reference/ Text Books:

- Punmia B C, “Surveying & leveling
- Singh Narinder, “Surveying & leveling”
- T.P.Kanetkar Surveying & leveling:-
- Kuchhar C L, “Surveying & leveling”
- Kanetkar & Kulkarni, “ Surveying & leveling”
- Sawhney P B, “Surveying & leveling”

Guidelines for the teachers:

The teachers should illustrate the instruments , survey layouts and various techniques of contouring & mapping an area.

University exam. Pattern:

The External jury will be of 50 Marks; i.e 25 marks for the portfolio/ projects submitted & 25 marks for the final Viva.

B.ARCH. SEMESTER –III					BARC308			ARCHITECTURAL DRAWING- III	
Scheme of Teaching					Scheme of Exam = Marks			Duration of Exam	Credit
L	T	P	S	Total	Internal	External	Total	4 Hours	3
0	2	0	2	4	75	75	150		

Objectives:- To develop perception ;presentation of simple architectural forms & buildings.
Methodology:-Studio assignments & lectures . Demonstration of 3-D geometrical objects & their 2-D representation on sheet.

Unit	Hours/Periods	Contents
I.	15	Perspective Drawing: Introduction to Grid Point Method.
II.	15	Two-point perspective views, using Measurement Point method
III.	15	Sciography:- • Shade and shadow of object of different shape at different levels and planes. • Shade and shadow of facade of simple building & architectural fenestrations
IV.	15	• Shades and shadows in perspective views

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC308.1	Interact technically with surveyors, Be able to prepare and interpret survey drawings
BARC308.2	Gain a broad understanding of Land Survey , Get accustoms with the angular and linear measurements
BARC308.3	Trained with recording the field information and necessary plot
BARC308.4	Contemporary issues and developments

Text /Reference Books:-

- N.D. Bhatt V.M. Panchal, "Engineering Drawing, Charotar Publisher 48th edition, 2005
- Ching, Frank (Francis D.K.), "Architectural Graphics, Van Nostrand Reinhold, 5th ed 2009
- Robert W Gill, "Manual of Rendering with Pen and Ink, Published on: 1990-04
- Fraser Reeki, "Reekie's Architectural Drawing, Tony K. McCarthy Wiley, Aug1995
- Ching Francis D.K. –Design Drawing .
- Rendow Yee- Architectural Drawing .

General guidelines for the teacher:
• Maximum drafting work will be done in the studio.
• Models of solids will be used as teaching aids.

University Examination Pattern:
- The Question Paper is of maximum 75 marks.
- 3 questions of 25 marks each, must be attempted out of 5 in all

B.ARCH. SEMESTER-III	BARC-309	COMPUTER APPLICATIONS-I

Scheme of Teaching					Scheme of Exam = Marks			Duration of Exam	Credit
L	T	P	S	Total	Internal	External	Total	No Exam, only Internals	1
0	0	2	0	2	50	00	50		

Objectives:- To Introduce students to MS Office tools- M S Word, MS Excel 7 MS PowerPoint

Methodology:- Lectures & exercises to enable the students to prepare well- formatted documents of different nature and extension types.

Unit	Hours/Periods	Contents
I.	9	• Understanding the basic commands & Formulae of MS Office Tools like Word & Excel ; • Application of Standard, Formatting Tool Bars & Status Bar • Saving and Publishing documents/spreadsheets.
II.	9	• Presenting concepts and proposals with the help of Text, Images & Drawing Tool Bars. • Inserting tables, Pie charts & drawings and animating them. • Creating Macros & Hyperlinks
III.	9	• Understanding the basic commands of MS Power poInternal • Importing spreadsheets or documents with other extension types.
IV.	9	• Preparing simple and interactive slide shows and presentations to present papers/ Seminars • Page Setup & Print Command.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC309.1	Use of software to enhance the presentation skills and 3d visualization through software
BARC309.2	Learning of various presentation elements like pie chart and bar graph through software.
BARC309.3	Learning of 3d model making with lighting and simulations techniques.
BARC309.4	Students will know the importance of computer Graphics applications(CAD)

Text /Reference Books:-

- Sinha & Sinha; Foundations of Computing, BPB
- Office 2013 in Easy Steps; Mcgraw Hill Education

General guidelines for the teacher:

The teacher shall make live demonstrations in the computer lab on the small scale projects.

University Examination Pattern:

- External Viva-voce will be conducted.
- The External jury will be of 50 Marks.

For computation of marks in final viva, 25 marks for practical file 25 marks for viva voce shall be considered.

B.ARCH. SEMESTER-IV					BARC401			ARCHITECTURAL DESIGN - IV	
Scheme of Teaching					Scheme of Examination= Marks			Duration of Examination	Credit 6
L	T	P	S	Total	Internal	External	Total	12 Hours (Evaluation by External Viva –voce)	
1	0	2	4	7	150	150	300		

Objectives:- To develop the design of buildings with respect to site, landscape, climate and Socio-economic conditions in semi-urban/rural context .& the application of indigenous technology w.r.t. **Vernacular Architecture**.

Methodology:

- Researching a modal community for the Vernacular studies, to be able to present the semi-urban/rural infra-structure in the light of designing typical buildings and related amenities.
- Developing the over-all community layout identifying the positioning of key facilities as required in the local culture.
- Individual/ Group studio exercises leading to design development

Unit	Hours/Periods	Contents
I.	21	Design of a country-side House/Farm-House considering live stock ,farm's land site orientation, prevailing wind direction and the use of local building materials and traditions.
II.	21	Agricultural Infrastructure
III.	21	Design of public place like Community Centre, Gram Panchayat, Anganwadi, Dispensery
IV.	21	Built & Unbuilt open spaces for congregation / communities

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC401.1	Acquire knowledge on traditional materials and construction techniques which can be used in the design of built spaces in the modern context.
BARC401.2	Interpretation of vernacular architecture in terms of its Functional aspects, Cultural aspects, Climatic considerations, Construction methods and techniques, Materials.
BARC401.3	Understand the concept of Vernacular Architecture and study of Indian Vernacular Architecture in detail.
BARC401.4	Understand the design process and its connection to the built environment.

Note:-

(a) Design should be vernacular in cont External

(b) Method of construction includes:- Data collection and analysis, Site conditions, Climatic Conditions, Demographic & Socio-Cultural setup, User requirements

Reference / Text bookss:

- Time Saver Standards for Architectural Design Data – John Hancock Callender.
- Ching, F.D.K., "Design Drawing", Van Nostrand Reinhold. 2.

- V.S.Pramar, Design Fundamentals in Architecture, Somaiya Publications Pvt. Ltd., New Delhi, 1973.
- Neufert, P., "Architects Data", 3rd Ed., Blackwell Science.
- Watson, D. (Editor), "Time-saver Standards for Architectural Design: Technical Data for Professional Practice", 8th Ed., McGraw-Hill.
- Francis D.K.Ching, Architecture Form, Space and Order, Van Nostrand Reinhold Company, New York, 1979.
- Structure in Nature- Strategy for Design – Peter Pearce
- Patterns in Nature- Peter Streens
- Lidwell,William,Holden,Kestina,Butler,Jill," Universal Principles Of Design", Rockport-Publications, Massachussets

Guidelines to Teacher:-

- Case study and library study should be conducted as and when required.
- Provision for physically challenged persons should be incorporated in design solutions.
- Exercises to be taken up to emphasis the significance of the user in the process of design.

University Examination Pattern:

- The Question Paper is of Max. 150 Marks.
- The Design Problem has to be informed to the students a week in advance .
- The students are expected to present their designs in simple plans & views .
- They are not required to adhere to Measured Drawings; i.e; they will make presentation drawings only.
- **The answer sheets will be marked on the basis of external viva-voce**

B.ARCH. SEMESTER-IV	BARC402	BUILDING CONSTRUCTION & MATERIALS - IV	
Scheme of Teaching	**Scheme of Examination (Marks)**	**Duration of Exam**	**Credit**
L T P S Total	**Internal External Total**	**4 Hours**	**4**
1 0 2 2 5	**100 100 200**		

Objectives:-

- To introduce and familiarize the students with constituents, manufacturing process/ availability/ properties/characteristics/defects/ classifications and usage of traditional building materials and their use in simple building work.
- To make students understand and appreciate the various methods of building construction in coordination with the building materials and science related to them

Methodology:-

- Introduction to materials and construction through lectures and studio exercises.
- Site visits to gain knowledge about construction details.
- Introduction to some basic construction methods and elements.

Unit	Hours/Periods	Contents
I.	15	• Adhesives as Building Material • Water Proofing Compounds
II.	15	• Structures in brickwork like fire places, jambs, cavity walls, arches, lintels, partitions in masonry
III.	15	• Cantilevered stairs in masonry
IV.	15	• Dhajji wall Construction and principles of earthquake resistance • Retaining Walls- materials and sections

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC402.1	To develop understanding about building elements and their construction principles
BARC402.2	To develop understanding about composition of various compatible building materials for construction.
BARC402.3	The subjects should also focus on developing design abilities by applying basic principles of construction
BARC402.4	Develop a fundamental understanding of material in construction systems and techniques, dimensions and intrinsic qualities that influence the design process.

Text books:

- R Barry, Building Construction, East West Press, New Delhi, 1999.
- B C Punmia, building Construction
- P N Khanna, Civil Engineering Handbook
- Ching D K, Building Construction Illustrated

Reference Books:

- Don A. Watson, Construction Materials and Processes, McGraw Hill Co., 1972.
- W.B.Mckay, 'Building Construction', Vol.1, 2, 3, Longmans, U.K. 1981.
- R.Chudley, 'Building Construction Handbook', British Library Cataloguing in Publication Data, London, 1990.
- Dr S P Bindra Arora, Text books on Building Construction.
- Shelters, Shacks, and Shanties By D. C. BEARD With Illustrations by the Author NEW YORK Charles Scribner's Sons 1916

General guidelines for the teacher:

- To introduce the students to primary building materials and their applications in building construction.
- To cultivate personal observation and self learning in the students, site visits should be conducted so as to cover the given syllabus.
- Students will observe measure, sketch and annotate what they see at site and submit a site visit report to the teachers concerned for evaluation. This award shall form part and parcel of the sessional work for internal assessment.

University Examination Pattern:

- The Question Paper is of Max. 100 Marks.
- Part A -10 short type questions of 4 Marks, covering entire syllabus
- Part B -4 Questions of 15 marks each to be attempted out of a total of 8 questions set from all the four units.
- **The answer sheets will be marked on the basis of external viva-voce**

B.ARCH. SEMESTER –IV	BARC403	COMPUTER GRAPHIC SKILLS-II	
Scheme of Teaching **L T P S Total** **1 0 2 0 3**	**Scheme of Examination (Marks)** **Internal External Total** **50 50 100**	**Duration of Exam** **No Exam (Evaluation by External Viva –voce)**	**Credit** **2**

Objectives:- Introduction and the use of software available for architectural applications.

Methodology:-

- Integration of practical exercises along with the design studio project
- Demonstrations & lectures explaining the uses and application of commands

Unit	Hours/Periods	Contents
I.	12	Advanced 2D drafting using Auto CAD.
II.	12	Use of layers and blocks exercise on simple working drawings

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC503.1	Create, manipulate and edit 2D drawings and figures.
BARC503.2	Introduces Autodesk's AutoCAD software as a design and drafting tool. Introduces basic 2D CAD commands, command interface, workspace, viewports and printing concepts.
BARC503.3	Covers creation, retrieval and modification of 2D drawing files that meet industry standards with an emphasis on mechanical design for the manufacturing industry.
BARC402.4	Apply elements of mechanical drafting such as layers, dimensions, drawing formats, and 2D figures in projects

Text /Reference Books:

- Goldenberg, Joseph, Autocad Architecture 2008 – Comprehensive Tutorial Autodesk 2008
- AutoDesk , "Auto Cad Manual 2012"
- Aubin , Paul F, Mastering Auto CAD Architecture 2008.
- Elise, Moss , AutoCAD Architecture 2008 Fundamentls Autodesk 2008.

Guidelines for the teachers: The teacher should demonstrate the commands**.**

University Examination Pattern:

The External jury will be of 50 Marks; i.e 25 marks for the portfolio/projects & 25 marks for viva.

B.ARCH. SEMESTER-IV					BARC404			SUSTAINABLE ARCHITECTURE	
Scheme of Teaching					Scheme of Examination (Marks)			Duration of Examination	Credits
L	T	P	S	Total	Internal	External	Total	3 Hours	2
1	2	0	0	3	50	50	100		

Objectives: To provide the knowledge of the evolution of different architectural styles through study of Multi-Religious & Provincial World Architecture.

Methodology: Study of the evolution of different styles of Architecture from 1500 CE to 1800CE around the globe

Unit	Hrs/Periods	Contents
I.	6	**INTRODUCTION** 1. Sustainable Development - Introduction, definitions, objectives and scope 2. Man & Environment - Introduction, issues and options 3. Human settlements - Planning, Growth, Development, Problems 4. Global warming - Introduction, Causes, Effects and Remedies, Carbon Credits. 5. Sustainable Design - Concept, Objectives, Principles, Approach to Sustainable Design 6. Architect - Role in Sustainable Development.
II.	6	**ISSUES SUSTAINABLE DEVELOPMENT** • Energy - Role, Importance in buildings • Sources of Energy- Non- renewable and renewable – Role and Importance • Site (Topography / Air – Condition / Surrounding) • Sustainable Materials – Production and use • Quality of indoor/outdoor environment •
III.	6	**CEPT & DESIGN STRATEGIES IN SUSTAINABLE DEVELOPMENT** • Built Environment- Sustainable Construction, Ecological Buildings, Green Building • Building Rating System • ECBC Code
IV	6	• Sustainability Assessment - LEED, Life Cycle Assessment, GRIHA • Climate responsive and Solar Passive Strategies in Indian Climates • Recycling/Reuse India's approach to sustainable Development

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC404.1	Conceptualization of large span constructions. Learnt how to design comfort space.
BARC404.2	How to create energy efficient building by actively harnessing renewable nature sources of energy (solar energy etc) and utilizing materials that least pollute the environment.
BARC404.3	Know about the designing of energy efficient building envelopes that respond to the climate of a place bldg.
BARC404.4	Aware about resource–efficient practices in India, advocating of the application of renewable energy system and the promotion of efficient lighting & HVAC system to reduce energy demand.

RECOMMENDED TEXT AND REFERENCE BOOKS

1. Koensberger, Ingersoll, Mayhew, Szokolay, 'Manual of Tropical Housing & Building,1974.
2. C.P. Kukreja,'Tropical Architecture', Tata McGraw-Hill Publishing Company, **1978**.
3. Martin Evans, 'Housing, Climate & Comfort', Architectural Press, **1980**.
4. Georg Lippsmeier, 'Building in the Tropics', Callwey Verlag, Munchen, **1980**.
5. Gideon S. Golany, 'Design for Arid Regions', Van Nostrand Reinhold, New York, **1983**.
6. B. Givoni, 'Man, Climate & Architecture', Von Nostrand Reinhold Company, New York,1981.
7. 'Reserch Notes on Climate', C.B.R.I, Roorkee.
8. Krishan A, Baker, 'Climate Responsive Architecture', McGraw-Hill Education (Asia) Co. and ChinaArchitecture & Building Press, **2004/2005.**
9. 'Energy Efficient Buildings in India', TERI.

UNIVERSITY EXAMINATION PATTERN

1. The Question Paper is of Max. 50 Marks.
2. Part A -5 out of 7 short type questions of 2 Marks, covering entire syllabus
3. Part B -4 Questions of 10 marks each to be attempted out of a total of 8 questions set from all thefour units

B.ARCH. SEM-IV					BARC405			HISTORY OF ARCHITECTURE -IV	
Scheme of Teaching					Scheme of Examination (Marks)			Duration of Exam.	Credit
L	T	P	S	Total	Internal	External	Total	3 Hours	2
2	0	0	0	2	50	50	100		

Objectives: To provide the knowledge of the evolution of different architectural styles through study of Multi-Religious & Provincial World Architecture.

Methodology: Study of the evolution of different styles of Architecture from 1500 CE to 1800CE around the globe

Unit	Hours/Periods		Contents
I.	6	1400-1500 CE	• Islamic Architecture in Deccan Plateau: jama masjid at Gulbargha • Muhammad Shah's Tomb in Bengal • Rajput forts : Chittor Fort • Mamluks in Egypt: Tomb of sultan Qaitbay, • Tughlaqs' Jami Masjid at Ahmedabad
II.	6	1500-1600 CE	• Rise of Italian Renaissance; San Lorenzo, Florence • Developments in Vatican City • Church of St Andrea at Mantua,& St Peter's Basilica • St. Peter's plans by Michelangelo & Bramante • Developments in America- Mexico : Temple Mayor Rise, Peru: Urban Developments
III.	6	1600-1650 CE	• Rise of Mughals in India: Fatehpur Sikri, Humayun's Tomb, Taj Mahal at Agra • Vijay Nagar Kingdom; Gol Gumbaz, Bijapur • Tea Houses in Japan: Katsura Imperial Villa • Ming Dynasty, China: Potala Palace • Churches at Kremlin
IV.	6	1650-1700 CE	• Italian High Renaissance: Villa Rotonda, Villa Trissino by Ar. Andrea Palladio • Bernini's layout for St. Peter's Square • Russian The Baroque Era- St Paul's Cathedral, St. Petersburg, Russia

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC405.1	To understand the role of geo-physical, societal, political and technological factors in the evolution of architectural and urban form.
BARC405.2	To develop a holistic approach to Architecture as an integral component of built environment
BARC405.3	Introduce the impact of growing international trade, industrialization and colonization on the architecture of India, Europe and America and preface the Modern movement.
BARC405.4	Students will Learn about how the colonial architecture flourished

Text /Reference Books:

- Ching, D K, A Global History of Architecture
- Parihar, S., "Some Aspects of Indo-Islamic Architecture", Abhinav Publishers. 1999
- Fletcher, Banister Sir, History of Architecture
- Maheshwari, Sanjeev & Garg, Rajeev, Ancient Indian Architecture (From Blossom to Boom).
- A History of Architecture :- James Fergusan, John Willey
- Fergusan James, Willey John, "History of Indian & Eastern Architecture, Dodd, Mead & company 1899
- Tagdell Christopher, "The History of Architecture in India, Phaidon Press,1994

University Examination Pattern:

- The Question Paper is of Max 50 Marks.
- 7 questions of 2 marks each (from the entire syllabus). There will be choice to answer any 5questions

8 Questions of 10 marks each (2 questions from each unit). There will be choice to answer any four questions, with at least 1 from each unit.

