PANJAB UNIVERSITY CHANDIGARH

SYLLABUS

for **Bachelor of Architecture**

(Ten Semesters)

(1st & 2nd semesters)

From the Session 2024-2025

PANJAB UNIVERSITY
SYLLABUS FOR B. ARCHITECTURE COURSE
(For the session 2024-2025)

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.

1ST semester examination scheme and contents of syllabus:

FIRST SEMESTER : SCHEME OF TEACHING

Duration of Semester : 18 weeks
Periods per week : 33
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	Credits	
1.	Architectural Design-I	8	144	Design assignments, time problems	08	
2.	Building Construction-I	4	72	Notes, sketches, drawings, tests, Assignments	04	
3.	Building Material-I	2	36	Notes, sketches, tests, Assignments	02	
4.	Structure Systems & Design-I	2	36	Notes & tests, Assignments	02	
5.	Architectural Drawing-I	4	72	Drawings, tests, Assignments	04	
6.	Architectural Graphics-I	4	72	Sketches, Assignments, drawings, tests	04	
7.	History of Built Environment-I	2	36	Notes, sketches, tests, Assignments	02	
8.	Theory of Design-I	2	36	Assignments & Tests	02	
9.	Workshop-I	3	54	Theory & Practical	03	
10	Health Education-I	2	36	Health and fitness, extra-curricular activities.	02	
	Total	33	594		33	

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

Course No.	Course Name	L-T-S	Credits	Marks
CCA-1-101	ARCHITECTURAL DESIGN-I	0-0-8	08	Sessional work : 200 Examination 200

Course Objectives: To learn elements and principles of basic design to architectural design.

Reference Books :

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

Course Contents :

UNIT-1

- Exercise in two and three dimensional compositions in order to achieve harmony, balance contrast etc. as entities in themselves
- 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.
- Anthropometric study of difference postures and activities.

Mid Semester Test: To be evaluated by external examiner

UNIT-2

- 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.

Evaluation System:

There will be minimum 10 design assignments in this semester. The first stage will comprise of evaluation of architectural design sheets of – Principles of design, Scale & Proportion and Anthropometrics. The end semester design assignment shall be of 05 stages:

- Reference studies & idea exploration.
- Concept formulation.
- Review – I & Review - II
- Preliminary Submission
- Final Submission.

Marks of each stage should be distributed by the design team.

End Semester Examination

INSTRUCTIONS TO THE PAPER SETTER

One/Two design problems are to be formulated which would assess the students on their ability to design a single UNIT structure following the elements and principles of design.

Course No.	Course Name	L-T-S	Credits	Marks
CCA-1-102	BUILDING CONSTRUCTION-I	0-0-4	04	Sessional work : 100 Examination : 100

Course Objectives: To educate the students with construction details of various components of a small single storied building.

Outlines of Syllabus :

The course is outlined from introduction of subject to theoretical and site specific practical studies.

Text Books :

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

Reference Books

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

Course Contents : As Outlined Under

UNIT-1

- 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) ofvarying thickness having various types of junctions.
- Stone masonry of various types.
- Block Masonry (Mud Blocks, Fly Ash Blocks etc)

UNIT-2

- 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

Mid Semester Test

UNIT-3

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

UNIT-4

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

End Semester Examination

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

INSTRUCTIONS TO THE PAPER SETTER

- The examiner is required to set a total of six questions, at least one from each UNIT
- The student is required to attempt any four question from each UNIT.

Course No.	Course Name	L-T-S	Credits	Marks
CCA-1-103	BUILDING MATERIAL-I	2-0-0	02	Sessional work : 50 Examination 50

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

Reference Books :

- 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
- P.C. Varghese, 'Building Materials',Prentice hall of India Pvt Ltd, New Delhi, 2005.
- Arthur Lyons – 'Materials for Architects and Builders' - An introduction Arnold,London, 1997.
- Hand book of Timber Engineering – BIS

Course Contents :

UNIT-1 - 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-2- BRICKS

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

Mid Semester Test

UNIT-3- 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-4- 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.
- Aluminium: Different types of section and uses in construction Copper, Zinc Brass,Stainless steel, tin etc.

- Properties uses, treatment.
- Available Section, Products (Hardware)

End Semester Examination

INSTRUCTIONS TO THE PAPER SETTER

1. The Examiner is required to set at least six questions in all and minimum of onequestion from each UNIT.
2. The student is required to attempt any five questions by selecting at least one from each UNIT.

