PANJAB UNIVERSITY, CHANDIGARH-160014 (INDIA)
(Estd. under the Panjab University Act VII of 1947-enacted by the Govt. of India)

FACULTY OF DESIGN AND FINE ARTS

Outlines of tests, syllabi and courses of Reading for

B.ARCHITECTURE

(1st to 10 Semesters)

1st to 6th Semesters (NEW)
7th to 10th Semesters (OLD)

FOR THE SESSION 2018-19

PANJAB UNIVERSITY

SYLLABUS FOR B.ARCHITECTURE COURSE

(Effective from academic session 2017-2018)

Philosophical Background: In simple terms, training of an architect deals with the complex relationship of Art, Daily Life and Techniques and the interpretation of this relationship in spatial and physical terms. Thus the aim of architectural education is to train the mind and develop skills to perceive the context of man and society. Today, the teaching of architecture has become a principal way of access to the creative professions, all of which - whether they be the construction of a building or town planning, interior design or landscaping - need professional training of the highest order. Wide horizons need to be covered when training architects. From the history of art (and architecture) to the resistance of material, from computer skills to Project Management, from down-to-earth social issues to intelligent buildings.

The B. Architecture Course is, thus, programmed to give an all-round exposure, with subjects delineated in the four streams of Art, Humanities, Science, and Technology. While the arts stream would train the students in creative thinking and skills through subjects such as Architectural Graphics, Architectural Drawing, etc. the humanities stream covering History of Built Environment, Vernacular Architecture, etc. would acquaint the student with the evolution and philosophy of architecture. Subjects in science and technology such as Building Technology, Structure Systems and Design, Building Construction, etc. are incorporated to give sound theoretical and practical knowledge of technical and constructional aspects of building. This is supplemented by practical application of the acquired theoretical and philosophical information through site visits, tours and practical work. The aim is to develop a holistic approach whereby a student can comprehend problems of architecture in totality of the societal and environmental context.

The Course Structure: The Bachelor of Architecture programme has a two tier break-up, with the first tier comprising six semesters and second tier comprising four semesters, making it a ten-semester degree course. The first tier culminates in a degree titled "Bachelor of Building Science". The emphasis here is on giving adequate practice in the basic skills viz. Architectural drafting, Technical detailing, Graphics, Structures and creative expression, culminating in Architectural Design. It is expected that a student, on completion of this stage, would be competent in assisting a qualified architect in running an architectural practice. It is also a foundation for the second tier leading to more advanced courses for the Bachelor's Degree in Architecture. After the first tier, the students are required to undergo one semester's Practical Training in an established architectural practice to acquaint them of realities of the field. The course culminates in a research-cum-design thesis in the tenth semester when students are required to undertake a topic/project of their choice, conduct research on its various aspects and apply the conclusions for evolving design solutions.

FIRST SEMESTER : SCHEME OF TEACHING

Duration of Semester : 18 weeks
Periods per week : 35
Duration of each period : 60 minutes

Note: The course work and assignments in each subject must be completed as prescribed.

Sr. No.	**Subject**	Periods per week	Total periods	Teaching Methodology and Sessional work
1.	Architectural Design-I	8	144	Design assignments, time problems
2.	Building Construction-I	4	72	Notes, sketches, drawings, tests, Assignments
3.	Building Material-I	2	36	Notes, sketches, tests, Assignments
4.	Structure Systems & Design-I	2	36	Notes & tests, Assignments
5.	Architectural Drawing-I	4	72	Drawings, tests, Assignments
6.	Architectural Graphics-I	4	72	Sketches, Assignments, drawings, tests
7.	History of Built Environment-I	2	36	Notes, sketches, tests, Assignments
8.	Theory of Design-I	2	36	Assignments & Tests
9.	Workshop-I	3	54	Theory & Practical
10	Health Education-I	2	36	Health and fitness, extra-curricular activities.
	Total	33	594	

FIRST SEMESTER : SCHEME OF EXAMINATION

PREPARATORY HOLIDAYS One week
EXAMINATIONS Approximately three weeks

NOTE : In addition to the University Studio Examination, the subjects of Architectural Design-I, and Building Construction-I will be assessed through a viva-voce by an external examiner appointed by the Panjab University.

Sr. No.	Subject	Duration of exam. (in hours)	Max Marks for Exam	Max. Marks for Sessional Work	Total Marks
1.	Architectural Design-I	6	200	200	400
2.	Building Construction-I	6	100	100	200
3.	Building Material-I	3	50	50	100
4.	Structure Systems & Design-I	3	50	50	100
5.	Architectural Drawing-I	6	100	100	200
6.	Architectural Graphics-I	6	100	100	200
7.	History of Built Environment-I	3	50	50	100
8.	Theory of Design-I	3	50	50	100
9.	Workshop -I	-	-	50	50
10.	Health Education-I	-	-	50	50
	Total		700	800	1500

ARCHITECTURAL DESIGN-I **CCA-1-101**

Periods per week: 8
Duration of Examination : 6 hours

Maximum Marks

Session work : 200
Examination : 200

Objective

To learn elements and principles of basic design with orientation to architectural design.

Contents

Unit –I

1. Exercise in two and three dimensional compositions in order to achieve harmony, balance contrast etc. as entities in themselves
2. Study of interrelationships, use of scales and proportioning for 3-dimensional forms. Compositions with buildings blocks and other architectural applications can be introduced in order to relate to architecture rather than basic design.
3. Anthropometric study of difference postures and activities.

Unit-II

Documentation and drafting of measured drawings of a single unit structure.

Application of Principles of design learned by doing two dimensional as well three dimensional into the mono cellular structure such as kiosk, bus shelter, and entrance design.

Teaching and Learning methodology

- Site visit to show live buildings designed by Le Corbusier or other good architects of Chandigarh for relating the principles of design of basic design into buildings e.g. Harmony contrast in façade of Capitol complex building.
- Audio visual presentation by teacher or seminars by students choosing the good buildings which clearly reflect the principle of design.
- Major evaluation stages (Concept, PS, and FS) would be assessed in an open viva voce.

Examination Instructions:

There will be a 6 hour Design Exam followed by a Viva. The question paper shall be formulated from the content of the syllabus.

Suggested Reading

1. Architecture: Form Space and Order, Francis D.K. Ching; Van N. Reinhold Co.,
2. Architectural Graphics by Frank Ching
3. Drawing a Creative Process by Francis D. Ching
4. Graphic Thinking for Architects and Designers by Paul Laseau
5. Time Saver Standards for Building Types, C. D. Joseph and Callender John;
6. Time Saver Standards for Architectural Design Data, C. D. Joseph & Callender John;
7. Neufert's Architect's Data.
8. Structure in Nature – Strategy for Design, Pearce Peter;
9. Architectural Design, Pickering, Ernest; John Wiley and Sons Inc., Canada, 1949.
10. Elements of Architecture, Von Meiss Pieree

INSTRUCTIONS TO THE PAPER SETTER

Examiner is required to set one compulsory question from unit-II only.

BUILDING CONSTRUCTION-I **CCA-1-102**

Periods per week : 4

Duration of Examination : 6 hours

Maximum Marks

Sessional work : 100

Examination : 100

Objective

To familiarize the students with construction details of various components of a small single - storied building.

Content

UNIT I

- Introduction to various components of a building (wall, foundation, floor, roof, doors, windows, etc.) and their structural and functional roles.
- Brick Masonry; various types of bonding in walls (English, Flemish & Rat Trap) of varying thickness having various types of junctions.
- Stone masonry of various types.
- Block Masonry (Mud Blocks, Fly Ash Blocks etc)

UNIT II

- Construction of foundations (brick and stone) for load-bearing and toe walls.
- Damp-proof course, detailing of horizontal & vertical DPC.
- Flooring: various types of durable and decorative floor finishes such as P.C.C, terrazzo (cast in situ and tiles), stones (marble, kota stone, granite, etc.), vitreous tiles, etc.

UNIT III

- Construction of flat Roof (Tile & Batten, RBC, RCC). Concepts of water proofing and thermal insulation of roofs.

UNIT IV

- Lintels and arches. Window sills
- Construction of Sunshades, Brise-Soliel, Brick Jali.

Note: Complete Section through a single storey building covering foundation/DPC/window cill/lintel/roof & wall junction/parapet wall/plinth protection, etc.

Teaching Methodology

Field/ Project visits to study the basic construction at various stages of brick walls, stone masonry etc. for better understanding, students must be taken to the under construction Site.

SUGGESTED TEXT AND REFERENCE BOOKS

TEXT BOOKS

1. McKay, WB Building Construction
2. Rangwala, S.C Engineering Materials
3. Punmia, B.C. Building Construction
4. Khanna P.N. Oractical Civil Engineer's Handbook

REFERENCE BOOKS

5. Ching, Francis D.K. Building Construction Illustrated
6. Construction Technology by Chudley
7. Construction of Buildings by R.Barry

INSTRUCTIONS TO THE PAPER SETTER

i. The examiner is required to set four questions i.e. one from each unit.

ii. The student is required to attempt three questions.

BUILDING MATERIAL-I **CCA-1-103**

Periods per week : 2

Duration of Examination : 3 hours

Maximum Marks

Sessional work	:	50
Examination	:	50

Objective

To make students aware about the importance of Building Science & Materials in Architecture.

Content

UNIT-I- STONES

- Various types of stone and their availability in India.
- Stone quarrying, dressing of stones, deterioration of stone, preservation of stone.
- Sizes, application properties and visual text/check for different types of stone (flooring, cladding, masonry)
- Artificial stone, uses and properties.

UNIT-II- BRICKS

- Manufacturing, classification, types, sizes ,properties of brick, visual text/check for different types of brick
- Different types of brick; uses and properties – Fire brick, sand lime brick, coloured brick etc.
- Cost effective brick and their uses in construction industry.
- Bricks tiles-manufacturing & their uses in facades, flooring, terracing etc.

UNIT-III- TIMBER & ITS FINISHES

- Sources of timber.
- Classification, characteristics, defects in timbers.
- Preservation and treatment of timber.
- Industrial timber products and their applications – plywood, particleboard, laminated board, block board, batten board, multi-layered plywood, MDF,HDF, veneers, hardboards
- White wash, Distemper ,Paints, varnishes and distempers, emulsions, cement base paints.oil paints
- Constituents of all types of paints, BIS specifications
- characteristics of good paints, types of paints and process of painting different surfaces.

- Applications, Covering capacity,Suitability, Advantages and Disadvantages.
- Types of varnish for timber -French polish and melamine finish, PU coating(internal & external),laquered finish, Duco paints & their applications,
- Surface finishes for various types of cladding materials, painting of ironwork
- Manufacturing, types and application
- Current Brands available in market

UNIT IV: METALS AND METAL PRODUCTS FOR BUILDING

- Iron: Various types of iron, properties of various types of iron, iron products and their uses in construction.
- Properties and architectural uses of mild steel and stainless steel, available sections & other products such as hardware etc.
- Aluminum: Different types of section and uses in construction Copper, Zinc Brass, Stainless steel, tin etc.
    - Properties uses, treatment.
    - Available Section, Products (Hardware)

Suggested Reading

1. Engineering Materials by S.C Rangwala
2. Civil Engineering Materials by P.D.Kulkarni
3. Materials of Construction by R.S.Deshpande
4. Construction Material Reference Book – D.K. Doran
5. P.C. Varghese, 'Building Materials', Prentice hall of India Pvt Ltd, New Delhi, 2005.
6. Arthur Lyons – 'Materials for Architects and Builders' - An introduction Arnold, London,1997.
7. Hand book of Timber Engineering – BIS

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.

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six questions in all and minimum of one question from each unit.

ii. The student is required to attempt any four questions by selecting atleast one from each unit.

STRUCTURE SYSTEMS & DESIGN – I **CCA-1-104**

Periods per week : 2

Duration of Examination : 3 hours

Maximum Marks

Sessional work : 50

Examination : 50

Objective

To understand the basic principles of Structural Mechanics, so that it forms the basis for study of Structural Systems and Design.

Contents: -

UNIT I:

- Force, units and characteristics of a force, representation of forces, coplanar force systems, resultant force, composition and resolution of force, parallelogram-Triangle – Polygon laws of forces
- Resultant of several coplanar concurrent forces. Lami's theorem.
- Concept of moment, characteristics of a moment, concept of a couple.
- Resultant of several coplanar non-concurrent parallel / non-parallel forces.
- Equilibrium conditions for bodies under coplanar forces.
- Numerical problems based on above topics.

UNIT – II

- Types of Loads: Dead load, Live load, Wind Load, Impact and Earthquake load.
- Type of loading: Point load, uniformly distributed load, uniformly varying load.
- Types of supports and their reactions: simple, roller, hinged, fixed supports.
- Types of beams: Simply supported, Cantilever, Over-hanging and Fixed beams.
- Shear force and Bending Moment Diagrams for Simply supported, Cantilever and over hanging beams subjected to Uniformly distributed load and Point loads only.

UNIT – III

- Concept of centre of gravity and centroid. Determination of centroid of plane geometrical figures by moment method only.
- Concept of Moment of inertia (second moment of area), theorem of parallel axis and theorem of perpendicular axis, radius of gyration. Determination moment of inertia of laminae of square, rectangular, L shape, T shape and I shape cross-sections.
- Types of pin jointed frames. Assumptions in computing the forces in members of a perfect frame. Analysis of perfect frames by method of joints, method of sections and Graphical method.

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six question i.e. two from each unit.

ii. The student is required to attempt four questions by selecting atleast one from each unit.

ARCHITECTURAL DRAWING-I **CCA-1-105**

Periods per week : 4

Duration of Examination : 6 hours

Maximum Marks

Sessional work : 100

Examination : 100

Objective

To familiarise the students with a basic knowledge of good drafting, lettering techniques and visualization of geometrical forms through plan, elevations & sections.

Content

UNIT I:

- Scales
- Lettering techniques
- Types of lines used in Architectural Drawing
- Basic Geometrical shapes drawings

UNIT II:

- Orthographic projections
- Orthographic projection Definition/meaning
- Planes of projection
- First and third angle projection
- Note: First angle projection to be followed for all exercises.
- Projection of points
- Projection of lines
- Projection of planes
- Projection of solids (Prisms, Pyramids, Cones and Cylinders).

UNIT III:

- Section of solids (Prisms, Pyramids, cones & cylinders)
- Intersection of solids:
- Development of surfaces:

UNIT IV

- Representation of a single room unit (one bed/study room with attached toilet & kitchen) in plans, elevations and sections showing the various building elements and furniture layout.

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set four questions one from each unit.

ii. The student is required to attempt three questions.

ARCHITECTURAL GRAPHICS-I CCA-1-106

Periods per week : 4
Duration of Examination : 6 hours
Maximum Marks

Sessional work	:	100
Examination	:	100

Objective

To learn the techniques of drawing and rendering with pencil in architectural design and graphic composition.

Content

Effects created by different pencil grades by varying thickness and pressure in the pencil - understanding the language of lines, freedom of lines for visualising design, drawing lines with the support of wrist and elbow, representation of various textures with thick, thin and flat pencil strokes.

- Exercises with different pencil grades to check varying intensities and create textures with demonstration.
- Composition with coloured paper using the basic principles of design.
- Indoor sketching, rendering of different solids like, sphere, cube, cone, cylinders, etc. with shades and shadows.
- Outdoors sketching to co-relate the shapes in geometry.
- Different kinds of trees, foliage of trees and shrubs with proper light and shade.
- Sketching of hut and its surroundings with special emphasis on foreground and background.
- Outdoor sketching of simple buildings.
- Rendering of stone and brick wall in pencil.
- Representation of human figures.

Workshops

1. To impart the practical aspect of 3-D composition, sculpture workshop in clay modeling will be organised by the concerned teacher.

2. Another workshop in pencil rendering will also be organised, highlighting its technique and styles. The workshop can be organised outdoor or indoor.

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set four questions from the entire syllabus.
ii. The student is required to attempt two questions.

HISTORY OF BUILT ENVIRONMENT– I CCA-1-107

Periods per week : 2

Duration of Examination : 3 hours

Maximum Marks

Sessional work : 50

Examination : 50

Objective

To understand the role of geo-physical, societal, political and technological factors in the evolution of architectural and urban form. To develop a holistic approach to architecture as an integral component of the built environment.

Contents

UNIT-I

- Man's early/prehistoric attempts to colonise and personalise space. Examples of early shelters and settlements for example, Stonehenge, tumuli, GobekliTepe, CatalHuyuyk, Jericho etc.
- Determinants of Built Form - geo-physical, societal, political and technological, etc. Global examples of vernacular architecture.
- Introduction to the River Valley Civilizations. Comparative study of different manifestations with reference to location, materials and techniques, socio-cultural influences and other contextual factors

UNIT-II

- Egyptian Civilization: Concept of the Royal Necropolis, locational context and architectural characteristics of public buildings, e.g. mastabas, pyramids and temples (rock-cut & structural) -one example of each type to be chosen. Worker's settlement- city of Kahun.
- Mesopotamian Civilization; the urban context and architecture of public buildings (ziggurats and palaces). Examples of the city and Ziggurat of Ur, city and palace and of Khorsabad.

UNIT-III

- Indus Valley Civilization: Form of the Harappan City, location and role of public buildings.
- Architecture of the typical Harappan dwelling Granary and Bath.
- The Vedic Village, Building typology and construction.

UNIT-IV

- **Ashoka and the beginning of the Buddhist school of Architecture in India. Socio-political factors in selection of sites of Buddhist Architecture.**
- **Building typology – Stupas, Chaityas and Viharas. For example, The Great Stupa at Sanchi, Chaitya Hall at Karli, Vihara at Ajanta. Suitable examples from each geographical context toillustrate differences in form, construction methods and ornamentation.**

NOTE: Analysis of architectural style/building typology must include functional, constructional/structural and ornamentation aspects.

Suggested Reading –

1. History of Architecture- Sir Bannister Fletcher
2. A Global history of architecture – Ching, Jarzombek, Prakash
3. World Architecture – Henry Russell Hitchcock
4. The rise of Civilization – David and Joan Oates
5. Architecture of the world : Egypt – Henri Steirlin
6. Architecture of India: Buddhist and Hindu – Satish Grover

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six questions in all and minimum of one question from each unit.

ii. The student is required to attempt any four questions by selecting at least one from each unit.

THEORY OF DESIGN- I CCA-1-108

Periods per week : 2

Duration of Examination : 3 hours

Maximum Marks

Sessional Work : 50

Examination : 50

Objective

To enable the student to understand the fundamental concepts and aspects of architectural design so as to equip them to view, understand and analyse a design by using sound and well reasoned judgement.

Contents

- Definition and scope of Architecture. Interdependence of various components of the built environment. Need for a holistic approach
- Design in everyday life, basic art forms, elements of design - space, form, line, texture, color, etc.
- Principles of Design, Scale, Balance, Proportion, Rhythm, etc..
- Objectives of Design, Truth, Beauty order, efficiency and economy.
- Forms and shapes in everyday life.
- Scale-basics
- Methodology of Creative Design.

Visual Perception

- Theory of colors (Color wheel),
- Architectural Vocabulary - For example, Façade, Building Envelope, Voids, Fenestrations, Clerestorey, Sight Lines, Rendering, Arch, Brise soleil, Cantilever, Column, Beam, Massing, Curvilinear, Rectilinear, Plan, Section, Elevation, Motifs, Aesthetic, etc.

Suggested Teaching Methodology

- Visits to local places of interest to grasp the theory and application of basic forms – College building, Gandhi Bhawan, Rock Garden, Leisure Valley, Museum
- Maximum use of audio-visual aides to be made form slides and library books.

