



AMITY UNIVERSITY
— R A J A S T H A N —

Amity School of Architecture & Planning
(ASAP)

Bachelor of Architecture
Courses Focusing on Employability

BAR 101 DESIGN – I

Course Code: BAR 101

Credit Units: 09

L/0-ST/6-P/0 Teaching hours: 06

A. COURSE LEARNING OUTCOME:

CLO 1 :	Interpret and Implement “Design” as a problem solving process.
CLO 2 :	Recognise and Execute visual form, functional space, anthropometrics, technology, economy, culture and environment as key parameters of Architecture.
CLO 3 :	Investigate, Compare and Infer existing architectural spaces through their measured drawings, models and photographs
CLO 4 :	Conclude and Recommend criteria to Justify/Decide basis for architecture design proposal
CLO 5 :	Develop, Propose and Draw the Design for a given architectural situation and Communicate through conventional architectural representations

B. SYLLABUS

Course Objectives:

- To create visual compositions using elements and principles in theory of design and understand its application in built- environment
- To measure, draw and comprehend the relationship between human dimensions and those of the built-environment.
- To investigate forms and subsequently analyze existing built-forms and spaces through Measured drawings so as to derive design criteria from the Case Studies
- To create architecture design for single purpose space employing the architectural design process
- To practice direct application of learning in BAR107 Theory of Design

Course Contents:

Module I: Design of 2D & 3D Compositions - 2 weeks

Exercise to design compositions with 2D Shapes and 3D Forms (geometric and irregular) using elements and principles of design

Module II: Transformations and Form Analysis – 3 weeks

Transformations of Forms -Addition, Subtraction, Extrusion – Space division, Space derivation, positive and negative spaces , Form Analysis, 2d representation of 3d form in terms of plan, section and elevation, Application in built- environment such as Façade design, Door elevation, Carpet design; Floor tile design & floor design, Mural design etc.

Module III: Anthropometrics - 2 weeks

Human dimensions – static and dynamic; proportions, space dimensions for various human postures and activities; Modular and Golden Section

Module IV: Measured Drawings of Architectural Spaces – 2 weeks

Importance of Case Study in design learning, Study of various existing architectural spaces through preparation of measured drawing with furniture layout

Module V: Design and Representation of Single purpose space unit – 5 weeks

Design project of Single Space unit structure with respect to Visual Language of Form (Art), Functional Space, Material & Structure (Technology) and culture; Suggestive Studio Projects involving activity spaces such as Living area, sleeping area, washroom, cooking area etc. – for example, cabin design, Entrance gate, kiosk, Toilets, Kitchen, Study room, Exhibition stall etc. *An A4 Design Report - documenting the process & progress of work through clippings of sketches/ photographs of models highlighting design concept as well as the final proposal drawings etc- shall be an essential part of submission.*

Examination Scheme:

Components	A	S1	S2	C T	Viva	E E
Weightage (%)	05	15	20	1 0	20	3 0

Text Books /Reference Books/Journals/Other Study Material:

- ‘Ching Francis, (1979), Architecture Form, Space and Order, Van Nostrand Reinhold Company, New York.
- Neufert Ernst, (1970), Architect’s Data, Crosby Lockwood and Sons, London.
- Chiara JD and Calender, (1983), Time Savers Standards for Building Types, M cGraw Hill Book Company, New York.
- Broomer, F. Gerald (1974) Elements of Design: Space, Davis Publications Inc., Worcester, M assachusetts.
- Wagenknecht, Kay and Herte (1989) Site + Sculpture – A collaborated design Process, Van Nostrand Reinhold, NY.
- Allen, Edward and Iano, Joseph (2006), The Architect's Studio Companion: Rules of Thumb for Preliminary Design, Wiley; 4th edition.
- Frederick, M atthew (2007), 101 Things I Learned in Architecture School, The MIT Press.
- Pearson, David (2001), New organic architecture: the breaking wave, University of California Press.
- Fawcett, Peter (2003), Architecture: design notebook, Architectural Press, 2nd edition

Online Resources

- <https://www.archdaily.com>
- <http://www.architectmagazine.com>
- <https://www.architecture.com/knowledge-and-resources/resources-landing-page>

BAR 102 MATERIALS AND CONSTRUCTION TECHNOLOGY - I

Course Code: BAR 102 Credit Units: 03 L/1-ST/1-P/1 Teaching hours: 03

A. COURSE LEARNING OUTCOME:

Course Learning Outcome:

CLO 1 :	To define basic building elements.
CLO 2 :	To Recognize the various types of brick and stone masonry both in superstructure and foundation
CLO 3:	To know about the types and fundamental aspects of construction in stone & brick i.e masonry, openings
CLO 4 :	To be able to use composite materials in a structure.
CLO 5 :.	To be aware of the properties and applications of the various materials

B. SYLLABUS:

Course Objective:

To understand the use of traditional building materials in simple building works.

To familiarize students with basic building components, their function and behavior under various conditions with specific reference to “Load Bearing Construction”

Course Contents:

Module I: Building Materials and Construction Technology - 3 weeks

Introduction to components of building from foundation to roof: Foundation, plinth, plinth beam, damp proof course (D. P.C.), sill, lintel, beam and slab, parapet, mummy etc. Detailed Section through 2 story building, Introduction to various methods, technology, materials, tools and equipment commonly used in – Excavation, Masonry works and carpentry.

Module II: Clay and Clay products, Stone - 2 weeks

Mud including stabilized earth, burnt bricks, brick tiles, blocks, lime and its product, stone and its varieties etc. Classification, availability, preparation and uses of above materials and their structural, visual and textural properties. **Module III: Brick and Stone Masonry -3 weeks**

Terminology: Bricks and its types, bats and closures used in different Brick Bonds Bonding: Types of bonds: English, Single, double, Flemish and rat trap bond. Corbelling, String courses and decorative brickwork.

Stone masonry: Types of stones, dressing and different bonds in stone, Random Rubble, Coursed Rubble, Ashlar.

Module IV: Stone and brick masonry Foundation - 3 weeks

Foundations: Need for foundations, its preliminary design criteria. Detail of spread foundation for load bearing walls of various thicknesses.

Module V: Openings - 2 weeks

Openings – Types and construction details of Lintels, arches, sill, jam etc. necessary to make openings
Exercises: preparation of drawings on above topics.

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- Building construction W.B.M cKay
- Building construction R Berry
- Building construction Chudley
- Building construction Francis D.K. Ching.

BAR 103 STRUCTURAL DESIGN & SYSTEM- I

Course Code: BAR 103 Credit Units: 02 L/2-sT/0-P/0 Teaching hours: 02

A. COURSE LEARNING OUTCOME:

Course Learning Outcome:

CLO 1 :	Analyse & evaluate the stress - strain relations for beam element under various loading & support conditions.
CLO 2 :	To Recognize the various types of brick and stone masonry both in superstructure and foundation
CLO 3 :	To know about the types and fundamental aspects of construction in stone & brick i.e masonry, openings
CLO 4 :	To be able to use composite materials in a structure.
CLO 5 :	To be aware of the properties and applications of the various materials

B. SYLLABUS:

Course Objective:

- To introduce the structural system in a building with all the basic components to understand the functions of various elements and building technologies used in various types of buildings.

Course Contents:

Module I: Simple Stresses and Strains- 3 Weeks

Elasticity, Stress, Strain, Types of Stresses, Elastic limit, Hook's Law, Modulus of Elasticity, Stresses in Composite Bars. , Poison's ratio, shear stress, Basic, Deformation of a body due to self-weight & force acting on it.

Module II: Principal stresses and strains-3 Weeks

Introduction, principal planes & their stresses, Analytical methods for the stresses on an oblique section of a body, stresses on an oblique section of a body subjected to a direct stress in one plane & two mutually perpendicular directions.

Module III: Centre of gravity-2 Weeks

Introduction, Centroid, methods for Centre of gravity, Centre of gravity by geometrical & moments consideration, axis of reference, Centre of gravity of plane figures, symmetrical & unsymmetrical sections.

Module IV: Moment of inertia-2 Weeks

Definition, Important theorems, section Modulus, Calculation of M.I by Integration method and its application to architecture system

Module V: Elements of Static-2 Weeks

Law of parallelogram of forces, resolution of a forces, law of triangular of forces, polygon of forces, Theorem of resolved parts resultant of number of concurrent coplanar forces, conditions of equilibrium, moment of a forces. Moment and arm of a couple,

theorems on couples

Module VI: Shear force and bending moment-2 Weeks

Various types of support & loads in Beams, Calculation of reactions in loaded beams, Cantilever & simply supported, Point load, udl & uvl. Calculation of shear force & bending moment & also its diagrammatic representation.

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- Elements of Structure, Morgan
 - Salvadori, Structures in Architecture,
 - Everet, Structure and Fabric,
 - Khurmi R. S., Strength of Materials,
 - R.K. Bansal, Engineering Mechanics
 - Khurmi R. S, Applied Mechanics and Strength of Materials.
- Salvadori and Heller, Structure in Architectur

BAR 104 GRAPHIC SKILLS – I

Course Code: BAR 104 Credit Units: 02 L-0 ST-0 P-4 Teaching hours: 04

A. COURSE LEARNING OUTCOME:

Course Learning Outcome:

CLO 1	Understand and remember the fundamentals of drafting
CLO 2	Understand the fundamentals of geometry
CLO 3:	Understand the principle and different types of projections and views
CLO 4 :	Learning the techniques of surface development
CLO 5	Produce presentations on all the four cognitive learning outcomes.

B. SYLLABUS:

Course Objective:

To familiarize the students with various drawing tools to give basic knowledge of drafting and lettering techniques. To provide a clear understanding about the scale of measurement and orthographic projections used as a drawing technique.

Course Contents:

Module I: Introduction to basics drafting, Lettering & Scales

Introduction and setting to the drawing equipment, Concept of line, its types, Line thickness quality, grade, divisions and angles, Concept of polygons, circles, geometrical curves, helix etc., Concept of Dimensioning & dimension line, BIS codes of drawings.

Free hand and Architectural lettering, proportion of letter size as per scale and size of the sheet. Scales: Engineers scale, Graphical scale and Representation factor (R.F). Scales on drawings. Types of scales: Plain scale and Diagonal scale.

Module II: Projection- Point, Lines, Planes

Definition, meaning and concept, Principles and Methods of projection. Projection of point, Lines & planes.

Module III: Projection-Solid

Projections of regular rectilinear and circular solids (prisms, pyramids, cones, cylinders, spheres etc.) in different positions. Sections of regular rectilinear and circular solids in varying conditions of sectional plane.

Module IV: Surface Development

Introduction and Methods of development of surfaces. Development of lateral surfaces of right solids like Cubes, Prisms, Cylinders, Pyramid, Cone etc.

Module V: 3D Drawing Views

Types, uses & advantages. Isometric, Axonometric & oblique view -solids, compositions & buildings. Metric drawings, projections and their dimensions.

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

Text:

- Architectural Graphics, C. Leslie Martin
- Architectural Graphics, Ching Frank
- Engineering Drawing, N.D. Bhatt

References:

- A.J. Metric Handbook, editors, Jan Bilwa and Leslie Fair weather Architectural Graphic standards editor, Boaz Joseph
- Neufert's Architect's data
- Time Saver standards for building types, Editor Joseph D.C. and John Callender. Rendering with pen and ink
- Practical Plane and Solid Geometry, H.Joseph and Morris

BAR 105 HISTORY OF BUILT ENVIRONMENT

Course Code: BAR 105

Credit Units: 02

L/2-T/0-P/0

Teaching hours: 02

A. COURSE LEARNING OUTCOME:

CLO 1 :	Analyze and evaluate the building styles of different eras and the strategic developments of forms and structures
CLO 2 :	Examine the developments in the use of materials with different eras.
CLO 3:	Analyze the spaces proportions, and sections, motifs of typologies of buildings such as communal hall, residences etc.

B. SYLLABUS:

Course Objectives:

- To make them understand the importance of study history of Architecture, development of civilizations and evolution of design as a by process of it
- To familiarize students with the factors that influence the development of architecture in history. Such as socio- economic, historical political influences of that time.
- To inform them about the technologies, materials used in the historical developments and their impact on the present day knowledge of architecture and design.
- To familiarize them with the regional architecture.

Course Contents:

Module I: Introduction to History of Human Settlements and Its Importance - 2 weeks

Pre-Historic Period till 3000B.C. - The type of settlement development during the period taking few examples of the different periods – Neolithic, Mesolithic, Bronze age, Iron Age with advancements of construction techniques, material used , human progression over the time period.

Module II: Introduction to Valley Civilization-1 - 4 weeks

Nile Valley Civilization (3000 B.C. – 100 A.D.)- Introduction to Egyptian Architecture and civilization, building characteristics and developments over the period in respect of different styles, construction technology, building materials used, evolution of form with significant changes over the time period.

Examples like- Tomb Architecture- Mastabas, Pyramids, Temples at Giza , Thebes ,Karnak Etc.

Mesopotamian Civilization (2500 B.C. – 600 B.C.)- Mesopotamian Civilization comprising of Babylonian, Assyrian, Akkadian Sumerian civilization in respect of buildings styles, construction technology, building materials used, evolution of form and art work development with significant changes over the time period

Examples like - Forts ,Temples ,Dwellings ,Ziggurats at Uruk ,Ashur ,Babylon etc.

Module III: Introduction to Valley Civilization-2 - 4 weeks

Indus Valley Civilization (3300B.C. – 300 B.C.)- The era of development in the Indus valley. Development of Harappan civilization. Iron Age of India explaining with examples of planning and buildings, construction technology, building materials used, evolution of form and art work development with significant changes over the time period.

Vedic Architecture (1750 B.C.)- The Aryan civilization- explain with examples of the buildings, construction technology, building materials used, evolution of form and art work development with significant changes over the time period.

Module IV: Introduction to Rajasthani Civilization - 4 weeks

Introduction to Regional Architecture of Rajasthan- M āru-Gurjara Architecture and Rajputana design from different regions with examples of Jaipur City and nearby areas:

Fort & Palaces – Amer Fort, City Palace , Nahargarh Fort, Udaipur Palace, Kumbhalgarh Fort , Mehrangarh fort etc. Havelis – in Shekhawati like at Nawalgarh , Fatehpur , Ramgarh ,Mandawa etc.

Stepwells & Temples – Chand Baori in Abhaneri , Ranakpur Temple , Dilwara Temple , Rani Sati Temple , Eklingji Temple Etc.

Introduction to Planning of Old Jaipur City with characteristics and material significance according to climate . Study the examples of vernacular buildings like Hawa Mahal , City Palace, Albert Hall , Jantar Mantar etc. with developing the understanding of different elements like jharokhas , jalis , chhatris etc. locally available materials , their application , construction techniques, evolution of form and characteristics changed over time period

Detailed Presentation exercise to be combined with local educational tour, heritage walks to be organized at regular intervals during the semester comprising of analysis of existing structures with respect

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- Sir Bannister Fletcher, (1975) “The History of Architecture”
- G.K.Hiraskar (2018) “Great Ages of World Architecture”
- Yatin Pandya, (2005) “Concepts of space in Traditional Indian Architecture”
- Deependra Prasad, Saswati Chetia, (2007) “New Architecture and Urbanism: Development of Indian Traditions”
- Vibhuti Chakrabarti, (1998) “Indian Architectural Theory and Practice: Contemporary Uses of Vastu Vidya”

BAR 107 THEORY OF DESIGN

Course Code: BAR 107

Credit Units: 02

L/2-ST/0-P/0 Teaching Hours : 02

A. Course Learning Objective

CLO 1 :	To Illustrate The Knowledge of various principles elements design.
CLO 2 :	To critically analyse the 2D & 3D compositions.
CLO 3 :	To analyse the differences between systematic and random design approach through developing understanding of design thinking.

B. Syllabus

Course Objectives:

- To enable student to develop understanding of “Design” as problem solving process for everyday life
- To enable student to interpret “Architecture Design” as integration of Visual Form, Functional space, Human measure, building technology (material and structural systems), economy, culture and environment.
- **To enable student for direct application of design theories in studio projects of course BAR101 Design –I**

Course Contents:

Module I: Design and Built Environments - 2 weeks

Introduction to Design – Creative problem solving, Aspects of Design – Art and Science, Design for Built Environment, Role of Architect, Interior Designer & Engineer, Aspects of Architecture Design– Visual Language of Form(Art) , Functional Space, Material & Structure (Technology) and culture.

Suggested Activities:i) Student will be asked to use online and Library resources to select images of any one product from everyday life and images of any one building of his/her choice to investigate aspects of design embedded in them . Student will present the investigation and learning in the form of PowerPoint presentation. ii) Group reading and discussion from extracts of “A Pattern Language: Towns, Buildings, Construction – Christopher Alexander”

Module II: Visual Language – 4 weeks

Introduction to how we see forms and perceive them and its importance in design, Visual Elements of Design - **point, line, surface, solids, colour, texture** etc; Principles of Design-**Balance, Symmetry, Repetition, Rhythm, Datum, Hierarchy** etc.; Built Forms and their aesthetics, Order-Character- meaning (symbolism) of Built Forms, Abstraction

Suggested Activities:i) Student will be asked to do online search for optical illusions and present them in class to appreciate how we perceive things ii) Student will be asked to disintegrate/explode a given built form into its constituent elements by sequential representation in drawing from whole form to surfaces to lines till points.iii) Student will be asked to sketch any one Building Façade in vicinity to identify and disintegrate it into its constituent design elements. Student needs to present the identified design principle that binds the elements together in the selected building façade iv) Students will be asked to search for built-form s that with strong association in cultural meaning and present them

Module III: Function: Activities, Spaces and Anthropometrics – 4 weeks

Types of Built- Environment - Enclosures; Human activities- space function; Types of Spaces – Primary, Supporting (Ancillary) and Link; Positive and Negative spaces; Relationship between Built-Form and Space & its function; Elements of Space making ; Anthropometrics – Human being as measure of everything, Modular and Golden Section.

Suggested Activities:i) In Group:- Rectangles of different sizes shall be marked in an open area and students shall be asked to use anthropometrics to suggest activities that can be done in the marked area. Students will enact the suggested activities within the area to evaluate their comprehension of space and anthropometrics ii) In Group : Students will be asked to create enclosure around the marked area and comprehend the psychological difference w.r.t space which the sense of enclosure creates in the user. Students shall now be asked to re-suggest the activities within the enclosure and enact them to evaluate their comprehension of space and anthropometrics iii) Composition using Golden Section

Module IV: Technology and Design - 2 weeks

Role of Material and technology in Design for Built- Environments; Brief introduction to types of Structural systems and their influence on built form; key materials used in Building Design (interior and exterior); Relationship between Material, Structure, function and form.

Suggested Activities: i) Student will be assigned a building/ built-form to deduce the influence of material and structure system on built-form
 ii) Redesign of a given built-form by altering material and structural system to presented through conceptual sketch/ model

Module V: Design Process in Architecture– 2 weeks

Iterative problem solving process of Design (Design Cycle); Design Process for Built-forms – sequence and stages; Different drawing types to represent different Design Stages – Bubble Diagram, Space Matrix, Conceptual Drawing, Architectural Presentation Drawing and Working Drawing.

Suggested Activities: i) Student will draw Design Process cycle, Bubble Diagram, Space Matrix, conceptual drawing and Presentation drawing for Studio Project in the course BAR101Design-I

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- A Pattern Language: Towns, Buildings, Construction- Christopher Alexander
- Structure in Architecture, Heller Robert and Salvadori Mario
- Design Fundamental in Architecture, Walter Gropius
- Pattern of Nature, Peter Streens
- Elements of Architecture, MeissPieree Von
- Architecture: Form, Space and Order, Francis D.K. Ching
- Elements of Space Making – Yatin Pandya
- Sketch Book by Tony Hunt

BAR 108 VISUAL ART AND APPRECIATION

Course Code: BAR 108 Credit Units: 01

L/0-ST/0-P/2

Teaching hours: 02

A. Course Learning Objective

CLO 1 :	Understand and remember the fundamentals of drafting
CLO 2 :	Understand the fundamentals of geometry
CLO 3:	Understand the principle and different types of projections and views
CLO 4 :	Learning the techniques of surface development
CLO 5 :	Produce presentations on all the four cognitive learning outcomes.

B. Syllabus

Course Objectives:

- To familiarize the students with the fundamentals and vocabulary of design.
- To expose the students to the practice of arts appreciation
- **To enable the students, represent their ideas in different media through aesthetically pleasing compositions.**

Course Contents:

Module I: Principles of design- 2 weeks

Introduce the students to the fundamental elements of art -line, shapes, form, space, colour, value & texture. Exercises will involve application of these elements.

Impart conceptual and procedural knowledge about principles of design- Balance, unity, pattern, emphasis, movement, rhythm, and contrast. Exercises will require implementation of these principles

Module II: Fundamentals of Colours- 3 weeks

Introduce the students to the fundamental terminologies of colour - hue, intensity, value, shades, tints, warm & cool colours- Learning their synthesis and application through exercises.

Enable the students to comprehend the qualities of colours - Colour wheel - Primary, Secondary & Complementary colours. Learning their synthesis and application through exercises.

Module III: Various Mediums of Drawings -3 weeks

Familiarize the students with the different mediums of drawing- Pencils, ink and water colour. Exercises will include creation of simple art works using the various mediums

Module IV: Free hand drawing - 2 weeks

Upskill the students with techniques of free hand drawing. Exercises will involve drawing of still life objects and outdoor sketches like buildings, streets, etc.

Module V: Art Appreciation - 2 weeks

Expose the students to the practice of interpretation of visual representation like ideas, emotions, and activities. Demonstrate examples to students. Exercises will include synthesis of graphics art with a background expression.

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- Wayne Enstice, Melody Peters, "Drawing space, Form, Expression", Prentice hall, Englewood Cliffs, New Jersey, 1990. Palmer John, "Drawing & Sketching", Brock Hampton Press, London, 1993.
- "Learn to Paint and Draw", Victoria House Publishing Ltd., Bath, UK, 1981. Goodman Sue & Porter Tom., "Designer Primer", Butter Worth Architecture, London, 1988.