B.ARCH. SEMESTER-IV					BARC406			BUILDING SCIENCE-II	
Scheme of Teaching					**Scheme of Examination (Marks)**			**Duration of Examination**	**Credit**
L	**T**	**P**	**S**	**Total**	**Internal**	**External**	**Total**	**3 Hours**	**2**
2	**0**	**0**	**0**	**2**	**50**	**50**	**100**		

Objectives:To familiarize the students with the design of ambient spaces and their surroundings; the factors affecting the design and the use of optimum devices for creating comfort.

Unit	Hours/Periods	Contents
I.	6	• Introduction to climatology, role of climate with respect to shelter, importance of studying Building Climatology. • Movement of earth around the sun, change of seasons, distribution of global pressure belts and global wind movements, global climatic zones. • Definition of weather, climate, elements of climate, interrelationship of climatic elements and psychometric chart.
II.	6	• Study of indigenous shelters in response to the climatic zones in India • Definition and explanation of thermal comfort, relationship of climatic, elements with thermal comfort, thermal stress index, bio climatic chart, effective temperature and corrected effective temperature histogram. • Heat exchange between building and environment (qualitative aspect only),thermal properties of materials, thermal properties of building elements, solar gain factor, solar temperature. • Use of C. Mahony's tables.
III.	6	• Solar chart and its importance ,understanding the movement of sun across the sky, importance of understanding the optimum orientation and building form in different climatic zones, concept of shading devices. • Sun path diagram • Calculation for the design of horizontal and vertical shading devices.
IV.	6	• Air movement inside buildings, Microclimate • Guidelines for designing well ventilated buildings • Optimum Orientation of Building — Importance, Form and Placement of Building

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC406.1	Climatology is the science of studying the average atmospheric conditions of a region in long-term perspective.
BARC406.2	Student learn about the primary goal of Climatology is to study the unique characteristics of atmosphere in controlling the global climate, origin, types of climates, causes and processes influencing the climatic variations, elements of weather and the impact of climate on humans or vice-versa.
BARC406.3	Under the umbrella of climatology the structure and composition of atmosphere are studied first.
BARC406.4	This further helps in designing of building or site.

Text /Reference Books:

- O.H.Koenigsberger and Others, " Manual of T ropical Housing and Building " – Part I - Climate Design, Orient Longman, Madras, India, 2010.
- Bureau of Indian StandardsIS 792, " Hand bookon Functional requirements of buildings other than industrial buildings , 1987.
- Martin Evans , "Housing Climate and Comfort" , Architectural Press, London , 1980
- B. Givoni, " Man, Climate and Architecture " , Architectural Sciences Series – Applied Science Publishers Ltd., London , 1981.
- B. Givoni , " Passive and Low Energy Cooling of building " , Van Nortrand Reinhold New York, USA 1994 .
- Galloe, Salam and Sayigh A.M.M. , "Architecture, Comfort and Energy", Elsivier Science Ltd. , Oxford, U.K. , 1998

University Examination Pattern

- The Question Paper is of Max 50 Marks.
- 7 questions of 2 marks each (from the entire syllabus). There will be choice to answer any 5questions
- 8 Questions of 10 marks each (2 questions from each unit). There will be choice to answer any four questions, with at least 1 from each unit.

B.ARCH. SEMESTER-IV					BARC407			BUILDING TECHNOLOGY-II	
Scheme of Teaching					Scheme of Examination (Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3 Hours	2
2	0	0	0	2	50	50	100		

Objectives:

To acquaint the students with the basic principles used in all basic building services with regards to Water supply, Sanitation, and storm water drainage

Methodology:

Subject shall be taught through the combination of Guest Lectures, Field visits, Visits to the Project Sites , actual display of Fittings, Pipes, Joints used and by carrying out
exercises in layout of simple drainage systems for Small buildings, Planning of Bathrooms and Lavatory Blocks in Domestic and Multi-storied building

Unit	Hours/Periods	Contents
I.	6	**Water Supply:** Potable Water, Water treatment techniques, Requirements of water supply to different types of buildings, fixtures, methods of distribution of water
II.	6	Municipal water distribution systems, underground and overhead water tanks. Brief description of rainwater harvesting and water table recharging techniques.
III.	6	**Sanitation and Drainage:**Refuse, different form of refuse: garbage/solid waste, storm water, their collection and disposal systems. •Drainage layout for building premises, kitchen, utility and toilet layouts, fixtures and fittings. •Types of traps,manholes, grease chambers, inspection chambers, intercepting traps. •Ventilation of drains and sewers, principles of design of sewer lines,
IV.	6	Drainage in non municipal areas, soak wells, septic tanks. Storm and rain water drainage system. •Sustainable and eco-friendly Sewage treatment techniques: biogas plants, sewage treatment methods •Specialized water supply and drainage requirements: swimming pools, basement level supply and disposal, terrace gardens supply and drainage etc.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC407.1	Acquire knowledge of principles used in building services with special emphasis on water supply.
BARC407.2	Understand Building Wiring System and illuminance with reference to Architecture.
BARC407.3	Understand the basic norms as per National Building Code.
BARC407.4	Understand different types & selection of lighting fixtures according to requirement.

Text /Reference Books:

- Duggal K.N. , " Public Health Service , Publisher, Chand, 1967
- Water Supply Sanitation BY R. Birdi
- Barry R, " Building Services , John Wiley and Sons Ltd 1998
- Garg S . K , " Water Supply Engineering, Khanna Publishers
- Water Supply& Sanitation : - G.S.Bindra/ J.S.Bindra

General guidelines for the teacher:

- On site studies
- Market surveys of different water supply and drainage pipes, fittings and fixtures.

University Examination Pattern:

- The Question Paper is of Max 50 Marks.
- 7 questions of 2 marks each (from the entire syllabus). There will be choice to answer any 5questions
- 8 Questions of 10 marks each (2 questions from each unit). There will be choice to answer any four questions, with at least 1 from each unit.

B.ARCH. SEMESTER –IV	BARC408	MEASURED DRAWING	
Scheme of Teaching	**Scheme of Exam = Marks**	**Duration of Exam**	**Credit**
L T P S Total	**Internal External Total**	**4 Hours**	**3**
0 2 0 2 4	**75 75 150**		

Objectives:-

To be able to prepare working drawings for buildings for the purposes of architectural and structural drawings as per local building codes & byelaws of simple buildings.

Methodology:-Studio assignments & lectures .

Unit	Hours/periods	Contents
I.	15	Measurement of some historical or modern building using simple Methods and plane table for plans and site plans.
II.	15	Measurement of elevations and sections by using instruments such as theodolites .
III.	15	Village or neighborhood study, preparing settlement plans.
IV.	15	Socio- economic studies and conservation studies etc.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC408.1	Preparing Working drawings required for execution of actual construction work as per local building codes & byelaws.
BARC408.2	Create and utilize construction drawings.
BARC408.3	Decipher and communicate information through drawings and specifications.
BARC408.4	Understand co-relation of different components & services in a building.

Text /Reference Books:-

Building Drawing by Shah, kale & Patki

General guidelines for the teacher: • Maximum drafting work will be done in the studio.

University Examination Pattern:

The portfolio viva is of maximum 75 marks.

B.ARCH. SEMESTER – IV					BARC409			COMPUTER APPLICATIONS-II	
Scheme of Teaching					**Scheme of Exam. = Marks**			**Duration of Examination**	**Credit**
L	**T**	**P**	**S**	**Total**	**Internal**	**External**	**Total**	**No Exam, only Internal**	**1**
0	**0**	**2**	**0**	**2**	**50**	**00**	**50**		

Objectives Introduction and the use of software available for architectural applications.

Methodology: The student investigates programming environment in the creation of a customized CAD environment

Unit	Hours/Periods	Contents
I.	12	Introduction to 3D commands. Simple exercises on 3D commands
II.	12	3D modeling of project & walk- through

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC703.1	Developing designs through 3D visualization &preparing presentation drawings in Revit.
BARC703.2	Knowing Fundamentals of Revit. Learning Commands- Filter, Floor, Column, Roof I Learning Commands - Stairs, Railing, Ramp. Learning Extrusion, Revolve, Sweep, Blend, Wall by face Floor by face, Roof by face.
BARC703.3	Learning Dimension, Text, Room & area plan, Colour scheme, Section, Call out, 3d crop view, Camera. Preparing Walk through.
BARC703.4	Application- Design Project to be converted into Revit Drawings

University Examination Pattern:
The Internal jury will be of 50 Marks; i.e 25 marks for the portfolio/projects & 25 marks for viva.

General guidelines for the teacher:
The teacher shall make live demonstrations in the computer lab on the small scale projects.

B.ARCH.SEMESTER-V	BARC 501	ARCHITECTURE DESIGN -V	
Scheme of Teaching	**Scheme of Examination= Marks**	**Duration of Examination**	**Credit**
L T P S Total	**Internal External Total**	**18 Hours (Evaluation by External Viva –voce)**	**6**
1 0 4 3 8	**150 150 300**		

Objectives:-

Application of Design theory and principles and Design of Low rise / medium rise /high rise buildings with complex issues to be tackled covering functional relationship, climatic condition, social aspects along with structural considerations and building services Application and use of relevant building bye-laws and provisions of National Building Code

Methodology:

- Study of the various techniques of Energy-efficient design and recycling technologies for water & wastes is mandatory as these have to be incorporated in the design proposals. Awareness about LEEDS rating and best practices is expected.
- Individual/ Group studio exercises leading to design development

Unit	Hours/Periods	Contents
I.	21	Design of Club House /Auditorium/Theater or Assembling spaces - P.S. Stage
II.	21	-do- Final Stage with Models
III.	21	Design of an Institutional Building like Senior Secondary School / Public Library or Youth Hostel - P.S. Stage
IV.	21	-do- Final Stage with Models

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC501.1	Understand the design as function.
BARC501.2	Understand architectural design as a process and as a final product and the fundamentals of space, form and order in architecture.
BARC501.3	Know about the Indoor space, outdoor space, the concept of space in buildings and the relationship between man and space, defining spaces and the degree of enclosure, Organization of spaces, fenestration and character of facade, enclosure and internal spaces.
BARC501.4	To make student understand and develop the quality and hierarchy of space (private/semi-private/public/semi-public).

Reference / Text Books:

- Time Saver Standards for Architectural Design Data – John Hancock Callender.
- Ching, F.D.K., “Design Drawing”, Van Nostrand Reinhold. 2.
- V.S.Pramar, Design Fundamentals in Architecture, Somaiya Publications Pvt. Ltd., New Delhi, 1973.

- Neufert, P., “Architects Data”, 3rd Ed., Blackwell Science.
- Watson, D. (Editor), “Time-saver Standards for Architectural Design: Technical Data for Professional Practice”, 8th Ed., McGraw-Hill.
- Francis D.K.Ching, Architecture Form, Space and Order, Van Nostrand Reinhold Company, New York, 1979.
- Structure in Nature- Strategy for Design – Peter Pearce
- Patterns in Nature- Peter Streens
- Lidwell,William,Holden,Kestina,Butler,Jill,” Universal Principles Of Design”, Rockport-Publications, Massachussets

Guidelines to Teacher:-

- Case study and library study should be conducted as and when required.
- Provision for physically challenged persons should be incorporated in design solutions.
- Exercises to be taken up to emphasis the significance of the user in the process of design.

University Examination Pattern:

- The Question Paper is of Max. 150 Marks.
- The Design Problem has to be informed to the students a week in advance .
- The students are expected to present their designs in simple plans & views .
- They are not required to adhere to Measured Drawings; i.e; they will make presentation drawings only.
- **The answer sheets will be marked on the basis of external viva-voce**

B.ARCH. SEMESTER-V	BARC502	BUILDING CONSTRUCTION & MATERIALS - V	
Scheme of Teaching	**Scheme of Examination (Marks)**	**Duration of Exam**	**Credit**
L T P S Total	**Internal External Total**	**4 Hours**	**4**
1 0 2 2 5	**100 100 200**		

Objectives:-:

- To introduce and familiarize the students with constituents, manufacturing process/ availability/ properties/characteristics/defects/ classifications and usage of traditional building materials and their use in simple building work.
- To make students understand and appreciate the various methods of building construction in coordination with the building materials and science related to them

Methodology:-

- Introduction to materials and construction through lectures and studio exercises.
- Site visits to gain knowledge about construction details.
- Introduction to some basic construction methods and elements.

Unit	Hours/Periods	Contents
I.	21	• Ferrous and Non ferrous metals
II.	21	• Plastics as Building Material -Thermoplastics and thermosetting plastics – properties and architectural uses of plastics – structural plastics – Reinforced plastics and Decorative laminates-plastic coatings, Adhesives and sealants – Modifiers and Plasticizers, Use of nano-materials
III.	21	• Panelling& Partitions in Timber and Aluminium sections • Glass Block Partitions • Fabrications of plastics (PVC and UPVC). Primary plastic building products for walls, roof and partitions
IV.	21	• ESCALATORS, RAMPS AND ELEVATORS: Construction Details of Ramps and Elevators• Details of Escalators•

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC502.1	Get familiarize with manufacturing process / properties / availability / usage of materials & methods of construction in buildings.
BARC502.2	Knowing Usability & suitability of different types of partitions.
BARC502.3	Understand various application details of materials with respect to durability, functionality, aesthetics, maintenance etc.
BARC502.4	Understand selection of elements relevant to site conditions.

Text books:

- R Barry, Building Construction, East West Press, New Delhi, 1999.

Reference Books:

1. Don A. Watson, Construction Materials and Processes, McGraw Hill Co., 1972.
2. W.B.Mckay, 'Building Construction', Vol.1, 2, 3, Longmans, U.K. 1981.
3. R.Chudley, 'Building Construction Handbook', British Library Cataloguing in Publication Data, London, 1990.
4. Dr S P Bindra Arora, Text books on Building Construction.
5. Shelters, Shacks, and Shanties By D. C. BEARD With Illustrations by the Author NEW YORK Charles Scribner's Sons 1916

General guidelines for the teacher:

- To introduce the students to primary building materials and their applications in building construction.
- To cultivate personal observation and self learning in the students, site visits should be conducted so as to cover the given syllabus.
- Students will observe measure, sketch and annotate what they see at site and submit a site visit report to the teachers concerned for evaluation. This award shall form part and parcel of the sessional work for internal assessment.

University Examination Pattern:

The Question Paper is of Max. 100 Marks.

- Part A -10 short type questions of 4 Marks, covering entire syllabus
- Part B -4 Questions of 15 marks each to be attempted out of a total of 8 questions set from all the four units.
- **The answer sheets will be marked on the basis of external viva-voce**

B.ARCH. SEMESTER –V					BARC503			COMPUTER GRAPHIC SKILLS-III	
Scheme of Teaching					**Scheme of Examination (Marks)**			**Duration of Exam**	**Credit**
L	**T**	**P**	**S**	**Total**	**Internal**	**External**	**Total**	**No Exam**	**2**
1	**0**	**2**	**0**	**3**	**50**	**50**	**100**	**(Evaluation by External Viva-voce)**	

Objectives: Introduction and the use of 3DS Max and Corel Draw software for architectural applications,as tool for comprehensive modeling, animation, simulation, and rendering solution for 3D animations, architectural visualization, and images

Methodology:-

- Integration of practical exercises along with the design studio project
- Demonstrations &lectures explaining the uses and application of commands

Unit	Hours/Periods	Contents
I.	12	Introduction to Corel Draw • Exploring the CorelDraw Screen • File Management • Setting Up the Page
II.	12	• Moving Around and Viewing Drawings • Customizing Options • Drawing and Shaping Objects • Selecting & Manipulating Objects • Transforming Objects • Outlining & Filling Objects • Arranging Objects
III.	12	• Special Effects • Working with Text • Working with Brushes • Working with Paragraph • Special Text Effects
IV.	12	• Using Symbols and Clipart • Working with Bitmaps • Special Page Layouts • Printing • Using Styles and Templates • Using Corel Trace

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC503.1	students will have the knowledge and ability to use Corel Draw confidently and effectively.
BARC503.2	Coreldraw is vector-based designing software used to create logos, flexes, brochures, invitation cards, and any kind of vector design based on the lining.
BARC503.3	This works with vector-based images, which edit two-dimensional images such as logos and posters.
BARC503.4	It is used for designing different artwork like posters, logos, cards any vector-related graphics.

Guidelines for the teachers:
The teacher should demonstrate the commands**.**

University Examination Pattern:
The External jury will be of 50 Marks; i.e25 marks for the portfolio/projects submitted &25 marks for the final Viva.

B.ARCH. SEMESTER-V	BARC504	STRUCTURES IN ARCHITECTURE -IV

Scheme of Teaching					Scheme of Examination (Marks)			Duration of Examination	Credits
L	T	P	S	Total	Internal	External	Total	3 Hours	2
1	2	0	0	3	50	50	100		

Objectives:
To teach the fundamental aspects of Limit state method with the help of thumb rules as applicable to simple Design problems.

Methodology:
Through class lectures, Presentations, site visits, case studies and making models & testing them. Study of behavior of structures through models and testing them for given load.

Unit	Hours/Periods	Contents
I.	9	Introduction- Materials, basic properties of concrete & steel, reinforcement , standard loading, characteristic strength, permissible stresses in concrete & steel as per Indian standard. Design philosophies- working Method, ultimate load method, Limit state method.
II.	9	Limit state Design Method- Safety & Serviceability requirements, Limit states, characteristics material strength , load & partial Safety factors. Design of Beams: Singly, doubly reinforced beam for flexure, Shear and Bond. Design of steel beams Design of RCC one way slab & two way slab.
III.	9	Design of Compression member: Design of short & slender columns
IV.	9	Vector Active Structure Systems.-Truss Systems Working out structure systems for Layout of a small building

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC504.1	Pre- Stressed Concrete principles and systems, loss of pre-stress, analysis and design of pre-stress beams.
BARC504.2	Effect of earthquake on concrete buildings, Role and design of beams, columns and joints in RC buildings. Planning for reducing earthquake effects on buildings.
BARC504.3	Design of riveted and welded connections (simple cases only), tension and compression members, beam and plate girder, introduction to grillage foundation and trusses.
BARC504.4	Elements of Earthquake Engineering, zoning, base shear, lateral forces, ductile detailing and introduction to new codes.