Suggested Reading –

- Understanding Architecture: Its Elements, History, and Meaning by Leland M. Roth, Westview Press Place publication.
- Architecture: Form Space and Order; Francis D.K. Ching; Van Nostrand Reinhold Co.,1979.
- “A Visual dictionary of Architecture”, F.D.K.Ching, Van Nostrand Reinhold
- The language of Architecture, NeilsPrak, Mounton & Co 1968
- Architect: A Candid Guide to the Profession, by Roger K. Lewis

INSTRUCTIONS TO THE PAPER SETTER

I. The Examiner is required to set six questions from entire syllabus.
II. The student is required to attempt four questions.

WORKSHOP- I **CCA-1-109**

Periods per week : 3

Maximum Marks:

Sessional Work	:	50
Examination	:	No Examination

Objective

To develop skills in understanding the complexities and constraints of brick and stone masonry.

Contents

- Introduction to masonry tools, Making proportional sketches of these tools and learning their uses.
- Construction of a low height masonry wall, using either stones or bricks, and,
- Brick wall junctions in English and Flemish bonds to be attempted also.
- Construction of low height brick jalli.

Suggested Teaching Methodology

- A demonstration of brick work, stone, timber works, textures and various exterior finished through audio-visual aids, to be presented to the class
- Masonry work shall be attempted in groups.
- Site visits for knowing Brick Bonding and jalli type and various exterior finishes especially to Tock Garden to be undertaken.

HEALTH EDUCATION-I **CCA-1-110**

Periods per week : 2

Maximum Marks

Sessional Work	:	50
Examination	:	No Examination

Objective

To make the students learn the various aspect of health fitness.

Content

UNIT-I

- Definition of exercise and physiology and an introduction to human body system.
- Effects of exercise on muscular, circulatory and respiratory systems.
- Phenomena like fatigue, second wind, and oxygen debt.

UNIT-II

Health and Fitness

- Development of physical fitness and its components.
- Sports performance in different games and sports.
- Yogic Activities.
- Adventure Activities.
- S.U.P.W. (Socially Useful Productive Work).

SECOND SEMESTER : SCHEME OF TEACHING

Duration of Semester : 18 weeks
Periods per week : 35

Duration of each period : 60 minutes

Note: 1. The course work and assignments in each subject must be completed as prescribed. All these units will be equally represented in the external examination.

Sr. No.	Subject	Periods per week	Total periods	Teaching Methodology and Sessional work
1.	Architectural Design-II	8	144	Design assignments, Time problems
2.	Building Construction-II	4	72	Notes, sketches, drawings, tests
3.	Building Material-II	2	36	Notes, sketches, tests
4.	Structure Systems & Design-II	2	36	Notes & tests, Assignment
5.	Architectural Drawing-II	4	72	Drawings, tests, Assignment
6.	Architectural Graphics-II	4	72	Sketches, drawing, Tests, Assignment
7.	History of Built Environment-II	2	36	Notes, sketches, tests, Assignment
8.	Theory of Design-II	2	36	Assignments, Tests
9.	Workshop of Model Making-II	3	54	Theory & Practical
10.	Health Education-II	2	36	Health and fitness, extra curricular activities
	Total	34	594	

SECOND SEMESTER : SCHEME OF EXAMINATION

PREPARATORY HOLIDAYS **One week**

EXAMINATIONS **Approximately three weeks**

NOTE: In addition to the University Studio Examination, the subjects of Architectural Design-II, and Building Construction-II will be assessed through a viva-voce by an external examiner appointed by the Panjab University.

Sr. No.	Subject	Duration of exam. (in hours)	Max Marks for Exam	Max. Marks for Sessional work	Total Marks
1.	Architectural Design-II	12	200	200	400
2.	Building Construction-II	6	100	100	200
3.	Building Material-II	3	50	50	100
4.	Structure System & Design-II	3	50	50	100
5.	Architectural Drawing-II	6	100	100	200
6.	Architectural Graphics-II	6	100	100	200
7.	History of Built Environment-II	3	50	50	100
8.	Theory of Design II	3	50	50	100
9.	Workshop and Model Making	-	-	50	50
10.	Health Education-II	-	-	50	50
	Total	-	700	800	1500

ARCHITECTURAL DESIGN- II **CCA-2-201**

Periods per week : 8

Duration of Examination : 12 hours

Maximum Marks

Session work : 200

Examination : 200

Objective

To learn the interdependence /Interrelationship of Form and Functions.

Content

- Disposition of function or interrelationship of various functions through diagrams or matrices or flowcharts
- Dispositions of functions on site and scale of building with respect to the site.
- To understand the concept of "Form follows function" and vice versa.
- Understanding the difference of scale in residence and School building.
- Comprehend requirements of the occupants

Projects

Unit-I

- Residence or Nursery school.

Unit-II

- Health centre, clinic/dispensary, Post Offices, Mobile homes, children's centre, child care centers etc.

Teaching and Learning Methodology

1. Case study of own residence of student to understand the various sizes of rooms, anthropometrics learned in 1st semester and functional planning.
2. To understand the light and ventilation concept in rooms.
3. Analysis of various activities in residence by various users, their chart formation.
4. Case study of School to understand the scale of building designed for kids. The furniture and fixtures to be studied as per kids requirements.
5. Major evaluation stages (Concept, PS, and FS) would be assessed in an open viva voce.

Suggested Reading

1. 100 Ideas that changed Architecture by Richard Weston
2. Landscape Graphics – Grand W.Reid Asla
3. A Comparative analysis of 20th century houses, Hideaki Hareguchi, Academy Editions, 1988
4. Tropical Asian House, Robert Powell, Select Books, 1996
5. The Essential House Book, Terence Conran, Conran Octopus, 1994
6. Time Saver Standards for Building Types, C. D. Joseph and Callender John;
7. Time Saver Standards for Architectural Design Data, C. D. Joseph & Callender John;
8. Neufert's Architect's Data

INSTRUCTIONS TO THE PAPER SETTER

Examiner is required to set one compulsory question from any of the unit.

BUILDING CONSTRUCTION-II CCA-2-202

Periods per week : 4

Duration of Examination : 6 hours

Maximum Marks

Sessional work : 100

Examination : 100

Objective

To familiarize the students with traditional construction methods of a single storied building in timber with sloping roof.

Content

UNIT-I

- Joinery work: Various types of doors in timber.
- Types of doors & Windows. Single & Double leaf panel doors.
- Battened, ledged and braced doors; Battened, braced & framed doors; Flush doors, etc.
- Sliding and sliding folding doors.
- Windows in timber.
- Workshop practice for joints in timber used above.

UNIT-II

- Introduction to the nature and characteristics of wood construction, its advantages and limitations.
- Walls in timber: Various types of timber frame walls, with details of joints and cladding, *Dhajji* walls construction. Windows and doors in Frame walls.
- Cladding with Timber and Timber products in Interior and Exterior (Wall paneling, Timber partitions, counters etc.)
- Design, detailing and construction of wardrobes and Shop/Bank counters.
- Foundations of Timber Posts.

UNIT-III

- Flooring: Various types of timber floors & their construction methods.
- Floor finishes for timber floors.
- Staircases in timber.

UNIT-IV

- Roofing: Types of timber roofs
  i) Introduction to different types of timber Roofs e.g. Flat, Couple, Close Couple, Collar, Lean to roof and Double Lean-to roofs, mansard roof.
  ii) King Post and Queen Post trusses.
  iii) North Light truss in Timber.
  iv) Roof coverings using AC/CGI sheets. Eaves, Gutters, Ridge and Valley detail.

Note: Field/ Project visits to study the uses of Timber in construction at various stages for better understanding, students must be taken to the constructed / under construction Site.

SUGGESTED TEXT AND REFERENCE BOOKS

TEXT BOOKS

1) Mckay, WB Building Construction
2) Rangwala, S.C Engineering Materials
3) Punmia, B.C. Building Construction

REFERENCE BOOKS

1) Ching, Francis D.K. Building Construction Illustrated
2) Construction Technology by Chudley
3) Construction of Buildings by R.Barry

INSTRUCTIONS TO THE PAPER SETTER

I. The examiner is required to set four questions i.e. one from each unit.

II. The student is required to attempt any three questions.

BUILDING MATERIAL-II **CCA-2-203**

Periods per week : 2
Duration of Examination : 3 hours

Maximum Marks

Sessional work	:	50
Examination	:	50

Objective

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.

Contents

UNIT-I-CEMENT & CONCRETE

- Cement, sand aggregates: types, properties and uses.
- Properties and various types of concrete.
- Different Grades and their uses.
- Method of preparation, laying and curing of concrete-Formwork, production of concrete, mix, proportioning, mixing, transporting, placing, compaction, curing of concrete, sampling and testing of concrete.
  Surface finishes in concrete, chemical admixtures
- Study of advanced concrete- special concretes like light weight ,high density,
- fibre reinforced, polymer concrete - outline of manufacture, properties and uses of the above -
- ready mixed concrete - guniting -
- cold weather and underwater concreting -
- Hollow concrete blocks for construction of walls in plains & hilly regions
- Precast pre stressed construction for large span structures
- current developments in concrete products

UNIT-II- CLAY & CLAY PRODUCTS,COST EFFECTIVE PRODUCTS,ECO FRIENDLY PRODUCTS

- Different types of soils and their bearing capacities and their suitability/application with respect to types of foundations
- **Mud:** Methods of preparation-construction methods and techniques-natural techniques for stabilization of mud,
- details of mud wall construction, adobe construction
-

soil blocks- S.S. Block - S.S.Cast in situ

- walls - flooring - roofing - plastering
- Terracotta tiles, Pavement tiles, Roofing tiles cladding tiles etc.
- Stoneware, Porcelain, Refractories : applications in construction
- Advances Ceramics: Product and application-Vitrified tiles, Glazed tiles, handmade tiles etc.

Eco Friendly Materials:

- Stabilized mud blocks,
- AAC -fly ash Blocks & other latest current trends &their applications in plains and hilly regions,
- Eco Boards, hard board, bison board,
- carbon products -composite tiles etc
- Bamboo as a building material-types-properties-application-working with bamboo-sizes of members- methods of joining-bamboo and its applications in construction

UNIT-III- GLASS:

- Manufacturing process, types, properties and application
- Various products of glass- Float glass wired glass, fiber glass, laminated glass, glass building blocks etc.
- Structural & Non-Structural glazing,
- Current brands in local & international market.
- Comparison of prices

UNIT-IV- PLASTICS, PVC,THERMAL INSULATING & WATER PROOFING MATERIALS

- Study of plastics –thermosetting and thermoplastics, resins, fabrication of plastics,
- polymerization and condensation -
- Application of plastic in building construction.
- Thermoplastics and thermosets - properties and architectural uses of plastics - structural plastics –
- reinforced plastics and decorative laminates -
- plastic coatings, adhesives and sealants - modifiers and plasticizers – fillers and stabilizers - fabrications of plastics.
- PVC –UPVC, Rubber: Products and uses in construction of HDPE and composite material.
- Materials for thermal insulations:
- Properties & uses
- Water Proofing materials (liquid, semi-liquid and solid) – Composition, Properties, Applications

- Different materials, rigid and flexible, used in damp-proofing, including brick on edge,
- rough Shahabad stone, bitumen sheets, plastic sheets and other proprietary materials

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.

Suggested Reading

- Engineering Materials by S.C Rangwala
- Civil Engineering Materials by P.D.Kulkarni
- Materials of Construction by R.S.Deshpande
- Construction Material Reference Book – D.K. Doran
- Construction Handbook for Civil Engg. And Architecture Volume 1 – M.M.Goyal
- Masonry Design & Detailing for Architects and Contractors – Christine Beall (McGraw Hill)
- Jules J.A. Janssen, Building with Bamboo: A Handbook, 1995.
- Gernot Minkev, Building with Bamboo, Birkhauser, 2012.

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six questions in all and minimum of one question from each unit.
ii. The student is required to attempt any four questions by selecting at least one from each unit.

STRUCTURE SYSTEMS & DESIGN – II CCA-2-204

Periods per week : 2

Duration of Examination : 3 hours

Maximum Marks

Sessional work	:	50
Examination	:	50

Objective:

To understand the principles of structural design of Steel Structures.

Contents: -

UNIT- I

- Simple bending theory, Section modulus, Radius of gyration
- Principle of superposition
- Determinate and Indeterminate structures
- Basic Data (IS: 800 and Steel tables) for design of steel structures
- Analysis & Design of Simply supported restrained roof steel beams subjected to uniformly distributed load.
- Purlins, Plate girders and Box girders (Descriptive only).

UNIT – II

- Structural steel connections:

  Riveted Connections: Types of rivets, permissible stresses in rivets, types of riveted joints, specifications for riveted joints as per IS 800.Failur of a riveted joint. Assumptions in the theory of riveted joints. Strength & efficiency of a riveted joint. Design of riveted joints for axially loaded members. (No Staggered riveting).

  Welded Connections: Types of welds & welded joints, advantages & dis-advantages of welded joints, design of fillet & butt weld.

  Plug and slot welds (Descriptive No numerical on Plug & Slot welds).

- Analysis & Design of single/double angle Tension members of a roof truss with riveted and welded connections.
- Analysis & Design of single/double angle Compression members (strut) of a roof truss with riveted and welded connections.

UNIT - III

- Analysis & Design of Single section steel column
- Analysis & Design of Built up steel columns with single lacing.
- Types of Column bases (Descriptive only).

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six questions i.e. two from each unit.

ii. The student is required to attempt four questions by selecting at least one from each unit.

ARCHITECTURAL DRAWING-II **CCA-2-205**

Periods per week : 4
Duration of Examination : 6 hours
Maximum Marks
Sessional work : 100

Examination : 100

Objective

To enable the students to have a better understanding of the 3-D through isometric/axonometric views, perspective drawing and sciography.

Contents

UNIT-I

- Axonometric/isometric views of compositions/complex forms
- Conversion of Axonometric/isometric views into orthographic projections.

UNIT-II

- Two point Perspectives of simple and complex objects leading to perspectives of building forms using the conventional plan method.

UNIT-III

- One point perspective using plan method of simple and complex objects leading to perspectives of building forms.

UNIT-IV

- Sciography
  - i) Sciography of points
  - ii) Sciography of lines
  - iii) Sciography of planes of different shapes on H.P. and V.P. w.r.t. distance from H.P. and V.P.
  - iv) Sciography of simple solids
  - v) Sciography of building elements like
- Recesses projections of different shapes
- Stairs/ramps
- Colonnades, etc.

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set four questions one from each unit.
ii. The student is required to attempt three questions.

ARCHITECTURAL GRAPHICS-II **CCA-2-206**

Periods per week : 4

Duration of Examination : 6 hours

Maximum Marks

Sessional work : 100

Examination : 100

Objective

To appreciate the role of colour in presentation and rendering techniques in architectural design.

Content

Introduction of transparent water colours, poster colours, pastel colours and their tonal values. Study of primary, secondary and intermediate colours in the form of geometric compositions. Introduction to Colour Theory.

- Outdoor sketching of buildings, huts, group of trees, different kinds of trees and foliage and vegetation in colour.
- Colour rendering of blocks.
- Use of overlapping effects in water colour and poster colour in mural composition based on geometric elements.
- Exercises on human figures and vehicles in colour.
- Rendering of stone & brick wall in colour.
- Outdoor sketching with graphite pencil to create monochromatic effect in design.
- Assignments on representation of water bodies, hills, etc.

Workshop

1. There will be the sculpture workshops, either in terracotta or the in a separate medium.
2. Different techniques in architectural rendering. Rendering of assignments done in the subject of Architectural Design-I

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set four questions from the entire syllabus.

ii. The student is required to attempt two questions.

HISTORY OF BUILT ENVIRONMENT – II **CCA-2-207**

Period per week : 2
Duration of Examination : 3 hours

Maximum Marks

Sessional work : 50
Examination : 50

Objective

To understand the role of geo-physical, societal, political and technological factors in the evolution of architectural and urban form.

To develop a holistic approach to architecture as an integral component of the built environment.

Contents

UNIT-I

- Hindu Temple Architecture
- Role of Hinduism and decline of Buddhism - Geographical/political states and kinds of movements.
- Rise of Brahmanical thinking
- Evolution of Temple Form -Rock-cut and structural forms.
- Comparison of temple forms in various regions of India.

UNIT II

- Various styles of Hindu Temples – Dravidian, Indo-Aryan (Orissa, Khajuraho, Gujrat and West India). Functional components, architectural form, construction and ornamentation.
- Architecture of Jain Temples in Gujrat and Rajasthan.
- Temple towns of South India (Madurai, Srirangam) and Rajasthan (Osian, Mt.Abu).

UNIT III

- Greek Civilization: Historical, geographical, political and cultural context. Characteristics of Greek Architecture such as Materials, Construction Systems, System of Proportioning, Greek Orders, Optical Corrections, etc. Architecture of Greek temples- Parthenon, Athens, Acropolis, Agora etc.
- Roman Civilization. Historical, geographical, political and cultural context.
  Concept of Monumentality, Materials & Construction Systems, Roman Orders.

  Building analysis - Colosseum, Pantheon, Thermae, Basilicas, Aquaducts, The Roman Villa

NOTE**: Analysis of architectural style/building typology must include functional, constructional/Structural and ornamentation aspects.**

Suggested Reading –

1. History of Architecture- Sir Bannister Fletcher
2. A Global history of architecture – Ching, Jarzombek, Prakash
3. World Architecture – Henry Russell Hitchcock
4. A History of Western Architecture – David Watkin
5. Architecture of India: Buddhist and Hindu – Satish Grover
6. The History of Architecture in India – Christopher Tadgell
7. Indian Temple Architecture: Form and Transformation - Hardy A
8. Architecture of the World : Greece – Henri Stierlin, Roland Martin
9. Architecture of the World : Roman Empire – Henri Stierlin, Gilbert Picard
10. Classical Architecture – Robert Adam

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six questions in all and minimum of one question from each unit.

ii. The student is required to attempt any four questions by selecting at least one from each unit.

THEORY OF DESIGN-II **CCA-2-208**

Periods per week : 2

Duration of Examination: 3 hours

Maximum Marks

Sessional work	:	50
Examination	:	50

Objective

The concept is to delimit the scope of Theory of Design as it specifically applied to "Architectural Design" and to bring out such elements of "Architectural Design" as distinguish it from other forms of design.

Contents

- Theory of Architecture and principles of planning.
- Analysis and classification: space usage.
- Inter-relationship of different spaces within a building.
- Inter-dependence of function, structure and form in architectural design.
- Accommodation and circulation, Wayfinding
- Architectural Vocabulary - Porch, Verandah, Courtyard, Double-height, Triple-height, Corridors, Aisle, Pedestal, Plinth, Threshold, Modular, Walkability, Verticality, Balcony, Terrace, Arcade, Colonnade, Patio, Pergola, Portico, Setback,
- Analysis and classification of the elements of circulation, (horizontal and vertical) such as entrance halls, corridors and stairs, ramps, lifts, escalators in different types of planning.
- Study of exercises in the relationship of plan, section and elevations of the building.
- Architectural programme: analysis and classifications.
- Architectural scale, Human scale, Monumental scale, true and forced scale.

Suggested Reading –

1. Peter von Meiss -Elements of architecture - from form to place, Spon Press 1992.
2. Architecture: Form Space and Order; Francis D.K. Ching; Van Nostrand Reinhold Co., 1979.
3. Architectural Scale, H Licklidan, The Architectural Press
4. Architecture and Human Dimensions, P.F.Smith, George Baldwin Ltd.
5. Courtyards – Aesthetic Social and Thermal Delight, John S Reynolds
6. Opening Spaces (Design as Landscape Architecture) – Hans Loidl Stefan Bernard
7. Conditional Design: An Introduction to Elemental Architecture, by Anthony Di Mari

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six questions from entire syllabus.
ii. The student is required to attempt any four questions.