BAR 201 DESIGN – II

Course Code: BAR 201

Credit Units: 09

L/0-ST/6-P/0

Teaching hours: 06

A. COURSE LEARNING OUTCOME:

CLO 1 :	Analyse functional spaces and the issues like clearances, lighting and ventilation, using the anthropometric study approach and work out Minimum and optimum areas for various functions.
CLO 2 :	Design according to the human considerations like, privacy, convenience, comfort, etc
CLO 3 :	Investigate, Compare and Infer existing architectural spaces through their measured drawings, models and photographs
CLO 4 :	Conclude and Recommend criteria to Justify/Decide basis for architecture design proposal
CLO 5 :	Develop, Propose and Draw the Design for a given architectural situation and Communicate through conventional architectural representations

B. SYLLABUS

Course Objectives:

- To understand interdependence of Form, Function, structure and basic services in building design
- To comprehend Site as determinant of Architectural Design
- To progress from the ability to design for uni-functional space to multi-functional spaces in a single building not exceeding G+1

Course Contents:

Module I: Introduction

Introduction to interdependence of Form, Function, Structure and essential services in with examples of residential buildings not exceeding G+1; Establishing Relationships between multifunctional spaces and their disposition in a single building; Understanding Site and Conducting Site Studies; Project introduction for studio exercise

Module II Measured Drawing as Tool for Case Studies and Site Studies

Detailed Measured Drawings (Plans, Sections & Elevations) of Residential building along with Site measurements and studies; Literature Review – Design Standards and Codes, Brief Formulation

Module III: Concept Formulation

Development of concept to be presented with conceptual block model and sketches for approval.

Module IV: Design Development

Design to be developed through a series of appraisals and open discussions. Planning at site as well as building level to be frozen and workability, efficiency of design to be worked out and finalized.

Module V: Presentation

Enhancement of presentation skills using multiple media. Creation of 3-D models based on the design. Preparation of perspective views (internal & external). Presentation of studies and design proposal through submission of sheet work – drawings and views as well as scaled models. *An A4 Design Report - documenting the process & progress of work through clippings of sketches/ photographs of models highlighting design concept as well as the final proposal drawings etc- shall be an essential part of submission.*

Design exercise can include minor problems like bus shelter, milk booth, entrance gate, watchman's cabin, traffic police kiosk, flower stall, ATM Centre and major problems like Residence – villa, farmhouse, weekend cottage, artist studio etc. having 3-4 spaces.

Examination Scheme:

Components	A	S1	S2	C T	E E	
Weightage (%)	05	15	20	1 0	20 Viva	30 EE

Text Books /Reference Books/Journals/Other Study Material:

- 'Ching Francis, (1979), Architecture Form, Space and Order, Van Nostrand Reinhold Company, New York.
- Neufert Ernst, (1970), Architect's Data, Crosby Lockwood and Sons, London.
- Chiara JD and Calender, (1983), Time Savers Standards for Building Types, M cGraw Hill Book Company, New York.
- Broomer, F. Gerald (1974) Elements of Design: Space, Davis Publications Inc., Worcester, M assachusetts.
- Wagenknecht, Kay and Herte (1989) Site + Sculpture – A collaborated design Process, Van Nostrand Reinhold, NY.
- Allen, Edward and Iano, Joseph (2006), The Architect's Studio Companion: Rules of Thumb for Preliminary Design, Wiley; 4th edition.
- Frederick, M atthew (2007), 101 Things I Learned in Architecture School, The MIT Press.
- Pearson, David (2001), New organic architecture: the breaking wave, University of California Press.
- Fawcett, Peter (2003), Architecture: design notebook, Architectural Press, 2nd edition

Online Resources

- <https://www.archdaily.com>
- <http://www.architectmagazine.com>
- <https://www.architecture.com/knowledge-and-resources/resources-landing-page>

BAR 202 MATERIALS AND CONSTRUCTION TECHNOLOGY - II

Course Code: BAR 102 Credit Units: 03 L/1-ST/1-P/1 Teaching hours: 03

A. COURSE LEARNING OUTCOME:

CLO 1 :	Distinguish between various type of wood though analysing their physical and chemical properties. Evaluate Cross sectional detail of a log Properties of Timber; Processing of Timber Evaluate and Identify use of timber & timber products in buildings
CLO 2 :	Design according to the human considerations like, privacy, convenience, comfort, etc
CLO 3 :	Recognise the different types of openings made up of timber in day to day life & understand the construction techniques of making wooden doors and windows. Develop understanding regarding the different types of carpentry joints & their specific uses and evaluate the best suitable joint in openings. Understand the construction techniques of making wooden staircase. Understand the various types of wooden trusses, their different components and construction techniques of making wooden trusses.
CLO 4 :	Evaluating and Analysing with the market surveys, case examples or literature studies available.
CLO 5 :	Create details for constructing a wooden staircase. After evaluating and analysing various wooden joints , Students will create roof trusses, staircases, windows or door.

B. SYLLABUS

Course Objective:

- To acquaint the students with Timber as a construction material and to familiarize them with construction techniques for use in building works.

Course Contents:

Module I: Timber -2 weeks

Difference between wood and timber, Classification, Characteristics, Defects and Preservation.

Module II: Timber Doors --3 weeks

Drawings of Timber Joinery, Types, Classification and Usage.

Doors: Ledged, Braced, Battered door, flush, paneled, single and double shutter doors of various types and sizes.

Module III: Timber Windows and ventilators - 3 weeks

Types, classification and construction details

Fully glazed, fixed glass, timber louvered, bay & casement window detail, ventilators details.

Module IV: Different type of Timber products: -3 weeks

Soft board, hard board, ply, straw board, MDF board, saw dust, block and particle board etc.

Their manufacturing, advantages and disadvantages, market terminology, Sizes available and prices, availability and use with all the details. Report, samples, catalogs to be compiled from market survey.

Module V: Wooden Staircases & trusses- Basic concepts and construction -2 weeks

Different type of Staircases & trusses and their terminology and construction detail.

Exercises: Preparation of drawings on above topics.

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- Building construction W.B.McKay
- Building construction R Berry
- Building construction Chudley
- Building constructin Francis D.K. Ching

BAR 203 STRUCTURAL DESIGN & SYSTEM - II

Course Code: BAR 203 Credit Units: 02 L/2-ST/0-P/0 Teaching hours: 02

A. Course Learning Objective

CLO 1 :	Understand & identify the properties of the constituent materials of concrete Identify and demonstrate the behaviour of fresh and hardened concrete. Design concrete mixes as per IS and ACI codes Identify, describe and carry out the main laboratory tests on concrete constituents.
CLO 2 :	Demonstrate recent advancements in concreting materials and procedures. Investigate the properties & characteristics of any soil type at any construction site using advanced methods
CLO 3:	Develop his /her interest in geotechnical engineering designing field

B. Syllabus

Course Objective:

- To understand the application of basic structural system into modified system of structure.
- To help the students for understand the basic principles of structural behavior and requirements of buildings with emphasis laid on the principles of various load & stresses distribution in beams and columns.

Course Contents:

Module I:Stresses in Beams-3 weeks

Theory of simple bending- neutral layer, bending stresses in beams, bending equation, Definitions, Distribution of shear stress in section of a beam – rectangular, semi- circular, T and I sections.

Module II:Analysis of Trusses-2 weeks

Introduction, forces in members, analytical methods, Method of joint & sections, graphical method, link polygon in trusses

Module III:Direct and Bending stresses-2 weeks

Introduction, eccentric loading, columns with eccentric loading, symmetrical columns with eccentric loading about one & two axis.

Module IV:Deflection of Beams-3 weeks

Introduction, Curvature of the bending beam, relation between slope, deflection & radius of curvature, methods for slope & deflection at a section, simply supported beam with a central, eccentric, UDL, UVL, Macaulay's method for slope & deflection.

Module V:Columns& Struts-3 weeks

Definition, Euler's Theory of long columns, Assumptions in the Euler's column theory Columns with end conditions, slenderness ratio, Limitations of Euler's formulae, IS Codes for columns.

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- Elements of Structure, Morgan
- Salvadori, Structures in Architecture,
- Everet, Structure and Fabric,
- Khurmi R. S., Strength of Materials,
- R.K. Bansal, Engineering Mechanics By.
- Khurmi R. S, Applied Mechanics and Strength of Materials,
- Salvadori and Heller, Structure in Architecture,

BAR 204 GRAPHIC SKILLS – II

Course Code: BAR 204 Credit Units: 02 L/0 ST/0 P/4 Teaching hours: 04

A. Course Learning Objective

CLO 1 :	Understand and remember the fundamentals of drafting
CLO 2 :	Understand the fundamentals of geometry Understand the principle and different types of projections and views
CLO 3 :	Produce presentations on all the four cognitive learning outcomes.

B. Syllabus

Course Objective:

To enable students to produce manual drawings of interpenetration of solids, perspective views and Sciography. To impart the techniques of architectural rendering required for effective presentation.

Course Contents:

Module I: Interpenetration of Solids

Orthographic Projection Drawings and Axonometric views of interpenetration of different solids in different position.

Module II: Introduction to perspective – Plan Method

Importance and use of perspective drawing in architecture; Anatomy of a perspective-cone of vision, station Points, picture plane, eye level, horizon line, ground line, vanishing point, etc; One point & Two point Perspectives Plan Method-simple form to building forms.

Module III: Perspective – Grid Method

One Point and Two point perspectives using Grid Method for faster production of Perspective Drawings.

Module IV: Sciography

Values in shades and shadows. Constructing plan shadows (point, line and plane), Constructing shadows in elevations (Point, line and Plane). Constructing shadows in perspective views. Short-cut methods for constructing shadows.

Module V: Introduction to Rendering(dry and wet)

Presentation techniques in different types, medium and materials. Rendering perspectives in different media (Dry/water based color and ink etc.). Variation in color/ ink, as per light position. Use of basic plantation, vehicles, human beings etc to introduce scale to building perspectives.

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

Text:

- Architectural Graphics, C. Leslie Martin
- Perspective and Sciography, Shankar Mulik
- Interior Design, Ahmed Kasu
- Architectural Graphics, Ching Frank
- Engineering Drawing, N.D. Bhatt
- Engineering Drawing – P.S. Gill

References:

- A.J. Metric Handbook, editors, Jan Bilwa and Leslie Fair weather
- Architectural Graphic standards editor, Boaz Joseph
- Neufert's Architect's data
- Time Saver standards for building types, Editor Joseph D.C. and John Callender.

Rendering with pen and ink.

BAR 205 HISTORY OF ARCHITECTURE-I

Course Code: BAR 205 Credit Units: 02 L/2-ST/0-P/0 Teaching hours: 02

A. COURSE LEARNING OUTCOME:

CLO 1 :	Analyze and evaluate the building styles of different eras and the strategic developments of forms and structures
CLO 2 :	Examine the developments in the use of materials with different eras.
CLO 3 :	Analyse the spaces proportions, and sections, motifs of typologies of buildings such as communal hall, residences etc.

B. SYLLABUS:

Course Objectives:

- Understanding of the Art and architecture of an era with respect to its influence in terms of its location, climate as well as the socio-cultural historical, economical and political systems in planning, building form and architectural details.
- Study of the building types and development of major buildings form of that period in detail with examples that identify the works of the period.

Course Contents:

Module I: Module title Buddhist and Architecture- 2 weeks

Buddhist Architecture- study of Bodh Gaya and Sanchi Stupa, Examples of Chaityas, Monastries and Stupas

Module II: Temple Architecture- 2 Weeks

- South India or Dravidian Architecture – Pallava Style (AD 600-900), Chola Style (AD 900-1150), Pandya Style (AD 1200 -1350), Vijaynagara Style. Some of the major buildings to be covered include Ratha and Shore temples in Mahabalipuram, Brihadeshwara Temple in Tanjore, Meenakshi Temple in Madurai and Virupaksha Temple
- North India
Nagara Style of Gwalior explained using examples of Teli Ka Mandir, Chaturbhuja Temple, etc.
Nagara Style of Orissa with examples of Mukteshwara Temple, Lingaraja Temple, Konark Sun Temple, etc.
Khajuraho Group of temples
- Central India - Chalukyan/ Vesara Style of Architecture – Description using examples like Badami Temple, temples at Aihole, etc.
- Jain temples of Rajasthan and Gujarat

Module III: Introduction to Islamic Period-1 Week

Introduction and understanding of "Islam's" philosophy and its interpretation in building types – Mosque, Tomb, Fort

and their elements like dome, arches, minarets etc. With reference to the Slave, Khilji, Tughlaq, Lodi and Sher Shah Suri (who ruled from Delhi), architecture at Punjab, Gujarat, Bijapur and Deccan.

Module IV: Mughal Architecture-2 Weeks

Examples of monuments at Fatehpur Sikri, Qutab Complex, Tughlakabad, Taj Mahal, Gol Gumbaj, Golconda Fort, Jami Masjid etc. The Architecture related to Babur, Humayun, Akbar, Shahjahan Period and later Mughal period its implication on Architectural field. Introduction to Mughal Gardens

Module V : Indian Colonial architecture-1 Week

Monumental buildings of Early colonial period – Examples – St. Pauls Cathedral Calcutta & Bombay Town hall

– Architectural character of Indo-Saracenic and Classical revival – University of Madras Senate House & Victoria

Memorial hall Calcutta – Later Colonial period – Contribution of Edwin Lutyens & Herbert Baker to the lay-out and Architecture of New Delhi – Rashtrapathi Bhavan & Parliament House.

Measured drawing exercise may be combined with local educational tour, recommended by the subject teacher to be organized at the end of the semester after the examinations

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

Text:

- “Glimpses of World History” by Pt. Jawahar Lal Nehru
- “The History of Architecture” by Sir Bannister Fletcher
- *Indian Architecture (Islamic Period) – Percy Brown*
- *Indian Architecture – Islamic Period – 1192 – 1857 b – Dr. SurinderBahai*
- *Islamic Architecture of the Indian Subcontinent – Bianca MariaAlferia*
- *“Buddist and Hindu Architecture” in Indiaby*

BAR 206 BUILDING SERVICES -I

Course Code: BAR 206 Credit Units: 02 L/2-T/0-P/0 Teaching hours: 02

A. Course Learning Objective

CLO 1 :	Understanding the scope, importance and ethics of the field of building services. Appreciate the requirements of different types of building services. Learn the concepts of the building services systems
CLO 2 :	To evaluate the quantity and quality of services to be provided.
CLO 3:	Identify the various appliances, fixtures and appurtenances. Learn about the popular techniques of the building sciences.
CLO 4	Study about the thumb rules and the byelaws of the services and learn how to apply the knowledge while designing the layout of the buildings and its execution
CLO 5	Develop reports and assignments containing write-ups, and sketches to express their understanding of building services during lectures and site visits.

B. Syllabus

Course Objectives:

- To acquaint students to basic principles of water supply, sanitation and plumbing bye laws and systems.
- To assist them in design of plumbing systems at building to town level for different typologies.

Course Contents:

Module I: Water Supply- 2 weeks

Introduction to water supply- sources of water; impurities, purification and treatment of water, Need to protect water; and requirements of water supply for different building types- storage, distribution.

Water supply systems at City/ Settlement level; Distribution networks; schematic making of an overhead water reservoir for a town/city.

Module II: Drainage Systems- 3 weeks

Concept, design and detailing of drainage systems at micro and macro level- Introduction to municipal drainage systems at town level, Building/ Site planning for drainage systems, Rainfall, Storm water drains, gullies, open drains (construction, gradients, ventilation and maintenance etc.). Concept, design and detailing of rainwater harvesting systems. Self-cleansing velocity, invert levels, drains on sloping sites, sewage disposal system in unsewered localities- septic tank, soak pits, cesspools, aqua-privy, leeching pits for individual building of urban and rural areas.

Module III: Sanitation- Sewerage- 2 weeks

Purpose and principles, collection and conveyance of waste matter. Sewage treatment plants and bye products. Sewage system design at building and town level. Sanitary appliances, fixture, traps, pipes and joints, drainage in non-municipal areas. Plumbing bye laws. Plumbing design of a toilet and kitchen

Module IV: Sanitation- Solid waste management - 2 weeks

Garbage types, collection and disposal- Purpose and methods (Incinerator, Dry disposal etc.). Garbage disposal in multi-story buildings, Treatment of industrial refuse, Refuse

and pollution problems.R4 of waste management.

Any important note or instruction for course coordinator

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

Text:

- Water supply, waste disposal and environmental engineering, Chatterjee Water supply and sanitary engineering, Singh
- Water supply and sanitation, Shah
- S.C.Rangwala, “Water supply and sanitary engineering”, Chartar publishing house, Anand,1989.

References:

- Design and practical handbook of plumbing, Mohan & Anand Plumbing Design and practice, Deolalikar
- Civil handbook, Khanna
- Building construction details, Banz
- Maintenance of buildings,Panchdhari
- G.M. Fair, J.C. Geyer and D.Okun, “Water and Waste water engineering”, Volume II, JohnWiley& Sons, Inc. New York, 1968
- Manual on sewerage and sewerage treatment, CPHEEO – Ministry of works and housing, NewDelhi, 1980

Renewable energy, basics and technology, supplement volume on integrated energysystems, Auroville, 1998

BAR 301 DESIGN – III

Course Code: BAR 301 Credit Units: 09

L/0-ST/6-P/0 Teaching hours: 06

A. COURSE LEARNING OUTCOME:

CLO 1 :	Analyse functional spaces and the issues like clearances, lighting and ventilation, using the anthropometric study approach and work out Minimum and optimum areas for various functions.
CLO 2 :	Design according to the human considerations like, privacy, convenience, comfort, etc
CLO 3 :	Investigate, Compare and Infer existing architectural spaces through their measured drawings, models and photographs
CLO 4 :	Conclude and Recommend criteria to Justify/Decide basis for architecture design proposal
CLO 5 :	Develop, Propose and Draw the Design for a given architectural situation and Communicate through conventional architectural representations

B. SYLLABUS

Course Objectives:

- To understand design for low rise Community buildings requiring integration of multifunctional spaces and services
- To understand symbolisms in built-forms

Course Contents:

Module I: Introduction

Introduction to community buildings preferably not exceeding G+2 that need ease of access, vertical circulation, way finding and form that can be a landmark and symbolize the aspirations of the target group with examples; Project introduction for studio exercise

Module II :Case studies, Site Studies and Literature Studies

Case Studies – primary and secondary; Site studies; Literature Review – Design Standards and Codes, Comparative Analysis and Area statement

Module III: Concept Formulation

Development of concept to be presented with conceptual block model and sketches for approval.

Module IV: Design Development

Design to be developed through a series of appraisals and open discussions. Planning at site as well as building level to be frozen and workability, efficiency of design to be worked out and finalized.

Module V: Presentation

Enhancement of presentation skills using multiple media. Creation of 3-D models based on the design. Preparation of perspective views (internal & external). Presentation of studies and design proposal through submission of sheet work – drawings and views as well as scaled models. *An A4 Design Report - documenting the process & progress of work through clippings of sketches/ photographs of models highlighting design concept as well as the final proposal drawings etc- shall be an essential part of submission.*

Design exercise can include community buildings like Kindergarten School, Primary Health Centre, neighbourhood Cafeteria, Motel, Post Office, Bank extension counter, Police Station, Departmental Store, Gymkhana and Youth Club etc.

Examination Scheme:

Components	A	S1	S2	C T	E E
Weightage (%)	05	15	20	1 0	20 Viva 30 EE

Text Books /Reference Books/Journals/Other Study Material:

- ‘Ching Francis, (1979), Architecture Form, Space and Order, Van Nostrand Reinhold Company, New York.
- Neufert Ernst, (1970), Architect’s Data, Crosby Lockwood and Sons, London.
- Chiara JD and Calender, (1983), Time Savers Standards for Building Types, M cGraw Hill Book Company, New York.
- Broomer, F. Gerald (1974) Elements of Design: Space, Davis Publications Inc., Worcester, Massachusetts.
- Wagenknecht, Kay and Herte (1989) Site + Sculpture – A collaborated design Process, Van Nostrand Reinhold, NY.
- Allen, Edward and Iano, Joseph (2006), The Architect's Studio Companion: Rules of Thumb for Preliminary Design, Wiley; 4th edition.
- Frederick, M atthew (2007), 101 Things I Learned in Architecture School, The MIT Press.
- Pearson, David (2001), New organic architecture: the breaking wave, University of California Press.
- Fawcett, Peter (2003), Architecture: design notebook, Architectural Press, 2nd edition

Online Resources

- <https://www.archdaily.com>
- <http://www.architectmagazine.com>

<https://www.architecture.com/knowledge-and-resources>

BAR 302 MATERIALS & CONSTRUCTION TECHNOLOGY – III

Course Code: BAR 302 Credit Units: 03 L/1-ST/1-P/1 Teaching hours: 03

A. COURSE LEARNING OUTCOME:

CLO 1 :	To define basic building elements.
CLO 2 :	To Recognize the various types of brick and stone masonry both in superstructure and foundation
CLO 3 :	To know about the types and fundamental aspects of construction in stone & brick i.e masonry, openings.
CLO 4 :	To be able to use composite materials in a structure.
CLO 5 :	To be aware of the properties and applications of the various materials

B. SYLLABUS

Course Objective:

- To acquaint the students with cement and cement concrete as a construction materials and to familiarize them with construction techniques in building works.

Course Contents:

Module I: Introduction to cement and Concrete – 2 weeks

Cement types, qualities, precautions etc. special purpose cement, cement concrete:

Types, Mixing, Curing, Water Cement Ratio etc.

Reinforced Brick Concrete: Qualities and Workability.

Introduction to R.C.C, its usage, types, making and availability with its advantages and disadvantages. Concreting under special conditions.

Module II: Foundation – 3 weeks

shallow and deep foundation

R.C.C. footings, isolated, strip, combined footings, Raft, Pile foundation with their detail.

Module III: Staircases – 3 weeks

Different types of R.C.C. Staircases with their construction detail, Components of staircase.

Module IV: Special Details – 3 weeks

R.C.C. columns and beam structure, roof forms and its connection with structure.

R.C.C. work defects

and its treatment.

Expansion joints and

its detail.

R.C.C. roof with water proofing details.