Course No.	Course Name	L-T-S	Credits	Marks
CCA-1-104	STRUCTURE SYSTEMS & DESIGN– I	2-0-0	02	Sessional work : 50 Examination 50

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

Reference Books :

- Mechanics of Structure by Junnarkar
- Building Design And Construction Handbook Sixth Edition

Course Contents :

UNIT-1

- 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-2

- 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 andover hanging beams subjected to Uniformly distributed load and Point loads only.

Mid Semester Test

UNIT-3

- 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 andGraphical method.

End Semester Examination

INSTRUCTIONS TO THE PAPER SETTER

1. The Examiner is required to set at least six questions in all and minimum of onequestion from each UNIT.
2. The student is required to attempt any five questions by selecting at least one from each UNIT.

Course No.	Course Name	L-T-S	Credits	Marks
CCA-1-105	ARCHITECTURAL DRAWING-I	0-0-4	04	Sessional work : 100 Examination 100

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

Reference Books :

- Engineering Drawing by N.D Bhatt
- Engineering Drawing, 1994 by Gill, P.S.

Course Contents :

UNIT-1

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

UNIT-2

- 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).

Mid Semester Test

UNIT-3

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

UNIT-4

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

End Semester Examination

INSTRUCTIONS TO THE PAPER SETTER

- The examiner is required to set a total of four questions, one from each UNIT
- The student is required to attempt any three question.

Course No.	Course Name	L-T-S	Credits	Marks
CCA-1-106	ARCHITECTURAL GRAPHICS-I	0-0--4	04	Sessional work 100 Examination 100

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

Reference Books :

- Architectural Design by Francis D.K. Ching;

Course Contents : 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.

UNIT-1

- Exercises with different pencil grades to check varying intensities and create textureswith demonstration.
- Composition with coloured paper using the basic principles of design.

UNIT-2

- 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.

Mid Semester Test

UNIT-3

- 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 andbackground.

UNIT-4

- Outdoor sketching of simple buildings
- Rendering of stone and brick wall in pencil.
- Representation of human figures

Workshop to be organised:

- To impart the practical aspect of 3-D composition, sculpture workshop in claymodeling will be organised by the concerned teacher.
- Another workshop in pencil rendering will also be organised, highlighting its techniqueand styles. The workshop can be organised outdoor or indoor.

End Semester Examination

INSTRUCTIONS TO THE PAPER SETTER

Two/three questions are to be formulated which would assess the students on their ability to sketch and render as per the topics mentioned above.

Course No.	Course Name	L-T-S	Credits	Marks
CCA-1-107	HISTORY OF BUILT ENVIRONMENT - I	2-0-0	02	Sessional work : 50 Examination 50

Course Objectives:
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.

Outlines of Syllabus:
It covers pre-historic, Egyptian, Mesopotamian, Indus Valley civilizations and their building typology.

Reference Books:

- History of Modern Architecture by Kenneth Frampton
- Architecture in India (since 1990) by Rahul Mehrotra
- A Global history of architecture – Ching, Jarzombek, Prakash
- Architecture of the world : Egypt – Henri Steirlin
- Architecture of India: Buddhist and Hindu –Satish Grover
- History of Architecture – Sir Bannister Fletcher
- The rise of Civilization- David and Joan Oates
- World Architecture – Henry Russell Hitchcock

Course Contents:

UNIT – 1

Pre-historic

- 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-2

Birth of Civilizations

- **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 khorsabad.

Mid Semester Test

UNIT-3

Indus Valley civilization:-

- Form of the Harappa City, location and role of public buildings.
- Architecture of the typical Harappa dwelling Granary and Bath.
- The Vedic Village, Building typology and construction.

UNIT-4

Buddhist Architecture:-

- Asoka 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, ChaityaHall at Karli, Vihara at Ajanta. Suitable examples from each geographical conte[13] to xt illustrate differences in form, construction methods and ornamentation.

END SEMESTER EXAMINATION

INSTRUCTIONS TO THE PAPER SETTER

1. The Examiner is required to set at least six questions in all and minimum of one question from each UNIT.
2. The student is required to attempt any five questions by selecting at least onefrom each UNIT.

Course No.	Course Name	L-T-S	Credits	Marks
CCA-1-108	THEORY OF DESIGN- I	2-0-0	02	Sessional Work : 50 Examination 50

Course Objectives: Acquaint students with fundamental concepts; and visual and spatial framework of design and introduce theories in architecture.