WORKSHOP & MODEL MAKING-II **CCA-2-209**

Periods per week : 3

Maximum Marks

Sessional work : 50

Examination : No Examination

Objective

To understand the constraints and complexities and versatility of joinery in carpentry.

Contents

- Introduction to carpentry tools.
- Sketches of these tools.
- Exercise in sawing, chiseling, planning to learn the use of hand tools joinery.
- Construction of half lap, tongue and groove joints.
- Construction of mortice and tenon joint and dovetail joints.
- Construction of rafter joints in tension and compression.
- Varnishing exercise. Varnishing of joints made in the class.
- Making one wooden item or small furniture e.g. a pencil box, a stool bench, miniature door/windows columns.

Suggested Teaching Methodology

- Audio-visual lectures on types of joinery should be presented.
- Exercise on furniture items shall be attempted in groups. Site visit top a furniture shop to understand carpentry, joinery and varnishing works shall be undertaken.

HEALTH EDUCATION-II **CCA-2-210**

Periods per week : 2

Maximum Marks

Sessional work	:	50
Examination	:	No Examination

Objective

To make the students learn the various aspect of health fitness.

Content

UNIT-I

- Concept of vital capacity, blood pressure, pulse rate, general and specific conditioning
- Food requirements, and balanced diet
- Physical Fitness and its components: speed, strength, endurance, agility, etc.

UNIT-II

Health and Fitness

- Development of physical fitness and its components.
- Sports performance in different games and sports.
- Yogic Activities.
- Adventure Activities.
- S.U.P.W. (Socially Useful Productive Work).

THIRD SEMESTER : SCHEME OF TEACHING

Duration of Semester : 18 weeks

Periods per week : 32

Duration of each period : 60 minutes

Note: The course work and assignments in each subject must be completed as prescribed.

Sr. No.	Subject	Periods per week	Total periods	Teaching Methodology and Sessional Work
1.	Architectural Design-III	8	144	Design assignments, time problems
2.	Building Construction-III	4	72	Notes, sketches, drawings, tests
3.	Building Services-III	2	36	
4.	Structure Systems & Design-III	2	36	Notes & tests
5.	Theory of Design-III	2	54	Drawings, tests
6.	Architectural Graphics-III	4	36	Sketches,drawings, tests
7.	History of Built Environment-III	2	36	Notes, sketches, tests
8.	Computer Applications in Architecture-III	3	54	Theory & Practical
9	Workshops & Model Making-III	3	54	
10.	Health Education-III	2	36	Health and fitness, extra curricular activities
11	Educational Tour	1 week duration (5 daysx 6 hours=30)		Tour notes, sketches, drawings, and report
	Total	32	588	

THIRD SEMESTER : SCHEME OF EXAMINATION

PREPARATORY HOLIDAYS One week

EXAMINATIONS Approximately two weeks

NOTE: 1. In addition to the University Studio Examination, the subjects of Architectural Design-III and Building Construction-III will be assessed through a viva-voce by an external examiner appointed by the Panjab University.

The subject of Computer Applications in Architecture-III will be judged through a portfolio containing all the work done by the student during the entire semester. The jury will comprise of studio incharge and one external examiner appointed by the Principal.

Sr. No.	Subject	Duration of exam. (in hours)	Max Marks for Exam	Marks for portfolio	Marks for Sessional work	Total Marks
1.	Architectural Design-III	12	200		200	400
2.	Building Construction-III	6	100	-	100	200
3.	Building Services-III	3	50	-	50	100
4.	Structure System & Design-III	3	50	-	50	100
5.	Theory of Design-III	3	50	-	50	100
6.	Architectural Graphics-III	6	100		100	200
7.	History of Built Environment-III	3	50	-	50	100
8.	Computer Applications in Architecture-III	-	-	50	50	100
9.	Workshops & Model Making-III	-	-	-	50	50
10.	Health Education-III	-	-	-	50	50
11.	Educational Tour	-	-	-	-	-
	Total		600	50	750	1400

ARCHITECTURAL DESIGN-III **CCA-3-301**

Periods per week : 8

Duration of Examination : 12 hours

Maximum Marks

Session work : 200
Portfolio : 200

Objective

To learn the site planning principles and concept of vertical circulation.

Content

1. To understand the concept of zoning, blocking, relation between blocks in space and connectivity.
2. To understand the positive and negative concept of open space while doing blocking.
3. To understand the access and approach to building.
4. To understand the sightlines and visual impact of the building from different vantage points in context.
5. To understand concept of transition of space i.e. closed to semi open to open space.
6. To understand and correlate site circulation, services and aesthetics.
7. To understand the concept of vertical and horizontal circulation

Projects

Unit-I

- Hostel, Neighbourhood shopping or shopping mall.

Unit-II

- Motel, Guest House, Embassies, and Club.

Teaching and Learning Methodology

1. Case study of building complexes focusing on site planning and vertical circulation.
2. Form Finding exercises -Study of various two dimensions and three dimensional exercise of taking basic shapes such as cube, cuboids of certain no and assembling them in order to understand the concept of blocking and open spaces.

Suggested Reading

1. Form Defining Strategies: Experimental Architectural Design - Agkathidis, A., Hudert, M, and Schillig, G.

2. Site planning, Kevin Lynch, MIT Press, Cambridge, 1967
3. 10 Principles of Design by Ruth Slavid
4. Structure in Nature – Strategy for Design, Pearce Peter;
5. Time Saver Standards for Building Types, C. D. Joseph and Callender John;
6. Time Saver Standards for Architectural Design Data, C. D. Joseph & Callender John;
7. Neufert's Architect's Data

INSTRUCTIONS TO THE PAPER SETTER

Examiner is required to set one compulsory question from any of the unit.

BUILDING CONSTRUCTION-III **CCA-3-302**

Periods per week : 4

Duration of Examination : 6 hours

Maximum Marks

Sessional work	:	100
Examination	:	100

Objective

To introduce working and construction details of 2-4 storied buildings of load-bearing masonry frame construction in RCC.

Content

UNIT-I

- Introduction to concept of frame – structures in RCC.
- Foundations in RCC – Various types of constructions
- R.C.C. Construction- Advantages over load bearing construction, study of column grid, detailing of R.C.C. work with reinforcement for slabs, beams, columns, footing, staircases.
- RCC frame structure with infill walls of brick and various cement concrete products, such as hollow blocks, light weight concrete blocks, etc.

UNIT-II

- Introduction to various types and vocabulary related to construction details with special emphasis on Dog logged, Open well Staircase, Spiral and Cantilever Staircase.

UNIT-III

- Section through R.C.C. framed double storied building through toilet and staircase showing the details of Foundation, Floor, Window, Lintel, Chajja, Roof, Terrace, Parapet and Coping.
- Laying of floors – Basic preparation for Ground floor and upper floor
- Cantilevered construction in RCC such as canopies, projections etc.

UNIT-IV

- Types of formwork (shuttering) for concrete, scaffolding, shoring, etc.
- R.C.C. Form work and Shuttering details for-
  1. Column (square and round)
  2. Slab and Beam
  3. Retaining Wall

  Note: Field/ Project visits to study the uses of R.C.C. materials in construction at various stages for better understanding, students must be taken to the under construction Site.

SUGGESTED TEXT AND REFERENCE BOOKS

TEXT BOOKS

1. McKay, WB Building Construction
2. Rangwala, S.C Engineering Materials
3. Punmia, B.C. Building Construction
4. Khanna P.N. Oractical Civil Engineer's Handbook

REFERENCE BOOKS

1. Ching, Francis D.K. Building Construction Illustrated
2. Construction Technology by Chudley
3. Construction of Buildings by R.Barry

INSTRUCTIONS TO THE PAPER SETTER

i. The examiner is required to set a total of four questions i.e one from each UNIT.

ii. The student is required to attempt any three questions.

BUILDING SERVICES –III **CCA-3-303**

Periods per week : 2

Duration of Examination : 3 hours

Maximum Marks

Sessional work	:	50
Examination	:	50

Objective

To impart the knowledge and skills required for understanding the Building Services and their application to buildings with focus on Water Supply, Drainage and Sanitation and their integration with architectural design.

UNIT -I

Water Supply

1. Introduction, sources of water supply, qualitative and quantitative aspects, impurities, purification – sedimentation, coagulants, filtration, disinfection, water softening and miscellaneous treatment of water, Sources of water pollution and preventive measures.
2. Public water distribution system, methods of layout of distribution pipes(Pipes-material, Size and their jointing details), Basic Principles, Systems of Water Supply
3. Domestic, hot and cold water supply systems.

UNIT -II

Sanitation

1. Introduction, importance and purpose of sanitation, definitions – bacteria, invert, sewer, sewerage, types of refuse, collection and disposal of refuse,
2. Systems of drainage – separate, combined and partially separate system, advantages and disadvantages of each system. Dry and Wet Carriage Systems.
3. Sanitary Fittings-- Wash basins, WC's, Bath Tubs, Sink, Urinals, Bidets, Flushing Cistern, Traps etc .and Various types of joints
4. Sanitary requirements for various types of buildings, types of pipes, Man holes – drop manholes, manhole with intercepting trap, inspection chambers, self cleansing velocity, drains on sloping sites, sub soil drainage, storm water disposal – catch basins, inlets, storm water regulators.
5. Importance of pumps and sewage pumping stations, septic tanks – soak pit, soak well, design aspects, disposal of effluent.
6. Definitions – Siphonage, anti-siphonage pipe, cowl, fresh air inlet, soil and waste pipes, vent Pipe Systems of plumbing – single stack, one pipe, one pipe partially ventilated, two pipe disposal of waste water from buildings

7. Natural methods of sewage disposal – by dilution and land treatment, self purification of natural waters, oxidation, sewage treatment, oxidation ponds, aqua privy, garage drainage and layout of simple drainage systems, sewers, materials, laying and testing of sewers, ventilation of sewers, surface drains, sewer, cleaning of sewers, re-cycling of sewage water.
8. Rural sanitation, biogas, different methods of collection and disposal of dry refuse and night soil
9. Solid waste management-issues and classification of solid waste, various sources of solid waste and methods of collection, disposal and treatment of the waste.

UNIT-III

Storm Water Disposal

1. Types of Roads-WBM (water bound macadam) Road-Tar, Bitumen, Asphalt and RCC roads.
2. Pavements- Types (Soil stabilized, Brick and Stone paving), Use, Advantages/Disadvantages
3. Drainage- Sub- drains Culverts, Ditches, Gutters, Drop inlets and Catch Basins.
4. Rain Water Disposal for individual buildings and Rain Water Harvesting

TEACHING METHODOLOGY

a) 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 buildings
b) Exercises shall be clubbed with Design Studio Project OR Typical plan of residence with garage – showing all the traps, inspection chambers, pipes connected to public sewer line – alternatively connecting the same layout of pipes to septic tank, testing of drains and drain pipes

Site visits – Water treatment plant, sewage treatment plant, multistoried apartments for studying water supply and sanitary arrangements.

GUIDELINES FOR PAPER SETTER

Reference Books:

- *"Sanitary Engineering – (Vol. I and II)" by RS Deshpande*

- *"Water supply and Sanitary Engineering" by S Birdi,DhanapatRai and sons*
- *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*

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six questions in all and minimum of one question from each unit.

ii. The student is required to attempt any four questions by selecting at least one from each unit.

STRUCTURE SYSTEMS & DESIGN – III **CCA-3-304**

Periods per week : 2

Duration of Examination : 3 hours

Maximum Marks

Sessional work : 50

Examination : 50

Objective:

To understand the principles of design of RCC structures.

Content

UNIT- I

- Concept of RCC and Introduction to IS: 456
- Working stress method of design for RCC structures
- Theory of Singly Reinforced Section – Neutral Axis, Under reinforced section, Over reinforced section and Moment of Resistance
- Shear, Bond and Development length.
- Analysis and Design of singly reinforced rectangular RCC beam.
- Theory and Design of Doubly reinforced rectangular RCC beam

UNIT – II

- Theory and Design of: -
    - One way RCC slab
    - Cantilever RCC slab
    - Two way RCC slabs

UNIT – III

- Theory and Design of Long and Short, Square, Rectangular and circular RCC columns.

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six question i.e. two from each unit.

ii. The student is required to attempt four questions in all by selecting at least one from each unit.

THEORY OF DESIGN-III **CCA-3-305**

Periods per week : 2

Duration of Examination: 3 hours

Maximum Marks

Sessional work : 50

Examination : 50

Objective

To understand different design processes and strategies that can be applied in architecture

Design Process- Design methodology, Philosophies and approaches to design process, Challenges of designer

Selection of Strategies and Design Methods.- Criteria for choosing design method, input output chart for selecting design methods, Design strategies, Linear strategies, Cyclic Strategies, Branching strategies, adaptive strategies.

Collaborative strategy for adaptive architecture- Enabling everyone concerned with the designing of a building influencing decisions that affect both the adaptability of the building and the compatibility of its components.

Man-made design at all levels including objects of daily use

Suggested Reading

1. Design Methods by John Chris
2. Experiencing Architecture by Steen Eliel Rasmussen
3. Architecture Design and Ethics: Tools for Survival, T Fisher, Architectural Press
4. An Invitation to Design, Helen Marie Evans and Carla David Dunneshil, Macmillan Publishing Co. Inc., New York, 1982.
5. Design Process: A Primer for Architectural and Interior Design, Sam F. Miller, Van Nostrand Reinhold, 1995

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six questions from entire syllabus.
ii. The student is required to attempt any four questions.

ARCHITECTURAL GRAPHICS –III **CCA-3-306**

Periods per week : 4

Duration of Examination : 6 hours

Maximum Marks

Sessional work	:	100
Examination	:	100

Objective

To learn and apply various rendering techniques in Architectural Design & visual composition.

Content

Use of coloured pencils, pen & ink, in Architectural design assignments.

- Rendering of drawings (plan, elevations, perspectives) in two different medium from a design assignment of previous semester.
- Simple mural designing.
- Representation of texture (in colour) of ply, stone, marble, glass, etc. in colour.
- Black & White rendering of a given sketch in enlarged form. Sketch can be from interior or exterior.

Workshops

1. A workshop on rendering techniques will be organised.

2. A mural or sculpture workshop will be organised in ceramics, plaster of paris, wrought-iron or terracotta.

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set four questions from the entire syllabus.
ii. The student is required to attempt two questions.

HISTORY OF BUILT ENVIRONMENT-III **CCA-3-307**

Periods per week : 2

Duration of Examination : 3 hours

Maximum Marks

Sessional Work	:	50
Examination	:	50

Objective

To understand the role of geo-physical, societal, political and technological factors in the evolution of and urban form. To develop architectural a holistic approach to architecture as an integral component of the built environment.

Content

UNIT I

- Advent of Islam and its influence in India leading to the Indo-Islamic Style. Beliefs, tenets of Islam and its expression in architecture in India.
- Evolution of the Mosque & the Tomb design, beginning from the earliest examples of such type in the Indian sub continent.
- Delhi Sultanate: Mosques, Tombs and secular buildings:
- The Qutb Complex: Quwwat-Ul-Islam Mosque, Qutb-Minar, Tomb of Altutmish, extensions and additions by AllaudinKhilji.
- Arhai Din Ka Jhompra, Khirkee Masjid, JamaatKhana Masjid, Sultan Ghari, Tombs of GhiyasuddinTughlaq, Firoz Shah Tughlaq, Balban, Sikander Lodi.
- Firoz Shah Kotla
- Tomb of Sher Shah Suri, Sasaram

UNIT II

- Provincial Styles: Evolution and brief history, and study of the following:
- Mandu: All key buildings
- Jaunpur: Atala Masjid, Jami Masjid
- Gujarat: Jami Masjid &Adalaj, Ahmedabad, Baolis of Ahmedabad, and Jami Masjid at Champanir.
- Bijapur: Jami Masjid, Ibrahim Rauza, GolGumbaz, MehtasMahal.
- Hyderabad – Char Minar.

UNIT III

- The Mughals: A brief history and study of the following architectural examples:
- Humayun's Tomb
- FatehPurSikri
- Akbar's Mausoleum
- Red Fort, Jami Masjid, Delhi
- TajMahal
- Landscaping in Mughal Architecture : Babur to Aurangzeb
- A brief study of elements of Indo-Islamic Architecture like Arches, Domes, Squinches, Minarets, Jaalis, Chajjas and other symbolic expressions, and ornamentation patterns.
- Constructional system adopted by the Slave kings, Bijapur rulers and the Mughals.

Suggested Teaching Methodology

- Audio-Video lectures
- Site visits
- Guest/expert lectures
- Drawing, sketching and reporting assignments

Suggested Reading –

1. History of Architecture- Sir Bannister Fletcher
2. Islamic Architecture of the Indian Subcontinent – Bianca Maria Alfieri
3. Mughal Architecture & Gardens – George Michell
4. Indian Architecture (Islamic Period 1192-1857) – Dr.SurendraSahai
5. The History of Architecture in India – Christopher Tadgell
6. Islamic Architecture in India – Satish Grover

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six questions in all and minimum of one question from each unit.

ii. The student is required to attempt any four questions by selecting at least one from each unit.

COMPUTER APPLICATIONS IN ARCHITECTURE -III CCA-3-308

Periods per week : 3

Maximum Marks

Sessional work	:	50
Portfolio	:	50

Objective:

1. To train students to make their presentations and reports on computer.
2. To get familiar with Photoshop which is a standard graphical representation tool used in all designer fields.
3. An Introduction to Computer Aided Designing (CAD). This will enable students to make 2D Architectural Drawings on computer.
4. To make students familiar with the simplest form of 3D modelling to help them visualize and communicate their architectural designs.

Content:

UNIT I: Presentation, Report Making and Creating & Editing Raster & Vector Images.

- Presentation and Report making using **MS Power Point[1] and MS Word[2]**.
- Definition of Raster and Vector image formats and their different types.
- Introduction to **Adobe Photoshop[3]** (for Image editing in raster formats.)
    - Photoshop Interface and tools layout
    - Main tools in Photoshop (selection, brushes, gradient, crop, etc.)
    - Introduction to concept of Layers in Photoshop
    - Image enhancement tools of Photoshop (brightness, levels, hue, exposure etc.)
    - Image Blending Options (shadow, highlight, emboss, glow etc.)
    - Layer Blending (addition, subtraction, difference, multiply, screen, overlay etc.)
    - Introduction to reversible workflow in Photoshop by Staking effects in layer panel.
    - Introduction to Masking in Photoshop and applying stacked effects using masks.
        - Exercise: Enhance a set of architectural or art images taken from a camera and from internet using Photoshop image editing tools and showing before after.
        - Exercise: Create an abstract graphical composition with a supporting concept.
- Basic Introduction to **Adobe Illustrator[4]** (for Image editing in vector formats.)
- Basic Introduction to **Adobe Indesign[5]** (An advanced tool for report making.)

UNIT II: Computer Aided Design (CAD) tools for Architecture.