Module V: Temporary constructions – 3 weeks

Shoring, underpinning, strutting, formwork, scaffolding etc. in timber and steel.

Exercises: Identification of materials and study of relevant I.S. codes, field trips, preparation of drawings on above topics.

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- Building construction W.B.M cKay
- Building construction R Berry
- Building construction Chudley
- Building construction
Francis D.K. Ching
Civil Engineering
Handbook, P.N. Khanna
- R.C.C. Design, Khurmi,
Punmia, Sushil Kumar
Design of Steel Structure,
Negi

Structure in Architecture, Salvadori and

BAR 303 STRUCTURAL DESIGN & SYSTEM- III

Course Code: BAR 303 Credit Units: 02 L/0-ST/0-P/4 Teaching hours: 04

A. COURSE LEARNING OUTCOME:

CLO 1 :	Analyse & evaluate the shear force & bending moment for beam element under the various loading & support conditions by using different methods of structural analysis.
CLO 2 :	Examine the structure by using indeterminacy/determinacy concept from the stability point of view of structure.
CLO 3 :	Analyse the shear force & bending moment diagram by using moment distribution method slope deflection method & strain energy method under the various loading & support condition for the beam element.
CLO 4 :	Understanding the loading conditions of arches by using two & three hinged arches concept.

B. SYLLABUS

Course Objective:

- To understand the transformation of basic components of structural system into the analysis of structural system like: - analytical approaches in the beams & columns by using different kind of methods.
- To help the students for understanding the analytical methods by using statically methods which is described below

Course Contents:

Module I: Forms of structure-3 weeks

Determinacy & indeterminacy of the rigid as well as pin jointed structures, definition of static & kinematic indeterminacy, its application in plane & space forms structures.

Module II: Shear Force & Bending Moments calculation & its diagrammatic presentation by Moment distribution method-3 weeks

Introduction of S.F.D & B.M.D. calculation of shear force & bending moment by using moment distribution method for all types of support & loading system.

Module III: Shear Force & Bending Moments calculation & its diagrammatic presentation by Slope deflection methods-2 weeks

Introduction of S.F.D & B.M.D. calculation of shear force & bending moment by slope deflection methods for all types of support & loading system.

Module IV: Shear Force & Bending Moments calculation & its diagrammatic presentation by strain energy methods-2 weeks

Introduction of S.F.D & B.M.D. calculation of shear force & bending moment by Strain energy method for all types of support & loading system.

Module V: Arches-2 weeks

Introduction, definition, three & two hinged arches, fixed arches. Parabolic & circular arches. & its application in architecture system.

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- E. P. Popov, Mechanics of materials.
- S. Ramanathan, Theory of Structures.
- S. Bhavikatti, Structural analysis Vol.-I.
- S. Bhavikatti, Structural analysis Vol.-II.
- Morgan, Elements of Structure.
- Salvadori, Structures in Architecture.
- Everet, Structure and Fabric.
- Khurmi R. S., Strength of Materials
- R.K. Bansal, Engineering Mechanics.
- Khurmi R. S., Applied Mechanics and Strength of Materials.

Salvadori and Heller, Structure

BAR 304 GRAPHIC SKILLS– III (Computer aided)

Course Code: BAR 304 Credit Units: 02 L/0-ST/0-P/4 Teaching hours: 04

A. COURSE LEARNING OUTCOME:

CLO 1 :	Analyse & produce manual drawings of interpenetration of different solids in different positions and at different angles.
CLO 2 :	Understand the importance and use of perspective drawing in architecture; Anatomy of perspective-cone of vision, station Points and produce one point and two point perspective drawings manually through plan method and grid method.
CLO 3 :	Calculate and draw sciography, using different grades of shade and shadow in elevation and perspective views.
CLO 4 :	Apply the presentation techniques using different mediums such as color/ ink, as per light position. Also understand the use of basic plantation, vehicles, human beings etc to introduce scale to building perspectives.

B. SYLLABUS

Course Objective:

- To introduce students with computer and its application in architecture.
- To train students in drafting and presentation techniques using Auto-CAD.
- To train students how to make 2-D presentation and render using photoshop.

Course Contents:

Module I: Intro to Computer Graphics and basic application of 2D drafting Software - 1 week

Introduction to Auto CAD and its interface. Auto CAD co-ordinate system, inputting points, basic Auto CAD terminology, basic drafting commands.

Module II: Auto Cad (2-D): basic commands and introduction to use of printing equipment's and hardware - 2 weeks

To setting up a drawing environment; setting up the paper size setting unit setting grid limit, drawing limit, snap controls. Two- dimensional drafting work to be handled in detail on Auto Cad. Basic Drafting commands (Related to drafting of line to All geometrical shapes).

Module III: Auto Cad (2-D): modifying commands - 3 weeks

Basic commands related to drawing properties “layer control change properties, line-weight control”. Use of Display Commands, editing commands, construction commands, enquiry commands etc., Hatching & texturing in drawing, Working on layout & x-ref etc. Drafting of Plan(s), Elevation(s) and Section(s).

Module IV: Auto Cad (2-D): advanced commands-3 weeks

Draw, edit and create a complete set of architectural drawings for a dwelling unit using

AutoCAD Plan(s), Elevation(s) and Section(s) in detail. Create final presentation and documentation of 2D drawings in AutoCAD.

Familiarizing the use of printers, plotters their hardware and other related systems. Various Settings & different mode to print Auto CAD drawing. Importing & exporting the drawings from one software into other.

Module V: Use of photo editing Software - 4 weeks

Introduction to Photo editing as well as preparation of 2-D presentations and rendering views on Photoshop.

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- Manuals of AutoCAD – Autodesk Inc.
- Computer graphics and design, Radhakrishnan
Inside AutoCAD -parker,
denial& rice
- Adobe Photoshop user guide/manual.

Manuals of AutoCAD –

BAR 305 HISTORY OF ARCHITECTURE- II

Course Code: BAR 305 Credit Units: 02 L/2-ST/0-P/0 Teaching hours: 02

A. COURSE LEARNING OUTCOME:

CLO 1 :	Analyse and evaluate the building styles of different eras and the strategic developments of forms and structures
CLO 2 :	Synchronize the construction activities with installation of building services. Select the suitable system for particular requirements of buildings.
CLO 3 :	Understanding the importance of sound energy and its impact on building design and also able to control noise within the interior and from exterior sources.

B. SYLLABUS

Course Objectives:

- Understanding the world architecture during the Greek, Roman Romanesque Period and Gothic Period, Study of specific Architectural examples, characteristics features and their origin in above mentioned period.

Course Contents:

Module I: Greek Architecture- 2 weeks

Evolution and Development, Classical orders and constituent elements of architecture- Column orders and the articulation of temp les. Classification of temples, Geometry and symmetry of individual buildings and their relationship with others based on different organizing principles and conditions of site. Study of importance- Acropolis, Agora, Temples, Theatres, Tombs and House forms

Module II: Roman Architecture - 2 Weeks

Evolution and Development, Multiple building types to correspond the complex social functions and structure. Complex axial organization of forms. Concrete and construction of vaults and domes. Uses of classical orders in surface articulation. Study of important forums, Temples, Basilicas, Theaters, Amphitheatres, Circuses, Tombs, Triumphal arches, palaces, houses and villas.

Module III: Early Christian Architecture - 1 Week

Introduction and understanding of "Islam's" philosophy and its interpretation in building types – Mosque, Tomb, Fort and their elements like dome, arches, minarets etc. With reference to the Slave, Khilji, Tughlaq, Lodi and Shershah Suri (who ruled from Delhi), architecture at Punjab, Gujrat, Bijapur and Deccan.

Module IV: Byzantine Architecture-2 Weeks

Study of Italian basilicas and churches. Centralization in churches, Centrality and interiors of both cross domed and cross in square plan churches. Interior and exterior of churches with heavenly interiors. Construction of domes over polygonal

compartments through the use of pendentives. Study of important churches of the Time period.

Module V :Romanesque Architecture-1 Week

Spatial and formal integration of Romanesque churches. Integration of wall and vaults. Ribbed vault and the dissolution of external wall to allow light. Sensitivity to light and use of stained glass for mysterious interiors. Need and development of different external buttressing. Study of important cathedrals and churches in France

Presentations, paper writing and Essays exercise may be optionally be considered, recommended by the subject teacher at the end of the semester after the examinations

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

Text:

- “ Glimpses of World History” by Pt. Jawahar LalNehru
- “ Ubrban Pattern” by A.B.Gallion
- “ The History of Architecture” by Sir BannisterFletcher
- “ Thegreat age of world Architecture”-G.K Hirasker

References:

- History of Architecture – J ESwain
- History of Architecture by DoraCouch
- A study of History – AlmondToynbee

Traditions in Architecture – DoraCouch

BAR 306 BUILDING SERVICES- II

Course Code: BAR 306

Credit Units: 02

L/2-ST/0-P/0

Teaching hours: 02

A. COURSE LEARNING OUTCOME:

CLO 1 :	Understand the basic of sound energy, process and are able to manage building acoustical services provisions in construction sites.
CLO 2 :	Examine the developments in the use of materials with different eras
CLO 3 :	Analyse the spaces proportions, and sections, motifs of typologies of buildings such as communal hall, residences etc.

B. SYLLABUS

Course Objectives:

- To integrate electrical system with building design. Application of indoor and outdoor lighting in various planning and installation requirement right from generation to actual building level so that the students could use the same in their design.

Course Contents:

Module I: Introduction to electrical systems- 1 weeks

Introduction to electrical engineering services for buildings; Sources of electrical energy supplied to buildings Electricity generation, transmission and distribution. Instruments for measurement, metering; Electricity Authority, Act, rules and regulation regarding electrification of buildings; Standard Graphical symbols for electrical systems; electric fittings and appliances; Requirements of electrical materials such as conductors, insulators; Types and requirements of electrical cables

Module II: Electrical System design for a building - 1 weeks

Basic Principles of electrical circuit, Methods of wiring -Open and concealed wiring system, distribution system and supply in a building, distribution board and meter, switches; Electrical load calculation,; Design considerations of electrical installations, Study of Electrical layout in a building.

Module III: Electrical safety and protection system - 1 weeks

Protection against overload, short circuit, Control equipment such as switch gear, safety devices to be used in electrical layouts - Fuse, M.C.B, MCCB, ACB, VCB, RCB, ELCB; Earthing and Lightning Protection

Module IV: Photometric Concepts and Day Lighting- 1 weeks

Introduction to basic photometric concept: Light its behaviour and properties, Instruments for measurement lux meters, field of vision, visual task, visual comfort and glare: objectives of lighting design in architecture.

Module V: Artificial Lighting- 1 weeks

Introduction to basic photometric concept: Light its behaviour and properties, Instruments for measurement lux meters, field of vision, visual task, visual comfort and glare: objectives of lighting design in architecture.

Module VI: Design Exercise- 2 weeks

Design and developed detailed layout of electrical and lighting services of previous semester design problem.

Any important note or instruction for course coordinator

Examination Scheme:

Components	A	CE	C T	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- Raina K. B. & Bhattacharya S. K. (2007) Electrical Design, Estimating and Costing, New Age International Publishers, New Delhi.
- Dagostino, F. R. (1978) Mechanical and Electrical Systems in Construction in Architecture, Reston Publishing Company, Prentice Hill Co., Virginia.
- Egan, D. M. (1983) Concepts in Architectural Lighting, McGraw Hill Book Company.
- Flynn, J. E. et. al (1992) Architectural Interior Systems: Lighting, Acoustics and Air conditioning, Van Nostrand Reinhold
- NBO (1966) Hand book for Building Engineers, National Buildings Organisation, New Delhi.
- Grondzik, W. T., Kwok, A.G., Stein, B, Reynolds, J. S. (2009) Mechanical and Electrical Equipment for Buildings, Wiley
- “Electric Heating”, E.P.Ambrose, John Wiley & Sons Inc., New York, 1968.
- Electrical Technology, Seventh Edition, H. Cotton, CBS Publications, 2003
- Design of Electrical Installations by Er. V.K. Jain and Er. Amitabh Bajaj

BAR 307 SURVEYING AND LEVELLING

Course Code: BAR 307
hours: 02

Credit Units: 01

L/0-T/0-P/2 Teaching

A. COURSE LEARNING OUTCOME:

CLO 1 :	Carry out temporary adjustment of survey instruments by standard methods: to perform temporary adjustment of survey instruments with concepts of permanent adjustments
CLO 2 :	Conduct linear measurements using survey instruments and tools:- to perform line measurements using conventional and modern methods
CLO 3 :	Carry out levelling and cross sectioning survey:- to conduct and complete cross - sectional surveys and levelling works across multiple work environments
CLO 4 :	Carry out topographic survey: to conduct a topographical survey of an area and prepare resulting contour maps.

B. SYLLABUS

Course Objective:

- To impart basic surveying & levelling principles and use the skills to commonly needed in the planning of projects.
- To Demonstrate the role and application of modern surveying techniques and technologies.

Course Contents:

Module I: Introduction to surveying-2 weeks

Role of surveying in Architecture, Principle of surveying, classification of surveying according to nature of field & object, units of measurements.

Module II: Linear measurement-3 weeks

Role of linear measurement, Different methods, Equipment- Tape, chain, Odometer, Arrows, Ranging rods, Stadia Tachometry, EDM, Procedure, errors, applications of linear measurement

Module III: Angular measurement-3 weeks

Various equipment's, theodolite, compass -surveyors & prismatic, simple numerical. Rectangular and polar coordinates, Definition of Traverse, Application of traversing, Equipment and field procedure.

Module IV: Leveling & Contouring-3 weeks

Definition, Levelling instruments, differential levelling, Booking and reduction, Longitudinal and cross sectioning, Contouring, Characteristics of contours, locating contours.

Module V: Plane tabling & Setting out works-2 weeks

Various equipment's, methods of plane table, & setting out works, triangulation method etc. Simple methods of preparing on site drawings and layout of small buildings

Examination Scheme:

Components	A	H	C	V	C T	EE
Weightage (%)	05	10	10	05	20	50

Text Books /Reference Books/Journals/Other Study Material:

- Alok De, plane Surveying
- W. Schofield and Butterworth, Engineering surveying
- B.C. Punmia,Heinemann Surveying vol- 1

S.K. Duggal, Surveying vol -1

BAR 309 VERNACULAR ARCHITECTURE

Course Code: BAR 309

Credit Units: 01

L/0-ST/0-P/2

Teaching

hours: 02

A. COURSE LEARNING OUTCOME:

CLO 1 :	To understand how the contexts of a region have an impact on vernacular architectural forms.
CLO 2 :	To explore various traditional materials and construction techniques used in vernacular architectural forms.
CLO 3 :	To acquire knowledge on traditional materials and construction techniques which can be used in the design of built spaces in the modern context.
CLO 4 :	Understanding the impact of context of a region over architectural forms and expressions will lead to sensible and context specific and sensitive design solutions.

B. SYLLABUS

Course Objectives:

To expose the students to traditional architecture of the various parts of the country. The students will have knowledge of the planning aspects, materials used in construction, constructional details and settlement planning of the settlements in various parts of the country.

Course Contents:

Module I: Introduction to Vernacular Architecture

Approaches and concepts to the study of Vernacular Architecture – Introduction to Kutch architecture and Pucca architecture and architecture without architects developed through experience based on local material.

Module II: Southern region

Planning aspects, materials of construction, Constructional details & Settlement Planning of:

- Kerala – Nair houses (Tarawads), Kerala Muslim houses (Mappilah houses), Temples, Palaces and theaters – Thattchushastra.
- Tamil Nadu – Toda Huts, Chettinad Houses (Chettiars) & Palaces
- Karnataka – Gutthu houses (land owning community), Kodava ancestral home (Avnmane)
- Andhra Pradesh – Kaccha buildings, Religious practices, beliefs, culture & climatic factors influencing the planning of the above.

Module III: Western Region:

Planning aspects, Materials used, Constructional details, Climatic factors influencing the planning of

- Jat houses for farming caste, Bhungas (Circular Huts) and Havelis (Pukka houses) of Rajasthan
- Pol houses of Ahmedabad - Primitive forms, Symbolism, Colour, Folk art etc in the architecture of the deserts of Kutch & Gujarat state.
- Vernacular architecture of Goa.

Module IV: Northern and Eastern India

Planning aspects, Materials used, Constructional details, Climatic factors influencing the planning of

- Kashmir – Typical Kutcha houses, mosque, Dhoongas(Boathouses), Ladakhi houses, bridges
- Himachal Pradesh – Kinnaur houses
- Uttar Pradesh – Domestic housing of Uttar Pradesh

- Bengal – Bangla (Rural house form), AatChala houses – change from Bangla to Bungalow, Kutcha & Pucca architecture of Bengal. Nagaland – Naga houses & Naga village, Khasi houses Factors influencing the planning aspects, materials of construction & constructional details of the above.

Module V : Vernacular Architecture

Overview of vernacular Architecture of neighbouring countries and world such as Africa, UAE etc.

Exercise : Students may be advised to prepare case studies through literature/online/ site visits and submit report.

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- Traditional buildings of India, Ilay Cooper, Thames and Hudson Ltd., London
- Architecture of the Indian desert, Kulbushan Jain & M eenakshi Jain, Aadi Centre, Ahmedabad
- The Royal Palaces of India, George Michell, Thames and Hudson Ltd., London
- Chettiar Heritage, S.Muthiah, M eenakshi M eyappan, Visalakshmi RAMASWAMY, Lokavani-Hallmark Press Pvt. Ltd., Chennai
- Encyclopaedia of Vernacular architecture of the World, Cambridge University Press
- Havali – Wooden houses & mansions of Gujarat, V.S.Pramar, Mapin Publishing Pvt. Ltd., Ahmedabad
- The Tradition of Indian architecture – Continuity & Controversy – Change since 1850, G.H.R.Tillotsum, Oxford University Press, Delhi
- VISTARA – The architecture of India, Carmen Kagal. Pub : The Festival of India, 1986.

House, Form & Culture

BAR 401 DESIGN – IV

Course Code: BAR 401

Credit Units: 09

L/0-ST/6-P/0 Teaching hours: 06

A. Course Learning Outcome

CLO 1 :	Investigate the nature of the problem by analyzing the project brief, data collected from literature studies, site visits, case studies and other specific studies.
CLO 2 :	Create design concepts for the given project based on the developed understanding of the project.
CLO 3 :	Apply the learning of previous semesters and other allied subjects of the semester
CLO 4 :	Develop the architectural project in terms of architectural drawings, models, etc. with all the given requirements.

B. Syllabus

Course Objectives:

- To understand design for multifunctional public/commercial buildings upto G+6 requiring parking, vertical circulation, Grid Planning

Course Contents:

Module I: Introduction

Introduction to public or commercial buildings up to G+6 that are governed by Site restrictions in terms of bylaws and need ease of access, vertical circulation, way finding, Grid Planning and parking with examples; Project introduction for studio exercise

Module II :Case studies, Site Studies and Literature Studies

Case Studies – primary and secondary; Site studies- vehicular circulation pattern studies; Literature Review – Design Standards and Codes, Comparative Analysis and Area statement

Module III: Concept Formulation

Development of concept to be presented with conceptual block model and 3-D sketches for approval.

Module IV: Design Development

Design to be developed through a series of appraisals and open discussions. Planning at site as well as building level to be frozen and workability, efficiency of design to be worked out and finalized.

Module V: Presentation

Enhancement of presentation skills using multiple media. Creation of 3-D models based on the design. Preparation of perspective views (internal & external). Presentation of studies and design proposal through submission of sheet work – drawings and views as well as scaled models. *An A4 Design Report - documenting the process & progress of work through clippings of sketches/ photographs of models highlighting design concept as well as the final proposal drawings etc- shall be an essential part of submission.*

Design exercise can include office buildings, shopping centers/mall, Library, Town Hall,/municipal offices//headquarters, District Court, Nursing Homes, etc.

Examination Scheme:

Components	A	S 1	S 2	C T	EE	
Weightage (%)	0 5	1 5	2 0	1 0	20 Viv a	3 0 E E

Text Books /Reference Books/Journals/Other Study Material:

- 1'Ching Francis, (1979), Architecture Form, Space and Order, Van Nostrand Reinhold Company, New York.
- 2Neufert Ernst, (1970), Architect's Data, Crosby Lockwood and Sons, London.
- 3Chiara JD and Calender, (1983), Time Savers Standards for Building Types, M cGraw Hill Book Company, New York.
- 4Broomer, F. Gerald (1974) Elements of Design: Space, Davis Publications Inc., Worcester, M assachusetts.
- 5Wagenknecht, Kay and Herte (1989) Site + Sculpture – A collaborated design Process, Van Nostrand Reinhold, NY.
- 6Allen, Edward and Iano, Joseph (2006), The Architect's Studio Companion: Rules of Thumb for Preliminary Design, Wiley; 4th edition.
- 7Frederick, M atthew (2007), 101 Things I Learned in Architecture School, The MIT Press.
- 8Pearson, David (2001), New organic architecture: the breaking wave, University of California Press.
- 8Fawcett, Peter (2003), Architecture: design notebook, Architectural Press, 2nd edition

Online Resources

- <https://www.archdaily.com>
- <http://www.architectmagazine.com>
- [https:// www.architecture.com/knowledge-and-resources/resources-landing-page](https://www.architecture.com/knowledge-and-resources/resources-landing-page)

BAR 402 MATERIALS & CONSTRUCTION TECHNOLOGY – IV
Course Code: BAR 402 Credit Units: 03 L/1-ST/1-P/1 Teaching hours: 03

A. Course Learning Outcome

CLO 1	To illustrate the application of metal as construction material.
CLO 2	To demonstrate the various properties & characteristics of basic building materials such as steel & aluminum.
CLO 3	To demonstrate the application of steel and aluminum in actual building construction.
CLO 4	To elucidate the knowledge of various construction details of foundations, staircase & door window built in metal.
CLO 5	To indicate knowledge of steel trusses.

B. Syllabus

Course Objective

- To familiarize students with different metals such as aluminum and steel and copper in construction techniques for use of building materials in building works.

Course Contents:

Module I: Steel -2 Weeks

Study of steel as building material: types/ properties and treatment and various uses.

