FACULTY OF ARCHITECTURE & PLANNING

DEPARTMENT OF ARCHITECTURE

Bachelor of Architecture (B.Arch.)

Draft -

Detailed Syllabus for Semester I, II, III and IV

Vivekananda Global University, Jaipur

(Established by Rajasthan State Legislature vide Act. No. 11/2012 and covered u/s 2(f) of UGC Act 1956)

Draft - Syllabus for B.Arch.

B.ARCH
Semester-I
(Wef. 03 Jan, 2018- New)

S.No	Subject code	Subject Title	Teaching Hours			Total Hours	Credit
			Lecture	Tutorial	Practical		
1.	**BAR 101**	Basic Design and Visual Arts	1	2	2	5	5
2.	**BAR 102**	Architectural Structures - I	2	2	-	4	3
3.	**BAR 103**	Mathematics	2	-	-	2	2
4.	**BAR 104**	Architectural Drawing & Computer Applications - I	1	-	2	3	4
5.	**BAR 105**	Building Construction and Materials- I	2	2	2	6	6
6.	**BAR 106**	Open Elective	1	1	1	3	3
7.	**BAR 107**	Workshop- I	1	1	1	3	3
8.	**BAR 107**	Communication Skills -I	2	-	-	2	2
		Total	**12**	**8**	**8**	**28**	**28**

Note:

1. **Theory Examination (TE):** Theory exam shall be conducted for Architectural Structures – I (BAR 102), Mathematics (BAR 103) and Communication Skills –I (BAR 108)

2. **Theory and Drafting Examination (TDE):** Writing and Drafting exam shall be conducted for the studio subjects of Basic Design and Visual Arts (BAR 101) ,Building Construction & Materials-I (BAR 105), Architectural Drawing, and Computer Application -I (Bar 104),) in the Studio hall having the provisions of drawing boards.

3. **Sessional Viva-Voce Examination (SVE):** Portfolio examination (as Practical exam)/ Presentation shall be conducted through viva-voce in the subject of Open Elective (BAR 106), and Workshop- I (BAR 107), by internal / external examiner.

BAR 101 Basic Design and Visual Arts -I		
Course No.: BAR 101	**Course Title: Basic Design and Visual Arts -I**	**Credit: 5 L-T-P : 1-2-2**
Exam Duration: 3 hr	**Exam : Theory and Drafting Examination (TDE)**	**Max Marks: 100**

OBJECTIVE:

- To understand the elements and principles of design and experience them through exercises that will develop originality, expression, skill and creative thinking among students.
- To enable the understanding of 2D and 3D Compositions.

CONTENTS:

Unit I: Understanding design in 2D

- Principles of Visual Composition and potential of 2D elements like line, point, plane, etc. to create design; Two dimensional compositions of simple geometric shapes (triangles, rectangles, circles) ;Geometry in building elevations.

Unit II: **Form development and 3D compositions**

- Volumetric study of Platonic solids like Cube, Cuboids, Cylinder, Pyramid, Sphere etc. in simple positions. Introduction to Archimedean solids. Study of Solids and voids to evolve sculptural forms and spaces.

Unit III: Colour theory

- Play of colors and their influences as a design parameter. Exploring colour schemes and their application in a visual composition and in architectural forms and spaces.

Unit IV: Finishes and Textures

- Application and study of finishes ,textures and their associated impacts to design.

Unit V:Light and Shade

- Play of Light and Shade as an aspect of design. Analytical appraisal of building form in terms of visual character through light and shade, solids and voids etc.

EXERCISES:

- Craft work in paper including cutting, pasting techniques and origami.
- Sketches and artworks including 2D and 3D compositions with light, shade and proportions.
- Model making and 3d Compositions using paper and various other textures.
- Presentation on various architectural icons, and discuss various principles of design in them.

VISITS:

- Art Gallery, Visual Art Museum, Jaipur and Rajasthan Crafts Stores and Workshops.

Suggested Readings:

1. Broomer, F. Gerald (1974) Elements of Design: Space, Davis Publications Inc., Worcester, Massachusetts.
2. Maier, Manfired (1977) Basic Principles of Design, Vol.1, 2, 3 & 4, Van Nostrand Reinhold, NY.
3. Wong, Wucius (1977) Principles of two dimensional Design Van Nostrand Reinhold, New York.
4. V.S.Pramar, Design fundamentals in Architecture, Somaiya Publications Pvt. Ltd., New Delhi, 1973.
5. Francis D. K. Ching - Architecture - Form Space and Order Van Nostrand Reinhold Co., (Canada), 1979

BAR 102 Architectural Structures-I		
Course No.: BAR 102	**Course Title: Architectural Structures-I**	**Credit: 3 L-T-P : 2-2-0**
Exam Duration: 2 hr	**Exam : Theory Examination (TE)**	**Max Marks: 100**

OBJECTIVE:

- To explain Structural concept clearly, using analogies and examples to illustrate the points.
- To inculcate the understanding of the basic principles of structural mechanics for understanding of structural systems and basic analysis of structures.