- Introduction to the concept of a Computer based Architectural Designing and Drafting Tool.
- Drafting on **AutoCAD**[6]
    - AutoCAD Interface, Work space customizations.
    - Viewport transformations (zoom, pan, orbit, zoom extent etc.) to view drawings.
    - Understanding - Viewports, Coordinate System (project zero), Grids, Units setup, Dimensioning Setup and Drawing Limits.
    - Basic transformation and editing commands - move, rotate, scale, mirror, copy etc.
    - Snapping Tools – Positional, Angular, Ortho etc.
    - Creating a 1:1 scale Drawing in AutoCAD: Drafting Commands, Layers, Blocks, Hatch & Helpers (construction lines, points, markers and measuring tools) and reference images in background.
    - Dimensioning and Labelling
    - User Coordinate System (UCS)
    - Introduction to Paper space and Layout space in CAD
    - Creating sheet, formats, composing drawings on required scale and plotting.
    - Exercise: Draft current semester or previous semester design in AutoCAD.
- Introduction to different type of Architectural Drawings, Showing students with a complete set of drawings of an architectural project completed in all respect.
    - Presentation Drawings
    - Submission Drawings
    - Working Drawings

UNIT III: Basic 3D modelling tools for Design visualization

- Introduction to the concept and advantages of using 3D modelling tools in Designing.
- Free form 3D modelling in **Sketchup**[7]**.**
    - Introduction to Sketch-up Interface and toolbar layout
    - Opening a Sketch-up project downloaded from warehouse and viewing it from different angles using ‘viewport transformation tools’.
    - Creating a new file and setting up the units.
    - Understanding coordinate system in a 3D software (getting familiar working with 3 axis unlike 2 axis in 2D).
    - Creating lines, surface, rectangle, arcs and polygons using drawing tool.
    - Draw shapes on edge and utilise sketch-up “sticky” geometry
    - Creating and manipulate 3D solid objects (rectangle, cylinder, cone) using drawing tools and inferences
    - Design complex combined shapes using push/pull and move tools

- Using different modelling techniques to quickly create complex 3D forms
- Create concentric surface with the offset tools
- Arrange an array of duplicated objects
- Using colour and style to render detailed surfaces
- Exercise: Create 3D models of complex objects similar to AD exercises and make their isometric and perspective views.

- 3D modelling a Building in **Sketchup.**
  - Importing a simple AutoCAD DWG drawings into Sketchup
  - Placing the AutoCAD plan in relevant position for tracing, snapping
  - Creating solid walls, plinth of building, doors and windows openings
  - Creating basic materials
  - Create outdoor and indoor environment and import models from warehouse to populate scene.
  - Exercise: Create a 3D modelling a Building in Sketchup.
  - Exercise: Create a 3D modelling an interior scene in Sketchup.

INSTRUCTIONS TO THE PAPER SETTER

Examiner is required to evaluate three projects worked out during the entire semester from the above mentioned units.

WORKSHOP & MODEL MAKING-III **CCA-3-309**

Periods per week : 3

Maximum Marks

Sessional work	:	50
Examination	:	No Examination

Objective

To train the students to prepare building models in various mediums viz. mount board, thermocole and various other materials

Contents

Model making in paper, cardboard and mount board.

- To prepare block model of the design problem introduced in the semester along with site plan details such as parking, green area, landscape techniques etc.
- To prepare a detailed model in mixed materials of a major design problem in same semester

Suggested Teaching Methodology

- Model making shall be attempted in groups consisting of 2 to 3 students

HEALTH EDUCATION-III **CCA-3-310**

Periods per week : 2

Maximum Marks

Sessional work : 50

Examination : No Examination.

Objective

To make the students learn various aspect of health fitness.

Content

UNIT-I

- Nutrition, exercise and body composition.
- Methods of developing fitness.
- Awareness to various forms of pollution and water.

UNIT-II

- Health and Fitness
- Development of physical fitness and its components.
- Sports performance in different games and sports.
- Yogic Activities.
- Adventure Activities.
- S.U.P.W. (Socially Useful Productive Work).

FOURTH SEMESTER : SCHEME OF TEACHING

Duration of Semester : 18 weeks

Periods per week : 35

Duration of each period : 60 minutes

Note: The course work and assignments in each subject must be completed as prescribed.

Sr. No.	Subject	Periods per week	Total Periods	Teaching Methodology and Sessional work
1.	Architectural Design-IV	8	144	Design assignments, time problems
2.	Building Construction-IV	4	72	Notes, sketches, drawings, tests
3.	Building Services-IV	2	36	Notes, sketches, tests
4.	Structure Systems and Design-IV	2	36	Notes & tests
5.	Architectural Graphics-IV	4	72	Sketches, drawings, tests
6.	Building Climatology-IV	2	36	Drawings, tests
7.	Surveying & Mapping-IV	2	36	Notes, sketches, tests
8.	History of Built Environment-IV	2	36	Notes, sketches, tests
9.	Computer Applications in Architecture-IV	3	54	Theory & Practical
10	Design and Environmental Psychology-IV	2	36	
11	Health Education-IV	2	36	Health and fitness, extra-curricular activities
	Total	33	594	

FOURTH SEMESTER : SCHEME OF EXAMINATION

PREPARATORY HOLIDAYS : One week

EXAMINATIONS : Approximately two weeks

NOTE: 1. In addition to the Sessional marks, the subjects of Computer Applications in Architecture-IV will be judged through a viva voce and a portfolio containing all the work done by the student during the entire semester. The jury will comprise of the studio incharge and one external examiners appointed by the Principal.

2. In addition to the University Studio Examination, the subjects of Architectural Design-IV, and Building Construction-IV will be assessed through a viva-voce by an external examiner appointed by the Panjab University.

Sr. No.	Subject	Duration of exam. (in hours)	Max Marks for Exam	Marks for portfolio	Marks for Sessional work	Total Marks
1.	Architectural Design-IV	12	200	-	200	400
2.	Building Construction-IV	6	100	-	100	200
3.	Building Services-IV	3	50		50	100
4.	Structure Systems & Design-IV	3	50		50	100
5.	Architectural Graphics-IV	6	100		100	200
6.	Building Climatology-IV	3	50		50	100
7.	Surveying & Mapping-IV	3	50		50	100
8.	History of Built Environment-IV	3	50		50	100
9.	Computer Applications in Architecture-IV	-	-	50	50	100
10.	Design and Environmental Psychology-IV	3	50	-	50	100
12	Health Education-IV	-	-	-	50	50
	Total		700	50	800	1550

ARCHITECTURAL DESIGN –IV **CCA-4-401**

Periods per week : 8

Duration of Examination : 12 hours

Maximum Marks

Session work : 200
Portfolio : 200

Objective

To learn the site planning, building services and structure in complex building / group of buildings

Content

1. To understand site planning in a holistic manner covering all services, circulation, accessibility, microclimate, visual connectivity, parking, landscape etc.
2. To understand the climatic responsive design and environmental responsive design.
3. To understand the building services such as, water supply, sewage disposal, electrical etc at the building as well the site level.
4. To understand framed structure and sizes of columns, beams and slab thickness for different spans by thumb rule. Also, understanding the importance of structural grid in planning.
5. To understand the coordination between the various building services and also structural system.

Projects

Unit-I

- Office complex

Unit-II

- Residential school /college, Hotel, medical school, dental school, nursing school.

Teaching and Learning Methodology

1. Case study of office complex for site planning, structural system and services.
2. Students should be advised to work on structural grid. The building services should be marked at the concept stage so that later on it will be easy to workout.
3. One design project to reflect the learning from Building Climatology IV.
4. The climate fundamental should be learned through the making model and placed in particular machine in workshop.

Suggested Reading

1. Campus Planning, Richard P. Dober
2. Campus Planning in India, Kanvinde
3. Christopher Alexander; A Pattern Language
4. Time Saver Standards for Building Types, C. D. Joseph and Callender John;
5. Time Saver Standards for Architectural Design Data, C. D. Joseph & Callender John;
6. Neufert's Architect's Data

INSTRUCTIONS TO THE PAPER SETTER

Examiner is required to set one compulsory question from any of the unit.

BUILDING CONTRUCTION-IV *CCA-4-402*

Periods per week : 4

Duration of Examination : 6 hours

Maximum Marks

Sessional work : 100

Examination : 100

Objective

To make students understand various construction details in metals i.e. Steel, Aluminum.

Content

UNIT I

- Introduction to framed construction in steel, characteristics of steel sections, methods of jointing. Applications in various types of structures and different parts of buildings components.
- Details of Steel floorings in industrial buildings.
- Mezzanine floors.
- Steel stairs – Dog legged, Straight flight and spiral.

UNIT II

- Trusses in steel. - Constructional details of Simple Truss, North Light Truss, tubular truss, lattice girder, etc.
- Fixing details of various roof coverings at valleys & gutters etc.

UNIT-III

- Construction of various types of doors & windows in Steel & Aluminum.
- Lightweight partitions in Steel and Aluminum. Thermal and Acoustic insulation of spaces and metal cladding for facades.

UNIT-IV

- False ceilings, incorporating services such as air conditioning, lighting, etc.
- Metal and gypsum false ceiling.
- Cladding of interior and exterior walls in various metals.
- Non Load bearing partition in metals.
  Paneling in metal.

TEACHING METHODOLOGY

- Field visits to study the uses of metals in construction industry and process of laying of Steel Trusses.
- Study of Joinery of metals in workshop.
- Preparing Construction plates on above topics.
- Market study of the products available under different trade names with details of their manufacture, specification and performance.

SUGGESTED TEXT AND REFERENCE BOOKS

1. Watson, Don A; "Construction Materials and Processes", McGraw Hill Co., University of Michigan, 1972.
2. McKay, W.B. "Building Construction", Vol. 1,2,3,4, Longmans, U.K., 1981.
3. Alanwerth, "Materials", The Mitchell Pub. Co., Ltd. London, 1986.
4. Chudley, R. "Building Construction Handbook", British Library Cataloguing in Publication Data, London, 1990.
5. Barry, R. "Building Construction", East West Press, New Delhi, 1999.

INSTRUCTIONS TO THE PAPER SETTER

i. The examiner is required to set a total of four questions i.e one from each UNIT.

ii. The student is required to attempt any three questions.

BUILDING SERVICES-IV *CCA-4-403*

Periods per week : 2

Duration of Examination : 3 hours

Maximum Marks

Sessional work : 50
Examination : 50

Objective

To make the students aware of various services such as water supply ,drainage and electrical required for buildings

Content

UNIT-I

- Water supply : sources and treatment of water, storage and supply systems for buildings various fittings and material used for water supply sanitation
- Drainage System: Lay out for a small neighborhood
- Storm water disposal, advantages and disadvantages of various materials for pipes and layout of pipes.
- Waste Water disposal: Various types of systems used in buildings.
- **Materials used for pipes, layout and jointing of pipes, sewage treatment systems.**
- Solid- waste disposal: chutes, ducts, incinerators etc.

UNIT-II

- Services of single storeyed residential building and multi story structures: Water supply systems: fitting, hot and cold water supply layouts, geysers, boilers. Water storage and supply systems for domestic use.
- Drainage and Sewerage System: Storm water drainage, waste water disposal-carriage systems, sanitary fittings, types of pipes and drains in different materials and usage. Inspection and intercepting chambers and their details. Cess pools and septic tanks.
- Exercise for incorporating layout of services in a project completed in the Architectural Design Studio.

UNIT-III

- Electrical Services: types of wires, fittings and conducts
- Various types of wiring systems, advantages and disadvantages, safety and precautions.
- Electrical; equipment used in building; motors, fuses, switchboards etc.
- Introduction to illumination.
- Various types of lamps for artificial lighting – direct and indirect methods of lighting.
- Use of electrical fittings such as MCB's, ELCB's, fuse units,control panels, etc.
- Preparing an electrical layout for a residential Building incorporating above.

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six questions in all and minimum of one question from each unit.

ii. The student is required to attempt any four questions by selecting at least one from each unit.

STRUCTURE SYSTEMS AND DESIGN – IV *CCA-4-404*

Periods per week : 2

Duration of Examination : 3 hours

Maximum Marks

Sessional work	:	50
Examination	:	50

Objective:

To understand the principles of design of RCC structures.

Content

UNIT- I

- Theory and Design of simply supported circular slabs subjected to uniformly distributed load.
- Theory and Design of Dog legged stairs.

UNIT – II

- Fixed Beams: Bending Moment diagrams for a fixed beam subjected to uniformly distributed load and Point Load (Formulate to be stated No derivations).
- Theory and Design of:
    1. Singly and doubly reinforced T beams. Inverted T. Beams and isolated T beams
    2. Singly reinforced L Beams

UNIT – III

- Theory and Design of isolated uniform thickness column footings for Square. Rectangular and circular RCC columns subjected to axial loads.

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six questions i.e. two from each unit.

ii. The student is required to attempt four questions by selecting at least one from each unit.

ARCHITECTURAL GRAPHICS-IV CCA-4-405

Periods per week : 4

Duration of Examination : 6 hours

Maximum Marks

Sessional	:	100
Examination	:	100

Objective

To appreciate the role of presentation techniques in Architecture & Graphics.

Content

Introduction to photo based water colour, markers, mixed media for rendering,

charcoal techniques, 3-D composition from waste material, monochromatic colour schemes.

- Rendering of design assignment from previous or current semester.
- Rendering on the given sketch with specified medium (mix media or pastel shades).
- Sketching of buildings with human figures, vehicles etc. in colour & black and white.
- Sketching of old buildings (Fort, Havelis, etc).
- Creation of individual environment around a given building with landscaping and other elements.
- Mural composition for interior or exterior walls with suggestion of materials.

Workshops

1. A sculpture or mural workshop using waste material will be organised.

2. Workshop on rendering techniques.

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set four questions from the entire syllabus.
ii. The student is required to attempt two questions.

BUILDING CLIMATOLOGY-IV **CCA-4-406**

Periods per week : 2

Duration of Examination: 3 hours

Maximum Marks

Sessional work	:	50
Examination	:	50

Objective

- To acquaint students with the concept of climate as a significant determinant of built form.
- Familiarization with climate-controlling devices.

Content

UNIT-I

- 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.
- Study of indigenous shelters in response to the climatic zones in India

UNIT II

- 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, sol-air temperature
- 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

UNIT-III

- Calculation for the design of horizontal and vertical shading devices.
- Air movement inside buildings
- Microclimate.
- Role of landscape and other passive devices for climate control.

Suggested Reading

1. Manual of Tropical housing by OH Koenigsberger
2. Introduction to building climatology by Antony Sealey
3. Design primer for hot climates by Allan Konya
4. Tropical climatology by S. Nieuwolt
5. CBRI Daylight Distribution Charts

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six questions i.e. two from each unit.

ii. The student is required to attempt four questions by selecting at least one from each unit.

SURVEYING & MAPPING-IV **CCA-4-407**

Periods per week : 2

Duration of Examination : 3 hours

Maximum Marks

Sessional work: : 50
Examination : 50

Objective

To bring about an awareness of role of surveying in architectural and planning projects and to make the students conversant with the commonly used techniques of surveying.

Content

UNIT I

- Objectives, divisions and principles of surveying; scales and measurements; types of instruments and their uses.
- Chain Surveying: Principles and instruments. Methods of chaining, errors in measurements and corrections, recording field notes, obstacles in chain surveying
- Prismatic Compass: Its use in the measurement of angles from bearings.

UNIT-II

- Levelling: Terms used, Dumpy level and 1.0.P level, temporary adjustment of a level, levelling staves, reduction of levels, difficulty in levelling, errors and permissible limits of error, classification of levelling.
- Contouring: Technical terms used in contouring, characteristics of contours, methods of contouring, interpretation of contour, tracing the contour gradient for alignment of a roads and paths, uses of contour.

UNIT-III

- Plane Table Surveying: Plane Table and its accessories, setting and orienting the plane table, methods of plane tabling, advantages and disadvantages of Plane table surveying.
- Theodolite Surveying: Transit vermier, Theodolite, basic definitions, temporary adjustment, fundamental lines of theodolite, measurement of horizontal angle and vertical angle, reading a magnetic bearing of a line, prolonging a straight line, techniques of surveying for a large campus. Methods of Computation of area, methods of setting out of a building.
- Introduction to told station and softwares used in GIS

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six questions i.e. two from each unit.

ii. The student is required to attempt four questions by selecting at least one from each unit.

HISTORY OF BUILT ENVIRONMENT-IV **CCA-4-408**

Periods per week : 2

Duration of Examination : 3 hours

Maximum Marks

Sessional Work : 50
Examination : 50

Objective

To understand the role of geo-physical, societal, political and technological factors in the evolution of architectural and urban form.

To develop a holistic approach to architecture as an integral component of built environment.

Contents

UNIT-I

- Development of Church plan during the Early Christian period. Functional components, construction and architectural character. Examples of basilican and centralized churches
- Byzantine Churches- Greek Cross and Latin Cross plan. Basis of architectural form, structural systems, techniques of construction and ornamentation. Detailed analysis of Santa Sophia. Byzantine Churches in Greece and Russia.

UNIT II

- Evolution of Romanesque architecture. Changes in church plan, elevational features and structural systems. Development of Romanesque vaulting.
- Characteristics of Romanesque churches in Italy, France and Germany. Comparative analysis of representative examples.
- Civic Architecture of Romanesque England.
- Characteristics of the Gothic Cathedral. Changes in functional, visual and structural elements as compared to Romanesque period.

UNIT-III

- Basis of the Renaissance Movement. Its effect on the built environment.
- Pattern and form of the Renaissance town. Disposition and character of various urban elements.
- Renaissance Architecture – Phases of development, stylistic characteristics, building typology – definition and examples.
- Architects of Early Renaissance, High Renaissance and Mannerism. Principal works of Brunelleschi, Alberti, Bramante, Michelangelo and Palladio.

UNIT-IV

- Development of Baroque architecture and civic design.
- Elements of the Baroque town. Interrelation between buildings and urban space. Examples of Campidoglio and St Peters' Piazza, Rome, etc.
- Characteristics of Baroque architecture. Works of Bernini and Borromini.
- Rococo Architecture, Basilica at Ottobeuren, Germany.

NOTE: Analysis of architectural style/building typology must include functional, constructional/structural and ornamentation aspects

Suggested Reading –

1. History of Architecture- Sir Bannister Fletcher
2. A Global history of architecture – Ching, Jarzombek, Prakash
3. A History of Western Architecture – David Watkin
4. World Architecture – Henry Russell Hitchcock
5. Classical Architecture – Robert Adam
6. Renaissance Architecture by Bates Lowry
7. The Architecture of the Renaissance Volume I & II by Leonardo Benevolo
8. Renaissance Architecture by J. Quentin Hughes

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six questions in all and minimum of one question from each unit.

ii. The student is required to attempt any four questions by selecting at least one from each unit.

COMPUTER APPLICATIONS IN ARCHITECTURE-IV CCA-4-409

Periods per week :3

Maximum Marks

Sessional work	:	50
Portfolio	:	50

Objective:
The main aim of this course is to enable students to create good quality 2D and 3D graphics for representation of their designs in academics, and to create material for their training reports and various competitions they undertake during this semester.