Reference Books/Papers :

- Understanding Architecture: Its Elements, History, and Meaning by Leland M. Roth, West view 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, Neils Prak, Mounton &Co1968
- Architect: A Candid Guide to the Profession, by Roger K. Lewis
- Experiencing Architecture by Steen Eliel Rasmussen
- Architectural Scale, H Licklidan, The Architectural Press
- Architecture and Human Dimensions, P.F.Smith, George Baldwin Ltd.
- Lidwell, W., Holden, K., Butler, J. (2010). Universal Principles of Design, Revised and Updated: 125 Ways to Enhance Usability, Influence Perception, Increase Appeal, Make Better Design Decisions, and Teach Through Design. United States: Rockport Publishers.
- Warke, V., Simitch, A. (2014). The Language of Architecture: 26 Principles Every Architect Should Know. United Kingdom: Rockport Publishers.
- Norman, D. (2013). The Design of Everyday Things: Revised and Expanded Edition.

Course Contents :

UNIT-1

- Forms ands hapes in every day life– References of nature- its patterns and shapes for specific purposes
- Design in everyday life – the interrelationship between function and form of object – everyday objects
- Objectives of Design

UNIT-2

- Elements of design Idea of a one dimensional to three dimensional
- Point, line, Plane
- Form, Shape and Space
- Planes defining Space
- Transformation of Form
- Texture, color, pattern
- Principles of Design - Axis, symmetry, hierarchy, rhythm, datum, transformation, balance, contrast, emphasis.

Mid Semester Examination

UNIT-3

- Meaning of Architecture, its purpose and connection to various contexts, what it represents(political statement, cultural icons, social ideals, emotional impact)
- Necessity of theory in the architecture discipline, scope of theorizing in architecture

UNIT-4

- Scale and Proportion Architectural scale, Human scale, Monumental scale ,true and forced scale.
- Color Theory
- Light in Architecture

End Semester Examination

INSTRUCTIONS TO THE PAPER SETTER

1. The Examiner is required to set at least six questions in all and minimum of onequestion from each UNIT.
2. The student is required to attempt any five questions by selecting at least one from each UNIT.

Course No.	Course Name	L-T-S	Credits	Marks
CCA-1-109	WORKSHOP- I	0-0-3	03	Sessional Work : 50

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

Course Contents

UNIT-1

- Introduction to masonry tools, Making proportional sketches of these tools andlearning their uses.

UNIT-2

- 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.

UNIT-3

- Construction of low height brick jalli.

End Semester Examination - No examination

Course No	Course name	L-T-S	Credits	Marks
CCA-1-110	HEALTH EDUCATION- I	2-0-0	02	Sessional Work - 50

Course objective: To make the students learn the basic concepts related to health education

Reference Books:

- Bucher, C.A.Foundations of Physical Education, St. Louis; C.V. Mosby Co., 1972.
- Shaver, Larry G. Essentials of exercise physiology ,2016
- Hoeger, Werner W.K, Hoegen,Sharon A. Principles and Labs for fitness and wellness.7thed 2004.
- Richardson, Seano, Anderson, Mark B: Overtraining Athletes: Personal Journey in Sports.2008.
- Wilmore, Jack H and Costill, David L. Physiology of Sports and Exercise. Human kinetics. 1994.
- Mathew, D.K and Fox, E.L The Physiological Basis of Physical Education and Athletics. Philadelphia: W.B Saunders Company 1976.

Course Contents:

UNIT -1

- Meaning and definition of health, concept of health education, information about various health hazards. Helath services, Principles of health education, Introduction and Function of Skeletal System, Muscular System, Circulatory System, Respiratory System, Digestive System, Excretory System, Nervous System and Endocrine System.

UNIT-2

- Modern Concept of balanced posture
- Common postural deformities i.e., flat foot, bow legs, knock knees, lordosis, scoliosis, Kyphosis and round shoulders, their causes and remedial measure
- Causes of bad posture
- Common sports injuries- their classification and their care and prevention
- Therapeutic exercises (Active, Passive, Resistive and Stretching and their application for rehabilitation)

UNIT-3 Sports Training, its aims and characteristics

- Principles of sports training
- Need and scope of Sports Training in India

UNIT-4

Components of Physical Fitness

1. Speed
2. Strength
3. Endurance
4. Flexibility
5. Coordinative Abilities

- Means and methods of developing fitness components.