Text books:
1. Structure and Design By G G Schierle, PhD, FAIA

Reference Books:
1. Structure in Architecture - Mario Salvadori
2. Building Structure Primer - James E Ambrose
3. Structures - Schodeck

4. Structural Concepts and Systems for Architecture & Engineers - T.Y.Lin.
5. Elements of Structure – Morgan

General guidelines for the Teacher:

- To introduce the students to the global building environment and the inherent design features
- Students will learn through models & case studies of structural systems
- The paper will be set by the external expert

University Examination Pattern:

The Question Paper is of Max 50 Marks.

- 7 questions of 2 marks each (from the entire syllabus). There will be choice to answer any 5questions
- 8 Questions of 10 marks each (2 questions from each unit). There will be choice to answer any four questions, with at least 1 from each unit.

B.ARCH. SEM-V	BARC505	HISTORY OF ARCHITECTURE -V	
Scheme of Teaching **L T P S Total** **2 0 0 0 2**	**Scheme of Examination (Marks)** **Internal External Total** **50 50 100**	**Duration of Exam.** **3 Hours**	**Credit** **2**

Objectives:

To provide the knowledge of the evolution of different architectural styles through study of Multi-Religious & Provincial World Architecture.

Methodology:

Study of the evolution of different styles of Architecture from 1500 CE to 1800CE around the globe.

Unit	Hours/Periods		Contents
I.	6	1700-1800 CE	• The Baroque Era- St Paul's Cathedral, St. Petersburg, Russia • Neo=Palladianism: Stowe gardens, England • Durbar square, Nepal • Rise of Jaipur • Spread of Colonialism: The nayaks of Madurai- Meenakshi Temple
II.	6	1800-1850 CE	• Neo-Classicism, Romanticism & Picturesque Architectural Styles in Europe: Salt Works of Chaux, France, works of Ar.Ledoux, & Ar. Durand • PutuoZongcheng at Chengde, China • US Capital, Washington • Golden temple, Amritsar • Glimpses of Colonial Calcutta • Establishment of Bangkok by King Rama & Golden Stupa at Wat PraKaew
III.	6	1850-1900 CE	• Neo-Gothicism in England: Parliament House • Transition from Victorian Era to Beaux Arts through the Industrial Revolution: • London Law courts, • Crystal Palace & • Supreme Court, Rome, • Glass House at Werkbund Exhibition, Germany • Art Nouveau-Ar Victor horta : Maison Tassel • City Beautiful Movement in US • Garden City Movement: Ebnezer Howard's concept
IV.	6	1900-1925 CE	• Erich Mendelson's Expressionism at Einstein Tower, Germany • Lutyen's Delhi & Baker's Parliamnet House • Russian Constructivism: Rusakov Factory Club • Bauhaus School by Walter Gropius • Villa Savoye by Corbusier

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC505.1	Architectural style through study of world Architecture from 1700-1800CE.
BARC505.2	Evolution of Architectural style from 1800-1850CE.
BARC505.3	From 1850-1900CE Architectural styles through study of multi-religious and world Architecture.
BARC505.4	Around the globe -study different Architectural styles from 1900-1925CE.

Text /Reference Books:

- Ching, D K, A Global History of Architecture
- Parihar, S., "Some Aspects of Indo-Islamic Architecture", Abhinav Publishers. 1999
- Fletcher, Banister Sir, History of Architecture
- Maheshwari, Sanjeev & Garg, Rajeev, Ancient Indian Architecture (From Blossom to Boom).
- A History of Architecture :- James Fergusan, John Willey
- Fergusan James, Willey John, "History of Indian & Eastern Architecture, Dodd, Mead & company 1899
- Tagdell Christopher, "The History of Architecture in India, Phaidon Press,1994

University Examination Pattern :

- The Question Paper is of Max 50 Marks.
- 7 questions of 2 marks each (from the entire syllabus). There will be choice to answer any 5questions
- 8 Questions of 10 marks each (2 questions from each unit). There will be choice to answer any four questions, with at least 1 from each unit.

B.ARCH. SEMESTER-V					BARC506			BUILDING SCIENCE-III	
Scheme of Teaching					Scheme of Examination (Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3 Hours	2
2	0	0	0	2	50	50	100		

Objectives:

- To familiarize students with the various elements of landscape architecture and the principle of landscape design and conservation.
- To develop and strengthen the competence in dealing with the analytic, artistic and technical aspects of designing open spaces at different scales

Unit	Hours/Periods	Contents
I.	6	• Introduction to Landscape Architecture, • Elements- hard & soft; • Evolution of Garden Design w.r.t. regional environment & existing examples around the globe
II.	6	• Spatial development in Landscape Design. • Plant materials - classification, characteristics, use and application in landscape design; their role as shading devices. • Influence of climate & selection of color
III.	6	• Landforms:- Site Planning for neighbourhood parks, children's play area and Campus development • pavements, furniture. • Water: waterfalls/streams/pools & ponds • Light & sound effects
IV.	6	• Urban open spaces and principles of urban landscape; Street landscaping, landscape design for waterfront areas and functional areas in urban centers; Green roofs and walls

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC506.1	Get familiarize with natural & man made elements and their impact on environment.
BARC506.2	Understand concept of sustainability & sustainable development.
BARC506.3	Understand various issues like climate change, ecological footprint etc.
BARC506.4	Understand low impact construction practices, life cycle cost and alternative energy resources.

Text /Reference Books:

- T S S for Landscape Architecture, Mc Graw Hill, Inc, 1995
- Grant W Reid, From Conceptto Form in Landscape Design, V an Nostrand Reinhold Company , 1993.
- Brian Hacket, Planting Design, Mc Graw Hill, Inc, 1976
- Cliff T and Y, Handbook of urban landscape", Architectural press, 1973
- T .K. Bose and Chowdhury, "Tropical Garden Plants in Colour", Horticulture and Allied Publishers, Calcutta, 1991

University Examination Pattern

- The Question Paper is of Max 50 Marks.
- 7 questions of 2 marks each (from the entire syllabus). There will be choice to answer any 5questions
- 8 Questions of 10 marks each (2 questions from each unit). There will be choice to answer any four questions, with at least 1 from each unit.

B.ARCH. SEM–V	BARC507	BUILDING TECHNOLOGY- III	
Scheme of Teaching **L T P S Total** **2 0 0 0 2**	**Scheme of Examination (Marks)** **Internal External Total** **50 50 100**	**Duration of Examination** **3 Hours**	**Credit** **2**

Objectives:

- To acquaint the students with the basic principles used in all basic building services with regards to electrical services in buildings.
- To enable the students in understanding Lighting and illumination with reference to Architecture.

Methodology:

Subject shall be taught through the combination of Guest Lectures and exercises in simple layout for Small buildings

Study of the basics of photometry, effects and ambience of artificial lighting, the study has to be conducted on a small residential building.

Unit	Hours/Periods	Contents
I.	6	Fundamental principles of Electricity, Transmission of power, distribution in cities, Transformers and load calculations, Single and three phase connections, Types of Generators, UPS.
II.	6	Building Wiring System: Service wires, metering, light and power circuits. electrical safety devices, MCB, ELCB, distribution boards, wiring methods, ISI Codes and standard materials, Conductors, switch boards, electrical points in general building, Concept of earthing, Electrical symbols used in Plans, NBC, preparation of layouts for residences and offices.
III.	6	Basics of Lighting and Radiation, Key Technical Terms of Lighting and illumination, Units of lighting, Basic layers of Lighting- Task, Accent and Ambient lighting.
IV.	6	Lighting Fixtures and types of lighting arrangement, Types of Lamps (CFL, LED, fluorescent, Sodium and high-pressure mercury vapor lamp etc.), Recommended levels of illumination for various occupancies.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC507.1	Acquire knowledge of principles used in building services with special emphasis on electricity.
BARC507.2	Understand lighting and illuminance with reference to Architecture.
BARC507.3	Understand the basic norms as per National Building Code.
BARC507.4	Understand different types & selection of lighting fixtures according to requirement.

Text /Reference Books:

- K.B. Raina, S.K. Bhattacharya,(2015). “Electrical Design”
- Time-saver Standards for Architectural Lighting.
- Williams, Ben (1999). "A History of Light and Lighting"
- "Lamp." Columbia Electronic Encyclopedia, 6Th Edition (2011)
- Rensellaer, Lighting Research Center “Illumination Fundamentals”

Guidelines for Teacher:

The student will be taught basics electrical design and to create a portfolio that clearly expresses his/her ability to utilize artificial and day Lighting for improvising Architecture and Design.

University Examination Pattern:

- The Question Paper is of Max 50 Marks.
- 7 questions of 2 marks each (from the entire syllabus). There will be choice to answer any 5questions
- 8 Questions of 10 marks each (2 questions from each unit). There will be choice to answer any four questions, with at least 1 from each unit

B.ARCH. SEMESTER –V					BARC 508			SURVEYING, LEVELING & DRAWING	
Scheme of Teaching					**Scheme of Exam = Marks**			**Duration of Exam**	**Credit**
L	**T**	**P**	**S**	**Total**	**Internal**	**External**	**Total**	**No Exam,**	**3**
0	**2**	**0**	**2**	**4**	**75**	**75**	**150**	**(Evaluation by External viva voce)**	

Objectives:
To acquaint the students about the basics of surveying.

Methodology:
Students shall be able to draw Map, Plan and calculate area, volume and earthwork.

Unit	Hours/Periods	Contents
I.	6	**Introduction: -**Definition, Basic Principle of surveying, Scale, Map, Errors. **Chain and Compass Survey:** Principle of chain surveying, Measurement of distance with chain and tape, Direct & Indirect Ranging, offsets, selection of base line and stations, Tape corrections, obstacles in chaining, Bearing and its measurement with Prismatic & surveyors compass, Calculation of angels from bearings, local attractions and its elimination, adjustment of closing error by graphical method.
II.	6	**Theodolite & Plane Table survey: -** Temporary & permanent Adjustment, Measurement of horizontal and vertical angel, Adjustment of closing error by Bowditch and Transit rules, different equipment in plane tabling, different methods of plane tabling, Strength of Fix, Two and three point problems.
III.	6	**Levelling & Contouring: -** Types of levels, methods of levelling, Sensitivity of bubble tube, setting out grade lines, Temporary & permanent Adjustment, different method of contouring, Setting out contour gradient, Simple earthwork, calculations of areas and volumes.
IV.	6	**Minor Instruments: -** Box sextant, Hand level, Abney level, Plane meter, Ghat tracer, Tangent Clinometers, etc.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC508.1	Understanding the importance of Surveying in Architecture its aim, objectives, types of surveying methods and application, and different instruments used for Surveying.
BARC508.2	Understanding the method of Chain and compass survey, traversing map Survey of cluster of buildings map.
BARC508.3	Understanding the method of Leveling: using dumpy level and automatic level.
BARC508.4	Understanding the method of Contour survey and plotting of contour maps.

Text /Reference Books:

S.K. Duggal, 'Surveying', Vol. I & II, Tata McGraw Hill.

2. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Surveying Vol. I and II, Laxmi

Publications.

3. R. Agor, 'Surveying', Khanna Publishers.

4. S.S. Bhavi Katti, 'Surveying & Levelling', Volume I & II.

Guidelines for Teacher:

The student will be taught basics electrical design and to create a portfolio that clearly expresses his/her ability to utilize artificial and day Lighting for improvising Architecture and Design.

University Examination Pattern:

- The Question Paper is of Max 50 Marks.
- 7 questions of 2 marks each (from the entire syllabus). There will be choice to answer any 5questions
- 8 Questions of 10 marks each (2 questions from each unit). There will be choice to answer any four questions, with at least 1 from each unit.

B.ARCH. SEMESTER-V					BARC509			PARAMETRIC ARCHITECTURE-I	
Scheme of Teaching					Scheme of Examination			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	No Exam,	1
0	0	2	0	2	50	0	50	(Only Internal)	

Objectives:- Familiarizing the use of multimedia, AI and web applications.

Methodology:- Lectures & exercises to enable the students to prepare well- formatted sketches, models and documents of different nature and extension types.

Unit	Hours/Periods	Contents
I.	9	• Use of Internet, various search engines, Applications and plug-ins for Architectural Research
II.	9	• Introduction to computation, parametric modeling, algorithms, scripting, coding and open-source Modeling languages viz. 'Processing' • Sketching apps: free hand strokes with stylus
III.	9	• Exercises to understand scale in digital media Rastering Images • Introduction to tablets: Bamboo- slate/ ipad sketch etc. • Developing views and vistas for architectural design
IV.	9	• The concept of Artifical Intelligence (AI), • Role of AI and its applications in Architectural industry • Robotics and 3D printing

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC509.1	To Introduce students into practice of Computer Applications in Architecture.
BARC509.2	To familiarize Advanced learning of software available for architectural applications and familiarize the students with the concepts of 3D modeling.
BARC509.3	To enable them to experiment with forms, mapping, rendering and presentation techniques.
BARC509.4	To make students create integrated design documents by taking full advantage of the building model. Integration of practical exercises along with the design studio projects.

Text /Reference Books:-

- Sinha & Sinha; Foundations of Computing, BPB
- Flash Web Design, The Art of Motion Graph, Curtis Hillman, New Riders Publishing,Indianapolis, IN. U.S.A, 2000

General guidelines for the teacher:

The teacher shall make live demonstrations in the computer lab on the small scale projects

B.ARCH.SEMESTER-VI					BARC601			ARCHITECTURAL DESIGN-VI	
Scheme of Teaching					Scheme of Examination= Marks			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	18 Hours (Evaluation by External Viva –voce)	6
1	0	4	3	8	150	150	300		

Objectives:-

Course aims at teaching the design of buildings for passive recreation and large span buildings for public uses.

Methodology:-

- Study of the various techniques of Energy-efficient design and recycling technologies for water & wastes is mandatory as these have to be incorporated in the design proposals. Awareness about LEEDS rating and best practices is expected.
- Individual/ Group studio exercises leading to design development

Unit	Hours/Periods	Contents
I.	21	Design of a multi-storied building like office building, shopping mall, ,. The focus would be on understanding how to design for an urban setting. - P.S. Stage
II.	21	-do- Final Stage with Models
III.	21	Design of Infotainment center/ hotel./ small hospital - P.S. Stage
IV.	21	-do- Final Stage with Models

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC601.1	Learn the art of collecting data and to carry out analysis for the process of evolving design and individuality of approach.
BARC601.2	Understanding site planning: organization, scale, hierarchy, orientation and climate.
BARC601.3	Understand complex services in multi-storied buildings; understanding the architectural content of services in buildings.
BARC601.4	Implicate knowledge of design fundamentals and knowledge gained in other subjects to develop better design solutions. Develop appropriate graphic skills and presentation techniques (models, rendering) to explain the contents of a design.

Notes:-

(a) Design should be urban in context with sustainability and local byelaws as the key factors

(b) Method of construction includes:- Data collection and analysis, Site conditions, Climatic Conditions, Demographic & Socio-Cultural setup, User requirement

Reference / Text books:-

- Time Saver Standards for Architectural Design Data – John HancockCallender.
- Ching, F.D.K., "Design Drawing", Van Nostrand Reinhold.2.
- V.S.Pramar, Design Fundamentals in Architecture, Somaiya Publications Pvt. Ltd., New Delhi,1973.
- Neufert, P., "Architects Data", 3rd Ed., BlackwellScience.
- Watson, D. (Editor), "Time-saver Standards for Architectural Design: Technical Datafor Professional Practice", 8th Ed.,McGraw-Hill.
- Francis D.K.Ching, Architecture Form, Space and Order, Van Nostrand ReinholdCompany, New York,1979.
- Structure in Nature- Strategy for Design – PeterPearce
- Patterns in Nature- PeterStreens
- Lidwell,William,Holden,Kestina,Butler,Jill," Universal Principles Of Design",Rockport-Publications, Massachussets

Guidelines To Teacher:-

- Case study and library study should be conducted as and when required.
- Provision for physically challenged persons should be incorporated in design solutions.
- Exercises to be taken up to emphasis the significance of the user in the process of design.

University Examination Pattern:

- The Question Paper is of Max. 150Marks.
- The Design Problem has to be informed to the students a week in advance.
- The students are expected to present their designs in simple plans & views.
- They are not required to adhere to Measured Drawings; i.e; they will make presentation drawings only.
- The answer sheets will be marked on the basis of external viva-voce

B.ARCH.SEMESTER-VI					BARC602			BUILDING CONSTRUCTION & MATERIALS-VI	
Scheme of Teaching					Scheme of Examination =Marks			Duration of Exam	Credit
L	T	P	S	Total	Internal	External	Total	4 Hours	4
1	0	2	2	5	100	100	200		

Objectives:-

- To introduce and familiarize the students with constituents, manufacturing process/ availability/ properties/characteristics/defects/ classifications and usage of traditional building materials and their use in simple building work.
- To make students understand and appreciate the various methods of building construction in coordination with the building materials and science related to them

Methodology:-

- Introduction to materials and construction through lectures and studio exercises.
- Site visits to gain knowledge about construction details.
- Introduction to some basic construction methods and elements.

Unit	Hours/Periods	Contents
I.	21	• Study of Gypsum & Paints as Building Materials
II.	21	• Floors – Decked Floors
III.	21	• Roofs- Roofs and Trusses: Steel Trusses. • Detail of terracing for flat roofs. Water proofing and rainwater disposal., Rain Water Harvesting
IV.	21	• Expansion Joints

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC602.1	Get familiarize with properties / availability / usage of materials & methods of construction in buildings.
BARC602.2	Knowing Usability & suitability of different types of floors.
BARC602.3	Understand the details of different trusses with respect to durability, functionality, aesthetics, maintenance etc.
BARC602.4	Understand the importance of Expansion Joints to site conditions.

Text books:

1. R Barry, Building Construction, East West Press, New Delhi, 1999.

Reference Books:

1. Don A. Watson, Construction Materials and Processes, McGraw Hill Co., 1972.

2. W.B. Mckay, 'Building Construction', Vol.1, 2, 3, Longmans, U.K.1981.
3. R. Chudley, 'Building Construction Handbook', British Library Cataloguing in Publication Data, London, 1990.
4. Dr S P Bindra Arora, Text books on Building Construction.
5. Shelters, Shacks, and Shanties By D. C. BEARD With Illustrations by the Author NEWYORK Charles Scribner's Sons1.