Content:

UNIT I: Image (printed) and Display (monitor) Resolution

- For creating printable graphics on a computer screen with complete clarity, following topics must be covered first.
    - Features and difference between - CRT, LCD, LED, OLED, IPS, AH-IPS panels. Advantages of using an IPS, AH-IPS monitors for all graphical works.
    - Colours in a computer pixel (RGB) and colours in a print (CMYK)
    - Getting aware of various print technologies and their capabilities – Dot matrix, Inkjets, Laser, Press, from a negative, advanced technology printers.
    - Concept of Image resolution (actual pixels/dots in an image)
    - Concept of Pixels per Inch (PPI) (resolution of a screens)
    - Concept of Dots per Inch (DPI) (resolution of a print).
    - Exercise: Prepare a report on different type of display panels and International standard of print sizes.
    - Exercise: Find out PPI resolution of following displays:
        - An old 14”(diagonal dimension) 1024x800 pixels CRT monitor
        - An LCD display of 17” diagonally at 1280x720 resolution
        - A LED panel of 27” diagonally at 1920x1080p
        - A 4K Panel of 32” diagonally at 3840x2160p
        - A 5” FHD panel of mobile
    - Exercise: find out DPI resolution of following images:
        - An 800 x 600 pixels image printed on 8”x6” card
        - An 827 x 1169 pixel image printed on A4 (8.27×11.69 inch or 210 × 297 mm)
        - An 6622 x 4678 pixels image on A1 (23.39 × 33.11 inch or 594 × 841 mm)
        - An 3200 x 2400 pixels image on a sheet of 32”x24”
        - An 6400 x 4800 pixels image on a sheet of 32”x24”
    - Exercise: Create blank Images of A4, A3 & A1 resolution @ 100 & 300 DPI and place content in it in Photoshop

UNIT II: Presentation Drawings in 2D

- Rendering Plans, Elevations and Sections on **Adobe Photoshop**[1].
  - Export PDF from AutoCAD and Import in Photoshop in required print size, scale and resolution.
  - Importing Walls, Furniture, Exteriors and labelling from AutoCAD in separate layers
  - Using Photoshop selection tools and fill tool to create solid fills.
  - Using Blending options, Feather, Stroke and Pattern overlay to enhance the fills and drop shadows.
  - Organizing a project in groups and layers for large projects with proper nomenclature and grouping.
  - Practice saving in different print size and resolution as taught in UNIT I.
  - Exercise: Render current semester or previous semester designs in Photoshop.

UNIT III: Fundamentals of 3D Modelling in AutoCAD[2]

- Introduction and importance of three-dimensional (3D) Drafting for Architectural Designs.
- Introduction to 3D coordinate system and 3D viewports in AutoCAD.
- **AutoCAD** as a 3D drafting Tool
  - Introduction to Poly lines, 3D extrusion commands and Boolean operations in AutoCAD
  - Exercise: Creating 3D model of A dog-Legged and A spiral staircase
  - Exercise: Create a 3D model of a Small Room (Door/ Window/ Railing, Furniture, walls, slab, roof, parapet, chajja etc.)
  - Exercise: Create an Isometric 3D model of a self-designed building for UNIT V
  - Exercise: Create a 3D model of a complete building (own design) using AutoCAD

UNIT IV: Fundamentals of 3D Modelling in 3DS MAX[3]

- User Interface of 3DS MAX and interface customization.
  - Viewport transformation commands (Pan, Orbit, Zoom)
  - Object transformation tools (Move, Rotate, Scale)
- Creating basic primitive solid objects and shapes from create panel.
  - Adjusting their attributes from modify panel to desired dimensions.
- 3D coordinate system and arranging solid objects in 3D coordinates.
  - Exercise: create a composition in 3D space using solid primitive objects and shapes and place these objects in precise coordinates.
- Introduction to 3D wire mesh model and its sub elements - points, lines, surfaces, solids
  - Comparison of a 3D wire mesh model and its Sub-elements of to the elements of a 3D solid Object as studied in AD
  - Edit mesh and Edit poly modifier.
- Introduction to the concept of Modifier stacking in 3DS MAX and its reversibility.

    - Applying different modifiers to a Solid (Bend, Twist, Skew, Noise, Symmetry)
    - Exercise: Create a sculpture using modifiers stack on standard primitive objects
- Introduction to Different type of Lights in 3DS max (point light, linear, directional, area light, skylight etc.) and their Attributes (Intensity, inverse square decay, shadow casting etc.)
- Introduction to types of cameras and their attributes (position, direction, target, focal length)
- Introduction to Basic Standard Materials using Compact Material Editor
- Introduction to Basic Render Setting in Scanline rendering (resolution, file format,
    - Exercise: Create a small setup of 3ds max objects, apply materials and cameras and

UNIT V: 3D Axonometric rendering of Plans (horizontal cut) and sections (vertical cut) **in MAX**

- Importin a 3D model from **AutoCAD** or **Sketchup** into 3ds max without roof.
- How to apply materials to main surfaces – walls, glass, joinery, floor etc.
- How to put basic furniture, imported from internet libraries (archive3d.com), and scaled properly
- Setting up basic lighting and render output.

INSTRUCTIONS TO THE PAPER SETTER

Examiner is required to evaluate three projects worked out during the entire semester from the above mentioned units.

DESIGN AND ENVIRONMENTAL PSYCHOLOGY-IV CCA-4-410

Periods per week : 2

Duration of Examination: 3 hours

Maximum Marks

Sessional work	:	50
Examination	:	50

Objective

To understand how psychological factors affect human perception and subsequent use of space, which shall assist in a better designed built environment

UNIT I

Introductory: Nature of relationship between psychology and spatial behaviour with special reference to built environment.

Space perception with respect to - Three Major Types of territorial space: Micro Space, Meso-Space and Macro-space.

Personal Space: (Micro-Space) Variation in personal space behaviour due to social Psychological Environmental and Cultural factors; Stages in life. Satisfaction with the home environment through Architectural Design, Design flexibility for residential rented spaces

Unit-II

Home Base (MesoSpace) Psychological Functions of Home; Determinates of Housing preference; Concept of Neighbouhood as unit of Physical Panning, Subjective definition of Neighbourhood and the related Hierarchy in terms of Interpersonal relationships; Critique of Planners Ideological construction of the meaning and purpose of neighbourhood.

Home Range (Macro Space) Hierarchy of Social Spaces: Home Base and range; Spatial pattern of activity System- Time Budgets. Origin and Destination Survey, Orbits of activity and social factors of Class and Sender.

Unit III

Phenomenal Environment: Physical Various types of environment and related patterns of behavior: Work Place, School, Prison, Recreational Spaces,

Suggested Reading –

- Handbook of Environmental Psychology, Robert. Bechtel and Chruchman, John Wiley and Sons
- House Form and Culture, Amos Rapoport, Milawaukee: University of Wisconsin,1969
- Environmental Psychology: Principles and Practice, by Robert Gifford

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six questions in all and minimum of one question from each unit.

ii. The student is required to attempt any four questions by selecting at least one from each unit.

HEALTH EDUCATION-IV **CCA-4-411**

Periods per week : 2

Maximum Marks

Sessional work : 50

Examination : No Examination

Objective

To make the students learn various aspect of health fitness.

Content

UNIT-I

- Impact of environment on health.
- Effects of drugs on health.
- Yoga, health and fitness.

UNIT-II

- Health and Fitness
- Development of physical fitness and its components.
- Sports performance in different games and sports.
- Yogic Activities.
- Adventure Activities.
- S.U.P.W. (Socially Useful Productive Work).

FIFTH SEMESTER : SCHEME OF EXAMINATION

PREPARATORY HOLIDAYS One week

EXAMINATIONS Approximately two weeks

NOTE: 1. In addition to the Sessional marks, the subjects of Computer Applications in Architecture-V will be judged through a viva voce and a portfolio containing all the work done by the student during the entire semester. The jury will comprise of the studio in charge and one external examiners appointed by the Principal.

2. In addition to the University Studio Examination, the subjects of Architectural Design-V, and Building Construction-V will be assessed through a viva-voce by an external examiner appointed by the Panjab University.

Sr. No.	Subject	Duration of exam. (in hours)	Max Marks for Exam	Marks for portfolio	Marks for Sessional work	Total Marks
1.	Architectural Design-V	18	200	-	200	400
2.	Building Construction-V	6	100	-	100	200
3.	Structure Systems & Design-V	3	50	-	50	100
4.	Elements of Landscape-V	3	50	-	50	100
5.	History of Built Environment-V	3	50	-	50	100
6.	Computer Applications in Architecture-V	-	-	50	50	100
7.	Theory of Design-V	3	50	-	50	100
8.	Design And Sociology -V	3	50	-	50	100
9.	*Educational Tour-V	-	-	-	-	-
	Total		550	50	600	1200

Educational Tour – Tour Assignments should be marked in the relevant subject/s for which tour conducted**.**

ARCHITECTURAL DESIGN-V **CCA-5-501**

Periods per week : 10

Duration of Examination : 18 hours

Maximum Marks

Session work : 200

Portfolio : 200

Objective:

To emphasize the significance of contextual factors in architecture through design of socially, climatically and environmentally responsive architecture.

Content :

1. Study of a vernacular settlement with emphasis on socio-economic characteristics, climate and other geomorphic factors, local materials, building techniques, building typology, urban form, spatial analysis, etc
2. To understand social stratification, class structure, family structure and human community development;

Projects

Unit-I

- The analysis and design of vernacular settlement

Unit-II

- Institutional building, public library, museum, buildings in Rural context such as Janj Ghar, Panchayat Ghar etc on the basis of climatic responsive design and environmental responsive design.

Teaching and Learning Methodology –

1. Study of any vernacular settlement in village near Chandigarh / Punjab /Himachal /Haryana.
2. Features of vernacular settlement and their contextual understanding.
3. Relevance of these features in contemporary context by designing new type of building such as resort, kalagram etc.

4. Special lectures on the social & economic aspects of vernacular settlements to be organized.

Suggested Reading –

1. The tradition of Indian Architecture Continuity, Controversy – Change since 1850, G.H.R. Tillotsum ; Oxford University Press, Delhi, 1989.
2. New Vernacular Architecture: Richardson,Vickey; Laurance King Publishing,2001
3. Vernacular Traditions: Contemporary Architecture, by Aishwarya Tipnis, Ashok Lall
4. Concepts of Space in Traditional Indian Architecture, Yatin Pandya
5. Time Saver Standards for Building Types, C. D. Joseph and Callender John;
6. Time Saver Standards for Architectural Design Data, C. D. Joseph & Callender John;
7. Neufert's Architect's Data

INSTRUCTIONS TO THE PAPER SETTER

Examiner is required to set one compulsory question from the unit-II.

BUILDING CONSTRUCTION – V **CCA-5-502**

Periods per week : 5

Duration of Examination : 6 hours

Maximum Marks

Sessional work : 100

Examination : 100

Objective

To make students understand the concept of detailing in building construction.

Content

UNIT I

- Interior detailing such as cladding, paneling & partitions.
- Fixing details of cladding with emphasis on traditional & latest building materials.
- Fixing details of paneling with emphasis on traditional & latest building materials.
- Construction details of partition walls with varied materials.

UNIT II

- Differentiation of Kitchens – Commercial & Residential.
- Concept of Modular Kitchen.
- Design layout of Kitchen as per design standards.
- Construction Details of kitchen components such as – Counter details, Cabinets details, Chimney details, Sink Details etc.

UNIT-III

- Differentiation of Toilet – Commercial & Residential.
- Fixture layout of Toilet as per design standards.
- Construction Details of Toilet components such as – Counter details, Cabinets details, Exhaust & Janitor Chamber details, Tile layout, level markings & slope etc.

UNIT-IV

Design and detailing of Shops, Banks and other commercial establishments w.r.t:

Wardrobes

Bank Counters

Niches

Wooden Furniture.

TEACHING METHODOLOGY

- Field visits to study the commercial and residential kitchen & toilets.
- Market survey to study the latest materials.

SUGGESTED TEXT AND REFERENCE BOOKS

1. Watson, Don A; "Construction Materials and Processes", McGraw Hill Co., University of Michigan, 1972.
2. McKay, W.B. "Building Construction", Vol. 1,2,3,4, Longmans, U.K., 1981.
3. Alanwerth, "Materials", The Mitchell Pub. Co., Ltd. London, 1986.
4. Chudley, R. "Building Construction Handbook", British Library Cataloguing in Publication Data, London, 1990.
5. Barry, R. "Building Construction", East West Press, New Delhi, 1999.

INSTRUCTIONS TO THE PAPER SETTER

i. The examiner is required to set a total of four questions i.e one from each UNIT.
ii. The student is required to attempt any three questions.

STRUCTURE SYSTEMS AND DESIGN–V CCA-5-503

Periods per week : 2

Duration of Examination : 3 hours

Maximum Marks

Sessional work : 50

Examination : 50

Objective

To understand the principles of Design of RCC Structures, Analysis of Portal frames, Principles of Bulk – active and Vector active structures.

Content

UNIT – I

- Design of singly and doubly reinforced rectangular beams by limit state method.

UNIT – II:

- Moment Distribution Method: Introduction, Basic Propositions, Stiffness of a member, the distribution theorem, the carry-over theorem, relative stiffness, Distribution factor (No derivations).
- Analysis of symmetrical single bay, single and two storey portal frames of uniform section with simple symmetrical distributed or point loads by moment distribution method.

UNIT – III : (Theory only)

- Introduction to Structure Systems. Study of structures in nature and human body.
- **Bulk Active Structures**: Beams – Bending action, bending stresses, internal couple, moment of resistance. Effect of Shape and Orientation of beam cross – section, type of loading (udl / point load), type of supports, permissible deflection. on the load carrying capacity of simply supported, Cantilever, Fixed and Continuous beams.
    - Rectangular and Skew Grids. Curved Beams, Vierendale girder, Honey combed beams.
    - Slabs One – way, Two – way and Cantilever: load dispersion, deflected profile and internal forces / stresses under the action of uniformly distributed load.
    - Columns: Effective length, short and slender columns, Buckling load, middle third rule
- **Portal Frames**: Stiffness of fixed and hinged members, The Distribution

Theorem (No proof). Structural action of portal frames under gravity loads & Horizontal forces, Shear walls.

- **Vector Active Structures**: Trusses: General principles, Types, Concepts of various methods of analysis. Secondary stresses. Various shapes of trusses for different spans. Space truss.
- **Folded Plates**: Structural action of folded plate roofs.

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six question i.e. two from each unit.
ii. The student is required to attempt four questions by selecting at least one from each unit.

ELEMENTS OF LANDSCAPE -V **CCA-5-504**

Periods per week : 2
Duration of Examination : 3 hours

Maximum Marks

Sessional work	:	50
Examination	:	50

Objective

To familiarise the students with the attributes, use and importance of basic elements of landscape.

Content

UNIT- I
- Introduction to landscape design and its role in the built environment.
- Introduction to elements of landscape i.e. Earth, rock, water, vegetation.
- Use of landscape elements in site planning.

UNIT- II
- Detailed study of earth and rock elements of landscape in nature and in landscape design.

UNIT- III
- Detailed study of water and vegetation as elements of landscape in nature and in landscape design.

UNIT- IV
- History of Garden

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six questions in all and minimum of one question from each unit.
ii. The student is required to attempt any four questions by selecting at least one from each unit.

HISTORY OF BUILT ENVIRONMENT-V **CCA-5-505**

Periods per week : 2

Duration of Examination : 3 hours

Maximum Marks

Sessional work : 50

Examination : 50

Objective

To understand the role of geo-physical, societal, political and technological factors in the evolution of architecture and urban form.

To develop a holistic approach to architecture as an integral component of the built environment

Contents

UNIT-I

- Industrial Revolution and its impact on the development of new towns. Tony Garnier's Industrial city.
- Influence of new construction materials, industrial techniques and functional needs on building typology and architectural form.
- Advances in steel construction. The Great Exhibitions. Development of the high-rise.
- Modern Town Planning – Patrick Geddes, Patrick Abercrombie, Ebenezer Howard's Garden City.
- Age of Revivals.

UNIT-II

- Discovery of RCC Steel and its impact on Architecture Development
- Emergence of Modern Architecture in Europe. Social, technological and aesthetic concerns of Modern Movement. New building typologies and architectural expression. Eclectism, Vienna-secession.
- Philosophy and Architectural Style of Louis Sullivan, Walter Gropius

UNIT-III

- Architecture Movements :Neo Classicism, Arts and Craft Movement, Art Nouveau.

NOTE: Analysis of architectural style/building topology must include functional, constructional/structural and ornamentation aspects.

Suggested Reading -

1. Modern Architecture: A critical History – Kenneth Frampton
2. The History of Architecture by Banister Fletcher
3. A Global history of architecture – Ching, Jarzombek, Prakash
4. World Architecture – Henry Russell Hitchcock
5. A History of Western Architecture – David Watkin
6. Space, Time and Architecture: The Growth of a New Tradition- Sigfried Giedion

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six questions in all and minimum of one question from each unit.
ii. The student is required to attempt any four questions by selecting at least one from each unit.

COMPUTER APPLICATIONS IN ARCHITECTURE-V CCA-5-506

Periods per week : 3

Maximum Marks

Sessional work : 50

Portfolio : 50

Objective:

At the end of this part of the course the student should be able to create a project from scratch in a BIM working environment. In which all drawings, surface materials, sectional details, 3D model, 2D drawings, building schedules and MEP of a projects are completely linked. So that by updating one element of that project by any team member will update all interlinked components and drawings automatically. This will enable students to be able to manage a complex project more efficiently.

Content:

UNIT I: INTRODUCTION TO BUILDING INFORMATION MODELLING (BIM)

- Significance of BIM software in project management
  - Conceptualizing, Designing, Drawings, Analysis, Construction and teamwork.
  - A Report on BIM and its applications.

UNIT Ii: STUDYING A BIM SOFTWARE

- BIM Software in use – Introduction to **ArchiCAD[1], Revit[2], AutoCAD Architecture[3].**
- Detailed study of a BIM Software - ArchiCAD or Revit.
  - User Interface Introduction and customisation.
- Setting up a BIM Project
  - Working units, dimensions, story settings, Importing reference drawings & images.
  - Elements of a Building in a BIM environment.
- BIM Drawing tools and helpers
  - Working with Guide Lines (construction lines), Snap Guides and Points,
  - Grid snap, reference plan snap and angular Snap
  - Working plane and cutting plane

- Tracing reference plans or other stories using – 'Trace as reference'
- Layers setup and layer combinations

- Creating a BIM project
  - Understanding Pallets - Tool-box, Info-box, Status-bar and Navigation
  - BIM components in Tool-box - Design tools and Documentation Tools
  - Using 'Setting dialogue' to alter a BIM components
  - Create (from scratch) or Trace (from reference) - Walls, structure and grids
  - Define Openings and joinery tables - doors, windows, shutters, entries
  - Create floor slabs and roof slabs, cut-outs, parapets and projections in structure
  - Creating staircase, ramps, elevators and other modes of vertical circulation
  - Define surface materials in 3D viewports
  - Define line weights (sectional and non-sectional)
  - Create proper hatch in plans and sections
  - Place Objects from Library – Railings, Frames, Interior or Exterior objects.
  - Create custom objects using 'Morph Tools'
  - Creating site details and landscape using walls mesh and morph tools.
  - Creating MEP in BIM – Mechanical, Electrical and Plumbing Details

UNIT III: COMPOSITION AND DOCUMENTATION OF A BIM PROJECT

- Documentation and Visualization of a BIM project
  - Composing and saving different type of drawings using layer Combinations
  - Creating building schedules, joinery tables and energy evaluation charts
  - Sheet layout setup - Composing drawings on a Sheet layout
  - Export PDF and DWG

UNIT IV: VISUALIZATION MODULE

- Internal Rendering Engine
- External Rendering
  - Exporting a project in a usable 3D format – OBJ, 3DS, DAE. Keeping the scale and materials intact
  - Importing the project into External rendering software

- Quick rendering techniques in any rendering software - **3DS MAX[4], LUMION[5], Artlantis[6].**
  - Materials refinement
  - Lighting setup
  - Camera setup
  - Setting up the rendering output

INSTRUCTIONS TO THE PAPER SETTER

Examiner is required to evaluate three projects worked out during the entire semester from the above mentioned units.

THEORY OF DESIGN-V **CCA-5-507**

Periods per week : 2

Duration of Examination : 3 hours

Maximum Marks

Sessional Work	:	50
Examination	:	50

Objective

This concept is to drive deeper into the architectural problems and look for directive principles guiding the philosophy of design used by Makers of Modern architecture and to assess their contribution by their own criteria.