CONTENTS:

UNIT-1: Introduction to Structures
The Structures in our lives, why buildings stands, How do structures behave, The relationship of structure to building, Importance of structural systems, what is structural engineering?
UNIT-2 : Force
Introduction to Force, Characteristics of Force, Force Systems, Force vectors and resultants, Resultant of Forces, Resolution of Force, Law of Forces, Equilibrium of Forces, Lami's Theorem, Free Body Diagram.
UNIT-3 : Moment
What is a Moment?, Moment of a Force, Types of Moment, Law of Moment (Varignon's Theorem), Applications of Moment, Moment Equilibrium.
UNIT-4 : Load and Sections
What is a Load?, Nature of Load, Load paths, Load Systems, Properties of Sections, Methods of Sections, Moment of Inertia, Centre of Gravity.
UNIT-5 : Structural Components and Materials
Introduction to Structural components of buildings, Classification of Structural elements, Ornamentation of Structure, Structure as Ornament, Concept of Firmness, Commodity and Delight.

EXERCISES:

- Notes and Theory Assignment of each Unit.
- Structure based logical model making.
- Case studies of various structural components of buildings

VISITS:

- Railway stations, Bridges, High-rise buildings etc.

Suggested Readings:

1. Applied Mechanics and Strength of Materials, R.S. Khurmi
2. Basic Structures for Engineers and Architects, Philip Garrison
3. Why things don't fall down, J.E. Gordan

BAR 103 Mathematics		
Course No.: BAR 103	**Course Title: Mathematics**	**Credit: 2 L-T-P : 2-0-0**
Exam Duration: 2 hr	**Exam : Theory Examination (TE)**	**Max Marks: 100**

OBJECTIVE:

- Revision and understanding of principles of geometry, metric measures, commercial mathematics and statistics measures as a tool for architects.

CONTENTS:

Unit I: Measurement and metric systems

- Measurement of length , volume, mass, area of plane figures, computation of volume of solid figures shapes and voids

Unit II: Concepts of mathematics for business

- Basic principles of economics
- Fundamentals of Commercial mathematics and topics related to Purchase-Sale and profit-loss, Simple and Compound Interest, Taxation and loans.

Unit III:Algebra and Geometry

- Direction cosines and ratio's – Angle between two lines – Equations of a plane – Equations of a straight line – Coplanar lines – Shortest distance between skew lines –
- Cone and Sphere – Tangent plane – Plane section.

Unit IV:Concepts of Probability to Analyze data and interpretation of results using statistical tools.

- The arithmetic mean, median, mode, standard deviation and variance - Regression and correlation - Elementary probability - Laws of addition and multiplication of probabilities - Conditional probability – Independent events.

Unit V:Scale and conversion

- Scale, Unit Conversion and understanding of metric and imperial system.
- Inter conversion of linear – Area – Volumetric Units.

EXERCISES:

- Tutorials containing theoretical notes and numericals related to above topics
- Activities and projects related to topics taught in class.
- Area Calculation and Unit Conversion Charts.

VISITS:

- FieldVisits and pattern making**.**

Suggested Readings:

1. Gupta S.C and Kapoor V.K., "Fundamentals of Mathematical Statistics", Sultan Chand & Sons, New Delhi, 9th Edition,1996.
2. Geometry and Its Applications, Second Edition 2nd Edition by Walter A. Meyer
3. Engineering drawing by ND Bhatt

BAR 104 Architectural Drawing and Computer Application -I		
Course No.: BAR 104	**Course Title: Architectural Drawing and Computer Application -I**	**Credit: 4 L-T-P : 1-0-2**
Exam Duration: 3 hr	**Exam : Theory & Drafting Examination (TDE)**	**Max Marks: 100**

OBJECTIVE:

To Develop an understanding of drafting as a architectural tool for visualizing design and for graphical representation of physical objects. Introduction to Computers as a useful tool for professionals

CONTENTS:

Unit I: Introduction to the subject

- Familiarization with drawing materials and equipment like types of paper, pencils, sheet sizes and other drafting tools. Free Hand Drawing of Lines and Curves.
- Lettering and fonts, Dimensioning, Scale and conversions and representation of Scale in graphics

Unit II: Graphical representation of objects

- Orthographic Projections and 2D representation of simple and complex objects
- 3D representation of objects by isometric and axonometric projections of simple objects.