General guidelines for the teacher:

- To introduce the students to primary building materials and their applications in building construction.
- To cultivate personal observation and self learning in the students, site visits should be conducted so as to cover the given syllabus.
- Students will observe measure, sketch and annotate what they see at site and submita site visit report to the teachers concerned for evaluation. This award shall form part and parcel of the sessional work for internal assessment.

University Examination Pattern:

The Question Paper is of Max. 100 Marks.

- Part A -10 short type questions of 4 Marks, covering entire syllabus
- Part B -4 Questions of 15 marks each to be attempted out of a total of 8 questions set from all the four units.
- The answer sheets will be marked on the basis of external viva-voce

B.ARCH. SEMESTER –VI					BARC603			COMPUTER GRAPHIC SKILLS-IV	
Scheme of Teaching					Scheme of Examination			Duration of Exam	Credit
L	T	P	S	Total	Internal	External	Total	No Exam	2
1	0	2	0	3	50	50	100	(Evaluation by External Viva voce)	

Objectives:-Introduction and the use of 3 DS Max software for architectural applications. as a tool for comprehensive modeling, animation, simulation, and rendering solution for 3D animations, architectural visualization, and images

Methodology:-Integration of practical exercises along with the design studio project
Demonstrations & lectures explaining the uses and application of commands

Unit	Hours/Periods	Contents
I.	12	**Introduction to Photoshop** • The Photoshop Environment • Creating Custom Workspaces • Opening Images • Using the File Browser • Image Magnification • Viewing Document Information • Moving the Image • Undoing Mistakes and the History • Palette Using the options bar and other • panels Using the Tools • Displaying Drawing Guides • Setting Preferences
II.	12	**Photoshop Image Manipulation** • Opening an Image in Photoshop • Creating images in Photoshop • Saving images in Photoshop • Basic image editing • Cropping an Image • Bitmap Images • Vector Images • Image Size and Resolution Settings • Scanning Images • Placing Files • Supported import and export formats
		Layer Basics • About Layers-fill and adjustment Layers • Using the Layers Palette • Creating Layers • Deleting Layers • Moving Layers • Layer Opacity • Locking Layers • Layer modes and blending options • Apply Layers Style & Flatting and saving file **Color Basics**

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC603.1	students will have the knowledge and ability to use Photo shop confidently and effectively.
BARC603.2	Student will gain the skills and abilities to use Photo shop that are employable and rewarding.
BARC603.3	Student will learn to render the architectural plan sections and elevations etc.
BARC603.4	It will also help the student to explain their ideas of designs in creative way

Text / Reference Books:

- Goldenberg, Joseph, Autocad Architecture 2008 – Comprehensive Tutorial Autodesk2008
- AutoDesk , "Auto Cad Manual2012"
- Aubin , Paul F, Mastering Auto CAD Architecture2008.
- Elise, Moss , AutoCAD Architecture 2008 Fundamentlas Autodesk2008.

Guidelines for the teachers:

The teacher should demonstrate the commands**.**

University Examination Pattern:

The External jury will be of 50 Marks; i.e 25 marks for the portfolio/projects submitted & 25 marks for the final Viva.

B.ARCH.SEMESTER-VI					BARC604			STRUCTURES IN ARCHITECTURE-V	
Scheme of Teaching					Scheme of Exam			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3 Hours	2
1	2	0	0	3	50	50	100		

Objectives: To teach the basics of Seismic Design, Steel Design & Composite Structure Systems

Methodology:
Through class lectures, Presentations, site visits, case studies and making models & testing them.
Study of behavior of structures through models and testing them for given load.

Unit	Hours/Periods	Contents
I.	9	Design of steel beams
II.	9	Trusses- Definition of truss, Perfect truss, Imperfect truss, Type of trusses& suitability, analysis of simple stress by Analytical method
III.	9	Designs of connection in steel structure: Bolted & welded Connection, assumptions, different type of joints, design of Various types of welded connections subjected to direct loads & moments.
IV.	9	Surface Active Structures-Plate, Folded & Shell structures. Working out structure systems for Layout of a small building

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC604.1	To understand the principles of Design of RCC Structures, Analysis of Portal frames, Principles of Bulk – active and Vector active structures.
BARC604.2	The course outlines the metamorphosis of various structural concepts and systems during the development of architecture at various times.
BARC604.3	It also discusses the role of non-conventional innovative structural systems in the contemporary practice of architecture. It also highlights the impact of new materials and structural solutions on the innovative forms of architecture.
BARC604.4	The course thus aims at enabling students to design innovative non-conventional forms in their architectural design in a feasible manner, with a better understanding of the structural behavior of these forms.

Text /Reference Books:

- Structure and Design By G GSchierle, PhD, FAIA
- Structure in Architecture - Mario Salvadori
- Building Structure Primer - James E Ambrose
- Structures - Schodeck, Elements of Structure – Morgan
- Structural Concepts and Systems for Architecture & Engineers - T.Y.Lin.

General guidelines for the teacher:

To introduce the students to the global building environment and the inherent design features
Students will learn through models & case studies of structural systems

University Examination Pattern

- The Question Paper is of Max 50 Marks.
- 7 questions of 2 marks each (from the entire syllabus). There will be choice to answer any 5questions
- 8 Questions of 10 marks each (2 questions from each unit). There will be choice to answer any four questions, with at least 1 from each unit.

B.ARCH. SEM-VI					BARC605			HISTORY OF ARCHITECTURE -VI	
Scheme of Teaching					Scheme of Examination			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3 Hours	2
2	0	0	0	2	50	50	100		

Objectives:-To provide the knowledge of the evolution of different architectural styles through study of Multi-Religious & Provincial World Architecture.

Methodology:-

Study of the evolution of styles of Architecture from 1500 CE to 1800CE around the globe

Unit	Hours/Periods		Contents
I.	6	1925-1950 CE	Rise of Modernism • Mies Van Der Rohe's Barcelona Pavilion & FarnsworthHouse • Buckminster Fuller: Geodesic Dome &4D DymaxionHouse • Corbusier's Palace ofSoviets • Organic Architecture by F L wright RobieHouse, TaliesinEast • Emergence of tall buildings:RaymondHood's Rockfeller Centre, NewYork
II.	6	1950-1975 CE	• Cities of Chandigarh& Capitolcomplex, Bhubneshwar & Gandhinagar. • National Congress,Brasilia • Guggenheim Museum,Manhattan • Louis kahn's Parliament ofBangladesh • Sydney Opera House by JohnUtzon
III.	6	1975-2000 CE	• Ahmedabad after Corbusier: CEPT,Gandhi Ashram & Sangath • Kenzo Tange's Mastrplan for city ofAbuja, Nigeria • Post Modernism: pompidou Centre,France • Phillipjohnson's AT & T building, NewYork • I M Pei's Pyramide Du Louvre,Paris
IV.	6	2000-till date	Globalisation • Rise of Shanghai • San Tiago calatrava's Milwaukee Artmuseum, Wisconsin • Dubai Skyline • Concept of smart Cities:Barcelona

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC605.1	Understand the reasons of emergence, growth and termination of prevailing architectural periods.
BARC605.2	Analytical understandings on theories of design to be able to translate creative thinking of space.
BARC605.3	Understand the building type and its architectural style.
BARC605.4	Assess the merits of an architectural design in terms of key social, aesthetic and functional aspects.

Text /Reference Books:

- Ching, D K, A Global History ofArchitecture
- Parihar, S., "Some Aspects of Indo-Islamic Architecture", Abhinav Publishers. 1999
  Fletcher, Banister Sir, History of Architecture
- Maheshwari, Sanjeev & Garg, Rajeev, Ancient Indian Architecture (From Blossom to Boom). A History of Architecture :- James Fergusan, John Willey
- Fergusan James, Willey John, "History of Indian & Eastern Architecture, Dodd, Mead & company 1899
- Tagdell Christopher, "The History of Architecture in India, Phaidon Press,1994

University Examination Pattern:

- The Question Paper is of Max 50 Marks.
- 7 questions of 2 marks each (from the entire syllabus). There will be choice to answerany 5questions
- 8 Questions of 10 marks each (2 questions from each unit). There will be choice to answer any four questions, with at least 1 from eachunit.

B.ARCH. SEM-VI					BARC606			URBAN AND REGIONAL PLANNING	
Scheme of Teaching					Scheme of Examination			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3 Hours	2
2	0	0	0	2	50	50	100		

Objectives:- The study of this subject emphasizes on planning philosophies, overview of planning process and components of land use planning. It aims to train the students to carry out the further studies in the specialized field of Urban and Regional Planning.

Methodology: Studio Assignments, Lectures with the help of audio visual aid.

Unit	Hours/Periods	Contents
I.	6	• Urban and Regional Planning principles and considerations: Urban structure. • Urban typology, density and sustainability - spatial typesand morphologies related to intensity of use, • consumption of resources and production and maintenance of viable communities
II.	6	• Accessibility –ease, safety and choice when moving to and through places; Legibility and way finding; Designing places to stimulate public activity • Function and fit; Complementary mixed uses-constructive interaction; • Character and meaning; • Order and incident; • Continuity and change in time and place, contemporary culture
III.	6	• Civil society- building social capital • Sociology and social science and its relation to physical planning Theories of Urbanization – Marx Theory
IV.	6	• Human Aspects of Urban Form. • Regional planning macro and microeconomics. • Planning need, issues and five year plans, • Economic uplift, backwardness, Poverty alleviation; • Sustainable development, conservation measures, reduce recycle, reuse concept, care for future generation

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC606.1	Students will acquire a solid base of knowledge in the principles and practices of learning, including urban spatial structure, local public finance, economics of development, infrastructure provision, and globalization.
BARC606.2	Students will develop the skills necessary for the effective practice of planning, including its purpose, meaning and history; methods that envision future change; elements of plans; adoption, administration, and implementation of plans; speaking for the disadvantaged; laws and policies of environmental planning.
BARC606.3	Students will develop the values necessary for the effective practice of planning, including problem-solving skills; research skills; written, graphical, and oral skills; computational skills; collaboration with peers; meeting professional standards; forecasting and scenarios; implementation of plans; working with diverse communities.
BARC606.4	Students will learn the values and ethical standards affecting the practice of planning, including the values of justice, equity, fairness, efficiency, order, and beauty; the values of fair representation and equal opportunity; and respecting complex legacies.

Text/Reference Books

- Regional Planning in India Paperback – 2011 by Mahesh Chand (Author), V. K. Puri (Author)
- Urban and Regional Planning in India: by S K Kulshresth

University Examination Pattern:

- The Question Paper is of Max 50 Marks.
- 7 questions of 2 marks each (from the entire syllabus). There will be choice to answer any 5questions
- 8 Questions of 10 marks each (2 questions from each unit). There will be choice to answer any four questions, with at least 1 from each unit.

B.ARCH. SEM-VI					BARC607			BUILDING TECHNOLOGY-IV	
Scheme of Teaching					Scheme of Examination			Duration of Exam.	Credit
L	T	P	S	Total	Internal	External	Total	3 Hours	2
2	0	0	0	2	50	50	100		

Objectives: Developing an understanding regarding environmental sustainability and environmentally responsible green buildings.

Unit	Hours/Periods	Contents
I.	6	Natural environment Vis a vis built environment. Living environment Characteristics and components of Urban Ecosystem solar radiation,heat flow, air-movement, Land use, drainage and sanitation
II.	6	Concepts of green field development: Brown field development, environmental impact and ecological balance, FAR, layouts, sustainable Site development, vegetation, landscape elements, alternative services and technologies, rain water harvesting, on site sewerage retention, treatment, recycle and reuse
III.	6	Building Resources: Passive energy system Design, Building envelope, orientation and components of building fabric and Shading, High rise buildings, modular building Construction, curtain walls, Sourcing and recycling of building materials, alternative Calcareous, metallic and non metallic, materials.
IV.	6	Sick Building Syndrome, & Importance of green buildings in the contexts of Indian sub continent

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC607.1	Students will acquire a solid base of knowledge of components of Urban Ecosystem
BARC607.2	Students will develop the skills necessary for the effective practice of planning of of green field development: Brown field development
BARC607.3	Students will develop the values necessary for the Passive energy system Design.
BARC607.4	Students will learn about the Sick Building Syndrome, & Importance of green buildings

Text /Reference Books:

- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- Down to Earth, Centre for Science and Environment
- Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T.2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196

University Examination Pattern

- The Question Paper is of Max 50 Marks.
- 7 questions of 2 marks each (from the entire syllabus). There will be choice to answer any 5questions
- 8 Questions of 10 marks each (2 questions from each unit). There will be choice to answer any 4 questions, with at least 1 from each unit.

B.ARCH. SEMESTER-VI					BARC608			BUILDING BYELAWS	
Scheme of Teaching					Scheme of Examination			Duration of Exam.	Credit
L	T	P	S	Total	Internal	External	Total	3 Hours	2
2	0	0	0	2	50	50	100		

Objectives:-

- Architectural practice and building regulations.
- Familiarizing with Building Bye-laws through Local Developments Authority Guidelines, applicable to Residential and Non Residential building

Unit	Hours/Periods	Contents
I.	6	Building bylaws :terminology, ground coverage, FSI calculations, building height regulations, building use regulation
II.	6	Submission plan, methods of municipal approval, NBC, fire prevention and safety measures, other regulatory aspects such as master plan and zonal plan, NBC
III.	6	Provisions with respect to Land use classifications and use permitted Means of Access, Community open spaces and amenities, Requirement of Plots. Code of conduct for specially able & various services like water supply & sanitation, electrical, mechanical etc
IV.	6	NOC, Occupation certificate, Buildings services approvals and completion certificate procedure. Codal provisions with respect to Classification of Buildings, Open spaces within a plot, Offstreet parking spaces, Requirement of parts or buildings.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC608.1	Building Bye-Laws are legal tools used to regulate coverage, height, building bulk, and architectural design and construction aspects of buildings so as to achieve orderly development of an area.
BARC608.2	Students will develop the skills necessary to protect any building against noise, fire, earthquakes, structural failures, and any hazardous activity.
BARC608.3	Students will learn about the NBC standered codes
BARC608.4	Students will learn about NOC approvals, managing of open spaces & offstreet parking.

Text books and Reference Books:

- National Building Codes2005
- Local BuildingByelaws
- Master plan of any area as specified by theteacher

University Examination Pattern:

The Question Paper is of Max 50 Marks.

- 7 questions of 2 marks each (from the entire syllabus). There will be choice to answerany 5questions
- 8 Questions of 10 marks each (2 questions from each unit). There will be choice to answer any four questions, with at least 1 from each unit.

B.ARCH. SEMESTER –VI					BARC609			PARAMETRIC ARCHITECTURE-II	
Scheme of Teaching					**Scheme of Examination**			**Duration of Examination**	**Credit**
L	**T**	**P**	**S**	**Total**	**Internal**	**External**	**Total**	**No Exam, only internals**	**1**
0	**0**	**2**	**0**	**2**	**50**	**00**	**50**		

Objectives:

- To introduce the students advanced modelling techniques in Ruby/ Python
- To create Custom Objects and extend them using Inheritance. Additionally, this course explores the use of Grasshopper in Python.

Methodology:-

Students will learn how to construct a Grid to host objects, make Panels on to a Grid
To develop the panels into small modules

Content:-

Google Sketch –Up –
Sketching in different modes like, natural, sepia, monochrome, etc.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC609.1	Make student familiar to the software and use it effectively
BARC609.2	Students will learn about to create 3D objects in a 2D environment. Whether you plan to model for 3D printing or for other purposes, Sketch-up
BARC609.3	Students can create simple 3D physical models
BARC609.4	Allow students to better visualize their idea than they could do by sketching on paper.

Text /Reference Books:

- Goldenberg, Joseph, Autocad Architecture 2008 – Comprehensive Tutorial Autodesk 2008
- AutoDesk , "Auto Cad Manual 2012"
- Google, "Google Sketch up Manual"
- Aubin , Paul F, Mastering Auto CAD Architecture 2008.
- Elise, Moss , AutoCAD Architecture 2008 Fundamentlas Autodesk 2008.

General guidelines for the teacher:
The teacher shall make live demonstrations in the computer lab on the small scale projects.

B.ARCH. SEMESTER-VII					BARC701			ARCHITECTURAL DESIGN - VII	
Scheme of Teaching					Scheme of Examination= Marks			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	18 Hours (Evaluation by External Viva –voce)	6
1	0	4	3	8	150	150	300		

Objectives:- To familiarize the students with large scale housing and building projects with emphasis on building services and systems, architectural controls and building bye laws.

Methodology:-Study of the various techniques of Energy-efficient design and recycling technologies for water & wastes is mandatory as these have to be incorporated in the design proposals. Awareness about LEEDS rating and best practices is expected. Individual/ Group studio exercises leading to design development

Unit	Hours/Periods	Contents
I.	21	Large spans viz exhibition pavilions / industrial buildings / Multiplex - P.S. Stage
II.	21	-do- Final Stage with Models
III.	21	Multi-functional mid-rise buildings with specialized services, such asHousing (G+3) with Site area 1 hectare
IV.	21	• Housing Continued. • Site planning of an Institutional campus in terms of road arteries ,landscape, electrical substations & fire tanks

CO

URSE OUTCOMES: On completion of this course, the students will be able to

BARC701.1	Undertake comprehensive design with special emphasis on Structure System, Services, Architectural Control & Building Bye Laws.
BARC701.2	Understand the importance Climatic factors .
BARC701.3	Understand the Co-relation of structure system, circulation and other functional utility of spaces.
BARC701.4	Design user friendly public spaces for differently abled people.