Contents

(a) Foreign Architects

1. Louis I Kahn
2. Erro Saarinen
3. Philip Johnson
4. Paul Rudolph
5. Jorn Utzon
6. Kenzo Tango
7. James Sterling
8. Richard Rogers
9. Le Corbusier
10. Renzo Piano
11. Peter Eiessenmen
12. Frank Gehry

(b) Indian Architects

1. A P Kanvinde
2. C M Correa
3. B V Doshi
4. J A Stein
5. Uttam C Jain
6. Raj Rewal

7. Hafeez Contractor
8. Lauri Baker
9. A d Raje
10. H C Patel

Note: More stress should be laid on seminars so that each student gets a chance to engage in self-teaching.

INSTRUCTIONS TO THE PAPER SETTER

I. The Examiner is required to set six questions from the entire syllabus.
II. The student is required to attempt four questions.

DESIGN AND SOCIOLOGY –V **CCA-5-508**

Periods per week : 2

Duration of Examination : 3 hours

Maximum Marks

Sessional work : 50

Examination : 50

- Analyze how architectural sociology assists in perceiving the human use of space
- Examine the social issues and changes and draw directions for designs.
- Analyze determinants of social context and apply the in architectural design.
- Synthesize on the dependency of economic parameters on social and built forms and appraisefuture solutions.
- Develop and implement solutions for contemporary social issues
- Design built environment integrated with social institutions.

Unit I: SOCIOLOGY - BASIC CONCEPTS

Sociology and its uses in human settlement studies; Social structure, concept of culture and differentiation of space; Socio-cultural processes: Socialization, competition, accommodation, Socio economic parameters of community planning; Sociology and its relationship with Architecture**;**

Unit II SOCIETY AND ARCHITECTURE

Social Impact onhuman living environment; Social diversity andchoices on community settlements- impact of House-form and culture; Social identity and architectural relevance;

Unit III: **URBAN ISSUES**

Rural to Urban migration and its consequences - Population Density, Effects of High Density on Humans, Effects of Density on Social Behavior, Effects of Crowding, Effects of Urban Life, Ghettoization with special reference to slums, low cost and Public Housing,

Unit IV URBAN MAPPING

Cognitive Patterns Mental Maps and orientation Lunch's Theory of Cognitive Mapping; Social and cultural variations in the description cognitive Mapping techniques, Impact of activity on mapping by individuals capsule Images of the whole city.

Suggested Reading –

1. An Introduction to Sociology D. R. Sachdeva ; Vidya Bhushan,; Kitab Mahal.
2. Building and Society. Anthony D. King, Routledge Kegan & Paul, 1980.
3. Bill Hillier, Julienne Hanson; Space Syntax
4. Social Science - An introduction to the Study of Society, Elgin F. Hunt, David C. Colander
5. Environment and Behaviour - Planning and Everyday Urban Life, J. Douglas Porteous
6. Environmental Psychology: Principles and Practice, by Robert Gifford
7. Christopher Alexander; A Pattern Language

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six questions in all and minimum of one question from each unit.

ii. The student is required to attempt any four questions by selecting at least one from each unit.

SIXTH SEMESTER : SCHEME OF TEACHING

Duration of Semester : 18 weeks

Periods per week : 29

Duration of each period : 60 minutes

Note: The course work and assignments in each subject must be completed as prescribed.

Sr. No.	Subject	Periods per Week	Total periods	Teaching Methodology and Sessional work
1.	Architectural Design-VI	10	180	Design assignments, time problems
2.	Building Construction-VI	5	90	Notes, sketches, drawings, tests
3.	Structure Systems and Design-VI	3	54	Notes & tests
4.	Estimating & Costing and Specification -VI	2	36	Drawings, tests
5.	Town and Country Planning-VI	2	36	Notes, sketches, tests
6.	History of Built Environment-VI	2	36	Notes, sketches, tests
7.	Computer Applications in Architecture-VI	3	54	Theory & Practical
8	Building Bye-laws & Codes-VI	2	36	Notes, sketches, tests
	Total	29	522	

SIXTH SEMESTER : SCHEME OF EXAMINATION

PREPARATORY HOLIDAYS : One week

EXAMINATIONS : Approximately two weeks

NOTE: 1. In addition to the Sessional marks, the subject of Computer Applications in Architecture-VI will be judged through a viva voce and a portfolio containing all the work done by the student during the entire semester. The jury will comprise of the studio in charge and one external examiners appointed by the Principal.

2. In addition to the University Studio Examination, the subjects of Architectural Design-VI, and Building Construction-VI will be assessed through a viva-voce by an external examiner appointed by the Panjab University.

Sr.No.	Subject	Duration of exam. (in hours)	Max. Marks for Exam	Marks for portfolio	Marks for Sessional work	Total Marks
1.	Architectural Design-VI	18	200	-	200	400
2.	Building Construction-VI	6	100	-	100	200
3.	Structure Systems and Design-VI	3	50	-	50	100
4.	Estimating & Costing and Specification -VI	3	50	-	50	100
5.	Town and Country Planning-VI	3	50	-	50	100
6.	History of Built Environment-VI	3	50	-	50	100
7.	Computer Applications in Architecture-VI	3	-	50	50	100
8.	Building Bye-laws & Codes-VI	3	50	-	50	100
	Total		550	50	600	1200

ARCHITECTURAL DESIGN-VI **CCA-6-601**

Periods per week : 10

Duration of Examination: 18 hours

Maximum Marks

Session work : 200

Portfolio : 200

Objective

- To learn various aspects of design on hilly terrains.
- To learn design of simple service-and-structure oriented buildings.

Content

1. To understand the layout of buildings on hilly terrain by studying the topography of site and also understand the climatic consideration.
2. To understand the structure and services (air-conditioning, acoustics, lighting and fire fighting etc) in context with designing of building.
3. To understand the provision for differently abled persons as per building byelaws or other guidelines.

Projects

Unit I

- Housing complex on hilly terrain.

Unit II

- Theatres, multiplex, exhibition halls, museums, places of worship, recreational and cultural complex, Sports institute, Stadiums.

Teaching and Learning Methodology -

1. Site Visit of hilly terrain, any nearby area of Himachal.
2. Measured drawing of existing building of hilly terrain to understand the topography.

3. Study of services such as air-conditioning, acoustics, lighting and fire fighting etc in auditorium project.

Suggested Reading –

1. Time Saver Standards for Building Types, C. D. Joseph and Callender John;
2. Time Saver Standards for Architectural Design Data, C. D. Joseph & Callender John;
3. Neufert's Architect's Data

INSTRUCTIONS TO THE PAPER SETTER

Examiner is required to set one compulsory question from any of the unit.

BUILDING CONSTRUCTION-VI **CCA-6-602**
Periods per week : 5

Duration of Examination : 6 hours

Maximum Marks

Sessional work : 100

Examination : 100

Objective

To familiarize students with the system of making detailed working drawing required for construction on site.

Content

UNIT- I: Theoretical input

- Basics of Construction Management.
- Introduction to methodology of preparing working drawings. Systems of labeling, dimensioning, writing specifications, & co-ordination of Drawings.

UNIT- II: Basic Working Drawings

- Site Plan
- Excavation Plan and foundation details.
- Grid Plan
- Floor Plans
- Elevations and Sections.
- Terrace Plan
- Joinery Details – Door & Window Schedule

UNIT III: Services

- Fire Fighting Drawings
- Electrical Drawings
- Air Conditioning Drawings
- Plumbing Drawings.

UNIT IV: Construction Details

- Construction details of Basement and its treatment
- Extension, Expansion and Construction Joints, their details and treatments
- Commercial Kitchen- Study, designing and working drawing
- Case studies/ detailing of Public Toilets

NOTE:

1. **The students shall bring one of their previous semester's major projects for the preparation of working drawings.**
   Layout of services – water supply, sewerage, electrical, etc. will be taken up as part of the subject of Building Technology-VI.

NOTE:

Site visits to construction sites

SUGGESTED TEXT AND REFERENCE BOOKS

1. Watson, Don A; "Construction Materials and Processes", McGraw Hill Co., University of Michigan, 1972.
2. McKay, W.B. "Building Construction", Vol. 1,2,3,4, Longmans, U.K., 1981.
3. Alanwerth, "Materials", The Mitchell Pub. Co., Ltd. London, 1986.
4. Chudley, R. "Building Construction Handbook", British Library Cataloguing in Publication Data, London, 1990.
5. Barry, R. "Building Construction", East West Press, New Delhi, 1999.

INSTRUCTIONS TO THE PAPER SETTER

i. The examiner is required to set a total of four questions i.e one from each UNIT.

ii. The student is required to attempt any three questions.

STRUCTURE SYSTEMS & DESIGN – VI **CCA-6-603**

Periods per week : 3
Duration of Examination : 3 hours

Maximum Marks

Sessional work: 50

Examination : 50

Objective

To appreciate the complexities in the graphic representation of structural.
Information for construction purposes and to understand the structure principles in form active structures. Exam to be conducted only on Drawing sheets.

Contents: -

UNIT – I RCC STRUCTURES

- Preparation of structural drawings of beams, slabs, Lintels, chajjas, columns, isolated column footings, dog legged stairs for a load bearing structure.
- RCC Frame Structures: - Preparation of structural drawings of Portal frames, Coffer slab, sunken slab, Porch and Rectangular combined column footings.

UNIT – II STEEL STRUCTURES

- Structural Drawings for Built up column with lacing. Column Bases (slab, Grillage, Gusseted bases). Fink Roof Truss and North Light Truss along with fixing arrangements for purlins, roof covering and ridge pieces. Seated and Framed Column Beam connections

UNIT - III STRUCTURE SYSTEMS (Theory only)

- Cable Structures; - Funicular Polygon, Catenary, relation between tension and sag. Suspension bridges – Fan type, Harp Type, Self anchored bridges.
- Cable Roofs – Polygonal cable roof, cable roof with arch rib, Saddle shape, Pre-stressed cable roofs and cable suspended cantilever roof.
- Arch Structures: Basic concepts of rise, horizontal thrust, variation of arch thrust with rise. Roman, Gothic and Arabic arches. Flying buttress, Bridge structures.
- Arched Roofs – Barrel roof, Diagonal arch roof, Radial arch roof, Lamella cylindrical roof.
- Shells and Domes: Membrane action. Curvatures, Syn-clastic, anticlastic Surfaces, Rotatational, Translational & Ruled Surfaces. Membrane action in Circular Domes. Spherical Shells: Types of forces- Meridional, Hoop forces.
  distribution of forces. Support Conditions – Tension and Compression rings

  Buckling of thin shells. Structural action of Schwedler and Geodesic domes.

- **Pneumatic Structures: Background, Air – Supported Structures, Air – Inflated Structures, Hybrid Pneumatic Structures, Support Conditions and Materials.**
- **Introduction to softwares used in structural design such as (stand latest version etc.**

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six question i.e. two from each unit.
ii. The student is required to attempt four questions by selecting at least one from each unit.

ESTIMATING & COSTING AND SPECIFICATION–VI CCA-6-604
Periods per week : 2
Duration of Examination : 3 hours

Maximum Marks

Sessional work : 50

Examination : 50

Objective

To inculcate an awareness regarding factors effecting cost of buildings.

To familiarise the student with the commonly used methods of preparing estimates of Architectural Projects.

Content

UNIT-I

- Basic principles of Economics as applied to buildings and factors affecting cost of buildings.
- Types of Estimates in common usage.

UNIT-II

- Bill of Quantities of Materials. Its importance and methods of preparation. Practical examples.

UNIT-III

- Standard rates and their derivation from given rate.
- Case study/practical expertise in preparing detailed estimates of quantities of materials and analysis of rates of material and labour for a small residential building.

UNIT-IV

- Introduction to the importance of specification and their functions, different types of specifications, revision of specifications of building materials, brick, stone, cement, lime, aggregate, timber and various other finishes.
- Writing specifications for civil works of a small building project, starting with excavation, earth work, foundations, damp proof course, brick masonry work, concreting, flooring, plastering, painting, timber doors and windows, steel doors and windows, painting, varnishes etc.
- Writing specifications for Building services, such as water supply, plumbing, electrification, fire fighting, etc.
- CPWD specifications
- BIS specifications

- Punjab PWD Specifications.

NOTE: Scope of the subject will be limited to preparing detailed estimate and costing of two-storeyed residential buildings in masonry and reinforced cement concrete.

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six questions in all and minimum of one question from each unit.

ii. The student is required to attempt any four questions by selecting at least one from each unit.

TOWN AND COUNTRY PLANNING-VI **CCA-6-605**

Periods per week : 2

Duration of Examination : 3 hours

Maximum Marks

Sessional work : 50
Examination : 50

Objective:

To understand the role of planning in evolution of urban form.

Content

UNIT- I

- Overview of evolution of settlement design from the River Valley to Pre-Industrial (I7th century) towns with emphasis on the factors that influenced Town Planning principles and theories.
- Classifications of settlements based on form, use, scale, etc.

UNIT- II

- Role and contribution of the following towards contemporary town planning thought.
- Patrick Geddes, Patrick Abercrombie, Daniel Burnham, Soria Y Mata, Frederick Olmstead, Ebenezer Howard, Clarence Perry, CA Doxiadis, Le Corbusier.

UNIT- III

- Town Planning Policies in India from the18th century till present day.

- Methodology (planning process) for the development of new towns involving various stages like population projection, requirement of infrastructure, distribution of land use, formulation of alternative proposals for a healthy plan having possibilities of phase wise development, economic sustainability, analysis and selection of the optimum plan.

- Issues and strategies of Urban renewal of existing and historical towns – need for renewal, problems involved in urban renewal schemes, surveys to be conducted, methods of collection and analysis of data, rehabilitation and compensation, scope for future growth. Case studies of Urban renewal schemes in Indian and Western towns.

UNIT- IV

- Introduction to concept of smart cities.
- Case Study of cities (India and World) which have started functioning as smart cities.

UNIT- V

- Le Corbusier And Chandigarh,
- Planning Principles of Chandigarh
- Architecture and Architects of Chandigarh i.e. Pierre Jeanneret, Maxwell Fry, Janedrew

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six questions in all and minimum of one question from each unit.

ii. The student is required to attempt any four questions by selecting at least one from each unit.

HISTORY OF BUILT ENVIRONMENT– VI **CCA-6-606**

Periods per week : 2

Duration of Examination : 3 hours

Maximum Marks

Sessional Work : 50

Examination : 50

Objective

To understand the role of geo-physical, societal, political and technological factors in the evolution of architectural and urban form.

To develop a holistic approach to Architecture as an integral component of built environment.

Contents

UNIT-I

- Modern Masters with relevance to historic movements Frank Llyod Wright, Mies Van der Rohe, Le Corbusier, supported by examples of their works.
- The CIAM Group.
- Towns of the Modern Era – Canberra, Chandigarh, Brasilia.

UNIT II

- Variations of the Modern Movement – Expressionism, Constructivism, Art Decoetc Examples from Latin America, Africa, Japan, U.S.A, etc.
- International Theory and Practice after 1960s.
  - High Tech Architecture (Renzo Piano, Norman Foster, Richard Rogers
  - Deconstruction (Frank O'Ghery, ZahaHadid, Daniel Libeskind)
  - Phenomenology (Christian Noberg Schultz, Steven Holl, Peter Zumthor)
  - Post Modernism (Philip Johnson, Michael Graves, Robert Venturi)etc.
- Critical Regionalism- Theory and examples.

UNIT-III

- Colonial architecture and town planning in India. Planning of New Delhi.

- Influence of climate and materials on architectural expression. Examples of Colonial buildings in Calcutta, Bombay, Madras and Delhi.
- Emergence of Modern Architecture in India (Post Independence)– Early Modern buildings in Delhi and Pondicherry.

NOTE: Analysis of architecture style building typology must include functional, constructional/structural and ornamentation aspects

Suggested reading –

1. Modern Architecture since 1900 - William Curtis
2. Space Time and Architecture - SigfriedGiedion
3. History of Modern Architecture – Kenneth Frampton
4. A Global history of architecture – Ching, Jarzombek, Prakash
5. Architecture & Independence – Lang, Desai, Desai
6. Architecture in India (Since 1990) – Rahul Mehrotra
7. Books on individual Master Architects

INSTRUCTIONS TO THE PAPER SETTER

i. The Examiner is required to set six questions in all and minimum of one question from each unit.

ii. The student is required to attempt any four questions by selecting at least one from each unit.

COMPUTER APPLICATIONS IN ARCHITECTURE-VI CCA-6-607

Periods per week : 3

Maximum Marks

Sessional work	:	50
Portfolio	:	50

Objective:

At the end of this part of the course the student should be able to understand how to make detailed 3d graphical visualizations using an Industry standard animation software - **3DS MAX**, for communicating various design aspects of an Architectural Building to all type of audience – A layman, a professional and the client.

Content:

Since students have covered basic introduction to 3ds max in IV semester with a purpose of creating visual content for training reports and NASA competitions, Teacher may straight away start with the advanced techniques for 3DS MAX after a brief introduction

UNIT I: 3D STUDIO MAX – INTRODUCTION FOR ADVANCED LEVEL TRAINING

- Quick Introduction to Software interface, Basic commands, viewport transformation tools, object transformation tools, 3D coordinate system and snapping.
- Various Type of modelling in 3DS MAX, modifiers and the modifier stacking.
- Deformation Modifiers - Bend, skew, twist, symmetry, waves, noise etc.
- Mesh modifiers – Edit mesh modelling, edit poly modelling and nurbs modelling.

UNIT II: MODEL A BUILDING IN 3DStudio MAX

- Importing a DWG or a reference Image in 3ds max.

- Placing a DWG or an image in relevant position or in background to trace reference.

- Tracing a plan and creating walls, openings, door/windows, floor, roof and other details.

UNIT III: IMPORT A BUILDING IN 3DS MAX FROM OTHER DESIGN SOFTWARE - AutoCAD, ArchiCAD, Revit, Rhino, Sketchup.

- Exporting a model for 3DS max from Design software on proper scale.
- Importing a model in 3DS max with intact materials and on proper scale
- Techniques to keeping the building model 'reversibility editable' (To be able to edit the model in the primary design software and update in 3ds max).

UNIT IV: SETTING UP A PROJECT IN 3DS MAX

- MATERIALS - Maps, Textures, UV and Displacement
  - Understanding and creating different type of materials in 3ds max.
  - Applying materials to mesh surfaces using UVW Map and UV Unwrap.
  - Editing and updating imported materials with pre-applied UV maps from primary design software.

- LIGHTING
  - Understanding Type of lights – Point, Linear, directional, area, dome, sky, sun, Artificial lights with company specs (IES).
  - Lighting Analysis of a real case scenario in case of Exterior and Interior setup.
  - Different type of Lights in 3DS max (point light, linear, directional, area light, skylight etc.) and their Attributes (Intensity, inverse square decay, shadow casting etc.)
  - Replicating the Analysed lighting setup in 3ds max to understanding lighting techniques.

- POPULATING – Adding detailed pre-rendered 3D models of objects in 3ds max, downloaded from internet libraries for scale comparison and to replicate real life giving it a natural feel. – Foliage, Interior or Outdoor Objects, Fixed or Movable components, Background (Site surroundings, Buildings, Scenery, Landscape).