Unit III:Inter-relationship in 2D and 3D graphic presentation.

- Intersection of solids and conversion from 2D to 3D form for simple and complex objects.

Unit IV: Introduction to Computers

- Computer as a Tool for Architects, Introduction to Computer and its Peripherals.
- Hardware in brief (useful for Architects) viz. CPU, Keyboard, Mouse, Printer, Plotter, Scanner and Digitizer etc.

Unit V:Computer for Architects

- Introduction to various Software Relevant to Architects viz. MS Office, Internet applications, and mailing etc.
- Architectural Software: Beginner's Level (Introduction) Sketchup & AutoCad.

EXERCISE:

- Drawing Sheets- Handling A2 size sheets, making formats and formal composition for graphical representation
- Drafting exercise related to above topics.
- Exercise on MS office, Excel, Power Point Presentation
- Basics modeling in Architectural software (conceptual visualization)

Suggested Readings:

1. Bhat, N D (1995) Engineering Drawing, Charotar Publishing House, Bangalore, India
2. Gopalakrishna, K R (2001) Engineering Graphics, Subhas Publications, Bangalore, India
3. A visual dictionary of Architecture, Francis D.K. Ching
4. Fundamentals of Computers and Online Tutorials for computer applications.

BAR 105 Building Construction and Materials -I		
Course No.: BAR 105	**Course Title: Building Construction and Materials -I**	**Credit: 6 L-T-P : 2-2-2**
Exam Duration: 3 hr	**Exam : Theory & Drafting Examination (TDE)**	**Max Marks: 100**

OBJECTIVE:

- To introduce the dynamics of constructing buildings and an appreciation of the use of building materials in architecture as an integral component.
- To understand properties, characteristics, strength, and use of various natural materials such as soil, lime, rocks, stones, clay, etc.

CONTENTS:

Unit I: Introduction to building elements

- Introduction to various building elements -Substructure/ Superstructure. Understanding various components of a building like doors, windows, plinth, copings etc.

Unit II: Soil and lime as building material

- Fundamentals of Soil Science, Types of soils, Principles of Soil Stabilization.
- Types of lime, Manufacturing process slaking, Hardening – Testing and Storage.

Unit III: STONE as a construction Material

- Classification of rocks, Sources, Seasoning, Dressing, Characteristics and testing and uses of stones. Stone veneering, preservation of stones Deterioration of stones, Durability, Preservation, Selection of stones, Artificial stones.

Unit IV: TIMBER and BAMBOO as a construction Material

- Classification & structure of trees, Defects in timber, Storage of timber, Uses of timber, etc.
- Bamboo anatomy, Properties, strength, processing, harvesting, and working of Bamboo tools.

Unit V: Brick as units of construction

- Various types of bricks and their composition (Clay brick, Mud brick, CC brick, AAC block, Fly ash Brick etc.)

EXERCISES:

- Notes and tutorials on Properties of Materials
- Market survey, sample collection and Industrial Knowledge ; availability of materials
- Sketching Exercises on use building materials and of Components of building
- Basic drafting exercises on building elements and simple construction practices.

VISITS:

- Building construction and material markets
- Plywood Industry etc.
- Bamboo workshop.

Suggested Readings:

1. S.K. Duggal, Building materials, Oxford and IBH publishing Co, put, Ltd, New Delhi 110001, 1997.
2. Dunkelberg (K), Bambus – Bamboo, Bamboo as a Building Material, Karl Kramer Verlag Stuttgart, 2000.
3. R.J. Spencke and S.J. Cook, Building materials in developing countries, John Wiley and sons 1983.

BAR 106 Open Elective -I		
Course No.: BAR 106	**Course Title: Open Elective -1**	**Credit: 2** **L-T-P : 1-1-1**
Exam Duration: N/A	**Exam : Sessional Viva-Voce Examination (SVE)**	**Max Marks: 100**

OBJECTIVE:

- To Provide Field experience, Acclimatization of the place, appreciating and documenting architecture**.**

CONTENTS:

Unit I: Campus Visit

- Exploring various parts of our own campus and getting familiar with the functioning and environment of campus.
- Locating various departments and activities happening in the campus itself.

Unit II: City Visit

- Visiting various places of importance, Architectural monuments and Historic places within the Jaipur city like, Public buildings, important market places, public transport, market places, libraries and art galleries.

Unit III: Design festivals and seminars

- Understanding the local livelihood and Culture through interaction with people and attending various architectural events, fest and conferences happening in Rajasthan to understand the trends in profession.