End Semester Examination - No examination

2nd semester examination scheme and contents of syllabus:
SECOND SEMESTER : SCHEME OF TEACHING

Duration of Semester : 18 weeks
Periods per week 33

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 Methodologyand Sessional work	Credits
1.	Architectural Design-II	8	144	Design assignments,Time problems	08
2.	Building Construction-II	4	72	Notes, sketches, drawings, tests	04
3.	Building Material-II	2	36	Notes, sketches, tests	02
4.	Structure Systems & Design-II	2	36	Notes & tests, Assignment	02
5.	Architectural Drawing-II	4	72	Drawings, tests, Assignment	04
6.	Architectural Graphics-II	4	72	Sketches, drawing, Tests, Assignment	04
7.	History of Built Environment-II	2	36	Notes, sketches, tests,Assignment	02
8.	Theory of Design-II	2	36	Assignments, Tests	02
9.	Workshop of Model Making-II	3	54	Theory & Practical	03
10.	Health Education-II	2	36	Health and fitness, extra curricular activities	02
	Total	33	594		33

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

Course No.	Course Name	L-T-S	Credits	Marks
CCA-2-201	ARCHITECTURAL DESIGN- II	0-0-8	08	Sessional work : 200 Examination 200

Course Objectives: To learn the interdependence /Interrelationship of Form and Functions. Inclusion of barrier free approach in all buildings, accommodating individuals with varying physical difficulties.

Reference Books :

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

Course Contents :

- 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

UNIT-1

- Residence or Nursery school.

Mid Semester Test

UNIT-2

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

End Semester Examination

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.

Evaluation System:

There will be minimum 02 design assignments each semester. Each design assignment shall be of 05 stages:

i. Reference studies & idea exploration
ii. Concept formulation.
iii. Review – I & Review - II

iv. Preliminary Submission
v. Final Submission.

Marks of each stage should be distributed by the design team. Each of the above stages shall be evaluated on the following parameters:

i. Idea / concept originality
ii. Presentation of drawings to convey the idea
iii. Graphic presentations
iv. Model / 3D / Animation etc.

INSTRUCTIONS TO THE PAPER SETTER

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

Course No.	Course Name	L-T-S	Credits	Marks
CCA-2-202	BUILDING CONSTRUCTION-II	0-0-4	04	Sessional work : 100 Examination 100

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

Content

Reference Books:

- Mckay, WB Building Construction
- Rangwala, S.C Engineering Materials
- Punmia, B.C. Building Construction
- Ching, Francis D.K. Building Construction Illustrated
- Construction Technology by Chudley
- Construction of Buildings by R.Barry

UNIT-1

- 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-2

- 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.

Mid Semester Test

UNIT-3

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

UNIT-4

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

End Semester Examination

INSTRUCTIONS TO THE PAPER SETTER

- The examiner is required to set a total of six questions, at least one from each UNIT
- The student is required to attempt any four question from each UNIT.

Course No.	Course Name	L-T-S	Credits	Marks
CCA-2-203	BUILDING MATERIALS-II	2-0-0	02	Sessional work : 50 Examination : 50

Course Objectives: 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.

Reference Books :

- 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.
- GernotMinkev, Building with Bamboo, Birkhauser, 2012.

Course Contents :

UNIT-1**- -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-2**- CLAY & CLAY PRODUCTS,COST EFFECTIVE 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,
- 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.

Mid Semester Test

UNIT-3**- 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-4**- 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

End Semester Examination

INSTRUCTIONS TO THE PAPER SETTER

- The examiner is required to set at least six questions, minimum one from each UNIT.
- The student is required to attempt any five questions from each UNIT.

Course No.	Course Name	L-T-S	Credits	Marks
CCA-2-204	STRUCTURE SYSTEMS &DESIGN – II	2-0-0	02	Sessional work : 50 Examination : 50

Course Objectives: To understand the principles of structural design of Steel Structures.

Reference Books :

- Building Systems Reference Guide 1987 by Tyler G. Hicks
- Standard Handbook of Civil Engineering by Gurcharan Singh

Course Contents :

UNIT-1

- 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-2

- 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.

Mid Semester Test

UNIT-3

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

End Semester Examination

INSTRUCTIONS TO THE PAPER SETTER

- The examiner is required to set at least six questions, minimum one from each UNIT
- The student is required to attempt any five questions from each UNIT.

Course No.	Course Name	L-T-S	Credits	Marks
CCA-2-205	ARCHITECTURAL DRAWING-II	0-0-4	04	Sessional work : 100 Examination 100

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

Reference Books :

- Engineering Drawing, 1994 by P.S Gill
- Engineering Drawing By N.D Bhatt

Course Contents :

UNIT-1

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

UNIT-2

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

Mid Semester Test

UNIT-3

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

UNIT-4

- 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.