NOTE:- Method of construction includes:- Data collection and analysis, Site conditions, Climatic Conditions, Demographic & Socio-Cultural setup, User requirements

Reference / Text Books:

- Time Saver Standards for Architectural Design Data – John Hancock Callender.
- Ching, F.D.K., “Design Drawing”, Van Nostrand Reinhold. 2.
- V.S.Pramar, Design Fundamentals in Architecture, Somaiya Publications Pvt. Ltd., New Delhi, 1973.
- Neufert, P., “Architects Data”, 3rd Ed., Blackwell Science.
- Watson, D. (Editor), “Time-saver Standards for Architectural Design: Technical Data for Professional Practice”, 8th Ed., McGraw-Hill.
- Francis D.K.Ching,Architecture Form, Space and Order,Van Nostrand Reinhold Company, New York, 1979.
- Structure in Nature- Strategy for Design – Peter Pearce
- Patterns in Nature- Peter Streens
- Lidwell,William,Holden,Kestina,Butler,Jill,” Universal Principles Of Design”, Rockport-Publications, Massachussets

Guidelines to teacher:-

- Case study and library study should be conducted as and when required.
- Provision for physically challenged persons should be incorporated in design solutions.
- Exercises to be taken up to emphasis the significance of the user in the process of design.
- For end semester exam, marks would be awarded on basis of EXTERNAL VIVA-VOCE of both the Design Portfolio & the End-Semester Answer Sheet

B.ARCH. SEMESTER-VII	BARC702	BUILDING CONSTRUCTION & MATERIALS- VII	
Scheme of Teaching **L T P S Total** **1 0 2 2 5**	**Scheme of Examination = Marks** **Internal External Total** **100 100 200**	**Duration of Examination** **4Hours**	**Credit** **4**

Objectives:-:

To enable the student to study various constructional details in metals i.e., steel & aluminum in coordination with study of materials & science related to them.

To enable the student to know about latest techniques like prefabrication, pre-stressed,etc used in industry

Methodology:-

- Introduction to materials and construction through lectures and studio exercises.
- Site visits to gain knowledge about construction details.
- Introduction to some basic construction methods and elements.

Unit	Hours/Periods	Contents
I.	21	• The study about application of stainless steel in interior and exterior as well; the maintenance required in stainless steel.
II.	21	Doors and windows in : • Rolled steel section • Pressed steel frames • Sliding, folding and pivoted doors in UPVC
III.	21	• Commercial kitchen dry section (study, designing and working drawings).
IV.	21	• Commercial kitchen wet section (study, designing and working drawings).

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC702.1	Introduction to the study of building construction and materials, its importance.
BARC702.2	Various construction details in metals in coordination with study of materials and science related to them.
BARC702.3	Enable to know about latest techniques used in industry such as commercial kitchen.
BARC702.4	Designing and working drawing details.

General guidelines for the teacher:

- To introduce the students to primary building materials and their applications in building construction.
- To cultivate personal observation and self learning in the students, site visits should be conducted so as to cover the given syllabus.
- Students will observe measure, sketch and annotate what they see at site and submit a site visit report to the teachers concerned for evaluation. This award shall form part and parcel of the sessional work for internal assessment.

University Examination Pattern:

The Question Paper is of Max. 100 Marks.

- Part A -10 short type questions of 2 Marks, covering entire syllabus
- Part B -4 Questions of 20 marks to be attempted out of a total of 8 questions set from all the four units.
- **The answer sheets will be marked on the basis of external viva-voce**

B.ARCH. SEMESTER –VII					BARC703			COMPUTER GRAPHIC SKILLS -V	
Scheme of Teaching					Scheme of Exam = Marks			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	No External (Evaluation by external Viva-voce)	2
1	0	2	0	3	50	50	100		

OBJECTIVE: Introduction and the use of Autodesk Revit Architecture as a tool for building design, Simulation and drafting.

Unit	Hours/Periods	Contents
I.	12	**Transforms** • Using free transform • Move • Rotate • Scale • Skew Distort • Perspective • Flip-vertical, horizontal • Invert • Rotate 180, 90ocw, 90occw
II.	12	**Working with Selections** • Using the quick selection tool • Moving a selected area • Manipulating selection • Refining the edges of a selection **Masks and Channels** • Editing a mask • Applying a filter effect to a masked • selection • Creating a Gradient mask
III.	12	**Action** • Using the action palette • Recording action • Playing action • Editing action • Loading a saved action **Text Editing and Special Effects** • About the type Layer Creating horizontal and vertical type • Using horizontal and vertical type • mask tools • Using character palette for text • editing Creating text warp • Rasterizing type • Converting type to Shapes • Adding effect to text
VI.	12	**Photoshop Special Effects and Filter** • About special effects • Using filters • Basic filters • Filter Combinations **Creating Links Within An Image**

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC703.1	students will have the knowledge and ability to use Photo shop confidently and effectively.
BARC703.2	Student will gain the skills and abilities to use Photo shop that are employable and rewarding.
BARC703.3	Student will learn to render the architectural plan sections and elevations etc.
BARC703.4	It will also help the student to explain their ideas of designs in creative way

Text /Reference Books:

- Mastering latest version of Photo-shop
  by Brendan Dillon (Foreword), James Vandezande (Author), Eddy Krygiel (Author)

Guidelines for the teachers:

The teacher should demonstrate the software**.**

University Examination Pattern:

The External jury will be of 50 Marks; i.e 30 marks for the portfolio/projects submitted & 20 marks for the final Viva.

B.ARCH. SEMESTER-VII					BARC704			STRUCTURE IN ARCHITECTURE- VI	
Scheme of Teaching					Scheme of Exam = Marks			Duration of Exam.	Credits
L	T	P	S	Total	Internal	External	Total	3 Hours	2
1	2	0	0	3	50	50	100		

Objectives:

To teach the basics of Seismic Design, Steel Design & Composite Structure Systems

Methodology:

Through class lectures, Presentations, site visits, case studies and making models & testing them.

Study of behavior of structures through models and testing them for given load.

Unit	Hours/Periods	Contents
I.	9	Introduction of earthquake resistant structure, Behavior of structure under seismic load, earthquake failure
II.	9	Lateral Force Design & diagonal tension
III.	9	Introduction to Pre-stressed concrete structures
IV.	9	Composite Structural Systems; Composite sections (made of more than one material) Working out structure systems for Layout of a small building

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC704.1	Students will understand about the seismic load
BARC704.2	Students will understand about the lateral forces on the building.
BARC704.3	Students will understand about the Pre-stressed concrete structures.
BARC704.4	Students will understand about the Composite Structural Systems. students can apply the classroom concepts in real life.

Text books:

1. Structure and Design By G G Schierle, PhD, FAIA

Reference Books:

1. Structure in Architecture - MarioSalvadori
2. Building Structure Primer - James EAmbrose
3. Structures -Schodeck
4. Structural Concepts and Systems for Architecture & Engineers -T.Y.Lin.
5. Elements of Structure – Morgan

General guidelines for the teacher:

- To introduce the students to the global building environment and the inherent design features
- Students will learn through models & case studies of structural systems
- The paper will be set by the external expert

University Examination Pattern

- The Question Paper is of Max 50 Marks.
- 7 questions of 2 marks each (from the entire syllabus). There will be choice to answer any 5questions
- 8 Questions of 10 marks each (2 questions from each unit). There will be choice to answer any four questions, with at least 1 from each unit.

B.ARCH. SEMESTER-VII					BARC-705			INTERIOR DESIGN	
Scheme of Teaching					Scheme of Examination = Marks			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3 Hours	2
2	0	0	0	2	50	50	100		

Objectives:-:

To make the students study the Interior Design principles and their applications, and to foster creative ability and inculcate skills to understand and conceive architectural design.

Methodology:-

- Field studies and case studies for understanding the treatment and handling of interior spaces in context to functional requirements.

Unit	Hours/Periods	Contents
I.	9	• Definition of interior design, Interior architectural design process, vocabulary of design in terms of principles and elements • Introduction to the design of interior spaces as related to typologies and functions, themes and concepts - Study and design.
II.	9	• Brief study of the history of interior architectural design through the ages relating to historical context, design movements and ideas etc. • Brief study of folk arts and crafts with reference to interior design and decoration
III.	9	• Introduction to various elements of interiors like floors, ceilings, walls, staircases, openings, interior service elements, incidental elements etc., and various methods of their treatment involving use of materials and methods of construction in order to obtain certain specific functional, aesthetic and psychological effects. • Accessories used for enhancement of interiors, paintings, objects-de-art, etc.
IV.	9	• Study of the relationship between furniture and spaces, human movements & furniture designs related to human comfort. Function, materials and methods of construction, changing trends and lifestyles, innovations and design ideas. • Study of interior lighting • Interior landscaping, elements like rocks, plants, water, flowers, fountains, paving, artifacts, etc. their physical properties, effects on spaces and design values

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC705.1	To create different design schemes for different spaces. To generate character of different spaces according to the function.
BARC705.2	To understand the impact of different elements such as furniture and decorative features and upholstery. Understand the meaning and impact of design as it relates to human interaction, technology, theoretical frameworks, and interdisciplinary efforts.
BARC705.3	Understand the intricacies of interior space planning and its historical background. Understand the modern trends in the field.
BARC705.4	Interpret, evaluate and represent abstract concepts during all phases of the design process to indicate conditions, relationships, and requirements within the interior environment. Explore and generate creative solutions via a systematic and coordinated design process that integrates functional and aesthetic concerns.

Text books and Reference Books:

1. Ching, F. D. K. (1987). *Interior Design Illustrated*. New York : V.N.R. Publications.
2. Doshi, S. (Ed.) (1982). *The Impulse to adorn - Studies in traditional Indian Architecture.* Marg Publications.
3. Kathryn, B. H. and Marcus, G. H. (1993). *Landmarks of twentieth Century Design.* Abbey Ville Press.
4. Penero, J. and Zelnik, M. (1979). *Human Dimension and Interior space: A Source Book of Design Reference Standards.* New York : Whitney Library of Design.

General guidelines for the teacher:

- To make visits on disaster preparedness workshops.

University Examination Pattern:

- The Question Paper is of Max 50 Marks.
- 5 questions of 2 mark each (from the entire syllabus).
  8 Questions of 10 marks each (2 questions from each unit).
  There will be choice to answer any 4 questions, with at least 1 from each unit.

B.ARCH. SEMESTER-VII	BARC706	URBAN DESIGN

Scheme of Teaching					Scheme of Examination = Marks			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3 Hours	2
2	0	0	0	2	50	50	100		

Objectives:- The overall goal of the course is to help students formulate an understanding of the urban forms and spaces. The contemporary needs of the society and the role of spaces will be dealt along with the need for design control.

Methodology:
Students will understand the fundamental concepts and theories of urban design and apply them in their design projects.

UNIT	HOURS/PERIODS	CONTENTS
I.	6	INTRODUCTION • Emergence of urban design as a discipline • Introduction, Role, Scope and Importance of Urban Design • Distinction between Urban Design, Architecture and Town Planning • Concepts of urban design • Elements of Urban Design- Pattern, Grains, Texture, Density etc, their role and importance. • Urban design parameters- space and place, morphology, urban form and structure.
II.	6	BASIC PRINCIPLES & TECHNIQUES IN URBAN DESIGN • Determinants of Urban Form – Landform, Climate, Symbolism, Activity Pattern, Socio-cultural Factors etc. and their role and importance. • Imagability- Elements and their role and importance including Paths, Nodes, Landmarks ,Edges, Districts etc • Urban scale, Mass and Space;
III.	6	STUDY OF URBAN SPACES AND CITIES • To introduce the components of a city and their interdependent roles- urban fabric ; • Expressive quality of built forms, spaces in public domain like street, square, precinct, piazza, mall etc • Urban Design study of selected Capital Cities- Chandigarh and Delhi
IV.	6	DEVELOPMENT CONTROLS, POLICIES AND FRAMEWORK • Development Controls- Role and Importance in Urban Design. • Introduction to Legal and Institutional framework for Urban Design including Delhi Urban Art Commission- Objectives, Constitution, Role, Importance, Impact etc

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC706.1	Analyze and explain the Behavioral and Perceptual approach to the city as visual experience with the help of Kevin Lynch and Gordon Cullon's theories.
BARC706.2	Analyze and Design Social and Cultural layer that influence Urban areas.
BARC706.3	Classify and Create the spaces (built and unbuilt) in relation with Scale, Size, Byelaws in the process of transformation of Space and form.
BARC706.4	Demonstrate and Design the relationship b/w Physical activity and built environment, Human activity and Built environment.

Reference / Text Books:

1. The Concise townscape- Gordon Cullen
2. Image of the city - Kevin Lynch
3. Architecture of town and cities - Paul D. Speriregon, The MIT press
4. Urban design – street and square, Cliff Moughtin, Bath Press
5. Town and square - Paul Zucker
6. The urban pattern - Arthur B Gallion, CBS publishers
7. Architecture and the urban experience - Raymond J Curran. Van Nostrand Reinhold Company
8. Indian mega city and economic reforms - A.K.Jain , Management publishing Company

University Examination Pattern:

- The Question Paper is of Max 50 Marks.
- 5 questions of 2 mark each (from the entire syllabus).
- 8 Questions of 10 marks each (2 questions from each unit). There will be choice to answer any 4 questions

B.ARCH. SEMESTER-VII					BARC707			BUILDING TECHNOLOGY-V	
Scheme of Teaching					Scheme of Examination = Marks			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	No exam (Evaluation by External Viva-Voce)	2
1	0	2	0	3	50	50	100		

Objectives:

To acquaint the students with the basic principles used in all basic building services with regards to electrical and mechanical services in buildings.

Methodology:

Subject shall be taught through the combination of Guest Lectures, Field visits,

Visits to the Project Sites , by carrying out exercises in simple layout s for Small buildings

Unit	Hours/Periods	Contents
I.	6	Fundamental principles of Heating Ventilation And Air conditioning, IAQ, comfort conditions, gas laws
II.	6	Refrigeration cycle, A/C equipment, compressor heat exchangers, condenser, evaporators
III.	6	Types of Air-conditioning: single zone, multi zone, window air conditioners, split air conditioners, duct able air conditioners, package system and central air conditioning
IV.	6	All air systems and chilled water systems. A/C plant room, AHU's Building ducting, diffusers and grills, FC units..

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC707.1	Building services engineering, technical building services, architectural engineering, building engineering or facilities and services planning engineering refers to the implementation of engineering for the internal environment and environmental impact of a building.
BARC707.2	Building services engineers are responsible for the design, installation, operation and monitoring of the mechanical, electrical and public health systems required for the safe, comfortable and environmentally operation of modern buildings.
BARC707.3	This course is designed to enable students to understand various systems of Electrical services, Fire fighting.
BARC707.4	Illumination and Elevators/Escalator services; and its design application for a small and large building.

Text /Reference Books:

- David, E., Architectural Acoustics
- Narsmhan, An introduction to Building Physics
- Carrer and Pitam, G. Modern Air-conditioning, Healing and Ventilation
- Servems and fellows, Air-conditioning and ventilation, John Wiley.

General guidelines for the teacher:

- On site studies and Market surveys to be conducted

University Examination Pattern

The Question Paper is of Max 50 Marks.

- 7 questions of 2 marks each (from the entire syllabus). There will be choice to answerany 5questions.
- 8 Questions of 10 marks each (2 questions from each unit). There will be choice to answer any four questions, with at least 1 from each unit.

B.ARCH. SEMESTER-VII	BARC-708	DISASTER MANAGEMENT	
Scheme of Teaching	**Scheme of Examination = Marks**	**Duration of Examination**	**Credit**
L T P S Total	**Internal External Total**	**3 Hours**	**2**
2 0 0 0 2	**50 50 100**		

Objectives:-:
To make the students understand the various pre & post disaster design and management measures.

Methodology:-

Introduction to disaster management.
Measures to be taken in both natural and man made disasters.

Unit	Hours/Periods	Contents
I.	9	• Introduction to disaster management • Types of disaster (natural or man-made) • Causes of disaster risks and preparedness. Principals of Emergency Management, Safety precautions and standards in work environment
II.	9	Emerging approaches in disaster management –three stages • Pre –disaster stage(preparedness) • Emergency stage • Post disaster stage-rehabilitation
III.	9	**Earthquake** • Problems & design issues • General Principles of designing • Special construction techniques.
IV.	9	• General requirements, principles and measures for building design for Fire, floods, cyclones, avalanche, etc. • Special construction technique.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC708.1	Analyze relationship between Development and Disasters.
BARC708.2	Understand concept of sustainability & sustainable development.
BARC708.3	Understand various issues like climate change, ecological footprint etc.
BARC708.4	Understand low impact construction practices, life cycle cost and alternative energy resources.

Text books and Reference Books:

1. Disaster Mitigation; Experience and Reflection by Pradeep Sahni
2. Natural hazards & disaster by Donald Hyndman & David Hydman-Cengage Learning

University Examination Pattern:

- The Question Paper is of Max 50 Marks.
- 5 questions of 2 mark each (from the entire syllabus).

8 Questions of 10 marks each (2 questions from each unit). There will be choice to answer any 4 questions, with at least 1 from each unit.

B.ARCH. SEMESTER –VII	BARC709	PARAMETRIC ARCHITECTURE-III	
Scheme of Teaching **L T P S Total** **1 0 2 0 3**	**Scheme of Exam = Marks** **Internal External Total** **100 0100**	**Duration of Examination** **No Exam (only internal)**	**Credit** **2**

Objectives Introduction and the use of software available for architectural applications.

Methodology: The student investigates programming environment in the creation of a customized CAD environment

Unit	Hours/Periods	Contents
I.	12	Introduction to 3D commands. Simple exercises on 3D commands
II.	12	3D modeling of project & walk- through

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC703.1	Developing designs through 3D visualization &preparing presentation drawings in auto CAD.
BARC703.2	Knowing Fundamentals of auto CAD. Learning Commands of 3d in CAD.
BARC703.3	Learning Dimension, Text, Room & area plan, Colour scheme, Section, Call out, 3d crop view, Camera. Preparing Walk through.
BARC703.4	Application- Design Project to be converted into 3D CAD.

Text /Reference Books:

- Goldenberg, Joseph, Autocad Architecture 2008 – Comprehensive Tutorial Autodesk 2008
- AutoDesk , "Auto Cad Manual 2012"
- Aubin , Paul F, Mastering Auto CAD Architecture 2008.
- Elise, Moss , AutoCAD Architecture 2008 Fundamentlas Autodesk 2008.

University Examination Pattern:
The Internal jury will be of 50 Marks; i.e 25 marks for the portfolio/projects & 25 marks for viva.

General guidelines for the teacher:
The teacher shall make live demonstrations in the computer lab on the small scale projects.

B.ARCH. SEMESTER –VIII					BARC801			PRACTICAL TRAINING	
Scheme of Teaching					Scheme of Exam = Marks			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	No Exam (Evaluation by External Viva-voce)	18
0	0	0	0	0	540	360	900		

Objective: To make student learn the intricacies of Architectural Profession by joining and working with practicing Architects/Architectural firms for one complete semester.