Structural, Visual and textural properties, Varieties and application of steel and other metals and alloys

Module II: Foundation columns& trusses - 2 Weeks

Foundation such as Grillage foundation.

Structural Steel columns and space frames, Different type and details of Structural steel trusses, details of geodesic domes etc.

Roofing: Roof covering in G.I. Asbestos and fiber Sheets etc.

Module III: Staircases - 3 Weeks

Metal staircase: Types and construction detail and joints, fire escape staircase.

Module IV:Steel door and windows - 3 Weeks

Steel door and window: types and construction detail, standard door/ windows sections, fire doors Types of Rolling Shutters and their construction detail.

Module V: Aluminum - 3 Weeks

Aluminum as building material: properties and treatment, Construction and fixing details used for aluminum doors and windows, their applications, types, pricing.

Market survey of available materials: technology and hardware.

Exercises: presentation of seminars, preparation of drawings on above topics.

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- Building construction
W.B.McKa
y Building construction
R Berry
- Building construction Chudley
Building construction Francis D.K. Ching

BAR 403 STRUCTURAL DESIGN & SYSTEM- IV

Course Code: BAR 403 Credit Units: 02

L/2-ST/0-P/0

Teaching hours: 02

A. Course Learning Outcome:

CLO 1 :	Understand & identify the properties of the constituent materials of concrete
CLO 2 :	Identify and demonstrate the behaviour of fresh and hardened concrete.
CLO 3 :	Design concrete mixes as per IS and ACI codes
CLO 4 :	Identify, describe and carry out the main laboratory tests on concrete constituents.
CLO 5 :	Demonstrate recent advancements in concreting materials and procedures.
CLO 6 :	Investigate the properties & characteristics of any soil type at any construction site using advanced methods.
CLO 7 :	Create his own judgement regarding the analysis method required for problems regarding Stability of Soil Structures.
CLO 8 :	Apply these methods to the real-life structures
CLO 9 :	Develop his / her interest in geotechnical engineering designing field

B. Syllabus

Course Objective:

- To understand the material specification & its physical, engineering properties.
- To help the students understand the mix design process by IS codes & laboratory experiments & also learn about the soil classification & foundation system in framed as well as load bearing structures.

Course Contents:

Module I: Cement-3 weeks

Definition, Ingredients, Compounds, Properties, Hydration, Types and applications, manufacturing process of cement. **Workability & durability Tests of cement**

Module II: Aggregate-3 weeks

Classification, Sp. Gravity, Bulk density, moisture contents, Bulking of fine aggregates, fineness modulus, Practical size distribution. Laboratory tests for aggregate particles.

Module III: Concrete & its mix design-3 weeks

Definition, Advantages/ disadvantages, relevant IS codes, workability, Compressive strength, Flexural strength, factors affecting strength, nominal and designed mix concrete.

Laboratory & field tests to check the quality of concrete in terms of workability & durability.

Module IV: Soil Mechanics & Foundation engineering-4 weeks

Importance of the subject, Types of Soils, Phases, various Index properties of soil, relationships, simple numerical Classification of soil, engineering properties of soil, testing of soil. Various types of foundations, Bearing capacity of soil, field tests, plate load & penetration test, Effect of water level, Failure of foundation systems, Design

procedures for simple load bearing foundations., Terzaghi's theory

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- M.V. Naik, Building Construction – Materials.
 - Khurmi R. S, Strength of Materials.
 - Khurmi R. S., Applied Mechanics and Strength of Materials.
 - P.N. Khanna, Civil Engineering Handbook.
 - M.S. Shetty, Concrete technology.
 - K.R. Arora, Soil mechanics & foundation engineering.
 - Morgan, Elements of Structure.
 - Salvadori, Structures in Architecture.
 - Mackay WB, Building Construction, Vol. 1-4.
 - Chudley, Construction Technology, Vol. 1-6.
 - Mitchell, Elementary Building Construction.
- Everet, Structure and Fabric.

BAR 404 GRAPHICS SKILLS – IV (Computer Aided)

Course Code: BAR 404 Credit Units: 02 L/0-ST/0-P/4
04

Teaching hours:

A. Course Learning Outcome

CLO 1	Remember various tools or shorthand commands used in SketchUp, AutoCAD-3D, V-Ray.
CLO 2	Understand to develop higher-quality, more accurate architectural designs, and models; use tools specifically built to support 3D design- creation- rendering- animation based application.
CLO 3	Apply the knowledge of various aspects of building Services & Construction techniques into 3D designs.
CLO 4	Analyse the importance of 3D design- creation- rendering- animation based application in the field of Architecture and construction industry.
CLO 5	Evaluate 3D Modelling based design on critical thinking and problem solving skills.
CLO 6	Create 3D design models of an Architectural Project

B. Syllabus

Course Objective:

To learn drawing 3D-drawings through computers and taking advantage of it for rendering and presentations of the views.

Course Contents:

Module I: Introduction to (3-D) software: Exterior and Interior – 2 weeks

Introduction to basic 3-D software of architectural significance AutoCAD-3D and their basic usage (creating conceptual exterior and views of an Architectural Project).

Creating detailed Interior and views of a 3D project using Auto CAD.

Module II: Introduction to (3-D) software: Exterior and Interior -3 weeks

Introduction to basic 3-D software of architectural significance Google SketchUp and their basic usage (creating conceptual exterior and views of an Architectural Project).

Creating detailed Interior and views of a 3D project using Google SketchUp.

Module III: Introduction to Rendering software: Exterior-3 weeks

Use of V-Ray for Rendering 3D models of SketchUp and their final editing in photoshop.

Module IV: Introduction to Rendering software: Interior-3 weeks

Use of V-Ray for Rendering 3D models of SketchUp and their final editing in photoshop.

Module V: Introduction to Animation-3 weeks

Creating animation (walkthrough) of 3D models on SketchUp.

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- Manuals of AutoCAD – Autodesk Inc.
- Computer graphics and design, Radhakrishnan Inside AutoCAD- parker, denial & rice
- Google SketchUp user’s guide.
- Adobe Photoshop user guide/manual.
- Google SketchUp for Interior Designers – Daniel John Stine
- Rendering in SketchUp – Daniel Tal V-ray user’s Guide.
- Lumion user’s guide/manual.

Architectural Design with SketchUp – Alexander Schreyer

BAR 405 HISTORY OF ARCHITECTURE

Course Code: BAR 405 Credit Units: 02 L/2-T/0-P/0 Teaching hours: 02

A. Course Learning Outcome

CLO 1	Critically evaluate the development of architecture style in terms of its spaces .
CLO 2	Classify various architecture style by there elements and their evolution in terms of construction technology, building materials and forms over the period.
CLO 3	Formulate various stages of architecture movements in terms its style and evolution of its elements
CLO 4	Create the relevance and utility of various local materials used by various architects in different regions of the world.

B. Syllabus

Course Objectives:

Understanding the world architecture during the, Renaissance and Baroque Period;
Study of specific Architectural characteristics and their origin in above-mentioned period.

Understanding the Modern and contemporary Architectural History From 19th Century to the present age, the development process, the change in Techniques and construction.

Course Contents:

Module I: Gothic Architecture- 2 weeks

Massiveness and verticality of medieval churches. Combination of towered structures and longitudinal basilica. Gradual integration of towers from early to later with examples. Integration of centralized and longitudinal plans. Articulation of external wall like arcaded interiors resulting in dematerialization of exterior. Study of important cathedrals and churches from Italy and France.

Module II: Renaissance Architecture- 2 Weeks

- Italian Renaissance - The idea of rebirth and revival of art - Outline of the Architecture during the early Renaissance, High Renaissance and Baroque Periods - Features of a typical Renaissance palace, eg. Palazzo Ricardi, Study of the contribution of the following architects: Brunelleschi, Michaelangelo, Andrea Palladio, Example - St. Peter Rome, Villacaprain Vicenza.
- High Renaissance Architecture-French and English Renaissance- architectural character in the classical & Rococo period - Example – Chateau de Chambord, Louvre, Paris – Domestic British architecture- Study of the works Sir Christopher Wren, & Inigo Jones, Example - St. Paul's Cathedral, London. Banqueting House, Whitehall..

Module III: Baroque Architecture and Neo-Classical Period -1 Week

Dynamism and systemization of Baroque architecture vitality and spatial richness with underlying systematic organization. Definition of Neo-classic with taking few examples of the period. Study the buildings and structures relation to form, ratio, symmetry etc. Study of the different areas in France.

Module IV: Industrial revolution and modern Architecture movements (19th and 20th Century)-2 Weeks

Reasons for the evolution of Modern Architecture, origins-Neo Classicism- Enlightenment, Social revolutions, Historiography, Revivalism- Works of Soane, Ledoux, Boule, Durrand & Schnitzel. Industrial revolution and its impact – Emergence of new building typologies- New Materials and Technologies : history of steel, glass and concrete. Arts & Crafts movement in Europe and America; Art nouveau, and the works of Horta, Guimard, Gaudi and Macintosh; Organic Architecture -Early works of F.L. Wright. Chicago school; Art deco Architecture in Europe and America.

Presentations, paper writing and Essays exercise may be optionally be considered, recommended by the subject teacher at the end of the semester after the examinations

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

Text:

- “ Glimpses of World History” by Pt. Jawahar Lal Nehru
- “ Urban Pattern” by A.B. Gallion
- “ The History of Architecture” by Sir Bannister Fletcher
- “ The great age of world Architecture”-G.K. Hirasker

References:

- History of Architecture – J. E. Swain
- History of Architecture by Dora Couch
- A study of History – Almond Toynbee

Traditions in Architecture – Dora Couch

BAR 406 BUILDING SERVICES-III (Acoustical System)

Course Code: BAR 406
hours: 02

Credit Units: 02

L/2-T/0-P/0

Teaching

A. Course Learning Outcome

CLO 1	Understand the process and are able to manage building acoustical services provisions in construction sites.
CLO 2	Synchronize the construction activities with installation of building services.
CLO 3	Select the suitable system for particular requirements of buildings
CLO 4	Understanding the importance of sound energy and its impact on building design and also able to control noise within the interior and from exterior sources.
CLO 5	Plan and able to design and read acoustical layout required for different types of buildings

B. Syllabus

Course Objectives:

- To acquaint students about acoustical requirements and consideration for building design right from residential to the theatre type of building.

Course Contents:

Module I: Terminology in Acoustics- 1 weeks

Sound and its properties, audible sound, intensity and loudness, frequency and pitch, quality Reflection, absorption, transmission, diffusion, diffraction of sound ; Common acoustical defects: Echo, sound-foci, dead spots, sound shadows, resonance, insufficient loudness, external noise, reverberation and reverberation time.

Module II: Acoustic materials - 1 weeks

Sound absorbing materials and their applications– description and characteristics, types of absorbents and reflectors and their application, Market survey and sample collection.

Module III: Acoustical design case studies - 1 weeks

Study of existing designs to understand shapes/spaces and integration of acoustical equipment in the design.

Module IV: Noise control- 1 weeks

Environmental noise control: noise sources, airborne and structure-borne noise, transmission of noise, methods of environmental noise control, control of mechanical noise and vibrations, General idea of sound insulation. Noise control in specific types of buildings like – auditoriums, residential buildings, hotels, school, hospitals, offices, libraries.

Module V: Artificial Lighting- 1 weeks

Introduction to basic photometric concept: Light its behavior and properties, Instruments for measurement lux meters, field of vision, visual task, visual comfort and glare: objectives of lighting design in architecture.

Module VI: Design Exercise- 2 weeks

Acoustical design or case study of existing building such as auditorium, recording studio, theatre, cinema halls, hospitals or a multistory office building.

Any important note or instruction for course coordinator

Examination Scheme:

Components	A	CE	C T	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- Temp leton, Duncan & Saunders, David, "Acoustic Design", The Architectural Press, London, 1987.
- Temp leton (ed.), "Acoustics in the Built Environment", Butterworth, London, 1993.
- NBC of India
- K.A.Siraskar-A cousticsin building design
- Building Construction - B.C. Punmia
- Building Construction - Rangawalla
- Building Construction and M aterials – Gurcharan Singh
- Architectural Acoustics: E. David
- An Introduction to Building Physics: Narsmhan
- Fundamentals of acoustic by Kinsler, Lawrence E and others
- Enviromental acoustic by Doelle, Leslie L.
- Knudson and Harris, `Acoustical Designing to Architecture`.
- David Egan, `Architectural Acoustics` Ross publishers, 2008.

Ducan Temp leton et all `Acoustics in the Built Environment, Architectural press1997

BAR 408 ARCHITECTURAL CLIMATOLOGY

Course Code: BAR 408 Credit Units: 02 L/1-T/0-P/2 Teaching hours: 03

A. Course Learning Outcome

CLO 1	Understand the factors that determine microclimate of a region and shape the site - climate.
CLO 2	Predict the climatic zone of a given site on the basis of climatic data and establish the characteristics of the suitable architectural typology for that zone (Knowledge Application for Site Analysis)
CLO 3	Understand thermal comfort conditions required inside built environment
CLO 4	Understand heat exchange process in a building
CLO 5	Devise passive control of heat gain and loss in a building through appropriate architectural design solutions for different climatic zones to achieve energy conservation.

B. Syllabus

Course Objective:

To acquaint students to various concepts of climate analysis and its use in Architecture. To familiarize students with human thermal comfort as an essential function of building. Students shall learn using the natural climatic elements to achieve their maximum utilization for the minimum dependence on the artificial means.

Course Contents:

Module I: Introduction to Climate

Importance of climate in architecture, Factors affecting climate.

Elements of climate- Solar radiation, temperature, wind, humidity and precipitation and their measurement.

Module II: Tropical Climate

Climatic zones, Characteristics of tropical climate, macroclimate and microclimate.

Module III: Human thermal comfort

Study of body's heat production and heat loss, comfort zone, bio-climatic chart and effective temperature, Isopleths. Solar passive techniques: cooling and heating.

Module IV: Day light and shading devices

Natural light, glare, day light factor and day lighting in tropics.

Method of recording the position of sun in relation to earth, solar chart, shadow angle protractor and its application in design of shading devices.

Module V: Orientation, Ventilation and air movement

Requirement, size and position of openings, air flow pattern inside and outside

buildings. Orientation of buildings in relation to sun and wind.

Examination Scheme:

Components	A	CE	CT	EE
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Weightage (%)	05	25	20	50
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Text Books /Reference Books/Journals/Other Study Material:

Text:

- Manual of tropical housing and building, Koenisberger Solar power, Behling
- The climatic data handbook, Bhargava and Chand

References:

- Climate responsive Architecture, Arvind Krishan Architecture as response, Gree.

BAR 409 BAMBOO ARCHITECTURE

Course Code: BAR 409

Credit Units: 02L/2-T/0-P/0

Teaching hours: 02

A. Course Learning Outcome

CLO 1	to understand the benefits of building with bamboo and remember the various application and joints in bamboo.
CLO 2	importance of sustainably growing and harvesting bamboo and how to build structures to last a lifetime with best practice for crafting with bamboo.
CLO 3	Understand and analyze the various treatment and construction method of bamboo
CLO 4	Analyze and interpret a range of innovative structural systems to help make it easy for us to begin designing with bamboo.
CLO 5	To create designs that are functional, beautiful, and bring nature into the built environment.

B. Syllabus

Course Objective:

To familiarize the students with sustainable building material bamboo and its application in present technological change. The student shall learn the use of Bamboo for various kind of construction and application.

Course Contents:

Module I: Introduction to Bamboo as a Material

Introduction to bamboo and its different types and properties. General uses of Bamboo. Discussing bamboo growth and forms. Studying about bamboo as a material since history and its application being a versatile and fibrous material. Botanical Classification, Types based on Geographical distribution, climatic and soil conditions. Difference between Bamboo, Cane and Reed. Comparison of bamboo with wood. Harvesting, Storage and Drying of Bamboo. Active and Passive methods of Bamboo Preservation and Treatment. Working with Bamboo. Cutting, Sawing and Scorch Drilling of Bamboo. Types of Joints in Bamboo Construction. Shaping and Bending of Bamboo. Treatment of Bamboo Surface using Bleaching and Dyeing methods.

Module II: Bamboo as a Construction material.

Studying the grading of bamboo and its selection and size of bamboo for structure. The different traditional tools used for construction with their application. All the joinery in the structure based on types of lashing and types of shear keys.

Bamboo Reinforced Foundation. Bamboo Flooring. Bamboo Trusses & Roof Skeleton. Bamboo Shingles. Bamboo Walls. Bamboo Doors & Windows. Bamboo Furniture. Bamboo as a Scaffolding material. Bamboo Footbridges and Bridges. Reed Boards & Bamboo Ply.

Construction details in Bamboo. Types of Binding, Joints & Connections. Various steps involved- required sizes of members- methods of joining bamboo for various applications.

Module III: Building System & Component

Studying bamboo treatment for longer life of shelter. Analyzing the consideration for site selection. Detailing the construction of bamboo substructure and superstructure plus covering envelop with reference to latest technology.

Module IV: Bamboo products

Bamboo products such as Mats (Chatai), laminates, furniture, flooring, lampshades, furniture etc.

Module V: Live Exercise of Documentation, Workshop & Site Visit

Designing a bamboo structure residential/institutional/recreational etc. based on new technologies and innovations in the field. Case study of Bamboo Houses and Buildings.

Site visit to Built environments that have used Bamboo as a Construction material especially in Assam, Meghalaya, Auroville and Kerala.

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- The Book of Bamboo by David Farrelly
- Building with Bamboo: A Handbook by Jules J.A. Jansen
- Bamboo Style by Gale Beth Goldberg

References:

- Bamboo by Susanne Lucas
- Bamboo Architecture & Design (59 Case Studies) by Eduard Broto
- New Bamboo: Architecture and Design by Marcelo Villegas

BAR 410 ARCHITECTURE DOCUMENTATION

Course Code: BAR 410

Credit Units: 02

L/2-T/0-P/0

Teaching hours: 02

A. Course Learning Outcome

CLO 1	Understand the qualities of building spaces and their elements
CLO 2	Learn the methods involved in documentation like scaled drawings, photographic documentations, mapping, etc
CLO 3	Analyze the buildings visually and record the context and need
CLO 4	Evaluating and assessing the building properties and terminologies
CLO 5	Compile and assess the recordings

B. Syllabus

Course Objectives:

- To familiarize the students with various aspects, issues and considerations related to the documentation of architecture and its characteristics so that its heritage and inherent values can be identified and recorded.

Course Contents:

Module I: Introduction to Architectural Documentation - 2 weeks

Introduction to documentation of historical buildings includes not only measured photographic survey, but also surveying of the qualities of building spaces and their elements. Identification and understanding the use and purpose of the documentation.

Module II: Methodology- 3 weeks

Detailing the purpose, scaled drawings, photographic documentation, visual analysis, classification and mapping of the spaces and their elements. The originality of these spaces and elements are evaluated within the frame of research results that are previously published, site surveys made. Use of modern equipment such as 'CANVAS' and its interface with I-pad and AutoCAD etc to be understood.

Module III: Analysis - 3 weeks

Visual analysis consisting of analysis of spatial element and architectural elements need be understood. The spaces grouped according to their functions and the elements grouped according to their types. Visual analysis of onsite elements, outside elements need to be recorded. The context of the building need to be understood and recorded.

Module IV: Evaluation & Characteristics - 3 weeks

Distinguishing the modern with traditional architecture in terms of elements, details etc. Sketching and tabulating the spatial characteristics and their types

Module V: Compilation & Assessment - 3 weeks

Classification and comparison is an effective way to decipher architectural characteristics of a historical Building with its originalities and alterations. The compilation should be as realistic as possible without the opinion of the compiler to retain the authenticity of the project.

NOTE-Students may be assigned a case study to assess the understanding of the subject.

Any important note or instruction for course coordinator

Examination Scheme:

Components	A	C E	CT	EE
Weightage (%)	0 5	2 5	20	50

Text Books /Reference Books/Journals/Other Study Material:

- Glenn E. Wiggins, Manual of Construction Documentation: An Illustrated Guide to Preparing Construction Drawings, 1989, Whitney Library of Design.
- John H. Stubbs, Robert G. Thomson, Architectural Conservation in Asia: National Experiences and Practice.
- Wiley, Landscape Architecture Documentation Standards: Principles, Guidelines, and Best practices, 2016, John Wiley & Sons Inc.
- Architectural Heritage, New Technologies in Documentation: Council of Europe, 1990

BAR411 BARRIER FREE ARCHITECTURE

Course Code: BAR 411 Credit Units: 02L/2-T/0-P/0 Teaching hours: 02

A. Course Learning Outcome

CLO 1	To learn about Importance of Barrier free Architecture and uses in various types of buildings.
CLO 2	To know standards and norms for the Barrier free design.
CLO 3	To understand the importance of Barrier free design using Case studies of Design
CLO 4	To Evaluate existing public building and residential building using norms and Standards
CLO 5	To Redesign existing public building using norms and Standards

B. Syllabus

Course Objectives:

The objective of course is to learn the principles of barrier free design and concepts of universal design. It provides an idea about barrier free construction principles in buildings while understanding of the key aspects and systems of specially able persons built space in architecture.

Course Contents:

Module I: Special Abilities

Understanding the different human impairments such as visual, mobility and hearing and also understanding the abilities of such differently able persons. To understand the architectural requirements of such persons.

Module II: Introduction to Architecture for specially able

Defining the basic concepts of barrier free design, need for barrier free concepts in architecture, concepts of universal design and types of disabilities. Design principles for barrier free architecture and accessibility for all.

Module III: Barrier free elements for outdoors and Urban Design

Design elements outside the building like curb ramps, pedestrian crossing, public toilets, and parking, signage, flooring and street furniture. Case examples of Barrier free architecture in India and across the globe. To study the anthropometrics and dimensions of mobility devices, special fixtures for barrier free design. Barrier free construction materials and dimensions for flooring, walls, doors, windows, staircases, elevators, toilets, entrances and corridors.

Module IV: Laws

Knowledge of different laws prevailing within India and in other countries. Understanding implication of different laws on design of spaces.