End Semester Examination

INSTRUCTIONS TO THE PAPER SETTER

- The examiner is required to set a total of four questions, one from each UNIT
- The student is required to attempt any three question

Course No.	Course Name	L-T-S	Credits	Marks
CCA-2-206	ARCHITECTURAL GRAPHICS-II	0-0-4	04	Sessional work : 100 Examination : 100

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

Reference Books :

- Drawing A Creative Process calling Francs, D.K Ching
- Francis D. K Ching ; Architectural Graphics
- Architecture in Water colour by Thomas IN Schaller

Course Contents: 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.

UNIT-1

- Outdoor sketching of buildings, huts, group of trees, different kinds of trees and foliage and vegetation in colour.

UNIT-2

- Colour rendering of blocks.
- Use of overlapping effects in water colour and poster colour in mural composition based on geometric elements.

UNIT-3

- Exercises on human figures and vehicles in colour.
- Rendering of stone & brick wall in colour.

Mid Semester Test

UNIT-4

- Outdoor sketching with graphite pencil to create monochromatic effect in design.
- Assignments on representation of water bodies, hills, etc

Workshop to be organised:

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

End Semester Examination

INSTRUCTIONS TO THE PAPER SETTER

Two/three questions are to be formulated which would assess the students on their ability to sketch and render as per the topics mentioned above.

Course No.	Course Name	L-T-S	Credits	Marks
CCA-2-207	HISTORY OF BUILT ENVIRONMENT – II	2-0-0	02	Sessional work : 50 Examination 50

Course Objectives:

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.

Reference Books:

- A Global history of architecture – Ching, Jarzombek, Prakash
- A History of Western Architecture – David Watkin
- Architecture of World : Greece – Henri Stierlin, Roland Martin
- Architecture of World : – Roman Empire – Henri Stierlin, Gilbert Picard
- Architecture of India : Buddhist and Hindu – Satish Grover
- Classical Architecture –Robert Adam
- History of Architecture – Sir Bannister Fletcher
- Indian Temple Architecture : Form and Transformation – Hardy A
- Indian Architecture : Buddhist and Hindu –Percy Brown
- The History of Architecture in India – Christopher Tadgell
- World Architecture – Henry Russell Hitchcock

Course Contents:

UNIT-1

Hindu Temple Architecture:- Northern India

- Role of Hinduism and decline of Buddhism – Geographical/political states andkinds 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-2

Hindu Architecture:- Dravidian:- Southern India

- Various styles of Hindu Temples – Dravidian, Indo-Aryan (Orissa, Khajuraho, Gujrat and West India), Functional components, architectural form, construction and ornamentation.

Jain Temples:-

- Architecture of Jain Temples in Gujrat and Rajasthan.
- Temple towns of South India (Madurai, Srirangam) and Rajasthan (Osian, Mt.Abu)

Mid Semester Test

UNIT-3

Greek Civilization:-

- Historical, geographical, political and cultural context. Characteristics of Greek Architecture such as Materials, construction System, System of Proportioning, Greek Orders, Oprical Corrections, etc. Architecture of Greek temples:-
- Parthenon,
- Athens,
- Acropolis,
- Agora etc.

UNIT-4

Roman Civilization:-

- Historical, geographical, political and cultural context.
- Concept of Monumentality, Materials & Construction Systems, Roman Orders. Building analysis – Colosseum, Foruma, Pantheon, Thermae, Basilicas, Aquaducts, The Roman Villa

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

End Semester Examination

INSTRUCTIONS TO THE PAPER SETTER

1. The Examiner is required to set at least six questions in all and minimum of one questionfrom each UNIT.
2. The student is required to attempt any five questions by selecting at least one from each UNIT

Course No.	Course Name	L-T-S	Credits	Marks
CCA-2-208	THEORY OF DESIGN-II	2-0-0	02	Sessional work : 50 Examination 50

Course Objectives: Build the fundamentals of Space Planning, Perception and visualization of spaces, and introduce building typologies as a theoretical concept.