- **Practical Training Manual:**
    1. The total marks shall be suitably apportioned to assess on regular basis the monthly reports, office work and work done outside office hours.
    2. Students are required to send/ submit monthly progress reports of work done by them in the office in which they are working according to a prescribed schedule. These reports shall be assessed/marked regularly by the Practical Training Coordinator (PTC).
    3. On the conclusion of training, the work done by the student shall be examined and evaluated through a viva- voce to be conducted jointly by the HOD, PTC and External Jury (min. 2 members), who will be appointed by the University.

- **Work to be done by the student**:
  During training, students are required to do two distinct types of work in order to make optimum utilization of the period of training.
  1. Work to be done during office hours:
- The work to be done during office hours will include:
- Drafting, Tracing, Sketch designs, Presentation drawing, Perspectives, Models, documentation etc.
- Working Drawing and details
  2. Work to be done during extra - office hours:
- The work to be done during extra - office hours will include:
- Preparing a study report on Building design, Analysis incorporating Site visits, recording Observations etc.

- **Distribution of Marks**
  1. **Internal Assessment: (40 Marks)**

  Internal Assessment shall consist of periodical reports as given below:
  Joining Report and Monthly Progress reports (5 nos.)
- **2. University Examination (60 Marks)**
  University examination shall consist of Final Viva–Voce on the best of their training work.

Instructions to the practical training coordinator
Based on the above guidelines a detailed program shall be drawn each year by the practical training coordinator, which shall be approved by the hod before it is implemented. The intention will be to update the program on regular basis, incorporating new details, with focus on making continuous qualitative improvement of the practical training.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC801.1	Acquire knowledge of the process involved in addressing a design problem.
BARC801.2	Employ modes of architectural representation and other discipline-specific vocabulary and analytic systems.
BARC801.3	Office experience in respect of preparation of working drawing, detailing drawings of perspective, preparation of architectural models, study of filing systems of documents, drawings, ammonia prints and preparation of tender document. Acquaint with the practice in field outside the academic world to give insight of broader issues architect needs to deal with.
BARC801.4	Site experience, in respect of supervision of the construction activity, Observation, layout on site, study of the staking methods of various building, materials, taking the measurement and recording.

B.ARCH. SEMESTER –VIII					BARC802			PROJECT REPORT	
Scheme of Teaching					Scheme of Exam = Marks			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	No Exam (Evaluation by External Viva-voce)	4
0	0	0	0	0	12080200				

Objective: To make student learn the intricacies of Architectural Profession by joining and working with practicing Architects/Architectural firms for one complete semester.

Building Study Report (30 marks)

This includes a building design analysis for a study report which the students are required to do in extra office hours. The study should comprise of multifaceted aspects of any building or a complex in the final stage of construction. This shall put under following heads:

- Design concept
- Space Usage
- Circulation
- Climate responsiveness
- Façade Treatment & Architectural Expression
- Built in Furniture
- Services
- Construction Techniques
- Materials used etc.
- Conclusions

Format for the Building Study Report should be:

- Size of report – A4, Portrait format
- No. of Pages – 40-60 approx.
- Color of Page - White or light colored
- Mode of Presentation - Hand written or Typed in Times New Roman, Headings – 14, Body Text – 12, line spacing 1.5; margin 4 cm on left and 2.5 cm on the other sides.

Prints (30 marks)

The number of prints to be submitted should be 15 to 20. The prints should cover the important projects done during the training.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC802.1	The intricacies of Architectural Profession by working with practicing Architects/Architectural firms.
BARC802.2	Understand multifaceted aspects of a building or a complex in the stage of construction.
BARC802.3	Acquire knowledge of analyzing, making inferences of a project.
BARC802.4	Acquire skills of communicate through software presentations.

NOTE:

1. Each print will be accepted for evaluation only if signed by the trainee in the appropriate column, and duly attested by the employer.
2. Evaluation is to be done through viva voce by external jury comprising of two examiners appointed by the University at college level.

B.ARCH. SEMESTER-IX					BARC901			ARCHITECTURAL DESIGN - VIII	
Scheme of Teaching					Scheme of Examination(Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	No Exam, (Evaluation by External Viva on Portfolio)	10
2	0	2	7	11	250	250	500		

Objectives:- To make students aware and understand the complexity and methodology to handle large projects involving urban environment and prevailing building regulations..

CONTENTS

The design problems will include Public Buildings with diverse activities involving:

• **Urban Design Studio** dealing with issues such as campus planning/designing buildings in Historic context, related to urban development and renewal/design or ecologically sensitive control. This project will be dealt in two parts:
(a) Study of an existing urban environment to identify its typical characteristics and problems.
(b) Design solution to issues/problems identified above.

• **Campus designing** - University, Professional Institutes, Integrated Campus etc.

• **Capital Complex**-Secretariat, High Court, Assembly.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC901.1	Use of Development control rules like, density, zoning, FSI etc. redevelopment and urban conservation techniques.To understand the working of public & educational buildings and the process of planning and development of community area.
BARC901.2	To study Design orientation of advance & specialized buildings- environmental services, climate & acoustical system oriented buildings, their appropriate structural buildings &construction techniques.
BARC901.3	Study of urban environment, complex building forms, positive and negative space relationship, Parking Provision, Precincts concept and pedestrian movement.
BARC901.4	Leading the students to equip themselves, with Professional Competency and Capabilities to incorporate, detail out, plan, design & execute by using this acquired knowledge / know-how in all their future works / designs, of various Buildings as Professional Architects.

NOTE:-
External marks shall be awarded through viva- voce conducted by the External Jury appointed by the University of the Work done by the student during the semester.
Special lectures to be conducted on urban morphology and issues of urban renewal, as well as social & economic aspects of housing in urban areas. Concerned specialists to be involved in each of the two studio exercises.

Reference / Text Books:

1. Ching, Frank Francis D.K., 'Architecture: Form, Space & Order', John Wiley, Hoboken, **2007**.
2. V.S. Parmar, 'Design Fundamentals', Somaiya Publisher Pvt. Ltd, Mumbai, **1997**.
3. Scott Van Dyke, 'Form, Line to Design', Van Nostrand Reinhold, **1990**.
4. R. Scott, 'Design Fundamentals', Robart E. Krieger Publishing Company E & OE- Architects Hand Book and Planning.
5. Donald Watson, Michael J. Crosbie, 'Time Saver Standard', 8th Edn.
6. Neufert, Ernst; 'Architect's Data', 3rd Edn., Wiley–Blackwell, U.K., **2002**.
7. 'National Building Code of India', Bureau of Indian Standards, New Delhi, **2005**.

Guidelines to teacher:-

Minimum Two projects should be done by the student. The Projects selected should be based on realistic contexts.

- Library and Proto type Studies
- Site analysis and site planning
- Space planning
- Design development and volumetric studies (model)
- Preliminary design and volumetric study.
- Final design with detailed volumetric study and visual communications (3D Visualizations)

- The design submitted shall include complete project drawings, perspective, models and details. Teaching focus will be to promote design concept based on Site, Urban design, Landscaping, Traffic and Transportation, Climate, Energy, Services, Safety and compliance with Building Regulations etc. All buildings should have accessibility to the physically challenged persons

B.ARCH. SEMESTER-IX					BARC902			RESEARCH METHODOLOGY	
Scheme of Teaching					Scheme of Exam (Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3Hours	2
2	0	0	0	2	50	50	100		

Objectives: To promote Research in Architecture by making students aware and familiarize with various Methods of Research.

Methodology

- Emphasis shall be laid on understanding the role of research in Architecture. Students will be asked to carry out detailed survey of any residential/ commercial/ slum etc through different methods defined in the contents and prepare a research report based on the data collected, analysis made based on various statistical tools and conclusions drawn. Continuous evaluation shall be made of students work based on various assignments.
- Teaching shall be imparted through a combination of lectures by subject experts, case studies and making reference to already prepared research reports.

Unit	Hours/periods	Contents
I.	6	"Research" and its Significance in Architecture involving: • Meaning of Research. • Relationship between Design and Research. • Types of Research, Areas of Research, • Qualitative and Quantitative Paradigms.
II.	6	Methods of Research in Architecture including: • Interview • Questionnaire including Designing Questionnaire • Surveys- Pre & Post Occupancy Survey • Observation • Mapping
III.	6	Research Design: • Components of Research, • Literature Study and Research- formulating Questions, Hypothesis, Closing the Samples, • Methods of Data Collection, Analysis and drawing Inferences • Concepts of Dependent, • Significance of the Research Outcome. • Preparing Time Schedule & Budget for a Research Plan.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC902.1	To understand the significance in literature study and methods of research in architecture.
BARC902.2	Articulate a clear research question or problem and formulate a hypothesis thereby preparing a synopsis for architectural thesis project
BARC902.3	Identify and demonstrate appropriate research methodologies, know when to use them and apply problem solving skills to constructively address research setbacks
BARC902.4	Use library and other tools to search for existing body of research relevant to their topic.

Reference /Text Books:

1. Research Design: Qualitative & Quantitative Approaches -- Creswell, J.W.
2. Surveys in Social Research, Jaipur -- De Vaus, D.A
3. Qualitative Data Analysis: A User Friendly Guide for Social Scientists -- Dey
4. Architectural Research Methods -- Groat, L. &Wang D.
5. Handbook of Qualitative Research -- Norman K Denzin and Yvonna S Lincoln (Eds.)

University Examination Pattern:

1. One compulsory question containing 6 questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

B.ARCH. SEMESTER-IX					BARC903			CONSTRUCTION MANAGEMENT	
Scheme of Teaching					Scheme of Exam (Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3Hours	2
1	2	0	0	3	50	50	100		

Objectives: To make the students understand the factors affecting cost of buildings and methods of preparing estimates of architectural projects.

Methodology

Teaching in the subject will be a combination of Expert lectures and visits to Construction /Project Sites and discussions with Project Managers Students would be required to do a case study of an ongoing construction project.

Unit	Hours/periods	Contents
I.	6	**Project Management**- Concept, Background, Purpose, Aim, Objectives, Scope and its Significance • **Traditional Management Systems**- Advantages and limitations • **Role of Architect** in Construction/Project Management • **Resources** of Construction Industry. • **Construction** stages, Construction team, Equipment Management
II.	6	**Project Management Techniques**- Network, CPM, PERT • **CPM Analysis**- Critical Path, Float Computation Result Sheet etc. • **PERT**- Introduction, Theory and Network analysis
III.	6	• **Cost Time** analysis in Network Planning • **Financing of Project**, Depreciation and Break even Cost analysis • **Cost Control**- Budget, Accounting System, Problems
IV	6	**Quality and Safety**- Objectives, Issues, Organizing for Quality and Safety • **Stages of Inspection** and Quality control • **Planning of Temporary Services** at the site. • **Security of Materials** and Manpower at building site. • **Computer Application** in Construction Management

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC903.1	To provide an insight into management of building construction projects involving handling of various resources.
BARC903.2	Design Management: Coordinating with all the stakeholders, consultants and others having a say in design process in order to arrive at a final programme in a timely and efficient manner
BARC903.3	Project Management: The scope of activities will depend upon the Project Delivery Method deployed.
BARC903.1	Broadly deals with all the activities concerned with the implementation process subsequent to the preparation of design and construction drawings.

Reference /Text Books:

1. R.L. Peurify, 'Construction Planning, Equipment and Methods', International Book Company.
2. L.S. Srinath, 'PERT &CPM Principles and Applications', EWP Limited New Delhi.
3. B.C. Punmia & K.K. Khandelwal, 'Project Planning and Control with PERT\CPM', Laxmi Publications, New Delhi, **2009**.
4. Mukhopadyay, S.P. 'Project Management for Architects and Civil Engineers', IIT, Kharagpur, **1974**.
5. P.S Gahlot & B.M. Dhir, 'Construction Planning & Management'.
6. P.N. Modi, 'PERT and CPM', Standard Book House, New Delhi, **2009**.

University Examination Pattern:

- The Question Paper is of Max 50 Marks.
- 5 questions of 2 mark each (from the entire syllabus).
- 8 Questions of 10 marks each (2 questions from each unit). There will be choice to answer any 4 questions

B.ARCH. SEMESTER-IX					BARC904			CONTEMPORARY THEORIES IN ARCHITECTURE	
Scheme of Teaching					Scheme of Exam (Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3Hours	2
20	0	0	2		50	50	100		

Objectives: To make students understand, appreciate and familiar with the recent Architectural Movements of importance and their impact on built environment.

Methodology

- Emphasis shall be laid on understanding of journey of Architecture and trends guiding the profession in post- fifties and its impact on changing the typologies of various buildings including materials and technologies used.
- Continuous evaluation shall be made of students work based on various assignments.
- Teaching in the subject will be a combination of Expert lectures, specific case studies and field visits.

Unit	Hrs/periods	Contents
I.	6	Overview of World Architecture since 1950 in relation to: • Late Modernism • Post Modernism • De-constructivism
II.	6	Study of Various Theories governing Contemporary Architecture through : • Case Studies • Architectural Trends • Impact on Urban Built Environment
III.	6	Emerging Building Typologies with Focus on: • Residential Development • Offices & Commercial Development • Skyscrapers • Institutional Development • Public Development • Industrial Development

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC904.1	Understanding the journey of world Architecture & trends since 1950 in relation to architectural movements.
BARC904.2	Study the various theories governing contemporary Architecture.
BARC904.3	Study the various programs, functions and philosophies related to contemporary theories.
BARC904.4	Study in changing the typologies of various building including materials and technologies used.

Reference /Text Books:

1. The Language of Post Modern Architecture by Charles Jencks
2. Modern Architecture since 1900 by William j. Curtis.
3. Intentions in Architecture by Nordberg Sclulzc
4. Contemporary Indian Architecture after the Masters by Bhatt V and Scriver P
5. “Architecture in the 20th Century”, Vol. 1-2, Taschen, by Gossel, P. and Leuthauser, G.

University Examination Pattern:

1. One compulsory question covering the course contents of both Units. • In addition, Four questions are to be set from each Units. • Students are required to attempt five questions including compulsory question with two questions from each Units. • Question paper is to be set covering entire syllabus by making parts and mixing the topics.

B.ARCH. SEMESTER-IX					BARC905			PROFESSIONAL PRACTICE	
Scheme of Teaching					Scheme of Exam (Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3Hours	2
2	0	0	0	2	50	50	100		

Objectives:

- To make students understand and familiar with different aspects of Architectural Practice and Professional Responsibilities.

Methodology

- Teaching in the subject will be a combination of Expert lectures from Architects working in the profession, visits to the offices and discussions with reputed Architects.
- Students should be encouraged to attend professional meets organized by the professional bodies including IIA, COA, IOE etc.

Unit	Hours/periods	Contents
I.	6	• **Architects –** Role, Functions, Social Obligations, Profession Activities, Responsibilities etc. • **Indian Architects Act 1972 –** Scope, Objective, Role & Importance in managing the profession and professionals. • **Council of Architecture –** Constitution, Role and Function, Registration of Architects etc. • **Indian Institute of Architects –** History, Objectives, Role and Function in promoting Architectural profession and education.
II.	6	• **Architectural Practice –** Type of Practices, Setting office, Office Organization, Management, Income Tax, Service Tax etc. • **Architectural Competition –** Importance, Type, Procedure, Guidelines framed by Council of Architectural to conduct competition, including Role of Board of Assessors, Professional Adviser and Technical Advisers. • **Code of Professional conduct** • Conditions Governing the **Appointment of Architects**, Scale of Professional charges, Execution of work and payment of fee.
III.	6	• Duties, Responsibilities and Liabilities of **Client, Architect, Contractor** and their mutual relationship. • **Tenders-** Type, Process, Scrutiny and Selection of Contractor, Pre Qualification and Registration of Contractor. • Concept of **Contract.** • **Copy Right Act** as Applicable to Architectural work. • **Complaints –** Procedure for lodging complaints, and their Resolution based on Indian Architects Act 1972 • **Valuation -** Purpose, Objective, Types and Method of valuation. • Arbitration and Reconciliation Act.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC905.1	To acquaint students with their roles and responsibilities of dealing with various related agencies and the freedom/ limitations as a professional as well as their real status in the society.
BARC905.2	To make students aware about the various codes of practices and different acts regarding the construction of building .Learns how to setup and run office
BARC905.3	Learnt the payment schedule, architectural services schedule, different MEP services consultants work.
BARC905.4	To understand the plan approval process from the sanctioning authority. Need and Role of Arbitrator.

Reference /Text Books:

- Indian Institute of Architects Hand Book – IIA
- The Indian Architects Act, 1972.
- Council of Architecture – Hand Book of Professional Documents – 2007.
- Indian Arbitration Act.
- Chakraborty M, **"**Estimating, Costing & Specification and Valuation in Civil
- Engineering and Service Tax Manual"
- Nananvati R, "**P**rofessional Practice"
- Apte V S, "Professional Practice & Management"

University Examination Pattern:

- One compulsory question of short answer type containing 5 questions of 2 marks each (10 Marks) is to be set from the entire syllabus (4 Marks and 6 marks from unit I and Unit –II respectively)
- In addition,three questions are to be set from UNIT 1 & II. Two question are to be set from Unit III
- Students are required to attempt five questions including compulsory question with minimum one question from each UNIT.
- Questions paper is to be set covering entire syllabus by making parts and mixing the topics.

B.ARCH. SEMESTER-IX					BARC906A			PRODUCT DESIGN	
Scheme of Teaching					Scheme of Exam (Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3Hours	2
1	0	2	0	3	50	50	100		

Objective

Taking the learning of form studies that is platonic forms, natural forms, colors, materials and finishes; students shall advance in the form studies towards product styling.

Unit	Hrs/Periods	Contents
I.	21	To understand the meaning of the form (metaphor, attributes and emotions) through stylized products from different domains. • To understand the role of light in surface transitions with color and finishes.
II.	21	Introduction to new materials and processes. • Introduction to environment friendly materials and the processes. (Including traditionally used materials in our context and culture.) • Advance studies in mass production processes and their influence on design and development of products.
III.	21	• Emphasis on material search and process selection in relation to cost, product safety, function, human factors, form, finishes and joining methods. • To conduct industry /workshop visits to observe and understand processes.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC906A.1	Employ research and analysis methodologies as it pertains to the product design process, meaning, and user experience.
BARC906A.2	The Product Design program trains designers to use their creativity, design thinking, and design process to bring new ideas, products,
BARC906A.3	Use the Product Design and Development Process, as a means to manage the development of an idea from concept through to production.
BARC906A.4	Design product by using tools, materials, craft techniques etc.