Module V: Case Study, Presentation & Design elements

Barrier free architecture in Public Buildings – dimensions and standards. Case Study of Barrier free elements in Public buildings, Photographic documentation and Presentation. Incorporation of barrier free elements in project being pursued in architectural design.

Examination Scheme:

Components	A	C E	C T	E E
Weightage (%)	0 5	2 5	2 0	5 0

Text & References:

- Guidelines and Space Standards for Barrier Free Built Environment for Disabled and Elderly Persons – Central Public Works Department, Ministry of Urban Affairs & Employment, India, 1998

IS – 4963 (1987), Recommendations for buildings and facilities for Physically Handicapped

BAR 501 DESIGN – V

Course Code: BAR 501 Credit Units: 12

L/0-ST/8-P/0 Teaching hours: 08

A. Course Learning Outcome

CLO 1	To Recognizing the previous semester learning outcomes like anthropometric, ergonomics, space a, locations, site analysis and active and passive design consideration for the different climatic Zones
CLO 2	To implementing the basics of design problem and analysis the different similar projects through Literature Studies, site visit, case studies, and other relevant studies.
CLO 3	To critique the existing knowledge and attributed knowledge through student self learning and standardize them for further creation
CLO 4	To produce given project based on to develop the architectural project in terms of architectural drawings, models, etc.
CLO 5	To attributing the design centric theoretical knowledge and practical knowledge like case studies of the building weather applicable or not.

B. Syllabus

Course Objectives:

- To impart significance of context in Architectural Design through response to climate, environment, **bylaws** and culture
- **To introduce basics of planning of small campuses/complex involving more than one building blocks.**
- To introduce considerations for achieving Sustainability through Architectural Design.

Course Contents:

Module I: Introduction

Introduction to context as strong determinant of architecture of any location with examples, Climate and Culture as comprising factors of context; Project introduction for studio exercise

Module II: Case studies, Site Studies and Literature Studies

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; Literature Review – Design Standards and Codes, Comparative Analysis and Area statement

Module III: Concept Formulation

Development of concept to be presented with conceptual block model and sketches for approval.

Module IV: Design Development

Design to be developed through a series of appraisals and open discussions. Planning at site as well as building level to be frozen and workability, efficiency of design to be worked out and finalized.

Module V: Presentation

Enhancement of presentation skills using multiple media. Creation of 3-D models based on the

design. Preparation of perspective views (internal & external). Presentation of studies and design proposal through submission of sheet work – drawings and views as well as scaled models. . ***An A4 Design Report - documenting the process & progress of work through clippings of sketches/ photographs of models highlighting design concept as well as the final proposal drawings etc- shall be an essential part of submission.***

Design exercise can include problems having multi - building blocks complex such as a tourist resorts/ three-star hotel, youth hostels, Craft workshops and Centers, Haats, Social upliftment /empowerment centers etc with emphasis on climatic design. Sites may be chosen in different climatic regions in India except in hilly regions etc.

Examination Scheme:

Components	A	S 1	S 2	CT	EE	
Weightage (%)	05	1 5	2 0	10	20 Viva	30 EE

Text Books /Reference Books/Journals/Other Study Material:

- ‘Ching Francis, (1979), Architecture Form, Space and Order, Van Nostrand Reinhold Company, New York.
- Neufert Ernst, (1970), Architect’s Data, Crosby Lockwood and Sons, London.
- Chiara JD and Calender, (1983), Time Savers Standards for Building Types, McGraw Hill Book Company, New York.
- Broomer, F. Gerald (1974) Elements of Design: Space, Davis Publications Inc., Worcester, Massachusetts.
- Wagenknecht, Kay and Herte (1989) Site + Sculpture – A collaborated design Process, Van Nostrand Reinhold, NY.
- Allen, Edward and Iano, Joseph (2006), The Architect's Studio Companion: Rules of Thumb for Preliminary Design, Wiley; 4th edition.
- Frederick, Matthew (2007), 101 Things I Learned in Architecture School, The MIT Press.
- Pearson, David (2001), New organic architecture: the breaking wave, University of California Press.
- Fawcett, Peter (2003), Architecture: design notebook, Architectural Press, 2nd edition

Online Resources

- <https://www.archdaily.com>
- <http://www.architectmagazine.com>

<https://www.architecture.com/knowledge-and-resources/resources-landing-page>

BAR 502 MATERIALS & CONSTRUCTION TECHNOLOGY – V

Course Code: BAR 502 Credit Units: 03 L/1-T/1-P/1 Teaching hours: 03

A. Course Learning Outcome

CLO 1	To remember properties & application of different finishing materials like ACP, PVC, Gypsum, Glass, Fiberglass, Glass bricks, Metals, Stone, Ceramics, Exposed brick work, Paints, POP, Polish, and Varnishes etc.
CLO 2	To understand the criteria of applying latest materials & construction details of different building component like flooring, false ceiling, false partition and special doors.
CLO 3	To apply visual & textural properties of latest finishes & hardware's in building interiors and exterior.
CLO 4	To evolve innovative designs of Interior & exterior components like flooring, false ceiling, false partition and special doors.
CLO 5	To prepare construction details of designed components.

B. Syllabus

Course Objective:

- To familiarize students with different materials in flooring, roofing and interior and exterior finishing and their use in building works.

Course Contents:

Module I: Flooring and paving: type and construction detail – 3 weeks

Soft and hard flooring Stone, Tile, Indian Pattern Stone (IPS) Flooring, Concrete pavers & Stamping, Wood, Epoxy, Vinyl, Carpets etc.

Classification, Manufacturing, Market availability and prices, Advantages/ Disadvantages, design and detailing etc.

Module II: False ceiling type and construction detail– 3 weeks

POP, Gypsum board, Acoustic panels, Wood, Metal etc.- Classification, Manufacturing, Market availability and prices, Advantages/ Disadvantages, Design and detailing etc.

Module III: Exterior and interior finishes– 3 weeks

Latest finishing materials and their applications in construction- ACP, PVC, Gypsum, Glass, Fiberglass, Glass bricks, Metals, Stone, Ceramics, Exposed brick work, Paints, POP, Polish, Varnishes

Module IV: Partition and paneling– 3 weeks

Partitions and Paneling, Cupboards/Cabinets

indifferent materials

Module IV: Special Details– 2 weeks

Sliding door, Folding door, Revolving Door, sliding and folding door with hardware and their combinations' Details such as nosing/railing /grills/balusters in different materials etc.

Exercises: Field trips, market survey of available materials, technology and hardware, preparation of study reports and presentation of seminars, preparation of drawings on above topics.

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text & References:

- Building construction W.B.McKay Building construction R Berry
- Building construction Chudleys

Building construction Francis D.K. Chings

BAR 503 STRUCTURAL DESIGN & SYSTEM- V

Course Code: BAR 503
02

Credit Units: 02

L/2-T/0-P/0 Teaching hours:

A. Course Learning Outcome

CLO 1	To impart the knowledge of structural design of a reinforced concrete structure using a working stress method.
CLO 2	To learn to design RCC beams, columns, slabs as per codal provisions by using a working stress method.
CLO 3	To understand the principles involved in analysis and design of reinforced concrete structures.
CLO 4	To impart the knowledge of yield line theory

B. Syllabus

Course Objective:

- To understand the Design of R.C.C. structures by using IS: - 456: 2000.
- To help the students for design the structural members like: - beam, column & slabs by using IS:456:2000 (based on working stress method) & implement in analytical software likes: - STAAD Pro V8i.

Course Contents:

Module I: Working stress method-4 weeks

Introduction, plain & reinforced concrete, objectives of structural design, Code recommendation for working stress method, stress- strain curve for ductility & brittle material, understanding the concept of elasticity. Behavior of concrete under compression & tension, creep & shrinkage of concrete, behavior in flexure.

Module II: Design of beams & one-way slabs-3 weeks

Introduction, requirements of flexural reinforcement, requirements for deflection control, Design of singly & doubly reinforced rectangular sections by using IS :- 456: 2000.

Module III: Design of two-way slabs-3 weeks

Design of wall- suspended two-way slabs, design of beam- supported two-way slabs, design of column- supported slabs, reinforcement details in column- supported two-way slabs.

Module IV: Design of Compression members-2 weeks

Introduction, estimation of effective length of a column, Code requirements on slenderness limits, minimum eccentricities & reinforcement, design of short column under- axial & uni-axial compression Design of column under axial compression with biaxial loading, design of slender column.

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- M.V. Naik, Building Construction – Materials.
 - Khurmi R.S., Strength of Materials.
 - Khurmi R. S., Applied Mechanics and Strength of Materials.
 - P.N. Khanna, Civil Engineering Handbook.s
 - Sushil Kumar, Khurmi, Punmia, R.C.C. Design.
 - Negi, Design of Steel Structure.
 - Salvadori and Heller, Structure in Architecture.
 - E. P. Popov, Mechanics of materials.
 - R. Park and T. Paulay, Reinforced concrete structures.
 - M.L. Gambhir, Concrete technology.
 - N. Krishna Raju, Design of reinforced concrete structures.
 - S. Unikrishnapillai&devdasmenon,.Reinforced concrete design.
 - IS: 456- 2000
 - SP: 16- 1980
 - Morgan, Elements of Structure.
 - Salvadori, Structures in Architecture.
 - Mackey, WB, Building Construction Vol. 1-4.
 - Chudley, Construction Technology Vol. 1-6.
- Mitchell, Elementary Building Construction.

BAR 504 GRAPHICS SKILLS – V (Computer aided)

Course Code: BAR 504 Credit Units: 02 L/0-ST/0-P/4 Teaching hours: 04

A. Course Learning Outcome

CLO 1	To remember various tools or shorthand commands used in Autodesk Revit Architecture, 3Ds Max, Rhino and grasshopper.
CLO 2	Understand to develop higher-quality, more accurate architectural designs and models; use tools specifically built to support Building Information Modelling workflows.
CLO 3	To apply the knowledge of Structural, Mechanical, Electrical, Plumbing, Communications, Security, Fire Protection system into BIM-based designs.
CLO 4	To analyse the importance of Revit Architecture in the field of Architecture and construction industry.
CLO 5	To evaluate Building Information Models based on critical thinking and problem solving skills.
CLO 6	To create Building information modelling solutions and parametric models.

B. Syllabus

Course Objective:

- To train students to create 3D in Revit.
- Understand different aspects of collaborative modeling, BIM based scheduling and estimating
- will have hands-on experience with advanced BIM solutions, which support collaborative and concurrent teamwork; view of the building industry

Course Contents:

Module I: Learning detailed 3D creation using Revit (Building Information Modelling (BIM) software)- 3 Weeks

Introduction about BIM, Introduction to Autodesk Revit Architecture, Revit File Types, Exploring User Interface, Building Elements, starting a New Project and importing other files in Revit, Drawing Plan as per Dimension. Creating detailed 3D (Exterior & Interior) of an Architectural project and generating its Plan(s), Elevation(s) Section(s), view(s) a complete set of architectural drawings using Revit.

Module II: Learning 3D Rendering using Revit-3 Weeks

Advanced 3D creation and rendering in Revit. Material application, Lighting, Camera setting, Background, Scenic development for still 3d images and their final editing in Photoshop etc.

Module III: Learning 3D Animation using Revit-1 Week

Using Revit for developing 3D animation (walk through) for Architectural significance. Complete scenic development, material and lighting as well as camera positioning for moving images. Saving and viewing animations.

Module IV: Creating Complex forms/ shapes and printing-3 Weeks

Massing Introduction; Creating In-Place Masses using Forms, Extrusion, Revolve, Sweeps. Composing sheet and final presentation on Revit.

Importing and exporting Revit file into other software.

Module V: Learning BIM software Revit for Complex forms/ shapes-4 Weeks

Introducing a BIM Strategy document, Model management, Project team collaboration techniques, Transmittal and model issue protocols, Basics of large model sub-division, Exercise on work sets and task allocation

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text & References:

- Autodesk Revit user guide/manual.

Autodesk Revit Architecture: Eric.

BAR 505 BUILDING BY LAWS, CODES & PRACTICES

Course Code: BAR 505

Credit Units: 02

L/2-T/0-P/0

Teaching hours: 02

A. Course Learning Outcome

CLO 1	Importance of the Development controls, building byelaws and codes and practices as applicable in the country.
CLO 2	To be able to Translate the building byelaws and codes to the architectural design in BAR 501.
CLO 3	To analyse the effect of building byelaws on the building design and the residents
CLO 4	Analyse and apprise the benefit of application of the building byelaws and the codes

B. Syllabus

Course Objectives:

- To study the development controls as applicable to building design. To acquaint the students to compulsory building bye-laws and permits.

Course Contents:

Module I: Introduction of By-Laws - 3 weeks

Introduction to Building Bye Laws and regulation, their need and relevance, general definitions such as building height, building line, FAR, Ground Coverage, set back line et all. Role of various statutory bodies governing building works like development authorities, municipal corporations etc. Introduction to Master Plan and understanding various land uses like institutional, residential etc. and related terminology

Module II: Application of By-Laws - 4 weeks

Interpretation of information given in bye laws including ongoing changes as shown in various annexure and appendices. Application of Bye Laws like structural safety, fire safety, earthquake safety, basement, electricity, water, and communication lines in various building types.

Module III: Introduction of Codes & Practices - 3 weeks

Introduction to various building codes in professional practice emphasizing the importance of codes and regulations to protect public health, safety and welfare and to ensure compliance with the local authority.

Module IV: Application of Codes & Practices - 4 weeks

Understanding the applications of various codes as per various building types. Conducting a comprehensive code search process and representing the above analysis by preparing detailed code data sheets as applicable in the domain which has been chosen for the research.

Any important note or instruction for course coordinator

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- 'Delhi Building Bye-Laws – Nabhi Publications D.D.A.– Delhi Master Plan
- Unified Building by laws of 2017 Rajasthan
- Various IS Codes

BAR 506 BUILDING SERVICES- IV

Course Code: BAR 506
hours: 02

Credit Units: 02

L/2-ST/0-P/0 Teaching

A. Course Learning Outcome

CLO 1	To analyse the importance of fire safety in a building.
CLO 2	To understand the different aspects of materials in terms of fire safety.
CLO 3	To accumulate awareness of fire safety norms
CLO 4	To be able to do comparison between different fire detection systems and cctv equipment
CLO 5	To design a fire fighting and cctv system for a building.

B. Syllabus

Course Objectives:

- To acquaint the student with the fire safety regulation and security systems to be adopted in the buildings. Study the development codes and bye-laws of fire safety regulations, and study about the different methods and materials for treatment in buildings for fire safety.

Course Contents:

Module I: Fire Safety- 1 weeks

Introduction: basic understanding about fire, growth decay curve. Causes of fire in buildings, types of fire, spread of fire, production of smoke and poisonous gases. Fire safety and preventive measures.

Module II: Fire properties of materials- 2 weeks

Basic fire properties of materials i.e. ignitability, combustibility, surface spread of flame, fire propagation, toxicity etc.: General behavior of materials, combination of fire retardant and non-combustible materials.

Module III: By-laws for firefighting - 2 weeks

Firefighting regulations with reference to National Building code. Fire escape, stairways and escape routes, dry and wet risers, Water demand for firefighting, storage tanks, fire hydrants etc.

Module IV: Fire extinguishing- 1 weeks

Study of Fire detection systems, smoke detectors, heat detectors, fire alarms etc. Fire extinguishing systems, Unit fire extinguishers, Chemical and foam extinguishers, Chemical and foam extinguishers.

Module V: Advance Security Systems - 1 weeks

Communication systems in buildings, CCTV, conduits to accommodate the systems. Security and Surveillance. Remote control for security systems and automation

Any important note or instruction for course coordinator

Examination Scheme:

Components	A	CE	C T	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- Fire Safety: National Building Code of India 1983, An Introduction to Building Physics: Narsmhan
- Fire Safety in Buildings by V.K. Jain

Brannigan, F. L. & Corbett, G. P. (2008). Brannigan's Building Construction for the Fire Service. Sudbury, MA: Jones & Bartlett Publishers.

BAR 508 ENERGY CONSERVATION ARCHITECTURE

Course Code: BAR 508
02

Credit Units: 02

L/2-T/0-P/0

Teaching hours:

A. Course Learning Outcome

CLO 1	demonstrate a good ability to calculate the energy balance of buildings
CLO 2	evaluate different opportunities to save energy with measures regarding both building technology and building services engineering in both new and existing buildings
CLO 3	assess whether there is a potential conflict between energy conservation and indoor climate for different energy saving measures
CLO 4	analyze and interpret results both critically and independently regarding energy and indoor climate in buildings based on values from both calculations and measurements
CLO 5	demonstrate a good ability to work independently on investigating energy and indoor climate issues for buildings and to present the results both orally and in writing in well-prepared technical reports.

B. Syllabus

Course Objectives:

- To familiarize students with principles, techniques and guidelines for planning and design of energy conserving architecture.
- Study of solar energy systems and other alternative sources of energy being used in architectural applications.

Course Contents:

Module I: Introduction - 2 weeks

Classification and characteristics of energy resources, Use and exploitation of resources, Resource use in architecture / exploitation of resources for development, Resource shortage and constraint, Concepts and need for conservation, Renewable, non-renewable resources and alternate sources of energy. Need and necessity of energy conservation.

Module II: Energy conservation Architecture - 3 weeks

Principles of energy conservation, Pattern of energy use in buildings, Technologies and methods of conservation, Economic, technological and environmental implications. Ambient energy and lifecycle requirement of energy in different types of buildings. Use and possibility of alternate sources of energy.

Module III: Conservation of other resources - 3 weeks

Conserving building materials, water, land etc. in architecture, methods of conservation and their implication. Understanding the concept of zero energy buildings.

Module IV: Design of ECA - 3 weeks

Fundamentals of planning and design, Elements and principles of design, Study of design

problems, Application of relevant principles for design solutions, Innovative and appropriate construction technologies. Use of landscaping elements in energy conservation.

Module V: Exercise - 3 weeks

Students shall workout a practical exercise of converting one of their designs into energy conserving building.

Any important note or instruction for course coordinator

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- Alternative Natural Energy Sources in Building Design: Davies and Schubert.
- Design with nature: I. McHarg
- The Ecological Context: H. McHale.
- Energy Conservation Standards: for building design, construction and operation, S. Fred Dubin

Online Resources

- <https://www.IGBC.com>
- <https://www.ECBC.com>

<https://www.GRIHA.Org>

BAR 601 DESIGN – VI

Course Code: BAR 601 Credit Units: 12

L/0-ST/8-P/0

Teaching hours: 08

A. Course Learning Outcome

CLO 1	Understanding the scope, importance and need of the design. Learn the principles, methods, process, and concepts of design. Appreciate the requirements of design guidelines.
CLO 2	Evaluate architectural design concepts' applicability in various contexts by studying cases.
CLO 3	Apply the learning of the previous semester and theoretical or practical design to evolve a unique concept for a real architectural design project.
CLO 4	Evolve specific architectural design guidelines, policies, and recommendations for the project.
CLO 5	Create a design proposal for the given project in terms of presentation drawings, 3D model; 3D views, etc., as per the given requirements.

B. Syllabus

Course Objectives:

- To understand Design constraints pertaining to buildings requiring integration of basic services and structures; building on hilly terrain(contours); buildings forming a complex
- To investigate design issues pertaining to above typologies
- To create architectural design for above typologies

Course Contents:

Module I: Introduction

Introduction to parameters that control design criteria for buildings that require integration of basic services and structures; constraints and design strategies for building on hilly terrain and designing for variety of buildings that are part of same complex with examples. Project introduction for studio exercises.

Module II: Case studies, Site Studies and Literature Studies

Case Studies – primary and secondary; Site and surroundings survey- location, local climatic conditions, topography, existing landscape, socio- cultural impact on design; Literature Review – Design Standards and Codes, Comparative Analysis and Area statement

Module III: Concept Formulation

Development of concept to be presented with conceptual block model and sketches for approval.

Module IV: Design Development

Design to be developed through a series of appraisals and open discussions. Planning at site as well as building level to be frozen and workability, integration with structures and services, efficiency of design to be worked out and finalized.

Module V: Presentation

Presentation of studies and design proposal through submission of sheet work – drawings and views as well as scaled models. *An A4 Design Report - documenting the process & progress of*

work through clippings of sketches/ photographs of models highlighting design concept as well as the final proposal drawings etc- shall be an essential part of submission.

Design exercise can include projects like Housing, Auditorium, Museum, Institute campus on Hills/plains, shopping malls etc.

Examination Scheme:

Components	A	S 1	S 2	CT	EE	
Weightage (%)	05	1 5	2 0	10	20 Viva	30 EE

Text Books /Reference Books/Journals/Other Study Material:

- ‘Ching Francis, (1979), Architecture Form, Space and Order, Van Nostrand Reinhold Company, New York.
- Neufert Ernst, (1970), Architect’s Data, Crosby Lockwood and Sons, London.
- Chiara JD and Calender, (1983), Time Savers Standards for Building Types, McGraw Hill Book Company, New York.
- Broomer, F. Gerald (1974) Elements of Design: Space, Davis Publications Inc., Worcester, Massachusetts.
- Wagenknecht, Kay and Herte (1989) Site + Sculpture – A collaborated design Process, Van Nostrand Reinhold, NY.
- Allen, Edward and Iano, Joseph (2006), The Architect's Studio Companion: Rules of Thumb for Preliminary Design, Wiley; 4th edition.
- Frederick, Matthew (2007), 101 Things I Learned in Architecture School, The MIT Press.
- Pearson, David (2001), New organic architecture: the breaking wave, University of California Press.
- Fawcett, Peter (2003), Architecture: design notebook, Architectural Press, 2nd edition

Online Resources

- <https://www.archdaily.com>
- <http://www.architectmagazine.com>

[https:// www.architecture.com/knowledge-and-resources/resources-landing-page](https://www.architecture.com/knowledge-and-resources/resources-landing-page)

BAR 602 MATERIALS & CONSTRUCTION TECHNOLOGY – VI

Course Code: BAR 602 Credit Units: 03 L/1-ST/1-P/1 Teaching hours: 03

A. Course Learning Outcome

CLO 1	Understand the design intent of the architect.
CLO 2	Be able to read construction drawings.
CLO 3	Communicate with consultants and vendors.
CLO 4	Develop and convert the design intent into a set of good for construction drawings.