Reference Books :

- Petervon Meiss-Elements of architecture-from form to place, Spon Press1992.
- Architecture: Form Space and Order; Francis D.K. Ching; Van Nostrand Reinhold Co.,1979.
- OpeningSpaces(DesignasLandscapeArchitecture)–HansLoidlStefanBernard
- Conditional Design: An Introduction to Elemental Architecture, by Anthony Di Mari
- Hearn, M. F. (2003). Ideas that shaped buildings. Cambridge: MIT Press.
- Tsurumaki, M., Lewis, P., Lewis, D. J. (2016). Manual of Section.
- Warke, V., Simitch, A. (2014). The Language of Architecture: 26 Principles Every Architect Should Know. United Kingdom: Rockport Publishers.
- Alexander, C. (1977). A Pattern Language: Towns, Buildings, Construction . United States
- Roenisch, R., Conway, H. (2005). Understanding Architecture: An Introduction to Architecture and Architectural History. United Kingdom: Routledge.
- Hillier, B; (2007) Space is the machine: a configurational theory of architecture. [Book]. Space Syntax: London, UK
- Tigges , F. Janson , A.(2014) . Fundamental Concepts of Architecture: The Vocabulary of Spatial Situations . Switzerland: Birkhäuser.

Course Contents :

UNIT-1

- Brief understanding of theories in architecture
- Examples – Vitruvius's *firmitas, utilitas, venustas; Viollet le duc – rational design method, design as a metaphor,* Le Corbusier's Five Points of Architecture , Form follows function, 21st Century tropes

UNIT-2

- Space planning within a building, rationale for sequencing and flow of spaces
- Analysis and classification :space usage, Inter-relationship of different spaces within a building.
- Inter dependence of function,structure,and form in architectural design

Mid Semester Examination

UNIT-3

- Circulation – how they govern function and movement, Purpose, types, related terms - (Corridors, Aisle, Pedestal, Plinth, ramps, staircase, lifts),
- Transition Spaces - Definitions, Types, and classifications, purpose, related terms (porch, verandah, threshold, balcony, courtyard, corridors, terrace, etc)
- House and Home, the Idea of a dwelling, personal space

UNIT-4

- Architectural program :analysis and classifications
- Exercises to build the relationship of the building's plan, section, and elevations .Examples of iconic/ historic buildings

End Semester Examination

INSTRUCTIONS TO THE PAPER SETTER

- The examiner is required to set at least six questions, minimum one from each UNIT
- The student is required to attempt any five question from each UNIT.

Course No.	Course Name	L-T-S	Credits	Marks
CCA-2-209	WORKSHOP & MODEL MAKING-II	0-0-3	03	Sessional work : 50
Course Objectives: To understand the constraints and complexities and versatility of joinery in carpentry.				
Reference Books :				
Course Contents :				
UNIT-1 • Introduction to carpentry tools. • Sketches of these tools.				
UNIT-2 • Exercise in sawing, chiseling, planning to learn the use of hand tools joinery. • Construction of half lap, tongue and groove joints.				
Mid Semester Examination				
UNIT-3 • Construction of mortice and tenon joint and dovetail joints. • Construction of rafter joints in tension and compression.				
UNIT-4 • 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.				
End Semester Examination - No Examination				

Course No.	Course name	L-T-S	Credits	Marks
CCA-2-210	HEALTH EDUCATION-II	2-0-0	02	Sessional work : 50

Course objective: To make the students to learn the basic concepts related to fitness

Reference Books:

- Beotra, Alka (2001-02), Drug Education Handbook on Drug Abuse in Sports (Mumbai: Applied Nutrition Sciences).
- Pande, P. K. (1987), Outline of Sports Medicine (New Delhi : Jaypee Brothers).
- Roy, Steven and Richard, Irvin (1983), Sports Medicine (N.J. : Englewood Cliff.).
- Sharma, N.P. (2005), Sharir Rachna Tatha Sharir Kriya Vigyan (New Delhi : Khel Sahitya Kendra).

Course Contents:

UNIT -1

- Benefits of exercise
- Growth and development
- Exercise and well-being sex and age characteristics of adolescent
- Body types
- Sex differences
- Individual differences
- Use , disuse and overuse phenomenon of exercise

UNIT-2

- Nutrition: Meaning of nutrition role of nutrition in daily life , Elements of balanced diet, Carbohydrates, Proteins, Fats, Vitamins, Minerals, Salts and Water.

UNIT-3

- Aim and objectives of First-Aid
- Importance of First-Aid in Sports Injuries
- Ergogenic Aids in Sports
- Aim and Objectives of Rehabilitation

UNIT-4

- Concept and Role of Athletic Care
- Prevention and Management of Injuries : Factors causing injuries and general principles for safe guarding
- Prevention of injuries
- Common Sports Injuries : Sprain, Strain, Abrasion, Laceration, Haematoma, Fracture, Dislocation

End Semester Examination - No Examination