UNIT V: ANIMATING A PROJECT IN 3DS MAX

- CAMERA SETUP
  - Understanding type of cameras in 3ds max – Target, Direct.
  - Understanding Technical terms of a DSLR – Exposure, Aperture, Focus etc.
  - Understanding the approach of a photographer for composing a real life interior or exterior scene
  - Changing camera exposure, aperture, focal length, view angle etc. in 3ds max

- ANIMATION TECHNIQUES
  - Understanding time line and key framing 3ds max
  - Techniques for Creating camera animation
  - Techniques for Creating basic object animation
  - Animation constraints and controllers

UNIT IV: RENDERING IN 3DS MAX

- Understanding how rendering works universally and comparing with real life Maxwell principals or light photons propagation and why rendering requires powerful CPU and GPU.
- RENDERING SETUP
  - Defining Output Resolution and Output format
  - Determining the render times and optimising scene materials according to available time.
  - Setting up Internal Rendering engines in 3ds max - Default scan line rendering and mental ray.
- EXTERNAL RENDERING ENGINE
  - Rendering with Advanced rendering engines like vray.
  - Latest evolved techniques for photorealistic lighting and how vray has made optimal use of all these techniques.
  - Vray rendering setup for quick, efficient and high quality rendering.
- RENDERING AN OUTPUT
  - Rendering through render setup (F10 and F9).
  - Automatic Rendering through 'Batch render'.
  - Rendering multiple frames of an Animation clip (~24 to 30 frames per second).

UNIT VI: POST PROCESSING

- IMAGE - Enhancing the output in Photoshop
  - Adding further Populating details to make scene look more natural.
  - Adding labelling or text in case of a descriptive 3D graphics.

- VIDEO - Joining animation frames in a Video editing software
    - Basic understanding of a video editing software and introduction to Interface of Aftereffects and Premium.
    - Importing the image sequence in Adobe After-effects or Adobe Premier.
    - Editing and enhancing a video and rendering an HD video output.

INSTRUCTIONS TO THE PAPER SETTER

Examiner is required to evaluate three projects worked out during the entire semester from the above mentioned units.

BUILDING BYE-LAWS & CODES-VI **CCA-6-608**

Period per week : 2

Duration of Examination : 3 hours

Maximum Marks

Sessional Work	:	50
Examination	:	50

Objective

To familiarize the students with various kinds of building regulations required to control and promote the ordered growth of a city /town, with special reference to Chandigarh Bye laws.

Content

UNIT- I

- Need for controls at various levels of town development.
- Background of controls and regulations.
- Overview of basic terminologies
- An overview of various Building Acts prevailing in independent India.
- Nature of building codes in special regions like heritage zones, air funnels, environmentally sensitive zones, disaster prone regions, coastal zones, hilly areas, etc.

UNIT-II

- Study of National Building Code in relation to specific definitions, architectural controls, services, fire protection etc.
- Building bye laws framed by local bodies of Chandigarh, Delhi, and Punjab.
- Study of the requirements of submission drawing for approval of the concerned authority.

UNIT- III

- Detailed study of Chandigarh Bye laws with emphasis on zoning, architectural controls, frame control, etc.
- Case study of buildings along V2s, marla houses, semi-detached houses, commercial and public buildings in Chandigarh.

UNIT- IV

- HUDA & PUDA Bye Laws comparison with Chandigarh

INSTRUCTIONS TO THE PAPER SETTER

- The Examiner is required to set six questions in all and minimum of one question from each unit.
- The student is required to attempt any four questions by selecting at least one from each unit.

SEVENTH SEMESTER (PRACTICAL TRAINING): SCHEME OF TEACHING
Duration : 24 weeks

NOTE:

1. This entire semester will be used for Practical Training, which is to be undertaken with an architect having a minimum professional experience of 8 years.

2. Trainees are required to submit monthly progress reports of the work done by them in the office. These reports will be monitored by a faculty member designated as the Practical Training Coordinator.

3. A Practical Training Examination will be conducted at the end of the training period, in which the work done by the trainee will be assessed through a viva voce.

4. A detailed Training Programme will be drawn up on the above guidelines by the Practical Training Coordinator and approved by the Principal each year before implementation. The intention is to continually update the programme in view of the changing demands of the profession.

Content

The following work is to be done by each trainee during the Practical Training:

- <u>During office hours</u>:

(i) Drafting, tracing, presentation drawings, perspectives, models, etc.
(ii) Working drawings and details.
(iii) Site visits.

- <u>In extra-office hours</u>:
  The trainee is also required to prepare a study report on building/buildings designed by his/her employer. The report is to be based on site visits and personal observations and will cover aspects of design, structure, use of material, construction methods, services etc.

SEVENTH SEMESTER (PRACTICAL TRAINING): SCHEME OF EXAMINATION

The total marks assigned to the Practical Training are 500. These shall be distributed as detailed below:

A.	**Periodical Reports**	
1.	Joining Report	
2.	Monthly progress report (6 Nos.) of 20 marks each	120
B.	**Work to be presented for Training Examination**	
1.	Work done during office hours	150
2.	Building Analysis Report	150
C.	**Viva Voce**	80

NOTE:

2. Detailed guidelines regarding the nature and quantum of work to be presented for the Training Examination and the Periodical Reports will be specified in the Training Schedule.

- The Training Examination will be conducted by the Principal, the Practical Training Coordinator and two External Examiners appointed by the Principal.

EIGHTH SEMESTER : SCHEME OF TEACHING

Duration of Semester : 18 weeks
Periods per week : 31
Duration of each period : 50 minutes
Note: The course work and assignments in each subject must be completed as prescribed.

Sr. No.	Subject	Periods per week	Total Periods	Teaching Methodology and Sessional work
	COMPULSORY SUBJECTS			
1.	Architectural Design-VIII	15	270	Design assignments, time problems.
2.	Building Construction-VIII	6	108	Notes, sketches, drawings, tests
3.	Professional Practice-VIII	2	36	Notes & Tests
ELECTIVES (ANY 4)				
1.	Hill Architecture-VIII	2	36	Assignments/Seminar/ Dissertation
2.	Lighting Design-VIII	2	36	Assignments/Seminar/Dissertation
3.	Vernacular Architecture-VIII	2	36	Assignments/Seminar/Dissertation
4.	Architectural Conservation-VIII	2	36	Assignments/Seminar/Dissertation
5.	Disaster Management for Buildings-VIII	2	36	Assignments/Seminar/Dissertation
6.	Interior Design-VIII	2	36	Assignments/Seminar/Dissertation
7.	Art & Architecture-VIII	2	36	Assignments/Seminar/Dissertation
8.	Town Planning-VIII	2	36	Assignments/Seminar/Dissertation
9.	Advanced Structure Systems and Design-VIII	2	36	Assignments/Seminar/Dissertation
	Total	31	558	

EIGHTH SEMESTER : SCHEME OF EXAMINATION

PREPARATORY HOLIDAYS : One week

EXAMINATIONS : Approximately two weeks

NOTE: 1. In addition to the University Studio Examination, the subjects of Architectural Design-VIII, and Building Construction-VIII will be assessed through a viva-voce by an external examiner appointed by the Panjab University.

Sr. No.	Subject	Duration of exam. (in hours)	Marks for Exam	Marks for Sessional work	Total Marks
COMPULSORY SUBJECTS					
1.	Architectural Design-VIII	18	250	250	500
2.	Building Construction-VIII	4	100	100	200
3.	Professional Practice-VIII	2	30	30	60
ELECTIVES (ANY 4)					
1.	Hill Architecture-VIII	2	30	30	60
2.	Lighting Design-VIII	2	30	30	60
3.	Vernacular Architecture-VIII	2	30	30	60
4.	Architectural Conservation VIII	2	30	30	60
5.	Disaster Management for Buildings-VIII	2	30	30	60
6.	Interior Design-VIII	2	30	30	60
7.	Art & Architecture-VIII	2	30	30	60
8.	Town Planning-VIII	2	30	30	60
9.	Advanced Structure Systems and Design-VIII	2	30	30	60
	Total		500	500	1000

ARCHITECTURAL DESIGN-VIII **CCA-8-801**
Periods per week : 15
Duration of Examination : 18 hours

Maximum Marks
Sessional work : 250
Examination : 250

Objective
To familiarize the students with specialised building design, laying emphasis on advanced structure and service requirements
Content
1. A design involving large spans, viz. exhibition pavilions, industrial buildings, etc.

2. Design of multi-storeyed buildings with sepcialised services, such as hospitals and hotels/Multipurpose/Mixed used Buildings.

Note: 1. Equal weightage to be given to each of the above problems.
2. Each of the two problems is to be attempted in at least three developmental stages with modifications made to suit services and structural requirement, besides other design requirements.
3. Special lectures on structural and services requirements to be organized. Concerned specialists to be involved in the studio at suitable stages.
4. each of above projects should be taken up to interior design layout/High level services applicable level.

BUILDING CONSTRUCTION-VIII **CCA-8-802**
Periods per week: 6
Duration of Examination : 4 hours

Maximum Marks

Sessional work	:	100
Examination	:	100

Objective

To make the students learn about all the aspects of advanced building construction techniques.

Content

UNIT-I

- Various systems of construction of high-rise buildings in rcc and steel.
- Foundations and superstructure.

UNIT-II

- Construction of verendeel girder, space steel frames, hinged portal trusses, air frames. Steel structural systems, other systems for large span structures, etc.

UNIT-III

- Details of Vertical Transportation System like lifts & escalators.
- Power supply systems, Fire Fighting Systems, Air conditioning & Garbage disposal, etc. in high-rise buildings.

UNIT-IV

- Installation of solar water heating system in buildings.
- Construction details of passive methods of environment control in buildings**.**

NOTE:

1. All the units should be equally represent in exam.
2. The question should be set such as answer could be attempted on answer sheets in sketch form**.**

PROFESSIONAL PRACTICE-VIII **CCA-8-803**
Period per week: 2
Duration of Examination : 2 hours

Maximum Marks

Sessional work	:	30
Examination	:	30

Objective

Introduction to the professional, vocational and legal aspects of architectural practice.

Content

UNIT- I

- Profession - vocation, trade union vis-à-vis professional activities, social obligations of profession, architectural professional association in its role and responsibilities.
- Architects Act 1972/87. Council of Architecture - its role and responsibilities.

UNIT- II

- Code of professional conduct.
- Condition of engagement and scale of professional fees.
- Copyright Act as applicable to architectural work.
- Architectural competition.

UNIT- III

- Concept of Contract and Arbitration.
- Duties and liabilities of architects, duties and liabilities of contractors.
- Articles of agreement, execution of works and payments.
- Arbitration, the Act, its application, and its scope.
- Valuation and valuation methods.

UNIT- IV

- Pre-tender qualification and registration of contractors.
- Office organisation and management, expense, structure, salaries and overheads. Role of design staff and supporting managerial staff; Personnel management and training responsibilities.
- Expression of Interest.

HILL ARCHITECTURE-VIII ***CCA-8-804***
Periods per week : 2
Duration of Examination : 2 hours

Maximum Marks
Sessional Work : 30
Examination : 30

Objectives
Building on the hills has been a challenge to man from time immemorial. The constraints of climate, topography and the local building materials produced rich traditions of vernacular architecture.
In the present context of environmental concerns that the hills face – a greater responsibility has been thrust on architects and builders.
The objectives of this course are to impart a comprehensive knowledge of these historical aspects and present day concerns.

Content
UNIT-I
- 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.

UNIT-II
- 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 indigeneous technology.

UNIT-III
- 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.

LIGHTING DESIGN-VIII ***CCA-8-805***
Periods per week : 2
Duration of Examination : 2 hours

Maximum Marks:

Sessional work	:	30
Examination	:	30

Objective
To introduce methods of determining qualitative & quantitative lighting requirements both for interiors and exteriors.

Content
UNIT- I

- Basic anatomy and functions of the eye. Adjustments made by the eye, Age-related defects and their design implication.
- Visual arc, Visual acuity, resolution angle, Contrast, Colour Contrast, Colour Adaptation, Visual performance and its relationship to Contrast, Size of task and Illuminance. Central and peripheral vision.
- Photometric terms used in the lighting industry and their interrelationship. Measurement of these terms.
- Colour Specification with Munsel and CIE system, Additive and Substractive colour mixing.

UNIT-II

- Lamp Properties; Effect of voltage & Temperature fluctuation on functiuoning of lamps, lamp cost, Lumen Loss, Lamp photometrics, etc. Brief history of lamps.
- Lamps – Incandecent, Discharge sources. High intensity discharge sources. Fiber optics, Induction Lamps, LED lamps. Recent developments in lamp technology.
- Luminaire properties like intensity distribution for ceiling luminaries & floodlights, LOR, ULOR, DLOR, IP rating, Glare control methods, Aesthetics and applications.

UNIT- III

- Quantitative lighting design of a simple space manually using lumen methods. Lighting design-using computers.
- Design principles used for lighting of various types of internal spaces. Design principles used for lighting of various external situations.
- Day lighting, Importance and method to calculate illumination due to daylight using daylight factor, day lighting practices. Integration with electric lighting.

VERNACULAR ARCHITECTURE-VIII **CCA-8-806**

Periods per week : 2
Duration of Examination : 2 hours

Maximum Marks

Sessional work	:	30
Examination	:	30

Objective

To understand vernacular architecture as distinct from other historical & modern styles of architecture to appreciate that it is site responsive and an outcome of indigenous techniques and various social, economic and mythical values of the society.

Content

UNIT-I

- Vernacular Architecture – Meaning & theories.
- Determinants of vernacular architecture: Role of social, cultural, political, economic symbolic, climatic, technological contest in creation of form.

UNIT-II

- Materials & technology,
- Role of vernacular architecture in disaster management.

UNIT-III

- Illustrated case studies of vernacular settlements/building typology from various regions in India and abroad.

ARCHITECTURAL CONSERVATION-VIII **CCA-8-807**

Periods per week : 2
Duration of Examination : 2 hours

Maximum Marks

Sessional work	:	30
Examination	:	30

Objective

To understand the significance of built heritage in the present-day context and to define the architect's role in the process of its conservation.

Contents

UNIT- I:Theory and History of Conservation

- Definition of 'Cultural Heritage'. Heritage as Cultural Resource. Various scales of manifestation from small works of art and historic buildings to cultural landscapes.
- Definition and purpose of Architectural Conservation. Values and Ethics.
- Philosophy of Action - Interventions such as Preservation, Restoration, Reconstitution, Adaptive Use, etc.
- History and theory of modern conservation thought.

UNIT- II:Scientific Approach

- Need for a multidisciplinary approach. Role of the architect at various stages of conservation action.
- Preparatory procedures and methods for architectural conservation - Inventories; Inspections and Reports; Research, analysis and documentation; various aspects of study, e.g. historicity, stylistic features, usage, physical condition, etc.
- Causes of Decay in Materials and Structure.
- Report on the field study of a historic building, documenting various material and non-material aspects and giving recommendations for conservation action.

UNIT- III:Management of Built Heritage

- Classification of Historic Buildings and Degrees of Protection. Legal Framework - comparison of systems in India and abroad.
- Management of Historic sites. Problems of Cultural Tourism, Interpretation and Presentation of historic structures.
- Role of UNESCO, ICOMOS and other international organizations.

DISASTER MANAGEMENT FOR BUILDINGS - VIII **CCA-8-808**
Periods per week : 2
Duration of Examination : 2 hours

Maximum Marks

Sessional work	:	30
Examination	:	30

Objective
To make the students understand the various pre & post disaster design and management measures.

Content
UNIT- I

- Earthquake: Problems & design issues
- General Principles.
- Special Construction techniques.

UNIT- II

- Fire, floods, cyclones, avalanche, etc.
- General requirements and principles for building design.
- Special construction techniques.

UNIT- III

- Post disaster problems, issues & management.

INTERIOR DESIGN-VIII ***CCA-8-809***

Periods per week : 2

Duration of Examination : 2 hours

Maximum Marks

Sessional work : 30

Examination : 30

Objective

To understand and appreciate the complexities and constraints in the design and execution of architectural interiors.

Content

UNIT- I

- Interior design in historical perspective.
- Principles of aesthetic composition in interiors.
- Meaning of spatial organization, perceptual needs, psychological needs, convenience, maintenance, durability and image in interior design.
- Application of colour, form and texture in interiors.
- Use of artificial and natural lighting in interiors.

UNIT- II

- Built-in furniture and movable furniture.
- Interior furnishings.
- Interior design accessories and decorative elements.

UNIT- III

- Traditional and modern building materials for interior finishes.
- Treatments applied to floors, walls, partitions and ceilings for interior design.
- Electrical and mechanical services and their integration into interior design schemes.

Note: Appraisal for above-mentioned issues through various library case studies or live projects.

ART AND ARCHITECTURE – VIII **CCA-8-810**
Periods per week : 2
Duration of Examination : 2 hours

Maximum Marks
Sessional work : 30
Examination : 30

Objective
1. To understand the symbiotic /interdependent nature of art and architecture.
2. Familiarization with various art forms used in architecture.

Content
UNIT- I
- Comparison of attributes of 'Art and Architecture'. Introduction to forms of pure and applied arts.
- Role of art in history of world architecture, including folk and vernacular examples.
- Symbiotic relationship of Art and Architecture at the levels of the single building, the cluster, the city, landscape, etc. (Note: Suitable examples may be drawn from different periods of history as well as of various forms of art /art objects).

UNIT- II
- *Detailed study of the following art forms as applied to architecture with reference to techniques of production, visual qualities, application through history and present day trends: Painting, Sculpture, Mosaics, Stained glass, Tapestries, etc.*

UNIT- III
Detailed case studies such as:
- Contribution of artists such as Henri Moore, Alexander Calder, etc. to enrichment of Architecture
- Works of architect–artists such as Le Corbusier , Satish Gujral, Michelangelo, etc.
- Specific examples of interrelation of art and architecture from different contexts, such as Folk Art of Madhubani, Byzantine Murals, Ajanta Wall Paintings, Gothic Churches, Shekhavati Havelis, Chandigarh's Rock Garden, etc.

NOTE: The case studies may be attempted individually or in groups.Special emphasis may be laid on documenting relatively unknown examples.

TOWN PLANNING-VIII **CCA-8-811**
Periods per week : 2
Duration of Examination : 2 hours

Maximum Marks
Sessional work : 30
Examination : 30

Objective:
To understand the role of planning in evolution of urban form.

Content

UNIT- I

- Overview of evolution of settlement design from the River Valley to Pre-Industrial (I7th century) towns with emphasis on the factors that influenced Town Planning principles and theories.
- Classifications of settlements based on form, use, scale, etc.
- Methodology (planning process) for the development of new towns involving various stages like population projection, need and quantitative requirement of infrastructure, distribution of land use, formulation of alternative proposals for a healthy plan having possibilities of phase wise development, economic sustainability, analysis and selection of the optimum plan.

UNIT- II

- Role and contribution of the following towards contemporary town planning thought.
- Patrick Geddes, Patrick Abercrombie, Daniel Burnham, Soria Y Mata, Frederick Olmstead, Ebenezer Howard, Clarence Perry, CA Doxiadis, Le Corbusier.

UNIT- III

- Town Planning Policies in India from the18th century till present day.
- Issues and strategies of Urban renewal of existing and historical towns – need for renewal, problems involved in urban renewal schemes, surveys to be conducted, methods of collection and analysis of data, rehabilitation and compensation, scope for future growth. Case studies of Urban renewal schemes in Indian and Western towns.

ADVANCED STRUCTURE SYSTEMS AND DESIGN-VIII CCA-8-812
Periods per week : 2
Duration of Examination : 2 hours

Maximum Marks
Sessional work : 30
Examination : 30

Objective:
To understand the principles of continuous slabs/beams, various types of structural foundations, water tanks, joints in structures. Design philosophy of prestressed concrete, limit state method.

Content

UNIT-I

- Design of continuous slab and continuous beam based on BM & SF coefficients as per IS:456.