B. Syllabus

Course Objective:

- To acquaint the students with working drawing in construction work.
- To expose the students to preparation and usage of working drawings on site.
- **To familiarize with requirement of the working drawing, its essentials and levels of details required so that work could be executed at site without any further assistance.**

Course Contents:

Module I: Introduction to Working and submission Drawing – 1 week

Introduction to the topic and its relevance in the construction field. Aspects such as – construction terminology, building bye-laws, requirements of submission and completion / compounding of projects to be discussed.

Module II: Dimensions

system – 2 weeks

Dimension system at building and site level

Module III: Working

Drawing I– 3 weeks Plans,

section and elevation

Module IV: Working Drawing II– 3 weeks

Typical structural detail. Excavation and shuttering working drawing and detail

Module V: Working Drawing III - 2 weeks

Toilet / kitchen & staircase details

Module VI: Working

Drawing IV - 2 weeks

Flooring handling pattern,

Landscaping's **Module VII:**

Roof drainage, flashing - 2

weeks Detail of terracing for flat roofs.
Water proofing and rainwater disposal.

Exercises

Making complete set of working drawings and details for a small two storied building designed in the previous semester, with necessary changes made as per the local bye-laws.

List of drawings-

Architectural drawing-Site Plan, All Floor Plans, Elevations, Sections, Doors and Windows schedule and details.

Structural drawing- Foundation Layout and details

Services drawing-Electrical and Plumbing layouts, HVACs layout.

Details drawing-Kitchen, Toilet, staircase details, Flooring Pattern, Details of grills, Parapet or railings, typical wall section with complete details.

Examination Scheme:

Components	A	C E	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- Elements of Structure by Morgan
 - Structures in Architecture by Salvadori
- Building Construction by Mackay WB Vol. 1-4 Construction Technology by Chudley Vol. 1-5

BAR 603 STRUCTURAL DESIGN & SYSTEM- VI

Course Code: BAR 603
02

Credit Units: 02

L/2-T/0-P/0

Teaching hours:

A. Course Learning Outcome

CLO 1	Investigate the tensile strength and design capacity of various steel elements in structures.
CLO 2	Create his/her own judgement regarding analysis method required for specific type of problem
CLO 3	Develop his/her interest in design of steel structures field.
CLO 4	Apply the design methods to understand the mechanism of existing structures.

B. Syllabus

Course Objective:

- To understand the design of Steel structures by using: - IS 800: 2007/1984
- To help the students for understanding the design of steel structures members like: - beam, columns & girders by using IS: - 800; 2007 (based on limit state method) & implement in analytical software's like: - Tekla Bentley version.

Course Contents:

Module I: Limit state method-2 weeks

Introduction, steelwork connections: -rivet, weld, bolt & pinned connections, failure & strength of a welded joint, working stresses in rivet joint, modes of failure of a riveted joint

Module II: Design of tension members-2 weeks

Introduction, types of tension member, net sectional area, net effective areas for angles & tees in tension. Permissible stresses, design of members subjected to axial tension & bending, lug angles.

Module III: Design of compression members-2 weeks

Introduction, modes of failure of a column, buckling failure: - Euler's theory, Ideal end conditions and effective length factors, radius of gyration & slenderness ratio, various column formulae, IS codes formulae, common shapes of compression members, strength of compression members, general specification for compression member, design of compression member

Module IV: Girders-2 weeks

Introduction, loads acting on girder, permissible stresses, types of girders & crane rails.

Module V: Advanced design for shear in beams-3 weeks

Design of advance R.C.C. Structures: - Strip & yield line method, Shear friction, horizontal shear transfer, composite concrete beams, design of shear walls, strut- & tie model, truss model, deep beams, bearing & shearing walls & corbels.

Module VI: Design for earthquake resistance-3 weeks

Effect of confining the concrete & introducing the famous models, flexural hinges & their lengths ultimate deformation & ductility of members with flexure, moment curvature relationship, cyclic behavior of beam- column member, redistribution of moments in reinforced beams, design of beam column joint.

Examination Scheme:

Components	A	H	C	V	C T	E E
Weightage (%)	05	10	10	05	20	5 0

Text Books /Reference Books/Journals/Other Study Material:

- | | |
|--|---|
| ■ P.N. Khanna, Civil Engineering Handbook. | ■ K. R. Arora, Advance concrete design. |
| ■ B.C. Punmia, Design of steel structures. | ■ IS: - 3370, IS: - 1893. |
| ■ Negi, Design of Steel Structure. | ■ Special publication -6 (SP-6) |
| ■ Salvadori and Heller, Structure in Architecture. | ■ Birla publication, Steel tables |
| ■ E. P. Popov, Mechanics of materials. | ■ Morgan, Elements of Structure. |

- ▣ J. Sterling Kinney, Indeterminate structural analysis.
- ▣ C.S. Reddy, Basic structural analysis.
- ▣ R. Park and T. Paulay, Reinforced concrete structures.
- ▣ M.L. Gambhir, Concrete technology.
- ▣ N. Krishna Raju, Design of reinforced concrete structures.
- ▣ IS: 800- 2007
- ▣ SP: 16- 1980
- ▣ N. Krishna Raju, Advance R.C.C. design.
- ▣ A.k. Chopra, Dynamics of structures.
- ▣ Chudley, Construction Technology Vol. 1-6
- ▣ Salvadori, Structures in Architecture
- ▣ Mackay WB, Building Construction Vol. 1-4
- ▣ Chudley, Construction Technology Vol. 1-6
- ▣ Elementary Building Construction by Mitchell
- ▣ Everet, Structure and Fabric.
- ▣ Tekla software. With Bentley version V8i.
- ▣ Morgan, Elements of Structure.
- ▣ Salvadori, Structures in Architecture.
- ▣ Mackay WB, Building Construction Vol. 1-4
- ▣ Mitchell, Elementary Building Construction.

BAR 604 QUANTITY SURVEYING & SPECIFICATIONS

Course Code: BAR 604
02

Credit Units: 02

L/2-T/0-P/0

Teaching hours:

A. Course Learning Outcome

CLO 1	Prepare quantity estimates for building structures as per the specifications
CLO 2	Draft detailed specifications and work out rate analysis for all works related to building structures.
CLO 3	Prepare cost estimate and valuation of construction works.
CLO 4	Prepare tenders and contract documents. Evaluate contracts and tenders in construction practice.

B. Syllabus

Course Objectives:

- To familiarize the students with the theory and practice of estimation and quantity surveying. To develop the understanding of specification writing.

Course Contents:

Module I: Introduction - 1 week

Definition, importance and uses of specification – principles and practice; method of writing specification; form and sequence of clauses, calculation of length according to long & short wall method, center line method.

Module II: Material Specifications - 2 weeks

Writing detailed specification for various common building materials e.g., bricks, sand, lime, timber, glass, paints etc.; specification of new building materials.

Module III: Specifications of Simple

construction - 2 weeks Writing detailed specification for various building construction works.

Module IV: Schedule of Rates - 2

weeks

Specification of BIS and other institutions; general Abbreviations used in specifications.

Module V: Introduction to Estimate - 2 weeks

Introduction to cost estimation and definitions of terms related to estimates.

Module VI: Types to Estimate - 2 weeks

Types of estimates, abstract and detailed estimates; detail estimates – methods of estimating; taking out of various items; preparation of bill of quantities – use of schedule of rates; analysis of rate and break up of material requirements.

Module VII: Cost accountancy & Book keeping - 2 weeks

Introduction to cost accountancy and book keeping.

Module VIII: Rate Analysis - 1 week

Principles of analysis of rates, rates of labour and materials, rate analysis in different building works.

Any important note or instruction for course coordinator

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- Estimating and Costing in Civil Engineering: B. N. Dutta
 - Estimation, Costing & valuation by M. Chakraborty.
 - Handbook on Building Economics and Productivity, Central Building Research Institute, Roorkee: S.C. Singh and G.C. Sofat.
 - Civil Engineering Handbook – P.N. Khanna
- R.C.C. Design – Khurmi, Punmia, Sushil Kumar

BAR 605 LANDSCAPE DESIGN & SITE PLANNING

Course Code: BAR 605

Credit Units: 02

L/2-ST/0-P/0

Teaching hours: 02

A. Course Learning Outcome

CLO 1	Characteristics of various types of plants/trees/ shrubs/ creepers/ edges/ hedges etc., and their suitability for landscaping; plant selection criteria, planting design.
CLO 2	Definition, scope, landscape architecture in relation to architecture. Landscape design elements and principles, historical review of gardens in India, Persia, Japan, Italy, France and England, contemporary landscape design
CLO 3	To know Landscape design element such as sculptures/ benches/ umbrellas/ fences/ posts etc. their design, selection and incorporation in landscape/ site planning schemes. Characteristics of various types of plants/ trees/shrubs/ creepers/ edges/ hedges etc., and their suitability for landscaping; plant selection criteria, planting design.
CLO 4	To Evaluate the topography/ slope, hydrology/ drainage, geology/ soil, vegetation, views – on site/ off site and then consideration in design and planning.
CLO 5	To design the outside space in accordance with the understandings and elements of site planning.
CLO 6	To review, reflect, re-interpret and refine the effectiveness of the designed outdoor spaces

B. Syllabus

Course Objective:

To acquaint the student with the various natural elements used to design transitional and outside spaces and establish a linkage between nature and the built environment

Course Contents:

Module I: Introduction

Definition, scope, landscape architecture in relation to architecture. Landscape design elements and principles, historical review of gardens in India, Persia, Japan, Italy, France and England, contemporary landscape design

Module II: Characteristics and use of plants

Characteristics of various types of plants/trees/shrubs/creepers/edges/hedges etc., and their suitability for landscaping; plant selection criteria, planting design.

Module III: Site Analysis and planning

Analysis of site with respect to topography/ slope, hydrology/ drainage, geology/ soil, vegetation, views – on site/ off site and their consideration in design and planning

Module IV: Landscape Design and maintenance

Landscape design for various building types; landscaping parks and roads, rock gardens, terrace gardens, landscaped courts. Preparation of landscape schemes; Landscape construction. Maintenance & phasing of landscape schemes.

Module V: Landscape design elements

Landscape design element such as sculptures/ benches/ umbrellas/ fences/ posts etc. their design, selection and incorporation in landscape/ site planning schemes.

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

Text:

- An Introduction to Landscape architecture by M. Laurie. An Introduction to Landscape Design by H. V. Hubbard
- Fundamentals of Landscaping and Site Planning by James B. Root. History of Garden Design by D. Clifford
- Tropical Garden Plants in Colour by Bose and Chowdhury

References:

- Colour and Design for Every Garden by Ortloff and Raymore Design with Nature by I. Mcharg
- The Way We Live by Alfresco
- New Landscape Design by Robert Holden Fundamentals of Ecology by M. C. Dash. Landscape Detailing by Michael Ittlewood.

BAR 606 BUILDING SERVICES-V

Course Code: BAR 606
02

Credit Units: 02

L/2-T/0-P/0 Teaching hours:

A. Course Learning Outcome

CLO 1	Understanding the scope, importance and ethics of the field of building services. Appreciate the requirements of different types of building services. Learn the concepts of the building services systems
CLO 2	To evaluate the quantity and quality of services to be provided.
CLO 3	Identify the various appliances, fixtures and appurtenances. Learn about the popular techniques of the building sciences.
CLO 4	Study about the thumb rules and the byelaws of the services and learn how to apply the knowledge while designing the layout of the buildings and its execution
CLO 5	Develop reports and assignments containing write-ups, and sketches to express their understanding of building services during lectures and site visits.

B. Syllabus

Course Objectives:

- To Integrate of HVAC system with building design & its application. To expose the students to the areas of air-conditioning, heating and ventilation in buildings of various types so that there integration could be done in most appropriate manner right at the design stage.

Course Contents:

Module I: Ventilation- 1 weeks

Natural and artificial ventilation systems; estimation of ventilation requirements; mechanical ventilation in buildings; scheme and equipment required for ventilation spaces like industrial kitchens, underground garages, and multistoried buildings and parking spaces.

Module II: Air conditioning- 2 weeks

Principles of Air conditioning; concept of thermal comfort; physiological principles; reaction of human body to the thermal environment; principles of psychometric; psychometric chart; selection of indoor and outdoor design conditions; refrigeration and air cycle; cooling and heating load calculations; various systems of air conditioning; duct work and air conditioning layout, fittings and fixtures; evaporative cooling, fair conditioning and its suitability. Types of systems- cooling tower, geothermal heating and cooling

Module III: Equipment's- 1 weeks

Scheme and equipment required for HVAC; their placement and physical space requirements.

Module IV: Load Calculation- 1 weeks

Cooling and heating load calculations; Introduction to British thermal unit and other factors; various systems of air conditioning; duct work and air conditioning layout, fittings and fixtures; evaporative cooling.

Module V: HVAC Design- 2 weeks

Design and drawing of HVAC system for a building designed in previous semester.

Any important note or instruction for course coordinator

Examination Scheme:

Components	A	CE	C T	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- Manohar Prasad, 'Refrigeration & Air conditioning'
 - C.P. Arora, 'Refrigeration & Air conditioning'
 - Modern Air-Conditioning, Heating and Ventilation: Carrer and G. Pitman.
 - Air Conditioning and Ventilation, Servems and Fellows, John Wiley
 - Ernest Tricomi-ABC of Air conditioning
 - Basics of Air conditioning by ISHRAE
 - All about Insulation by ISHRAE
 - ISHRAE HVAC Handbook 1997 Part - 1 -Air Conditioning
 - ISHRAE HVAC Handbook 2004 Industrial Ventilation Applications
- ISHRAE The Hand Book on Green Practices

BAR 705 ARCHITECTURAL CONSERVATION

Course Code: BAR 705 Credit Units: 02 L/1-T/1-P/0 Teaching hours: 02

A. Course Learning Outcome

CLO 1	Understanding the scope, importance and ethics of the field of Architecture Conservation. Also, learn about the different aspects of buildings and their causes of decay.
CLO 2	Learning how to evaluate the value of a heritage site and the different approaches taken for architectural conservation.
CLO 3	Apply the learning of the divergent approaches of conservation in comprehending the world wide examples of architectural conservation.
CLO 4	Develop reports and assignments containing write-ups, and sketches to express their understanding of conservation projects after their site visits.

B. Syllabus

Course Objective:

To familiarize the students with various aspects of Architectural Conservation. **To understand the role of a conservationist architect.**

Course Contents:

Module I: Introduction

Necessity, Values and Ethics, Principles and Scope of architectural conservation.

Module II: Methodology of Conservation

Understanding basic principles of conservation such as (a) Prevention (b) Preservation (c) Conservation (d) Restoration (e) Rehabilitation (f) Reproduction (g) Reconstruction (h) Adaptation

Module III: Structural Aspects of Buildings

Understanding Structural elements: beams, arches, vaults and domes; trusses and frames; piers, columns and foundations etc. accessing their losses and ways to conserve the same for longer life of building.

Module IV: Causes of Decay in Buildings

Natural and human factors; Environmental influences – thermal effect, corrosion and oxidation; Disasters; Botanical and biological causes. Accessing the extent of decay and devising the means to recover.

Module V: Building Repairs

Structural repairs, carpentry; Repairs of plaster work, paint work; Glass and mosaic surface repairs; Repair of excessive moisture etc. Understanding fundamentals of repairs of conservation for different purposes.

Module VI: Professional Practice

Investigation, documentation and analysis and preparation of inspection reports, Preventive maintenance; Legal

provisions; Management and phasing, presentation of heritage buildings. Cost estimation and cost control
Rehabilitation and adaptive use of buildings.

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

Text:

- Conservation of Buildings by J. H. Harvey
- An Introduction to Conservation by B. M. Feildon

References:

- A Critical Bibliography of Building Conservation by J. F. Smith.
- The Conservation of Historical Buildings by B. M. Feildon

BID 608 VAASTU IN ARCHITECTURE

Course Code: BID 608
hours: 02

Credit Units: 02 L-2/ST-0/P-0

Teaching

A. Course Learning Outcome

CLO 1	Understand the philosophy and believes in Vastu
CLO 2	Learn the relationship between humans and cosmos
CLO 3	Learn the concepts of vedicvastu
CLO 4	Learn the site planning and planning approaches of vastu
CLO 5	Produce building plans as per vastu

B. Syllabus

Course Objectives:

- To educate the students on Vastu Shastra so that our own built environment should be in harmony with the energy of the inmates living in it.
- To expose the students to the various theoretical and practical aspects of Vastu Shastra.
- To familiarize with the ancient mode of designing a building in amalgamation with the latest technologies available.

Course Contents:

Module I: Introduction to Vastu

Introduction to Vastu, History of Vastu, Vedas and other ancient books, Growth of Vastu, Vastu and today, Scientific definition of Vastu, Solar Passage & Buildings with research referencing, Solar Energy, Humans & Buildings, Cosmic Energy & Flow.

Module II : Vedic Vastu

Concept of Vedic Vastu, Vastu Purush, Mandalas, Five Elements Theory, Planets & Directions.

Module III : Planning As per Vastu

Direction and Corners, Eight directions, Importance of directions, Slope & Loading Pattern, Open space & balconies, Shapes, Vedic opinion on entries, Alternative opinion on entries, Main Door & Main Gate. Planning for Bedroom, Kitchen, Puja room, Bathroom, Children's room, Drawing Room, Living Room,

Office Room.

Module IV : Land & Location as per Vastu

Angles in a Plot & Building, VeedhiShoola, Angles & Extentions, Shermukhi&Gaumkhi plot, Good & Bad Location. Selection of land & soil test, Examination of the land as per Mayamata&Brahit Samhita, Types of Land as per Vedic books, auspicious land & Inauspicious land, Obstructions.

**Scientific correlation of
Vaastu Examination**

Scheme:

Components	A	CE	CT 1	EE
Weightage (%)	05	25	20	50

Text & References:

Text:

- B.B. Puri, Applied Vastu Shastra in Modern Architecture
- Michael Borden, Vastu Architecture: Design Theory and Application for Everyday Life
- Kathleen Cox, Vastu Living: Creating a Home for the Soul
- Talavane Krishna, TheVaastu Workbook: Using the Subtle Energies of the Indian Art of Placement
- Sherri Silverman, Vastu: Transcendental Home Design in Harmony with Nature

Rohit Arya, Vaastu: The Indian Art of Placement

BAR 701 DESIGN – VII

Course Code: BAR 701
hours: 10

Credit Units: 10 L/2-ST/8-P/0 Teaching

A. Course Learning Outcome

CLO 1	Understanding of the theoretical and applied research methodologies and practices used during the campus design process.
CLO 2	Integrated Evaluations and Decision-Making Design Process: Ability to demonstrate the skills associated with making integrated decisions across multiple systems and variables in the completion of a campus design project. This demonstration includes problem identification, setting evaluative criteria, analysing solutions, and predicting the effectiveness of implementation.
CLO 3	Ability to make design decisions within a complex architectural project while demonstrating broad integration and consideration of environmental stewardship, technical documentation, accessibility, site conditions, life safety, environmental systems, structural systems, and building envelope systems and assemblies.

B. Syllabus

Course Objectives:

- To understand Design constraints pertaining to **specialized high-rise/large span buildings requiring advanced services & structural systems.**
- To investigate design issues pertaining to Specialized buildings
- **To create architectural design for specialized buildings**

Course Contents:

Module I: Introduction to Specialized Buildings

Introduction to parameters that control design for specialized buildings requiring large span structures or advanced services with examples. Project introduction for studio exercises.

Module II: Case studies, Site Studies and Literature Studies

Case Studies – primary and secondary; Site and surroundings survey- location, local climatic conditions, topography, existing landscape, socio- cultural impact on design; Literature Review – Design Standards and Codes, Comparative Analysis and Area statement

Module III: Concept Formulation

Development of concept to be presented with conceptual block model and sketches for approval.

Module IV: Design Development

Design to be developed through a series of appraisals and open discussions. Planning at site as

well as building level to be frozen and workability, integration with advanced structures or services or both, efficiency of design to be worked out and finalized.

Module V: Presentation

Presentation of studies and design proposal through submission of sheet work – drawings and views as well as scaled models. An *An A4 Design Report - documenting the process & progress of work through clippings of sketches/ photographs of models highlighting design concept as well as the final proposal drawings etc- shall be an essential part of submission.*

Design exercise can include projects like high-rise apartments, large span exhibition pavilions, industrial buildings/warehouses, hotels, hospitals, Transportation hubs (Bus Terminal, Railway Stations, Airports, Metro Station etc.)

Examination Scheme:

Components	A	S 1	S 2	CT	EE	
Weightage (%)	05	1 5	2 0	10	20 Viva	30 EE

Text Books /Reference Books/Journals/Other Study Material:

- ‘Ching Francis, (1979), Architecture Form, Space and Order, Van Nostrand Reinhold Company, New York.
- Neufert Ernst, (1970), Architect’s Data, Crosby Lockwood and Sons, London.
- Chiara JD and Calender, (1983), Time Savers Standards for Building Types, McGraw Hill Book Company, New York.
- Broomer, F. Gerald (1974) Elements of Design: Space, Davis Publications Inc., Worcester, Massachusetts.
- Wagenknecht, Kay and Herte (1989) Site + Sculpture – A collaborated design Process, Van Nostrand Reinhold, NY.
- Allen, Edward and Iano, Joseph (2006), The Architect's Studio Companion: Rules of Thumb for Preliminary Design, Wiley; 4th edition.
- Frederick, Matthew (2007), 101 Things I Learned in Architecture School, The MIT Press.
- Pearson, David (2001), New organic architecture: the breaking wave, University of California Press.
- Fawcett, Peter (2003), Architecture: design notebook, Architectural Press, 2nd edition

Online Resources

- <https://www.archdaily.com>
- <http://www.architectmagazine.com>

<https://www.architecture.com/knowledge-and-resources/resources-landing-page>

BAR 702 MATERIALS & CONSTRUCTION TECHNOLOGY – VII

Course Code: BAR 702

Credit Units: 03

L/1-T2-P/0

Teaching hours: 03

A. Course Learning Outcome

CLO 1	To understand the design intent of the architect.
CLO 2	To be able to read construction drawings.
CLO 3	To Communicate with consultants & the vendors.
CLO 4	To Develop and convert the design intent into a set of good for construction drawings.