Reference Books:

Emotional Design: Why We Love (or Hate) Everyday Things by Don Norman
• The Psychology Of Everyday Things by Don Norman
• The Semantic Turn: A New Foundation for Design by Klaus Krippendorff.
Cradle to cradle by William Macdoungh.
• Industrial design: Materials and manufacturing guide by Jim Lesko.
• Sustainable Materials, Processes and Production (The Manufacturing Guides) by Rob Thompson.
• Modern Materials and Manufacturing Processes (3rd Edition) by R. Gregg Bruce and William K. Dalton

Evaluation

Continuous assessment of sessional work may consist of sketches, drawings, study models in various materials, journals, visit reports, power point presentations etc.

University Examination Pattern:

The Question Paper is of Max. 50 Marks.

- Part A -5 out of 7 short type questions of 2 Marks, covering entire syllabus
- Part B -4 Questions of 10 marks each to be attempted out of a total of 8 questions set from all the units.

B.ARCH. SEMESTER-IX					BARC906B			FURNITURE DESIGN	
Scheme of Teaching					Scheme of Exam (Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3Hours	2
1	0	2	0	3	50	50	100		

Objective

Develop competency for designing and critical thinking of furniture forms in relation to human scale

Unit	Hrs/Periods	Contents
I.	21	Physical dimensions of human body as a working machine • Human body as a system of levers • Identification & analysis of posture • Effect of wrong posture on cardiovascular & musculoskeletal system (example: back trouble, inter vertebral disc pressure, lower back and inter abdominal pressure) • Design application of anthropometry • Study of basic furniture dimensions based on anthropometric measurements
II.	21	Study of Italian, French, English furniture Introduction to furniture Aesthetics
III.	21	Study of modern furniture
IV	21	Design of furniture according to consumer ergonomics Planning simple furniture layouts of the different interior spaces such as: living room, dining room, bedroom, bathroom, kitchen, pantry, utility, foyer, corridor, passage, balcony etc

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC906B.1	Can analyse the role of human scale in furniture design, Identify posture & study of basic furniture dimensions.
BARC906B.2	Identify materials, aesthetic properties & different types of furniture.
BARC906B.3	To develop new ideas to design a furniture by knowing contemporary resources.
BARC906B.4	Design furniture , interior by using tools, materials, craft techniques etc.

Evaluation

Continuous assessment of sessional work may consist of sketches, drawings, study models in various materials, journals, visit reports, power point presentations etc

Reference /Text Books:

- De Chiara Joseph &Callender John, Time Saver Standards for Building Types or Architectural
- Interior Design, McGrawHili Book Co.
- Hanks, A.David. Decorative Designs of Frank Lloyd Wright, Dover Publications, Inc. New York, 1999.
- Alan Colquhoun, “Modern Architecture, History of Arts”, Oxford University Press, 1st edition, 2002.

University Examination Pattern:

The Question Paper is of Max. 50 Marks.

- Part A -5 out of 7 short type questions of 2 Marks, covering entire syllabus
- Part B -4 Questions of 10 marks each to be attempted out of a total of 8 questions set from all the four units.

B.ARCH. SEMESTER-IX					BARC907A			HOUSING
Scheme of Teaching					Scheme of Exam (Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3Hours	2
1	0	2	0	3	50	50	100		

Objectives:
To create awareness about the salient features of Housing, issues, causes and consequences of housing problems and to impart knowledge about the possible solutions.

Unit	Hours/periods	Contents
I.	6	Introduction, Role and Importance in the context of social and economic context • Typologies, Comparative Advantages and Disadvantages • Need and Demand • Shortage, Problems and solutions in the Indian Context • Housing Cost, Components and Strategies for minimizing Cost.
II.	6	Institutions involved in Providing Housing in India • Housing Finance and Institutions involved in Financing Housing in India • Affordable Housing • Land, its role and importance in Housing • Slums – Definition, Characteristics, Causes and solutions in the Indian Context.
III.	6	Housing policies in India. • Housing through Five year plans. • Role of private Sector in Housing. • Low Cost Housing. • Housing Survey .

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC907A.1	Knowledge of design principles and elements in residential architecture, understanding of housing functions as generator for architectural expressions and Knowledge of current questions related to housing design.
BARC907A.2	Housing design skills. General competence in design methods, materiality and detailing.
BARC907A.3	Basic housing design skills based on the knowledge acquired in the studio. Emphasis is on dwelling quality, quality of housing areas, as well as the ability to present architectural ideas in drawings and models.
BARC907A.4	General competence in design methods, construction principles, building materials, detailing.

Reference /Text Books:

1. Babur Mumtaz and Patweikly, 'Urban Housing Strategies', Pitman Publishing, London, **1976**.
2. Geoffrey K. Payne, 'Low Income Housing in the Development World', John Wiley and Sons, Chichester, **1984.**
3. John F.C. Turner, 'Housing by People', Marison Boyars, London, **1976**.
4. Martin Evans, 'Housing, Climate and Comfort', Architectural Press, London, **1980**.
5. Forbes Davidson and Geoff Payne, 'Urban Projects Manual', Liverpool University Press, Liverpool, **1983**. Patrik Schumacher: **2004**, Digital Hadid.
6. O.P. Miglani, 'Urban Housing in Developing Economy'.
7. A.K. Jain, 'Urban Housing and Slums'.
8. Thomas Poulose, 'Innovative Approaches to Housing for the Poor'.
9. 'Five Year Plans', Government of India Publications.
10. 'Readers Volume on Housing', of Institute of Town Planning.
11. S.C. Rangwala, 'Town Planning'.
12. Laurie Baker, 'The Manual of cost cuts for strong acceptable Housing'.

University Examination Pattern:

1. One compulsory question containing 6 questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

B.ARCH. SEMESTER-IX	BARC907 B	TRAFFIC & TRANSPORT PLANNING	
Scheme of Teaching	**Scheme of Exam (Marks)**	**Duration of Examination**	**Credit**
L T P S Total	**Internal External Total**	**3Hours**	**2**
1 0 2 0 3	**50 50 100**		

Objectives:-
To create awareness, impart knowledge about Traffic and Transportation and related issues.

Methodology:-

- Teaching in the subject will be a combination of Expert lectures and visits to areas of high traffic including City centre, Commercial areas, Wholesale Markets. Core Areas and Major Road Network passing through the city. The visit will also include traffic nodes like Bus Terminus, Railway Station, and Truck Terminus.
- Students should be made to do a small traffic survey in a congested area.

Unit	Hours/periods	Contents
I.	6	• **Traffic and Transportation**- Introduction, Need, Role and Importance • **Transport Systems**-Typologies, basic character and comparative advantages and disadvantages. • Role of **Bicycle** as a preferred mode of transport including planning for Bi-cycles • **Inter and Intra city Traffic**- Nature, characteristics, problems and solutions • **Accidents**- Causes, effects, and remedies to promote Road Safety • **Problems and Issues** related to Traffic and Transportation in the Indian cities and core areas with options to meet these challenges.
II.	6	• **Traffic Control Devices**- Typology, Application and comparative Merits and Demerits • **Signage**- Introduction, Objectives, Function and classification • Design of **Road Intersections**, Rotaries, Over bridges, Underpasses, • Flyovers with reference to a well-designed city like Chandigarh. • **Roads**- Hierarchy, Classification, Capacity, Road Cross-sections • **Mass Transportation/ Public Transport**-Concept, Characteristic, Mode, • Advantages and disadvantages • **Surveys**-Objectives, Need, Importance, Types and Methodologies for conductingTraffic Surveys. • **Parking-** Introduction, Types, Requirement, Problems and Solutions. • **National Transport Policy** • **Traffic Management and Land use Planning**

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC907B.1	Identify urban transportation problems Develop data base for calibration of travel demand models. Plan urban transport networks. Estimate urban travel demand
BARC907B.2	Conduct field studies for estimating traffic flow characteristics. Determine the capacity and level of service of a highway element.
BARC907B.3	Differentiate various curve fitting techniques. Estimate parking space requirements. Design traffic signal systems.
BARC907B.4	Model traffic stream behavior at the micro and macro level. Determine the capacity of highways. Identify urban transport corridors and prepare urban transportation plans

Reference /Text Books:

- Kadiyali, "Traffic and Transportation"
- National Transport Policy
- Agarwal S C, "Architecture and Town Planning"
- Institute of Town Planner (India) – Readers Volume
- UDPFI Guidelines – Ministry of Urban Development
- National Building Code,2005

University Examination Pattern:

- One compulsory question of short answer type containing 5 questions of 2 marks each (10 Marks) is to be set from the entire syllabus (4 Marks and 6 marks)
- In addition, three questions are to be set from UNIT 1. Four questions are to be set from Unit III
- Students are required to attempt Five questions including compulsory question with Minimum One question from each UNIT.
- Questions paper is to be set covering entire syllabus by making parts and mixing the Topics.

B.ARCH. SEMESTER-IX					BARC907C			TOWN PLANNING	
Scheme of Teaching					Scheme of Exam (Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3Hours	2
1	0	2	0	3	50	50	100		

Objectives:
To make students understand the role and importance of Town Planning in the Evolution of Human Settlements and Urban Forms in the Historical and Modern Context.

Methodology
Teaching of the subject shall help students to understand the importance and role of Town Planning in the Historical and Modern Context.

Unit	Hours/periods	Contents
I.	6	• Town Planning - Introduction, Role, Importance and Scope. • Planning Principals - Nile Valley, Greek and Roman Periods. • Town Planning in India - Indus Valley (Mohenjodaro), Islamic (Fatehpur Sikri), Medieval (Jaipur) and Colonial Period (New Delhi). • Human Settlements - Classification based on Road Pattern, Form, space, use & Population.
II.	6	• Towns and Cities in India – Issues, Problems and strategies for development. • Urbanization – Introduction, Definition, pattern, causes and effect in India. • Master Plan – Objectives, Contents, Role, Importance, Methodology and critical evaluation. • Regional Plan - Objectives, Contents, Role, Importance, Methodology and critical evaluation. • Smart Cities – Intent, Content, Scope, Approach, Methodology and critical Appraisal.
III.	6	• Planning Concepts- Garden City, Linear City, Industrial City and Sustainable City, Compact city and TOD. • Study of New Towns in India – Chandigarh, Gandhi Nagar, Bhubaneswar and Raipur. • Development Authorities – Role and Importance in Urban Development. • Neighborhood – Introduction, Concept, Objective, Principle and case study.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC907C.1	Study of various zones in urban context eg commercial, entertainment, residential etc in terms of the connectivity, circulation, open areas etc.
BARC907C.2	Students will take an overview of issues and trends relevant to the campus and the subjects selected by them for their final year dissertation
BARC907C.3	Understanding Statistical and graphical data analysis. Learning Services audit analysis of an commercial area. Knowing Existing Land use plan & Land values
BARC907C.4	Understand the concept of place making in a city. Study of Building use and land ownership

Reference /Text Books:

1. S.C. Rangwala, 'Town Planning'.
2. Paul D. Spreiregan, 'Urban Design: The Architecture of Towns and Cities'.
3. Arthur B. Gallion, 'The Urban Pattern: City Planning and Design'.
4. S.P. Gupta, 'The Chandigarh: An Overview'.
5. S.C. Agarwal, 'Architecture and Town Planning'.
6. 'Report of National Commission on Urbanization', Govt. of India.
7. 'The Punjab Regional and Town Planning and Development Act', 1995.
8. 'Senses of India', 2011.
9. 'Readers Volume in Town planning by Institute of Town Planners, INDIA'.

University Examination Pattern:

1. One compulsory question containing 6 questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

B.ARCH. SEMESTER-IX					BARC908 A			SIKH ARCHITECTURE	
Scheme of Teaching					Scheme of Exam (Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3Hours	2
2	0	0	0	2	50	50	100		

Objectives:-

- To understand the development of Sikh Architecture in Historical, Religious, social and environmental context
- To understand the secular buildings related to Sikh rulers such as Forts, palaces, institutions and their landscape elements

Methodology:-

- Teaching in this subject should be a combination of Lectures and visits to few prominent Historical Gurdwaras, Forts and palaces of the region.

Unit	Hours/periods	Contents
I.	6	• Evolution of Sacred Sikh Architecture – Salient features of a Gurdwara • Varieties of Arches, Domes, Capitals and other building elements • Building examples: Golden Temple, Amritsar, 5 Takhts of Sikhism and other historical Gurdwaras of India
II.	6	• Forts, Palaces, Institutions and Landscape elements developed under Sikh rulers in prominent cities like Amritsar, Patiala, Nabha, Kapurthala, Gobindgarh, Anandpur Sahib
III.	6	• Contemporary examples of Sikh Gurdwaras built in late 20th and 21st Century • Study of design of Khalsa Heritage Memorial complex at Anandpur Sahib

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC908A.1	Understanding of Sikh- past, history, cultural heritage, architecture
BARC908A.2	Understanding the concept of Sikh historic buildings & sites.
BARC908A.3	Demonstrate the importance of looking, seeing & interpreting the study of Sikh architecture.
BARC908A.4	Understanding / studying the various types of shapes and forms of the dome.

Reference /Text Books:

1. Arshi, Pardeep Singh, 'Sikh Architecture in the Punjab', Intellectual Pub. House, **1986**.
2. Mehar Singh, 'Sikh Shrines in India', Publications Division, Government of India, New Delhi, **1974.**
3. Madanjit Kaur, 'The Golden Temple: Past and Present, Amritsar', **1983.**
4. Brown, Percy, 'Indian Architecture (Islamic Period)', 5th Edn., Bombay, **1965**.
5. V.N. Datta, 'Amritsar: Past and Present. Amritsar', **1967.**

6. Edwardes, Michael, 'Indian Temples and Palaces', London,**1969.**
7. Darshan Singh, 'The Sikh Art and Architecture', Department of Guru Nanak Sikh Studies, Panjab University, **1987**.
8. W.G. Archer, 'Paintings of the Sikhs', London, **1966.**
9. Kanwarjit Singh Kang, 'Mural Paintings in the Nineteenth Century, Punjab', Ph.D. Thesis, Panjab University, Chandigarh, **1978.**

University Examination Pattern:

1. One compulsory question containing 6 questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

B.ARCH. SEMESTER-IX					BARC908 B			HILL ARCHITECTURE	
Scheme of Teaching					Scheme of Exam (Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3Hours	2
2	0	0	0	2	50	50	100		

Objectives: -
The objective of this course is to impart a comprehensive knowledge of historical aspects and present day concerns related to Hill Architecture.

Methodology :-
Teaching in this subject shall be a combination of Expert lectures from architects practicing/having experience in designing buildings in hill areas. The students should visit any hill settlement.

Unit	Hours/periods	Contents
I.	6	• Historical perspective of hill architecture and its unique attributes and concerns. • Major hill settlements in various regions of the world. • A broad view of traditional hill architecture of medieval European settlements and other places.
II.	6	• Traditional hill settlements of India. • An overview of vernacular hill architecture of Himachal Pradesh. • Building types, techniques and materials of vernacular architecture of Himachal Pradesh. • Lessons from vernacular architecture and their time tested indigenous technology.
III.	6	• Modern buildings on the hills in India. • Constraints of climate, topography and availability of materials. • Design factors such as access, circulation and gradients. • Structural aspects of modern buildings and necessary safeguards. • Environmental and ecological concerns and safeguards.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC908B.1	Understand the concept of Vernacular Architecture of Indian hills in detail, particularly of Indian state Himachal Pradesh.
BARC908B.2	Interpretation of hill architecture in terms of its Functional aspects, Cultural aspects, Climatic considerations, Construction methods and techniques, Materials.
BARC908B.3	Reinterpretation of hill architecture in Modern construction.
BARC908B.4	Understanding the concept of hill architecture in context with world's hill architecture.

Reference /Text Books:

1. Arshi, Pardeep Singh, 'Sikh Architecture in the Punjab', Intellectual Pub. House, **1986**.
2. Mehar Singh, 'Sikh Shrines in India', Publications Division, Government of India, New Delhi, **1974.**
3. Madanjit Kaur, 'The Golden Temple: Past and Present, Amritsar', **1983.**
4. Brown, Percy, 'Indian Architecture (Islamic Period)', 5th Edn., Bombay, **1965**.
5. V.N. Datta, 'Amritsar: Past and Present. Amritsar', **1967.**
6. Edwardes, Michael, 'Indian Temples and Palaces', London,**1969.**
7. Darshan Singh, 'The Sikh Art and Architecture',Department of Guru Nanak Sikh Studies, Panjab University, 1**987**.
8. W.G. Archer, 'Paintings of the Sikhs', London, **1966.**
9. Kanwarjit Singh Kang, 'Mural Paintings in the Nineteenth Century, Punjab', Ph.D. Thesis, Panjab University, Chandigarh, **1978.**

University Examination Pattern:

1. One compulsory question containing 6 questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

B.ARCH. SEMESTER-X	BARC1001	ARCHITECTURAL DESIGN – IX (THESIS PROJECT)	
Scheme of Teaching	**Scheme of Examination(Marks)**	**Duration of Examination**	**Credit**
L T P S Total	**Internal External Total**	**No Exam (External Viva by Jury)**	**18**
4 0 4 12 20	**450 450 900**		

Objectives:- To make student synthesis and use knowledge of various disciplines gained during entire study in an architectural project of his choice.

Contents

Thesis project will comprise of the following:

- An Illustrated Report-which will include the validity and scope of the chosen project, methodology, prototype studies, site analysis, and client's and architect's briefs, delineation of programme and design criteria.
- A fully worked-out Design Proposal-including consideration of site planning, structure, services, and any other aspect/specific to the project.

A. Stages of Work:

1. Approval of Project:

- The intent of the thesis project as well as the criteria for selection of the project will be introduced to the students around the 10th week of the previous semester, i.e. 9th Semester B.Arch.
- Before the closing of the 9th Semester, students will be required to submit brief write-up on three projects out of which one will be approved.

2. Rough Report comprising of all analytical aspects of the project including Synopsis, Library studies, Prototype studies, Site analysis, Delineation of Building Program, etc.
3. Evolution of Design: Shall be worked out in minimum of four stages. Viva Voce shall be conducted by the external examiners for each stage.
4. Final Report including Evolution of Design, Final Report, Drawings and Model, to be evaluated by jury comprising of H.O.D, Thesis Co-coordinator, External examiners (min. two) and Thesis Guide through a University Examination.