UNIT-II

- Combined footings: Need for combined footing, choice of shape of footing, method for design of a rectangular combined footing. (Descriptive only).
- Raft foundation – general, design criteria. (Descriptive only).
- Pile foundation – types of piles (Pre cast & cast-in-situ), under reamed piles, pile shoe, pile cap and grade beam (Descriptive only).
- Water tanks – types, general requirements, permissible stressed in concrete and steel, joints in water retaining structures. (Descriptive only).
- Provision of joints in structures – expansion joint, contraction joint, construction joints, materials used for joints. (Descriptive only).

UNIT-III

- High Rise Structures Systems.
  - i) Bearing Wall Structure
  - ii) Tubular System
  - iii) Composit System
  - iv) Superframe System
  - v) Supertruss-Tube

  Prestressed concrete – basic principles, advantages, pretensioning, post tensioning, high strength concrete, high tensile steel, design and detailing of simply supported beams only. (Descriptive only).

NINTH SEMESTER : SCHEME OF TEACHING

Duration of Semester : 18 weeks
Periods per week : 34
Duration of each period : 50 minutes
Note: The course work and assignments in each subject must be completed as prescribed.

Sr. No	Subject	Periods per week	Total periods	Teaching Methodology and Sessional work
	COMPULSORY SUBJECTS			
1.	Architectural Design-IX	15	270	Design assignments, time problems.
2.	Building Construction-IX	6	108	Notes, sketches, drawings, tests
3.	Research Methodology-IX	2	36	Notes & tests
ELECTIVES (ANY 4)				
1.	Architectural Photography-IX	2	36	Assignments/Seminars/tests/CD
2.	Services Control Systems in Buildings-IX	2	36	Assignments/Seminars/tests/CD
3.	Recent Heritage-IX	2	36	Assignments/Seminars/tests/CD
4.	Traffic & Transportation-IX	2	36	Assignments/Seminars/tests/CD
5.	Sustainable Architecture -IX	2	36	Assignments/Seminars/tests/CD
6.	Low Cost Effective Building Design & Construction-IX	2	36	Assignments/Seminars/tests/CD
7.	Landscape Design-IX	2	36	Assignments/Seminars/tests/CD
8.	Urban Design-IX	2	36	Assignments/Seminars/tests/CD
9	Construction Management-IX	2	36	Assignments/Seminars/tests/CD
	Total	31	558	

NINTH SEMESTER : SCHEME OF EXAMINATION

PREPARATORY HOLIDAYS : One week
EXAMINATIONS : Approximately two weeks
NOTE:1. In addition to the University Studio Examination, the subjects of Architectural Design-IX, and Building Construction-IX will be assessed through a viva-voce by an external examiner appointed by the Panjab University.

Sr.No.	Subject	Duration of exam. (in hours)	Max Marks for Exam	Marks for Sessional work	Total Marks
	COMPULSORY SUBJECTS				
1.	Architectural Design-IX	18	250	250	500
2.	Building Construction-IX	4	100	100	200
3.	Research Methodology-IX	2	30	30	60
ELECTIVES (ANY 4)					
1.	Architectural Photography-IX	2	30	30	60
2.	Services Control Systems in Buildings-IX	2	30	30	60
3.	Recent Heritage-IX	2	30	30	60
4.	Traffic & Transportation-IX	2	30	30	60
5.	Sustainable Architecture -IX	2	30	30	60
6.	Low Cost Effective Building Design & Construction-IX	2	30	30	60
7.	Landscape Design-IX	2	30	30	60
8.	Urban Design-IX	2	30	30	60
9.	Construction Management-IX	2	30	30	60
	Total		500	500	1000

ARCHITECTURAL DESIGN-IX **CCA-9-901**
Periods per week: 15
Duration of Examination : 18 hours

Maximum Marks

Sessional work	:	250
Examination	:	250

Objective

To make the students aware of design issues related to problems of urban development, urban renewal and housing .

Content

1. 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.

2. Multistoreyed Housing project/integrated townships taking into consideration services, site planning, traffic and circulation

NOTE:

1. Equal weightage to be given to each of the above problems.
2. Each of the two major problems is to be attempted in at least three development stages.
3. 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.

BUILDING CONSTRUCTION- IX **CCA-9-902**

Periods per week: 6

Duration of Examination : 4 hours

Maximum Marks

Sessional work : 100

Examination : 100

Objective

To prepare a set of working drawings for a high-rise/large span/specialized building project, using advanced constructional and structural building techniques.

Content

UNIT- I:

- Construction of Basement – Construction Details, its treatment.
- Extension & expansion joints in Buildings – their details & treatments..

UNIT- II

- **Basic formwork & construction details required for concrete structure such as shell, coffers, waffle roof, folded plates & span frame, etc.**

UNIT –III:

- Thermal & Acoustical treatment in RCC framed buildings including construction details.

UNIT- IV:

- Study of interior show room/shops, designs & details of Banks, Hotels, Offices, Public buildings, restaurants, etc.

UNIT- V:

- Construction of structural & non-structural cladding & glazing.

NOTE:

1. All units should be equally represented in exam.
2. Question should be set in such a form that the exam should be attempted in the form of drafted drawings on drawings sheets (cartridge/gateway). .

RESEARCH METHODOLOGY-IX **CCA-9-903**
Periods per week : 2
Duration of Examination : 2 hours

Maximum Marks

Sessional work	:	30
Examination	:	30

Objective

To appreciate the process of research and make the students aware of its potential in the field of architecture.

Content

UNIT- I

- Research in architecture - its nature, purpose & scope.
- Basic and applied research.
- Technical and behavioral - oriented research.

UNIT- II

- Science and scientific method - various steps in scientific method : hypothesis, research design, data collection & analysis, conclusions and implications with special reference to architectural research.

UNIT- III

- Methods of conducting research.
- Selection of topic, and its relevance.
- Identification and formulation of problem.
- Compiling and analyzing existing research database.
- Research design, research instruments and analysis.
- Presentation of results.
- Evaluation of findings, conclusions and recommendations.
- Techniques of research - report writing.

ARCHITECTURAL PHOTOGRAPHY-IX ***CCA-9-904***

Periods per week : 2

Duration of Examination : 2 hours

Maximum Marks

Sessional work	:	30
Examination	:	30

Objective

To familiarize students with the basic skills of photography for use in architecture, and related fields like, landscape design interior design both as a tool of documentation and aesthetic interpretation.

Contents

UNIT-I

- Nature, history and scope of photography.
- Various applications of photography.
- Creative composition in photography.
- Architectural photography and its role in documentation and creative design process.
- Various types of cameras and films.

UNIT-II

- Components of 35 mm SLR camera.
- Various types of lenses for 35 mm cameras and their uses/applications.
- Other camera accessories.
- Medium, format and large format cameras and their special uses.
- Digital cameras and their usage.

UNIT-III

- Laboratory demonstration of developing and printing of black and white photography.
- Field assignments in groups of architectural photography, interior and landscape photography work - both in colour and black and white mediums.
- To document and interpret as aesthetic expression - various subjects of photography such as buildings, landscapes and interiors.

SERVICES CONTROL SYSTEMS IN BUILDINGS- IX **CCA-9-905**
Periods per week : 2
Duration of Examination : 2 hours

Maximum Marks
Sessional work : 30
Examination : 30

Objective
To make students aware of the capability and limitations of control systems for various building services, gain fundamental knowledge of types of controllers, prepare basic diagrams required for automatic control systems and implement automated control system in their projects.

Content
UNIT- I
- Sensors & Actuators.
- Pneumatic controls systems, electric control systems.
- Computerized control systems, Direct Digital controls.

UNIT- II
- Control in HAVC (Climate Control), Control of valves, dampers, stair pressurization, temperature, humidity, chillers, VAV boxes, night purging.
- Control in electric supply, electrical power distribution, SB, MDBs, DBs, MCBs, ELCBs, Fuses, Relays, switches, contractors, motor starters, start-to-start timers, delay switches etc.
- Controls systems in vertical transportation, remote elevator monitoring.
- Controls in fire services, fire panels, door and window automation, and fire door operation.
- Lighting controls.
- Access control and security, biometrics.

UNIT- III
- Energy efficiency and services control systems, outside air economy cycle, automated louvers for sun control, electrochromics.
- Integrated building management systems (BMS), intelligent buildings, and communication protocols used in services control, remote monitoring and management.
- Home automation.
- Appliance control systems.
- Recent developments in services control systems industry.

RECENT HERITAGE-IX **CCA-9-906**
Periods per week : 2
Duration of Examination : 2 hours

Maximum Marks
Sessional work : 30
Examination : 30

Objective
To provide a concise overview of the recent built heritage of the 19th and 20th century and explore the philosophical and technical issues of its conservation.

Content
UNIT- I: Processes and Manifestations
- Definition and scope of ' Recent Heritage'. Need for study.
- Overview of historical development and roots of 'Recent Heritage'. Various social, economic, technological and aesthetic processes that shaped its form.
- Nature of 'Innovations', such as in use of building materials, technology, concepts of production, organization of space, etc.
- Categories and Manifestations (City Planning, Mass Housing, Standardization, Industrial development, Landscapes, etc.).

UNIT- II:Technological and Philosophical Issues
- Diversity of expression in geo-cultural regions of the world.
- Problems of Material, Technology, Changing Use Patterns, etc.
- Philosophical questions - Attitudinal and Aesthetical problems; issues of Authenticity; Criteria for valuation, identification and conservation.
- Legal protection; UNESCO AND ICOMOS initiatives.

UNIT- III:Case Examples
- Literature and/or field studies of various expressions of built Recent Heritage, such as Colonial Heritage, Industrial Heritage, Modern Heritage, etc. Each of these categories can be further analyzed in terms of the cultural and regional nuances of Asian, African, Latin American, American and European perspective.

TRAFFIC & TRANSPORTATION – IX ***CCA-9-907***
Periods per week : 2
Duration of Examination : 2 hours

Maximum Marks
Sessional work : 30
Examination : 30

Objective
To make the students conversant with methods, techniques of traffic & transportation, the socio-economic and environmental issues related to the movement of humans and goods in general and in urban areas in particular.

Content
UNIT-I
- Traffic and urban environment.
- Various kinds of transportation systems with their qualitative analysis.
- Problems encountered in Intra-city transport systems.
- Road accidents: Causes and remedial measures.

UNIT-II
- Traffic control devices.
- Regulation and enforcement.
- Road design elements: Functional classification and alignment.
- Road design elements: Intersections.

UNIT-III
- Traffic surveys: volume, speed & delay, origin & destination.
- Parking surveys.
- Movement of human and goods at the inter-city levels.
- Urban traffic and transport problems.
- Public transport in urban areas.
- Transport policy issues.

SUSTAINABLE ARCHITECTURE-IX ***CCA-9-908***
Periods per week : 2
Duration of Examination : 2 hours

Maximum Marks

Sessional work	:	30
Examination	:	30

Objective

To make the student understand the importance of natural resources & their use in building construction and maintenance as well as to make optimal use of the resources through various technique.

Content

UNIT-I

- Global warming – Reasons.
- What is sustainable Development and various Dimensions (Economic, Social & Environmental) viewpoints.
- Role of Architects in sustainable Development.

UNIT-II Concepts in sustainable Development

- Sustainable Construction
- Ecological Building
- Green Building & Rating system
- Environmental Arch.
- Carbon Credits & Rating System.

UNIT III Issues in Sustainable Development

- Energy
- Resources – Water/Earth/Air
- Materials – Production and use
- Water
- Quality of indoor/outdoor environment
- Site (Topography/ Air-condition/ surrounding).

UNIT –IV Design Strategies

- Process and Assessment
- Solar Passive
- Surroundings
- Lesser consumption of resources (optimization of resources)
- Climate responsive
- Recycling/Reuse
- Life Cycles assessment
- The basics of sustainable Design
    1. The Thermal
    2. The Luminous
    3. Sonic

UNIT V

- India's approach to sustainable Development.

LOW COST EFFECTIVE BUILDING DESIGN & CONSTRUCTION–IX CCA-9-909
Periods per week : 2
Duration of Examination : 2 hours

Maximum Marks
Sessional work : 30
Examination : 30

Objective
To make the student aware of the use of conventional and non-conventional resources for low-cost construction.

Content
UNIT- I

- **An introduction to the subject as also the building processes adopted in different climatic zones of the country, resulting in varied vernacular expressions.**
- **Use of cost- effective technologies through the use of local materials, up gradation of traditional technologies, prefabrication etc**.

UNIT-II

- **Need for low cost construction, both in the rural and the urban sectors**
- **Innovations of building techniques for low cost construction.**
- **Analysis of space norms for low cost buildings.**

UNIT-III

- **Study of usages pattern of low cost buildings by the habitants.**
- **Comparative analysis of building materials and costing**.
- **Economy through Planning & Design**.

LANDSCAPE DESIGN –IX **CCA-9-910**

Period per week : 2
Duration of Examination : 2 hours

Maximum Marks

Sessional work	:	30
Examination	:	30

Objective

This course is aimed at providing a comprehensive knowledge regarding ecological aspects and environmental concerns in landscape design.

Content

UNIT- I

- Introduction and historical backdrop of the evolution of landscape design as a process of interface between Man and Nature.
- Introduction to ecology and its importance to Landscape Designers.
- A brief history of gardens world over – and their relevance in their time, context and social needs.
- Advanced knowledge of basic elements of landscape such as earth, rock, water and vegetation, in the context of their environmental aspects and concerns.

UNIT –II

- Site analysis and site- structure unity.
- Environmental Impact Assessment techniques.
- National environmental policy and Bio-diversity significance in urban areas.
- Basic knowledge of contour/mapping and various methods of documentation of physical features, topography and landscape elements.

UNIT-III

- Contemporary landscape design work/projects in India.
- Case studies of varied urban situations with typical different landscape characters in and around Chandigarh region to analyse and assess their present landscape status by applying knowledge and techniques acquired as above.
- Landscape Design proposal based on above-mentioned analysis as a studio exercise.
- Expert lectures/workshops be organized.

URBAN DESIGN-IX CCA-9-911

Periods per week : 2
Duration of Examination : 2 hours

Maximum Marks

Sessional work	:	30
Examination	:	30

Objective

To appreciate the nature and role of various facets of Urban Design in the making of the built environment.

Content

UNIT- I

- Introduction to the role and scope of Urban Design. Comparison with 'architecture' and 'town planning'.
- Determinants of Urban Form such as landform, climate, symbolism, activity patterns, socio-cultural factors, materials and techniques and other contextual references. Case examples from various periods in history and different parts of the world.
- Vocabulary of Urban Design. Urban Pattern, Grain, Texture, Density, etc.
- Concepts of Imageability. Elements of the city's image. Paths, nodes, landmarks, edges, and districts – their characteristics, role and interrelationship.
- Designing parts of the city: Systems of communication, and utilities, visual expression, accent and contrasts, urban character, landscape features and city extension areas.

UNIT- II

- *Types of Urban Spaces - street, square, precinct, piazza, mall, etc.*
- Various elements of urban space – their identification, characteristics and role in the shaping of the space.
- Changing role of urban spaces through history. Role of public places in the contemporary city.
- Design principles – Scale and Enclosure
- Case studies of well known urban spaces from various periods of history to illustrate their design and performance aspects.

UNIT- III

- Role of Legislation and Controls in design of the built environment.
- Types of urban controls: FAR, Incentive Zoning, Density, Planned Unit Development, Building height, Building Bulk etc. Special provisions of Town planning Acts. Analysis of urban legislation in Delhi, Mumbai, etc.
- Aesthetic Legislation – Historical Development and applications. Case example of aesthetic controls of Chandigarh – their basis, characteristics and problems of implementation and enforcement.

CONSTRUCTION MANAGEMENT – IX **CCA-9-912**
Periods per week* : *2
Duration of Examination : 2 hours

Maximum Marks

Sessional work	:	30
Examination	:	30

Content

UNIT- I

- Aim, objectives and functions of Construction Management.
- Construction stages, Construction team.
- Role of an Architect in Construction Management.
- Management techniques and tools.

UNIT- II

- Bar charts and limitations of bar charts.
- Programme Evaluation and Review Technique (PERT)
- Critical Path Method (CPM) for project management
- Development and analysis of CPM net work.
- Cost time analysis in network planning.
- Scientific methods of construction management.

UNIT- III

- Project management for repetitive type of buildings. Line of Balance Method - its working knowledge with exercises.
- Resources scheduling methods through Bar charts, CPM and Line of Balance method.
- Inspection and Quality control.
- Safety in construction.

TENTH SEMESTER : SCHEME OF TEACHING

Duration of Semester : 20 weeks
Periods per week : 24
Duration of period : 50 minutes

Sr.No.	Subject	Periods per week	No. of weeks	Total periods
1.	Thesis	24	20	480

TENTH SEMESTER : SCHEME OF EXAMINATION

Sr.No.	Subject	Examination Marks (for details, see syllabus)	Marks for Sessional work	Total Marks
1.	Thesis	500	500	1000

THESIS STUDIO **CCA-10-1000**

Periods per week : 24

Maximum Marks

Sessional work : 500

Examination : 500

Objective

To use and synthesise knowledge of various disciplines in an architectural project of the students' own choice.

Content

A. The thesis project will comprise the following:

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

B. Stages of Work:

1. 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 16th week of the previous semester, i.e. 9th Semester B.Arch.
   - Before the closing of the 9th Semester, students will submit brief write-ups on three projects out of which one will be approved.
2. Rough Report, comprising all analytical aspects of the project including the synopsis, library studies, prototype studies, site analysis, delineation of building program, etc.
3. Evolution of Design, to be worked out in a minimum of four stages.
4. Draft of Final Report, including Evolution of Design
5. Final Report, drawings and model, to be evaluated through a University Examination.

NOTE:

- Students will submit two copies of the final report (original and one photocopy) on a standard format prescribed in the thesis programme issued every year by the Thesis Coordinator.
- The report must also include A-4/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 of the report will be retained for reference in the college library.

C. Schedule of submissions/examination

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

Stages of Work			**Time allocated**	**Max. Marks**
1.	**Sessional Work**			
(a)	Rough Report			
	i)	Introduction& topic finalization	1 week	
	ii)	Synopsis	2 week	25
	iii)	Preliminary Library studies	2 weeks	25
	iv)	Site analysis, Prototypes additional library studies	2 weeks	100
(b)	Evolution of Design			
	i)	Design Criteria and Concept	2 week	50
	ii)	Design Proposal Stage-I	2 week	50
	iii)	Design Proposal Stage-2 (incorporating structures & services)	2 week	50
	iv)	Pre-final Design	2 weeks	150
(c)	Draft Final report (Incorporating improvements suggested in Rough Report, Design Criteria and explanatory sketches of Evolution of Design).		1 week	50
2.	**External Examination**		4 weeks	500

NOTE:

- Students are required to submit the Final Report, all final drawings and model/s in the standard format prescribed in the Thesis 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. In addition, two members of the Visiting Faculty would also be associated throughout the duration of the studio. Each student will be assigned a Thesis Guide (from amongst the faculty) who will supervise the progress of the student's work on a regular basis.
2. The Principal, 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 Principal and the entire studio team (Thesis Coordinator, Visiting Faculty members and the concerned Thesis Guide).
   ii) Jury for the External Examination will comprise the Principal, Thesis Coordinator, the concerned Thesis Guide and two External Examiners appointed by the Panjab University.
   iii) Marks awarded at each stage will be based on the average of those awarded by all jury members. The decision of the Principal will be final in case of dispute/discrepancy.
   iv) 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 the 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.
   vii) Students, who fail to obtain pass marks in the periodic assessment, shall be required to change their thesis project.

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