B. Syllabus

Course Objective:

- **To familiarize student with advance building materials and their construction details.** Learning construction details of various building parts at advanced level.

Course Contents:

Module I: Advance material I – 2 weeks

Properties and application of different Glass and glass products: Plain, sheet, plate, textured, laminated, wired and shock resistant glass. Glass blocks, glass tiles, mirrors, heat reflecting glasses and Glass wool.

Plastics, Nylon, PVC, Bakelite, Polythene, glass fiber reinforced plastic

Module II: Basement construction – 4 weeks

Type-full/semi /2 or more basement floors.

Water proofing material and admixture.

Design and construction detailing of basement

Design and detailing of Basement Ramp, slope, drainage, lighting, ventilators and finishing etc.

Module III: Fast Pace Construction – 4 weeks

Methods, types of construction – beams & slab, waffle grid slab, drop beam and slab, flat slab, lift slab, cast - in-situ service and stair core – cross wall and box frame construction

Module IV: Elevators and Escalators – 4 weeks

Elevators types and construction detail, Details of lift section, machine room equipment lift well and lift pit. Escalators: types and construction detail, Travellators and other modern modes of vertical movement.

Exercises: field trip and report, preparation of drawings on above topics

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- Elements of Structure by Morgan
- Structures in Architecture by Salvadori
- Building Construction by Mackay WB Vol. 1-4
- Construction Technology by Chudley Vol. 1-6

BAR 703 CONSTRUCTION & PROJECT MANAGEMENT

Course Code: BAR 703
hours: 02

Credit Units: 02

L/1-ST/1-P/0 Teaching

A. Course Learning Outcome

CLO 1	To remember the project management techniques for handling construction projects.
CLO 2	To apply knowledge of charts & critical path networking for planning the construction activities.
CLO 3	To analyse the resource allocation requirements for various construction projects.
CLO 4	To formulate project schedules & plans for typical civil construction projects.

B. Syllabus

Course Objectives:

- To introduce the students about need of CPM to handle complexity of design & construction; also the role of an architect in effective project management to handle cost overruns, timelines & quality etc.
- **To familiarize students with various simple construction planning techniques such as bar charts & networking diagrams.**
- **To make students familiar with best construction practices, project scheduling & sequencing, equipment's & technologies etc.**

Course Contents:

Module I: Introduction - 2 weeks

Defining a Project; Phases involved in Project life cycle i.e. from inception phase to the Post-construction phase, Project Appraisal, Project Delivery Methods, Various stakeholders in construction industry and their roles and responsibilities, Introduction to Project Management Knowledge Areas.

Module II: Construction Planning & Scheduling - 3 weeks

Preparation of Work Break Down Structures and Sequencing of Activities, Resource and Duration Estimating, Preparation of Schedules (using CPM, PERT, Gantt charts, precedence diagrams, etc.), Monitoring and controlling the schedules, Computer Applications for preparing and managing Schedules, Preparation of schedule for completion / submission of deliverables related to their current design exercise.

Module III: Cost & Resource Management - 3 weeks

Functions of Financial or Cost Management, The Concept of Time Value of Money, Techniques of Capital Budgeting, Cash Flow Statement, Preparation of cost baselines and their analysis & Earned Value Management, Organizing work, staffing, delegation and decentralization, Human resource management, Customer Relationship Management (CRM), & Entrepreneurship Issues in Indian Construction Industry

Module IV: Quality & Safety Management - 3 weeks

Evolution of Quality Management, quality assurance & control and ISO requirements, Introduction to concept of quality in building design, construction and project management, Tools for Quality Management, Introduction to construction site conditions in India, Impact of safe working environment on HR performance and their productivity, Legal, contractual and other guidelines for construction safety.

Module V: Tendering & Contract Administration - 3 weeks

Types of Tenders & Contracts, Inviting a Tender, Conditions implied on a Tender, Pre-qualification of contractors, Preparation of contract documents, Contract Conditions, Evaluation of contract bids and Award, Arbitration & Alternative Dispute resolution mechanisms.

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- IS 15883: Construction Project Management – Guidelines.
- A Guide to the Project Management Body of Knowledge by Project Management Institute, USA.
- Construction project management: a practical guide to field Construction Management by S. Keoki Sears, Richard Hudson Clough, Glenn A. Sears.
- CPWD, MES, FIDIC, JCT, ADB, World bank, etc.: General & Special conditions of contract and standard operating procedures.
- Contracts and their Management by B. S. Ramaswamy.

Online Resources

- <https://www.projectmanager.com/blog>
- <http://www.smartsheet.com>

BAR 704 HOUSING & TOWN PLANNING

Course Code: BAR 704

Credit Units: 03

L/1-ST/2-P/0

Teaching hours: 03

A. Course Learning Outcome

CLO 1	Understand and remember the fundamental concepts, definitions, and standards of town planning by learning the evolution and contemporary guidelines in practice.
CLO 2	Evaluation of the various planning theories, works of notable town planners and outstanding examples, and the different stages of the contemporary planning process.
CLO 3	Experience of the different stages of contemporary planning processes
CLO 4	Creation of reports and thematic maps for land use and master plans

B. Syllabus

Course Objectives:

- To Introduce the elementary science of town planning principles
- To familiarize students with evolution and development of town planning through history
- To familiarize the students with various aspects, issues and considerations related to housing design and community planning

Course Contents:

Module I: Introduction to Town Planning - 3 weeks

Introduction to Human settlements, principles of human settlements in ancient, medieval, modern times. History of Town Planning and Urban design, Concept of Town planning, Evolution of settlements, form & pattern through historical process of development. Study of various City plan patterns viz; Linear, Radial and Grid Iron layout patterns, New modern ways of Planning, Socio-economic dynamics of urbanization. Industrial revolution and modern city, Garden City, Satellite town, Democratic city. Case studies of some recent planned cities like New Delhi, Canberra, Brazillia, and Chandigarh.

Module II: Planning Process - 2 weeks

Methodology of conducting town planning, surveys and analysis of data collected, use of G.I.S. site planning & urban development, Study of traffic characteristic ; Composition, speed, volume and direction of movement. Urban road systems and geometry, Capacity of roads and intersections, Road network & sections, climate, service & zoning, city scape & street scape.

Module III: Town Planning Theories- 3 weeks

Planning theories of the twentieth century, Current theories on physical planning. Planning theories of Sir Patrick Geddes, Kevin Lynch, Clarence Perry, Frank Lloyd Wright, Ebenezer Howard, Le Corbusier, Soria Y Mata, Lewis Mumford. Study of garden city, radiant city and Utopian concept. Neighborhood planning, elements of neighborhood, definition, formation, need & relationship with the town plan.

Module IV: Planning Standards - 2 weeks

Formulation of planning standards for land use, density, road and various community facilities at the local and town level. Study of Urban development plan formulation & Implementation (UDPFI) guidelines; Detailed understanding of the latest planning and housing acts and other planning regulation

Module V: Introduction to Housing - 2 weeks

Definition of house and housing. Housing and its importance in Architecture; Housing and its relationship with Neighborhood and city plan. Various aspects and issues related to housing.

Type of dwelling structures, Built form, socio-psychological and aesthetic implications and suitability of different types of dwellings, detached, semidetached houses, Flats and multistoried classification according to the type of access-corridor, gallery, direct grouped, combination of these access types. Definition of each of the above types, their suitability, advantages, disadvantages and social, economic and aesthetic implications. Sub-division techniques; proportions of plots and need of roads. Garages and parking areas. Housing situation in India, Various Govt. programmes

Module VI: Housing Design and Site Planning- 2 weeks

Criteria for site selection and housing layout considerations, Considerations of physical characteristics of site, climate and orientation, Importance of orientation and climatic factors in housing design. Location factors, legal and financial factors, norms and standards for dwelling community and neighborhood factors, shopping, education, health and recreational facilities.

Importance of topography in housing design. Problems inherent in steeply sloping sites, economic and aesthetic implications of the building along and against the contours, silhouette problems on a sloping site. Effects of plantation in the background and front of buildings on a sloping site. conservation of beauty spots, Roads in residential areas.

Any important note or instruction for course coordinator

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- Principles and practice of Town and Country Planning, Kebble
- Urban and Regional Planning – A System Approach, J. B. McLoughin Town Planning in its social context, G. Cherry
- Cities of Tomorrow: An Intellectual History of Urban Planning and Design in the Twentieth Century by Peter Geoffrey Hall
- The Development of the Planning Process, J. F. Amos
- Ekistics: An Introduction to the Science of Human Settlements, C. A. Doxiadis Town Planning in Ancient India, BinodeDutt
- Urban Pattern, Arthur B. Gallion
- An Introduction to Housing layouts: Greater London Council
- Housing: J. Macsai.
- Low cost housing in developing countries by G. C. Mathur Laurie Baker by Gautam Bhatia

Elective-VI

BID 806 INTELLIGENT INTERIORS

Course Code: BID 806 Credit Units: 02 L-1/T-1/P-0 Teaching hours: 02

A. Course Learning Outcome

CLO 1	To understand the difference between conventional design approach and Digital design process.
CLO 2	To understand use of different software, digital design tools and techniques for different-different digital design processes.
CLO 3	To apply digital design tools and techniques for the development of complex products, building interiors and exterior.
CLO 4	To evolve innovative digital architectural components by using logical and mathematical model.
CLO 5	To create physical structure evolved by digital design process.

B. Syllabus

Course Objectives:

- Technology is becoming inherent part of modern life and has invaded every aspect of our life including the building interiors. Intelligent interiors are one of the most important parts of the modern buildings and objectives of the course is to make students aware of the use of technology in interiors.

Course Contents:

Module I: Introduction - 2 weeks

Overview of intelligent interiors and use of electronics & IT equipment for creating interesting interiors.

Module II: Intelligent Safety Systems - 3 weeks

Use of technology to maximize the performance of fire alarms and security systems while at the same time minimizing costs. Incorporation of safety equipment such as CCTV etc aesthetically in the interiors.

Module III: Workplace automation - 2 weeks

Intelligence with respect to workplace automation in an intelligent interior consists of the use of high – tech office automation systems to render the operation of a company more efficient. This can be done at a reduced cost to tenants by virtue of the equipment being shared.

Module IV: Automation of interiors - 2 weeks

Remote control in interiors, Managing and monitoring building efficiency from distance. Managing Security, HVAC etc from distance.

Module V: Virtual spaces and interiors - 3 weeks

Learning ways & system of creating such spaces that change shape/ size/ ambience/ colour etc. to change according to performance & suite the audience- D/4D/6D interiors. Interiors to suit the model & behavior of the user. Right from ones entry to the building to reach his final destinations. Temperature, light and colour control.

Module VI: Intelligent use of energy - 2 weeks

Intelligent interiors consist of energy use to the minimum with computerized system. To control light, airflow, air-conditioning, outdoor light entering the building heating and minimizing the energy consumption.

Examination Scheme:

Components	A	CE	CT 1	EE
Weightage (%)	05	25	20	50

Text & References:

BAR710 DESIGN OF LOGO & SIGNAGE'S

Course Code: BAR710
02

Credit Units: 02

L/1-T/1-P/0

Teaching hours:

A. Course Learning Outcome

CLO 1	Solve complex design problems using creative thinking and analytical skills
CLO 2	Develop and demonstrate their understanding and skillful use of the elements and principles of visual design
CLO 3	Gain skill to use the digital tools as a powerful means of communication for creation, modification & presentation
CLO 4	Learn ways to apply aesthetic sensibilities into their works and explore ways to balance between formal theories with practical applications.

B. Syllabus

Course objective:

- To acquaint the students with graphic design of symbols, logos and signage
- To familiarize the students towards its application in the field of architecture and built-environment globally

Course contents:

Module I: Introduction

Definition of Graphic design and its specialized industries; History of Visual communication, pivotal movements & designers that led to the development of Graphic Design industry dealing with Symbols, Logos and Signage as witnessed today.

Module II: Visual Design Fundamentals

Visual design elements and principles, theory of graphics and visualization, Colour theory, Typography and Photography; 2D and 3D visual elements for representation and transformations.

Module III: Design Process – Symbols and Logos

Creative thinking processes and methods; Typology fundamentals; designing, narrating and concept evolution for symbols and logos; Designing fundamentals of words, images, aesthetics, identity and expressions; Case Studies of famous examples of Logo and Symbol design.

Module IV: Design Process - Signage

Understanding importance of signage as per the building typologies; impact of commercial signage on users; ergonomics of informative signage; sign regulations, harmony with contextual urban design, architecture and environment, Design process and Case Studies of key informative and commercial signage.

Module V: Technology

Commerical Printing, materials & techniques for signage fabrication and erection, Signage lighting, Use of Graphic design softwares for designing symbols, lgos and signage.

Examination Scheme:

Components	A	CE	CT	EE
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Weightage (%)	05	25	20	50
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Text Books /Reference Books/Journals/Other Study Material:

- Chris Calori, David Vanden-Eynden, Signage and Wayfinding Design: A Complete Guide to Creating Environmental graphic design system, 2015 wiley
 - Lisa Silver, Logo Design that Works: Secrets for Successful Logo Design, 2001, Rockport Publishers
 - Michelle Galindo, Signage Design, 2011, Braun
- Edo Smitshuijzen, Signage Design Manual, 2007 Prestel Pub

BAR 801 PRACTICAL TRAINING

Course Code: BAR 801

Credit Units: 21

L/0-T/0-P/0

Teaching hours: 00

A. Course Learning Outcome

CLO 1	To make students acquire the practical experience which will concoct them for their likely responsibilities, immediately after qualifying B. Arch. Course.
CLO 2	Students are expected to learn with the realm of architectural discipline ranging from generation of idea, preparation of drawings to the final execution of design on site.

B. Syllabus

Course Objectives:

- The intent of the 'Professional Training' is to make students acquire the practical experience which will concoct them for their likely responsibilities, immediately after qualifying B. Arch. Course.
- Students are expected to learn with the realm of architectural discipline ranging from generation of idea, preparation of drawings to the final execution of design on site.

Course Contents:

At the end of the 7th Semester, and as a part of the Academic Curriculum, the students of the **Bachelor's of Architecture** are required to undergo a compulsory **Practical/Field Training** for a period of **6 Months**.

Module I: Nature of works expected during the training

To the following but not necessarily containing all-

- Preparation of:
 - Sketch designs, presentation drawings etc.
 - Municipal drawings according to the byelaws.
 - Workings drawings and details.
 - Estimates, bill of quantities & specifications.
- Discussions with:
 - Clients
 - Structural Consultants
 - Services Consultants
- Inspection and management of site:
 - Preparation of Models, perspectives and photographs
 - Preparation of Reports, progress charts etc.
 - Other administrative works

Module II: Content of Training Report

Following contents will be followed for both intermediate and final submissions:

After completion of practical training, the trainee is required to submit the following in a hard copy. Training report should contain:

- Office profile
- Listing of current project being undertaken
- Project wise details of work undertaken by student
- Trainee's own assessment and experience about office, working, projects etc.

All projects listed in the report should compulsorily correspond with the list of projects mentioned in the monthly log. Copies of drawing shall be attached as annex to support the content of the report. The drawing prints shall be obtained with the permission of the office and stamped/sealed by the 'Supervisor'/Head of the firm/office.

Assessment:

The Practical/Field Training will be supervised by the faculty from time to time by making regular visits

to the places of the training to get a first-hand feedback about the students' work & discipline etc. In addition, the office will be requested to submit a confidential report about discipline/behavior/punctuality, which will be part of marking system.

Submission

At the end of Practical/Field Training each student will submit a portfolio* of his/her work along with the aspects which the student has learnt to enhance his/her professional capability.

The portfolio will be assessed by an internal Jury where each student will be given time to display, present & conclude the experience gained.

***: A portfolio shall include written report, blue print/photocopies of the practical work done and or photographs of the work executed during this period.**

Note: The Practical/Field Training will be organized by the School; however a student will be allowed to choose a place of his/her preference for which prior approval of the School will be required.

Examination Scheme:

Components	S	VIVA
Weightage (%)	50	50

NINTH SEMESTER

CourseCode	CourseTitle	Univ. Category	CoA Category	L/T/ST/PPerWeek			Credits	Teaching hours
				L	T/ST	P		
BAR901	Design–VIII	CC	PC	0	10	0	15	10
BAR902	Advanced Materials&ConstructionTechnology	CC	BS&AE	1	1	1	3	3
BAR903	Dissertation	CC	PAECC	0	0	4	2	4
Domain Elective– VII(SelectanyOneDE)								
BAR904	LightandArchitecture	DE	PE	2	0	0	2	2
BAR905	IntelligentInteriors	DE	PE					
BAR906	DisasterResistantArchitecture	DE	PE					
Domain Elective– VIII(SelectanyOneDE)								
BAR907	TensileConstruction	DE	PE	2	0	0	2	2
BAR908	InteriorDesign	DE	PE					
BAR909	SetDesign	DE	PE					
	TOTAL			5	11	5	24	21

NINTH SEMESTER

BAR 901 Architectural Design – VIII (Urban Design Studio)

Course Code: BAR 901

Credit Units: 14

Teaching hours: 18

A. Course Learning Objective

CLO 1	Understanding the scope, importance and need of the urban design. Learn the principles and concepts of the urban design. Appreciate the requirements of urban design guidelines.
CLO 2	Evaluate urban design concepts applicability in different-different contexts by studying cases.
CLO 3	Apply the learning of the previous semester and urban design to evolve a unique. Concept for a real urban design project.
CLO 4	Evolve specific urban design guidelines, policies and recommendations for the project.
CLO 5	Create an urban design proposal for the given project in terms of presentation drawings, 3D model; 3D views etc as per the given requirements.

B. Syllabus

Course Objective:

Student shall learn the urban design concept and shall learn to design on the site taking the offsite consideration. On the site they shall learn to design taking the surroundings and areas beyond the boundaries also consideration.

Course Contents:

Module I: Introduction to Urban Design concept

Introduction to urban design concepts and their relation with the Architecture.

Module II Case studies

Students shall visit live site, take photographs and measurements and learn to identify landmarks, vista etc. Basic urban design element and present a report.

Module III: Development regulations

Understanding of development regulations, Master Plan and other legal restrictions and making presentations.

Module IV: Process of urban design

Learning the process of urban design, delineation of the study area, making detailed analysis, mapping the area, identifying the important onsite and offsite elements, heritage structures and working out inferences.

Module V : Design formulation

Working out the alternative proposals of the area delineated in module IV. Preparation of vision statement, analyzing the proposal and working out detailed design giving the necessary

interventions.

Module VI: Design Programme :

Phasing out the development, preparing and comparison of existing situation to the proposed images, possibilities of development

Design exercise can include urban development/ redevelopment schemes, Neighborhood unit or similar assignments. The design shall include detailing of one of the building. Students shall submit Presentation drawings and a model with views

Design Problem shall include application of courses taught in previous semester such as material & Constructions technology and Building services.

Components	A	S 1	S 2	C T	V iv a	E E
Weightage (%)	0 5	1 5	2 0	1 0	2 0	3 0

Examination Scheme:

Text & References:

Text:

- Emerging concepts in urban design space design – Broadban, G
- Image of the city - Lynch K.
- Urban Pattern – S. Gallion
- A Pattern Language – Angel King Fiksdahi
- Urban Planning, Theory and Practices- M.Pratap Rao

References:

- Site Planning- K. Lynch
- Site Planning by Simonds

BAR 902 Materials & Construction Technology – VIII (Advanced Building Construction)

Course Code: BAR 902

Credit Units: 04

Teaching hours: 04

A. Course Learning Objective

CLO 1	Understanding the scope, importance and need of the urban design. Learn the principles and concepts of the urban design. Appreciate the requirements of urban design guidelines.
CLO 2	Evaluate urban design concepts applicability in different-different contexts by studying cases.
CLO 3	Apply the learning of the previous semester and urban design to evolve a unique. Concept for a real urban design project.
CLO 4	Evolve specific urban design guidelines, policies and recommendations for the project.
CLO 5	Create an urban design proposal for the given project in terms of presentation drawings, 3D model; 3D views etc as per the given requirements.

B. Syllabus

Course Objective:

Understanding different technology used in latest construction methods and Studying modern construction techniques.

Course Contents:

Module I: Introduction to Pre-Fabrication Technology

Introduction to the topic and its relevance in the construction field. Aspects such as – construction terminology, types, Applications, Detailing. Site visits and material collection from Pre-Fabrication manufacturing units and live examples.

Module II: Introduction to Pre-Stressed Technology

Introduction to the topic and its relevance in the construction field. Aspects such as – construction terminology, types, Applications, Detailing. Site visits and material collection from Pre-Stressed manufacturing units and live examples.

Module III: Advanced Glazing systems

Structural Curtain wall –Design, detailing and specifications, Staircase and railing in glass- details of junction fixing etc. Market survey of available materials, technology and hardware. Students shall

Module IV: Advanced Architectural details

Advance details of grooves, beading and patterns in furniture and fixtures and their

continuity, understanding the use of modern fixtures and hinges as applied to various building material. Students shall prepare details of some of works done by them in the previous years.

Module VI: Miscellaneous metals such as copper, stainless steel etc. and their advanced application in buildings such as cladding, piping etc along with three detailing of their construction..