NOTE:

- Students will be required to submit two identical copies of the final report along with a soft copy, on a standard format prescribed in the thesis programme issued by the Thesis Coordinator.
- The report must also include A-3 size copies of all final drawings and at least two photographs of the final model/models.
- The original copy of the report, the final drawings and models will be returned to the student after the declaration of the result. The photocopy along with the soft copy of the report and drawings will be retained for reference in the college library.

B. **SCHEDULE OF SUBMISSIONS/EXAMIATION**

Stages of Work			Time allocated
1.	Sessional Work		
(a)	Rough Report		
	i)	Introduction& topic finalization	1 week
	ii)	Synopsis	2 weeks
	iii)	Preliminary Library studies	2 weeks
	iv)	Site analysis, Prototypes additional library studies	2 weeks
(b)	Evolution of Design		
	i)	Design Criteria and Concept	2 weeks
	ii)	Design Proposal Stage-I	2 weeks
	iii)	Design Proposal Stage-2 (incorporating structures & services)	2 weeks
	iv)	Pre-final Design	2 weeks
(c)		Draft Final report (Incorporating improvements suggested in Rough Report, Design Criteria and explanatory sketches of Evolution of Design).	1 week
2.		External Examination	4 weeks

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC1001.1	Identify a research topic, conduct a literature review, and analyze and synthesize information to develop a unique and well-supported argument or design solution.
BARC1001.2	Apply their knowledge of architecture to design a building, space, or urban environment that addresses the research question or problem.
BARC1001.3	Communicate their ideas effectively through written, oral, and visual presentations, and will gain experience in project management and teamwork.
BARC1001.4	Understand the design process and its connection to the built environment.

NOTE:

- Students are required to submit the Final Report, all final drawings and model/s in the standard format prescribed in the Thesis Programme.
- Submission will be made one day before the date of examination.

D. Teaching and Evaluation System:

1. The thesis studio will be conducted under the overall coordination of the Thesis Coordinator. Each student will be assigned a Thesis Guide (from amongst the faculty) who will supervise the progress of the student's work on a regular basis.

2. The H.O.D, the Thesis Coordinator and the concerned Thesis Guide will do approval of the thesis project/topic.

3.

i. All stages of sessional work will be evaluated jointly by the H.O.D., External examiner/s, Thesis Coordinator and the concerned Thesis Guide.

ii. Jury for the External Examination will comprise the H.O.D, Thesis Coordinator, the concerned Thesis Guide and two External Examiners appointed by the University.

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

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

v. 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 candidate fails to appear in the viva voce examination at any stage, the thesis project submitted by him/her shall not be accepted.

vi. 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.

B.ARCH. SEMESTER-IX					BARC1002A			REAL ESTATE MANAGEMENT	
Scheme of Teaching					Scheme of Exam (Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3Hours	2
2	0	0	0	2	50	50	100		

Objectives: To acquaint the students with the basic principles used in the development and management related real estate field.

Methodology:

Subject shall be taught through the combination of class lectures, Presentations, site visits, case studies by carrying out exercises related Real Estate Sector as in the Development.

Unit	Hrs/Periods	CONTENTS
I.	6	**Introduction to Real Estate** Real Estate, Land, Real Property, Classification of Properties, Characteristics of Different Property Types, Real Estate Management (REM)Public Property Management vs. Private Property Management
II.	6	**Real Estate Development (RED)** Real Estate Development Process, Real Estate Developer's Role, Different Partners in the RED Process
III.	6	**The Relationship between Management and Real Estate** General Management Challenges, General Management Functions, Managerial Role, Managerial Skills, Management Process, Different Firms by Real Estate Functions
IV	6	**Property Management Strategies** Strategies andResponsibilities of the Management Team, Property Management Functions and the Development Process, Developing the Property Strategic Plan, Property Strategic Planning Process

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC1002A.1	Summarize the scope of the existing real estate industry in the current business environment and to classify the various statutory and legal regulations applicable to real estate market.
BARC1002A.2	Outline the roles, responsibilities, rights and liabilities of different real estate stakeholders. Get exposure to the various documentation procedures for different real estate transactions, appraisals, agreements and valuation of properties.
BARC1002A.3	To perform Quantitative analysis with a methodology used in different transactions using the current rates of properties, registration charges and appropriate fees applicable in different states.
BARC1002A.4	Delineate project development process, compare the different sources of real estate funds and classify the risks associated therein. Formulate a real estate project by assessing its feasibility and evolving strategies for effective management.

Reference /Text Books:

THORNCROFT, M., (1965) Principles of Estate Management, *Estates Gazette*.

1. TRIPPI R. R., *1989.* A decision support system for real estate investment portfolio Management Information & Management, *vol. 16, p. 47-54.*
2. UNESCO - online: http://whc.unesco.org/.

University Examination Pattern:

The Question Paper is of Max. 50 Marks.

- Part A -5 out of 7 short type questions of 2 Marks, covering entire syllabus
- Part B -4 Questions of 10 marks each to be attempted out of a total of 8 questions set from all the four units.

B.ARCH. SEMESTER-IX					BARC1002B			ARCHITECTURAL JOURNALISM	
Scheme of Teaching					Scheme of Exam (Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3Hours	2
2	0	0	0	2	50	50	100		

Objectives: -

- To develop the skill of students who have an inclination towards writing
- To enable the students to record, report, analyze and Evaluate architecture in its Theoretical and Practical form.

Methodology :-

- The students should be exposed to the work of professional Art and Architecture critics/journalists.
- Various forms of architectural journalism should be studied from Architecture Magazines.
- Report writing should be presented to a panel to be chaired by the teacher for Discussion, criticism and consequential changes.

Unit	Hours/periods	Contents
I.	6	• Introduction of Journalism in general • Theories of journalism, Techniques and processes • Contemporary Architectural journalism, Digital Journalism, Architecture, Arts and Journalism / Media
II.	6	• Phrasing and summarizing a given report • Editing given material • Writing original reports on design projects • Writing Editorials for Magazines and Journals
III.	6	• Reporting activities like seminars, Panel discussions, Conferences etc. • Thesis or Research Report writing • Writing Captions for Pictures, Programmes and Events • Organizing material for publication in Newspapers, magazines etc.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC1002B.1	To analyze the role of writing in architectural journalism.
BARC1002B.2	To asses various techniques and methods of researching and writing architectural research papers.
BARC1002B.3	To explain the potential of architectural writings and journalism.
BARC1002B.4	To publish a research paper on an architectural topic.

Reference /Text Books:

1. Joseph Wilkes, 'Encyclopedia of Architecture, Design, Engineering & Construction', John Wiley & Sons, New York, **1988**.
2. 'Architectural Press, U.S.,' vol.1.
3. 'Criticism, Architectural', vol. 2.
4. 'The Architecture Critic; A Survey of Newspaper Architecture Critics in America. New York', Columbia University, **2001**.
5. Bender, Thomas, 'Architecture and the Journalism of Ideas'.
6. Morrone, Francis, 'Do Architecture Critics Matter?'.
7. Ockman, Joan, 'Current Criticism', The Architect's Newspaper issue 19.
8. Majd Musa, 'Architectural Criticism and Journalism', 2007.

University Examination Pattern:

- One compulsory question containing 6 questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus.

- The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

B.ARCH. SEMESTER-IX					BARC1003A			BUILDING MAINTENANCE	
Scheme of Teaching					**Scheme of Exam (Marks)**			**Duration of Examination**	**Credit**
L	**T**	**P**	**S**	**Total**	**Internal**	**External**	**Total**	**3Hours**	**2**
2	**0**	**0**	**0**	**2**	**50**	**50**	**100**		

Objectives: -Students should know the role of maintenance in buildings

Methodology :-Teaching will be a combination of Case studies and field visits to buildings in deteriorating conditions.

Unit	Hours/periods	Contents
I.	6	Maintenance- Introduction, Need, Scope, Importance& Role of an Architect. • Maintenance-Economic and Social significance • Distress in structures • Causes of distress, defects and decay • Role of climatic elements • Classification of maintenance works
II.	6	Various defects in Buildings (Masonry, Load bearing and Framed structure) from foundation to parapet level including services • Diagnostic Techniques
III.	6	Prevention measures/Defects due to poor design and construction • Treatment methods/Repair materials • Retrofitting

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC1003A.1	Developing concept of maintenance as continuous phenomena and preventive approach for longevity of buildings.
BARC1003A.2	Identify standard building and construction materials, basic building mechanical systems and components, and discuss applicable solutions to mitigate building envelope and basic mechanical system component failures.
BARC1003A.3	Describe procedures for research, requisition, and procurement of materials and parts to complete construction and maintenance tasks and/or work orders.
BARC1003A.4	Apply quantitative methods to common building maintenance tasks.

Reference /Text Books:

1. A.C.Panchdhari,Maintenance of buildings', New Age InternationalLimited,Publishers,NewDelhi,**2003**.
2. 'Maintenance Manual of CPWD', Director General (Works) CPWD, Nirman Bhawan, New Delhi, **2003.**
3. R. Chudley, 'The Maintenance and Adaptation of Buildings', Longman Technical Services, London, **1981**.
4. W.H. Ransom 'Building Failures: Diagnosis and Avoidance', E. & F.N. Spon, London, **1987**.
5. A.C. Panchdhari, 'Water & Sanitary Installation', New Age International (P) Limited,
6. Publishers, New Delhi, **2005**.
7. Hutchinson, Barton and Ellis, 'Maintenance & Repair of Buildings', Butterworth & Co. (Publishers) Ltd., UK, **1975**.
8. P.S. Gahlot and Sanjay Sharma, 'Building Repair and Maintenance Management'.

University Examination Pattern:

1. One compulsory question containing 6 questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

B.ARCH. SEMESTER-IX					BARC1003B			ARCHITECTURAL CONSERVATION	
Scheme of Teaching					Scheme of Exam (Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3Hours	2
2	0	0	0	2	50	50	100		

Objectives: - To promote understanding and importance of the Historical buildings and their Preservation and conservation.

Methodology:-

- Emphasis shall be laid on understanding of Architectural Conservation. Continuous evaluation shall be made of student's work based on various assignments and sketching.
- Teaching in the subject will be a combination of Expert lectures, specific case studies and field visits of historical and contemporary buildings/complexes.
- Students would be required to do, in groups, a case study of a historical building to make them understand the various aspects of Architectural Conservation. The study will be illustrated with maps, visuals, photographs and sketches.

Unit	Hours/periods	Contents
I.	6	• Heritage- Introduction, Definition, Role, Importance, Scope and Limitations • Study of basic historical styles in Indian Architecture. • Study of ornamentation and detailing in historical buildings in various styles. • Study of construction methods and structural analysis of various historical building styles e.g. Arches Domes, Vaults and Shikharas etc.
II.	6	• Study of finishes in historical buildings. • Effects of weathering/ pollution on historical buildings. • Study of landscaping style/ Plantation around historical buildings. • Knowledge of plantation/ water features in Mughal Garden and Hindu Temples.
III.	6	• Methods of studying and documenting historical monuments in the context of guidelines issued by UNESCO, INTACH. • Methods of saving monuments from vandalism. • Institutional framework to protect Heritage • **Role of Historic Building/Area/City in Present Context:** • Understanding Historic City/complex by doing a study of its Heritage Components, various aspects for spatial Planning, the role of conservation and relevance of historic buildings/areas in present context.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC1003B.1	Understand conservation and its process.
BARC1003B.2	Study and find better techniques of conservation.
BARC1003B.3	Analyze, troubleshoot, and implement conservation related solutions with previously done works and researches.
BARC1003B.4	Learn the process of documenting the work of conservation.

Reference /Text Books:

1. Oliver Paul, 'Encyclopaedia of Vernacular Architecture of world'.

2. Jay Thakkar, 'Matra: Ways of measuring Built form of Himachal Pradesh', CEPT University.
3. Bernard M. Feilden, 'Conservation of Historic Buildings', 3rd Edn., Architectural Press, **2003**.
4. Latham, Derek, 'Creative Re-use of Buildings', Donhead, **2007.**
5. A.G.K. Menon & B.K. Thapar, 'Historic Towns and Heritage Zones', INTACH.
6. 'International Charters for Conservation and Restoration', ICOMOS.
7. Yogeshwar K. Parajuli, 'Bhaktapur Development Project – Experience in Preservation and Restoration in a Medieval Town', **1974-85**.
8. Divay Gupta, 'Identification and Documentation of Built Heritage in India', INTACH, **2007**.
9. Petruccioli, Attilio, 'After Amnesia – Learning from The Islamic Mediterranean Urban Fabric', ICAR, **2009**.

University Examination Pattern:

1. One compulsory question containing 6 questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus
2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

B.ARCH. SEMESTER-IX	BARC1004A	ENERGY EFFICIENT BUILDINGS AND BUILDING AUTOMATION					
Scheme of Teaching					Scheme of Exam (Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3Hours	2
2	0	0	0	2	50	50	100		

Objectives: -

- After successful completion of this course, student should be able to understand global issues related to the use and consumption of fossil fuel energy and applications of renewable and nonrenewable energy resources, provide efficient lighting systems, design passive architecture and evaluate overall performance improvement of buildings.
- Understand Building automation and the issues related to the control system in a building.

Methodology:-

- The students have to take individual or group design projects dealing with at least one or more than one of the above studied technique/s.

Unit	Hours/periods	Contents
I.	6	• **Energy Sources**: Introduction to renewable & non- renewable energy sources • **Global Scenario**: Global availability of renewable & non- renewable energy sources • **Energy Consumption in various building typologies**: Analysis of energy consumption in terms of energy load through heating/ cooling/ventilation/ lighting & other loads.
II.	6	• **Energy efficient measures:** Study of different energy-efficient principles of a building and their various application techniques in different climatic zones prevailing in India including solar active and passive features.
III.	6	• Introduction to Building automation in general and understanding the issues related to the control system in a building. • Basic concept of computerized control systems, network designed to monitor and control various systems for lighting, ventilation, alarms & security, communication, etc. • Issues related to illumination and lighting. Systems to allow / control Natural light. Aperture/openings and shading devices control systems based on automated systems. • Issues related to ventilation air handling with automated systems of control of apertures and artificial ventilation-air conditioning. • Issues related to systems of communication (mechanical systems).

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC1004A.1	How energy Efficient architecture can be adopted as an alternative in today's perspective.
BARC1004A.2	How to create energy efficient building by actively harnessing renewable nature sources of energy (solar energy etc) and utilizing materials that least pollutes the environment.
BARC1004A.3	Know about the designing of energy efficient building envelopes that respond to the climate of a place bldg.
BARC1004A.4	Aware about resource–efficient practices in India, advocating of the application of renewable energy system and the promotion of efficient lighting & HVAC system to reduce energy demand.

Reference /Text Books:

1. Seymour Jarmal, 'The Architects Guide to Energy Conservation'.
2. R.G. Stein, 'Architecture and Energy'.
3. David Anink, Chiel Boonstra, John Mak, 'Handbook of Sustainable Building'.
4. Peter F. Smith, 'Eco- refurbishment'.
5. Arvind Krishan, Simos Yanas, Nick Baker, S.V. Szokolay, 'Climate Responsive Architecture: A Design Handbook for Energy Efficient Buildings', Edn., Tata McGraw Hill, **2001**
6. Roy McAlister, 'The Solar Hydrogen Civilization', American Hydrogen Association, **2003.**
7. Reinhold A. Carlson, Robert A. Di Giandomenico, 'Understanding Building Automation Systems (Direct Digital Control, Energy Management, Life Safety, Security, Access Control, Lighting, Building Management Programs)'.
8. 'Building Automation: Control Devices and Applications', In Partnership with NJATC, **2008.**
9. 'Building Control Systems, Applications Guide (CIBSE Guide)', The CIBSE, **2000.**
10. McGowan, McGowan, J. John, 'Building Automation Online'.
11. John E. Traister, 'Security/Fire Alarm Systems: Design, Installation, and Maintenance'. **1995.**

University Examination Pattern:

1. One compulsory question containing 6 questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus
2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).

B.ARCH. SEMESTER-IX					BARC1004 B			ADAVNCED CONSTRUCTION & MATERIALS	
Scheme of Teaching					Scheme of Exam (Marks)			Duration of Examination	Credit
L	T	P	S	Total	Internal	External	Total	3Hours	2
2	0	0	0	2	50	50	100		

Objectives: -

- To make students understand and appreciate the role and importance of economy in the built environment

Unit	Hours/periods	Contents
I.	6	• Building Economics-Introduction, Definition, Role, Scope, Importance and Principles • Cost of Building- Components and their impact on Cost • Cost of Building- Typologies including Life Cycle Cost, Construction Cost, Maintenance • Cost Management- Aims, Objectives, Need, Principles, Procedure, Cost Analysis.
II.	6	• Cost Reduction -Using Site Planning and Architectural Design • Cost Reduction –Using Specification, Space optimization and Structural Innovations • Space Norms- Role, importance, Principles involved in defining Space Norms with special reference to National Building Code. • Cost Analysis- Low Rise and High Rise Buildings
III.	6	• Technology – Role, Importance, Use in making buildings cost- effective • Building Technologies – Typologies including Modular construction, Pre-Engineered Buildings etc. their merits and demerits • Mass Production and Standardization- Need, Principles, Role and Importance in promoting cost effectiveness • Materials- Role, Importance, Analysis, Innovation/ up-gradation in making buildings cost- effective • Construction Techniques- Principles involved, Impact on building cost with specific reference to few innovative techniques with comparative merits and Demerits.

COURSE OUTCOMES: On completion of this course, the students will be able to

BARC1004B.1	Understand The role of Materials in architecture.
BARC1004B.2	Bridging the gap between architectural Materials & Advanced Construction
BARC1004B.3	Understand Materials relationship with aesthetics, space, form and structure.
BARC1004B.4	Analyze, troubleshoot, and implement solutions with new functions.

Reference /Text Books:

1. TERI, 'Sustainable Buildings- Design Manual', Vol- I & II.
2. National Building Code, 2005.
3. A.K. Lal 'Hand book of Low Cost of Housing', New Age Publishers.
4. 'Readers Volume on Housing' – Institute of Town Planners, India.
5. 'Report of Govt. of India on Housing Shortage'.
6. Journal of IIA, 2013.

University Examination Pattern:

1. One compulsory question containing 6 questions of 2 marks (12 marks), each requiring short answers, are to be set from the entire syllabus.
2. The examiner is required to set another six questions (two from each unit), out of which the students are required to attempt any four questions (selecting at least one from each unit).