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text & References:

Text:

- Building Construction – Materials by M.V. Naik
- Strength of Materials – Khurmi R. S.
- Applied Mechanics and Strength of Materials – Khurmi R. S.
- Civil Engineering Handbook – P.N. Khanna
- R.C.C. Design – Khurmi, Punmia, Sushil Kumar
- Design of Steel Structure – Negi
- Structure in Architecture – Salvadori and Heller

References:

- Elements of Structure by Morgan
 - Structures in Architecture by Salvadori
 - Building Construction by Mackay WB Vol. 1-4
 - Construction Technology by Chudley Vol. 1-6
 - Elementary Building Construction by Mitchell
- Structure and Fabric by Everet

BAR 904 Dissertation

Course Code: BAR 904

Credit Units: 02

Teaching hours: 03

A. Course Learning Objective

CLO 1	Identification of research area and preparation of research proposal
CLO 2	Literature study and data collection
CLO 3	Analysis of site and data
CLO 4	Prepare research methodology
CLO 5	Preparation of reports and drawings

B. Syllabus

Course Objective:

The objective is to introduce students to the research based project and its analysis. A research study will be undertaken by each student of different topics of immediate relevance to the professional knowledge. The study would include a through literature survey as well as data collection from the field service or by contact with practicing Architects, Interior designers and public at large as clients. Each student will prepare an analytical research project based on the above information and submit in the form of a well-complied document duly illustrated with relevant diagrams, sketches and informatics presentation.

Note: Dissertation can be treated as a preamble as the base of the thesis done on individual basis so the students could learn to work on research project

Course Contents:

Module I: Introduction

Introduction to the dissertation project and get the project/ topic approved by the school and respective faculty giving suitable justifications and reasons for the research. The proposal of research should include the aims, objectives, methodology, limitations, bibliography, site etc. at the time of approval of topic.

Module II: Collection and Analysis of Data (Case Study)

Site and surroundings survey- location, local climatic conditions, topography, existing landscape, socio-cultural impact on design. Study the site potentials in term of energy conservation and natural conditions.

Module III: Analysis of Data

Research analysis and data collection, Justification to topic selected. Detailed study of functions, Study of relationship of built and open spaces, interlinking of various activities.

Module IV: Methodology

Methodology of research, Data analysis, Data compilation.

Module V: Presentation

Preparation of analysis report with suitable drawings for discussion

Submission: The submission will be in the hard Bound A-4 Size Report. The research should include the followings:

Selection of Dissertation topic	Justification to topic selected	Site analysis and justification
Methodology of research	Research analysis and data collection	Climatic conditions
User requirements and standards	Analysis	Inferences
Conclusions	Recommendations/ Suggestions	Bibliography

Examination Scheme:

Components			1	1
Weightage (%)	05	15	30	50

Text & References:

Text:

- Site Planning Standards, J. D. Chaira.
- Time Saver Standards, J. H. Callender and J. D. Chaira
- Architectural Graphic Standards, C. G. Ramsey
- Neufert's Architects Data, V. Jones, Ed. Gen.

References:

- Intention in Architecture, N. S. Christian
 - Form and Structure, D. Philip and O. Frei
 - A.J. Metric Handbook, editors, Jan Bilwa and Leslie Fair weather
- Planning – the Architect's handbook, E and E.O

BAR 903 Housing

Course Code: BAR 903

Credit Units: 02

Teaching hours: 02

A. Course Learning Objective

CLO 1	To define basic elements of housing, interrelationships between human needs and housing subsystems,
CLO 2	To outline various housing policies and programmes; zoning regulations and development norms
CLO 3	To understand the concept of demand and supply in housing
CLO 4	Feasibility analysis of housing project through pre design calculations & critical appraisal of existing housing schemes
CLO 5	To develop suitable design of a neighbourhood based on the basis of knowledge acquire.

B. Syllabus

Course Objective:

To familiarize the students with various aspects, issues and considerations related to housing design and community planning.

Course Contents:

Module I: Introduction to housing

Definition of house and housing. Housing and its importance in Architecture; Housing and its relationship with Neighborhood and city plan. Various aspects and issues of housing,

Module II: Types of dwellings

Type of dwelling structures, Built form, socio-psychological and aesthetic implications and suitability of different types of dwellings, detached, semidetached houses, Flats and multistoried classification according to the type of access-corridor, gallery, direct grouped, combination of these access types. Definition of each of the above types, their suitability, advantages, disadvantages and social, economic and aesthetic implications. Sub- division techniques; proportions of plots and need of roads. Garages and parking areas.

Module III: Energy-efficient and cost effective housing

Cost reduction in housing: techniques and related issues, alternative building materials. Energy efficient housing.

Module IV : Govt Policies and

intervention Housing situation in India.

Various Govt programmes

Module V: Local Considerations

Importance of topography in housing design. Problems inherent in steeply sloping sites, economic and aesthetic implications of the building along and against the contours, silhouette problems on a sloping site. Effects of plantation in the background and front of buildings on a sloping site. conservation of beauty spots, Roads in residential areas.

Module VI: Housing Design and Site Planning

Criteria for site selection and housing layout considerations, Considerations of physical characteristics of site, climate and orientation, Importance of orientation and climatic factors in housing design. Location factors, legal and financial factors, norms and standards for dwelling community and neighborhood factors, shopping, education, health and recreational facilities.

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text & References:

Text:

- An Introduction to Housing layouts: Greater London Council
- Housing: J. Macsai.
- Low cost housing in developing countries by G. C. Mathur
- Laurie Baker by Gautam Bhatia

References:

- Housing: an environment for living, Keiser, Marjorie Branin
- Housing and Buildings in hot-humid and hot-dry climate.

Domain Electives – IX

BAR905 INTELLIGENT INTERIORS

Course Code: BAR 905
hours: 02

Credit Units: 02

L/2-T/0-P/0

Teaching

CLO 1	Understanding the scope, importance and need of the urban design. Learn the principles and concepts of the urban design. Appreciate the requirements of urban design guidelines.
CLO 2	Evaluate urban design concepts applicability in different-different contexts by studying cases.
CLO 3	Apply the learning of the previous semester and urban design to evolve a unique. Concept for a real urban design project.
CLO 4	Evolve specific urban design guidelines, policies and recommendations for the project.
CLO 5	Create an urban design proposal for the given project in terms of presentation drawings, 3D model; 3D views etc as per the given requirements.

Course Objectives:

Technology is becoming inherent part of modern life and has invaded every aspect of our life including the building interiors. Intelligent interiors are one of the most important parts of the modern buildings and objectives of the course is to make students aware of the use of technology in interiors.

Course Contents:

Module I: Introduction - 2 weeks

Overview of intelligent interiors and use of electronics & IT equipment for creating interesting interiors.

Module II: Intelligent Safety Systems - 3 weeks

Use of technology to maximize the performance of fire alarms and security systems while at the same time minimizing costs. Incorporation of safety equipment such as CCTV etc aesthetically in the interiors.

Module III: Workplace automation - 2 weeks

Intelligence with respect to workplace automation in an intelligent interior consists of the use of high – tech office automation systems to render the operation of a company more efficient. This can be done at a reduced cost to tenants by virtue of the equipment being shared.

Module IV: Automation of interiors - 2 weeks

Remote control in interiors, Managing and monitoring building efficiency from distance. Managing Security, HVAC etc from distance.

Module V: Virtual spaces and interiors - 3 weeks

Learning ways & system of creating such spaces that change shape/size/ambience/colour etc. to change according to performance & suite the audience- D/4D/6D interiors. Interiors to suit the model & behavior of the user. Right from ones entry to the building to reach his final destinations. Temperature, light and colour control.

Module VI: Intelligent use of energy - 2 weeks

Intelligent interiors consist of energy use to the minimum with computerized system. To control light, airflow, air-conditioning, outdoor light entering the building heating and minimizing the energy consumption.

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

Text

- 'Drywall (Pro Tips for Hanging & Finishing), John D. Wagner
- Graphic Interiors (Space Designed by Graphic Artists), Corina
- Dean Interior design illustrated , Francis D.K. Ching
- Graphic Interiors (Space Designed by Graphic Artists), Corina Dean

Reference Books

- A.J. Metric Handbook, Jan Bilwa and Leslie Fair weather Architectural Graphic standards, Boaz Joseph
- The Curtain Book, M itchl Beazlty
- Illustration + Perspectives (In Pantone Colors), Eiji Mitooka

BAR 906 DISASTERRESISTANT ARCHITECTURE

Course Code: BAR 906 Credit Units: 02 L/2-T/0-P/0 Teaching hours: 02

CLO 1	Identification of research area and preparation of research proposal
CLO 2	Literature study and data collection
CLO 3	Analysis of site and data
CLO 4	Prepare research methodology
CLO 5	Preparation of reports and drawings

Course Objectives:

- To familiarize the students to the various theoretical and practical aspects of disasters and explain them the precautions to be taken in design resistant structures.
- To introduce the disaster management techniques and method of rehabilitation
- To make them understand the concept of shelter housing, etc.

Course Contents:

Module I: Introduction - 2 weeks

Overview of disasters; major natural disaster – flood, cyclone, droughts, landslide, heat waves, earthquakes, fire hazards etc. and their importance to architects.

Module II: Factors Causing Earthquake - 3 weeks

Module content Basic understanding on fragile eco-system, physiographic and geo-chemical data mapping, soil and topography, hydrological factors, climatic conditions. Site planning, building form and shape, considerations for earthquake resistant buildings

Module III: Strategies for Disaster Prevention- 3 weeks

Engineering, architectural, landscaping and planning solutions for different types of calamities. Norms, standard practice procedures for shelter and settlement

Module IV: Fire Safety in Buildings - 3 weeks

Understanding Fire. Learning precautions for fire resistant buildings, Designing the fire resistant building using modern construction techniques and materials, Fire safety in multistoried buildings.

Module V: Laws Related to Disasters- 3 weeks

Fire related Laws for buildings, Earthquake related laws, provisions in NBC and other standards laid down by Bureau of Indian Standards

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- Dynamics of Structures by A. K. Chopra
- Building Configuration and Seismic Design, C. Arnold and R. Reitherman
- Earthquakes An Architect's Guide to Non-Structural Seismic Hazard, H. J. Lagorio
- Handbooks by IIT Kanpur for Earthquake Design.

- The Seismic Design Handbook, F. Naeim
- Design for Earthquakes, J. Ambrose and D. Vergun

TENTH SEMESTER

BAR 1001 Project (Thesis)

Course Code: BAR 1001

Credit Units: 18

Teaching hours: 24

A. Course Learning Objective

CLO 1	To illustrate the ability to designs a project responsive to the contextual and program requirements
CLO 2	To demonstrate systematic & methodological learning from various stages of the research & design process.
CLO 3	To communicate the ideas clearly using writing, verbal and visual presentation
CLO 4	To evaluate & compare data gathered from pre-design research
CLO 5	To demonstrate application of various codes, standards and regulations governing the project.
CLO 6	To illustrate the ideas clearly using a detailed physical Model.

B. Syllabus

Course Objective:

To provide the students an opportunity to research and develop a design scheme for a project of their choice and approved by the school maintaining professional working standards and attain a professional level approach with extensive details. To attain independent professional approach analysis based design projects achieving high level of workability, efficiency and aesthetics in 3-D form with all the services properly worked out.

Course Contents:

Module I: Introduction

Introduction to the thesis design and get the project approved with the finalization of thesis guide/s. (Consent to be taken from internal and external guide both). The project research should include the followings:

Aim and Objective of study and Justification to topic selected	Case studies selected	Suggestions
Methodology of research	Analysis of study	Concept and planning of your own design
Limitation and scope of research	Conclusions of study	Bibliography

Module II: Research

Extensive research specific to project through the primary and secondary data collection. Conduct the case studies with extensive study and analyze to get a clear picture of the existing example. Detailed site

study is to be conducted simultaneously.

Module III: Concept Development and Designing

Development of concept at various stages and levels with conceptual model and 3-D sketches to be studied. Design to be developed through a series of appraisals and open discussions. Planning at site as well as building level to be frozen and workability, efficiency of design to be worked out and finalized.

Module IV: Specifications and Estimation

The project estimation with all the necessary specifications to be detailed and studied to get a clear picture of the cost of the project. The details should include all the interior and exterior details.

Module V: Presentation

Complete project development and analysis report to be compiled containing all the details of the project. Presentation in terms of 3-D drawings and detailed Model to be submitted. Mode of presentation may be mutually devised by co- coordinators and student that may be project specific.

Examination Scheme:

Components	A	P	S	External Jury/Viva
Weightage (%)	05	25	20	50

The thesis project to be evaluated through open jury comprise of thesis guide and external expert members.

Text & References:

Text:

- Site Planning Standards, J. D. Chaiara.
- Time Saver Standards, J. H. Callender and J. D. Chaiara
- Architectural Graphic Standards, C. G. Ramsey
- Neufert's Architects Data, V. Jones, Ed. Gen.
- Towards a Human Architecture, A. Bruce
- Architectural Graphics: C. Leslie Martin
- Perspective for the Architect: Themes and Hudson
- Interior Design: Ahmed Kasu
- Architectural Graphics – Ching Frank
- Engineering Drawing – P.S. Gill

References:

- Form and Structure, D. Philip and O. Frei
 - Architectural Graphic standards editor – Boaz Joseph
 - Planning – the Architect’s handbook, E and E.O.
 - Time Saver standards for building types, Editor Joseph D.C. and John Callender.
 - Practical Plane and Solid Geometry – H. Joseph and Morris
- Architectural Thesis done by other people

BAR 1002 Professional Practice & Management

Course Code: BAR 1002

Credit Units: 02

Teaching hours: 02

A. Course Learning Objective

CLO 1	Identify different professional bodies and Statutory Bodies in India, their functioning, importance and role towards the profession and role of the professional towards these bodies
CLO 2	Analyse and critically evaluate the requirements of a professional office/ corporate office to be ready to establish/join one.
CLO 3	Select and implement one of the practice types to be able to establish one's own practice
CLO 4	Demonstrate awareness of laws and bylaws related to the profession

B. Syllabus

Course Objective- To acquaint the students about different Professional and Legal bodies related to the Architecture Profession, their role and importance to a professional

To make the students understand the professional intricacies, professional responsibilities and conduct, legal obligations and implications so that at the end of their studies the Students is familiar of their responsibilities as a professional.

Module I –Professional Bodies- Familiarization with different Professional Bodies directly and in-directly related to architecture profession such as The Indian Institute of Architects (IIA), The Council of Architecture (COA), The Indian Institute of Interior Designers (IIID), International Union of Architects (UIA), Architects Regional Council Asia (ARCASIA), South Asian Association for Regional Cooperation of Architects (SAARCH), The Indian Society of Landscape Architects (ISOLA), The Institute of Engineers (India) (IEI) , The Institute of Town Planners India (ITPI) etc.

Module II Discussions in Detail about the IIA, its formative History, Its bye laws, rules and regulations, membership procedure and categories, IIA Elections, Functions and formation of the IIA Council, Importance of IIA, Activities of IIA and Awards by IIA.

Module III Architects Act 1972 and COA - Detailed study of the Act, different clauses and their consequences. Study of the Intellectual Property Right Act. The Council of Architecture- its formation procedure, functions role and responsibilities, members of the council, rules and regulations of the COA. Minimum Standards of Architectural Education as set up by the COA.

Module IV Code of Professional Conduct and scale of professional charges and Setting up of Office as lay down by the COA and modified from time to time. Procedures to be followed by an architect for the safe running of the Practice. Awareness about Architectural Competitions and the Procedure lay down by the COA. Does and Don'ts for Architectural Competitions.

Module V Tendering and Contracts for Construction of Buildings-types, details of a

tender document, procedure to be followed for calling tenders, tender analysis, election of the contractor and award of the work. Important terms such as EMD, Security Deposit, Defect Liability, Insurance etc. Types of the Contracts, legality of the Contract, important clauses of the Contract, role of the owner, architect and the contractor in fulfillment of the contract

Module VI Valuation of Fixed Assets-Introduction, Techniques, elements and factors affecting valuation, Methods, Types – renewal or lease/ extension of lease, standard rent, easement right, dilapidation, valuation of landed property, comparable cost of scale, purchase and mortgage, Capital gain tax, wealth tax, property tax and other taxes

Module VII Arbitration- Arbitration, Arbitrator, nature of arbitration, appointment, conduct, powers and duties of arbitrator and umpire amended from time to time. Procedure of arbitration, Claims – Fire insurance, damages with specific relevance to insurance. Injunction- Easement and its definition, interim, payment and mandatory injunctions.

Module VIII Acquisition and Ownership-Acquisition, Principles of acquisition, Purpose, Elements of acquisition – market value method and physical method of valuation.

Examination Scheme:

Components	A	CE	CT 1	EE
Weightage (%)	05	25	20	50

Text & References:

Text:

- COA documents.
- Architect's Act 1972
- Architectural Practice in India – Prof. Madhav Deobhakta
- Construction Project Management – K.K. Chilkar
- Construction Planning and Management – M.B. Dhir& S.P. Ghilot

References:

- Professional Practice in India – S.K. Sahu
 - Code of Architectural Practice – B.M. Basu
 - Project Management with CPM and PERT – Moder and Philipese
- Construction Method and Techniques – MullickMullind

Domain Electives - X

BAR 1003 PRODUCT DESIGN

Course Code: BAR 1003

Credit

Units:

02

Teaching hours: 02

A. Course Learning Outcome

CLO 1	Identification of research area and preparation of research proposal
CLO 2	Literature study and data collection
CLO 3	Analysis of site and data
CLO 4	Prepare research methodology
CLO 5	Preparation of reports and drawings

B. Syllabus

Course Objective:

To expose the students to the various theoretical and practical aspects of ergonomics and product design

Course Contents:

Module I: Ergonomics

Definition of human factors, Application of human factors data, Human activities – their nature and effects, man-machine system and physical environment

Module II: Human control system

human performance and system reliability, information input and processing, visual display, visual discrimination, Alphanumeric and related displays, visual codes and symbols, Auditory, tactual and olfactory mechanism, applied anthropometric, physical space and arrangement

Module III: Product Design

Form, colour, symbols, user specific criteria; material, technology and recyclability; packaging; multiple utility oriented approach to product design; design of household elements, tools and devices; element design for the physically and mentally repaired. Creative thinking –creativity and problem solving- creative thinking methods-generating design concepts-systematic methods for designing – functional decomposition – physical

decomposition – functional representation –morphological methods-TRIZ- axiomatic design **Module IV:**

Product Design Applications

Design Definitions and Design Spectrum, Product Attributes – Function and Emotion, Product configurations and Component relationships, Product Analysis – Diachronic, Synchronic, Understanding and Analyzing contexts, parallel situations, future situations, Understanding modularity and modular systems, 3D lattice and structures, Design of Modular System, abstract design, Process of conception and its documentation. Identifying customer needs, voice of customer, customer populations, hierarchy of human needs, need gathering methods – affinity diagrams – needs importance-establishing Product Design characteristics- competitive benchmarking- quality function deployment- house of quality-product design specification-case studies

Module V: Industrial application of Product Design

Industrial Product design, human factors design, user friendly design, design for serviceability, design for environment, prototyping and testing, cost evaluation, categories of cost, overhead costs, activity based costing methods of developing cost estimates,

Manufacturing cost, value analysis in costing

Exercise : Hands on Workshops on Product Design Studio, Case Studies on Product Design Development and Value Engineering

Examination Scheme:

Components	A	CE	CT	EE
Weightage (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

Text:

- A-Level Product Design, Will Potts
- Materials and Design: The Art and Science of Material Selection in Product Design, Michael Ashby, Kara Johnson Human Factors in Product Design, W.S. Green
- Product Design: Graphics with Materials Technology, Lesley Cresswell

References:

- Creativity in Product Innovation, Jacob Goldenberg, David Mazursky Building Product Models, Charles M. Eastman
- Building Better Products with Finite Element Analysis, Vince Adams, Abraham Askenazi

BAR 1004 COSTEFFECTIVE ARCHITECTURE

Course Code: BAR 1004

Credit Units: 02

Teaching hours: 02

A. Course Learning Outcome

CLO 1	To help the students for understand the concept of building economics behavior and requirements of buildings with emphasis laid on the principles of various costs & economic performance of building
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B. Syllabus

Course Objective:

To familiarize the student with cost-effective construction for building economy. To develop an understanding of different issues,

types and techniques involved in the design and construction of low cost structures

Course Contents:

Module I: Introduction

Basic shelter issues in India and Affordability, Need for achieving low costs in building construction – Low cost vs. Quality. Factors constituting building costs, Controlling parameters for achieving Cost Effective Architecture – land, space, materials, design, construction techniques, construction time & labour.

Module II: Understanding needs of economically weaker sections

Cultural study of economically weaker sections in India in different pockets like slums & existing EWS & LIG housings, space usage pattern studies, study for modifications and alterations done by dwellers in existing

EWS & LIG Schemes

Module III: Architectural Planning & Design for Cost Effective Architecture – Space Optimization

Site planning and Architectural Design as tools for Cost Effective Architecture, Space planning Norms of National Building Code, India for Economically weaker Sections in Urban and Rural Areas; National building organization – Recommendation of Housing and Urban Development Corporation, Space optimization as a process of cost reduction, Multiple use of space, Multiple use of furniture.

Module IV: Building Materials, Construction techniques & Time Optimization for Cost Effective Architecture

Architecture

Local materials and traditional technologies, Improved traditional technologies, Innovative Materials and construction methods developed Laurie baker; CBRI Roorkee, HUDCO, Anangpur Building Centre, Development Alternatives, Auroville Building Centre and many others for different types of walling, roofing and foundation with materials like Pressed soil blocks, soil cement blocks and other alternative materials – fly ash brick, gypsum byproducts, Ferro cement products, bamboo, jute stalk etc; Ways to cut down the use of unwanted building materials, Project time optimization to reduce project costs, Use of effective project management techniques.

Module V: Studies and Comparative Analysis for Cost Effectiveness

Case studies presentations of low cost/ cost effective projects and their comparative cost analysis with conventional

projects

Examination Scheme:

Components	A	CE	CT	EE
Weight age (%)	05	25	20	50

Text Books /Reference Books/Journals/Other Study Material:

- Alternative Construction, Contemporary Natural building Methods: Edited by Lynne Elizabeth and CassandrAdams.
- Low cost housing in developing countries by G. C. Mathur
- How the other half builds – Vol 1, 2 & 3 by Vikram Bhatt et al.
- National Building Code of India, 2005 – PART 3 – ANNEX C, E & F Laurie Baker – Life, work, writings by Gautam Bhatia
- Low Cost Housing – An analytical Study of the current practices & techniques by Vastu Shilpa Foundation
- CBRI Publications – Book 1-9
- Low Cost Housing competitions 1974 – 96 by HUDCO How to reduce building costs by Laurie Baker