Unit IV: Field trips

- Interaction with localities, Outdoor Sketching and Photography of Various architectural monuments

Unit V:

- Participation in Competitions and Consultancy Works

EXERCISES:

- Documentation tools- mapping, photography, sketching etc.
- Interviews and report writing on experiences and discussions.

VISITS:

- Various historic places.
- Festivals, conferences and seminars.

Suggested Readings:

- Trending architecture and design Magazines
- Tour guides, tourist books and coffee table books on architecture.
- Research publications ,Conference and seminars proceedings.

BAR 107 Workshop -I		
Course No.: BAR 107	**Course Title: Workshop -I**	**Credit: 3 L-T-P : 1-1-1**
Exam Duration: N/A	**Exam : Sessional Viva-Voce Examination (SVE)**	**Max Marks: 100**

OBJECTIVE:

- Develop sketching and photography Skills, Ability and Comprehension as cognitive skills for designers.
- Establishing Significance Of Art.

CONTENTS:

Unit I: Pencil as a tool for communication

- Utility of pencil as a tool of graphic communication. Drawing Human figures, still life, auto-mobile and vegetation. Shading and rendering using pencil and charcoal.

Unit II: Color Theory

- Design principles & Introduction of types of colors and mediums. Shading and coloring using various dry mediums.

Unit III: Creating 2D and 3D Compositions

- Shading, lighting, texture and shadow, sketching a frame with respect to view finder, place, color, mood and purpose. Sketching architectural exteriors and interiors with respect to scale, composition, texture, color, skyline, light and shade.

Unit IV: Introduction to camera and photography

- Technical know How About Cameras, Its Accessories And their Applications
- Digital Photography.

Unit V: Model making in paper

- Introduction to various model making sheets and paper boards, Full Cut, Half Cut, Folding , pasting etc. techniques of model making.

EXERCISES:

- Pencil Sketching- Human Figures, Vegetation, Still Life, Etc.
- 2D Composition using design principles and point, line, plane.
- Colour Wheel Study of Primary, Secondary and Tertiary Colours.
- Getting Prints from Digital Images
- Model making of simple geometric forms using paper.

VISITS:

- Outdoor visit for sketching.
- Visit to art galleries and exhibition.
- Outdoor visit for photography

Suggested Readings:

- “Architects Sketchbook” by Will Jones
- “Architectural Graphics” by D.K. Ching
- “The Photographer’s Eye : Composition & Design for Better Digital Photos” by Michael Freeman

BAR 108 Communication Skills -I		
Course No.: BAR 108	**Course Title: Communication Skills -I**	**Credit: 2 L-T-P : 2-0-0**
Exam Duration: 2 hr	**Exam : Theory Examination (TE)**	**Max Marks: 100**

OBJECTIVE:

- Developing a language and vocabulary of Architectural importance and improve upon other verbal and non-verbal languages and methods of communication used by students

CONTENTS:

Unit I: Developing Architectural vocabulary

- Introduction to building components and definitions of basic terminologies used in architecture for example balcony, building, chajja, chowk or courtyard, parapet, water-closet, window, etc.

Unit II: **Introduction to architecture as profession**

- Identifying various building typologies, works of master architects and buildings of architectural importance.

Unit III: Formal writing skills

- Basic writing skills, Applications, Reports, Covering Letter & Curriculum-Vitae writing, etc.

Unit IV: Verbal communication

- Developing good command over English language; Reading and Comprehension of books and writings from different genres, Communication skills for Presentations, seminars, etc.

Unit V:Languages of Art and expression

- English Grammar revision- Understanding and discussing various genres of art and design like dance, music, literature, painting, craftsmanship, etc. and their relationship with architecture.

EXERCISES:

- Movie and book reviews
- Graphical and written presentation on building elements and styles in architecture.
- Exercises on English grammar
- Applications and formats to be developed for department use;(like application for site visit,etc.)

VISITS:

- Buildings of Architectural Importance/Tourist Places in Jaipur to understand building elements and styles
- Jaipur Literature festival (January 2018)

Suggested Readings:

- Words & Buildings A vocabulary of Modern Architecture, Adrian Forty
- A visual dictionary of Architecture, Francis D.K. Ching
- English Grammar- Wren and Martin.

Semester II

S.No	Subject code	Subject Title	Teaching Hours			Total Hours	Credit
			Lecture	Tutorial	Practical		
1.	**BAR 201**	Architectural Design - I	1	1	3	5	6
2.	**BAR 202**	Architectural Structures - II	2	2	-	4	3
3.	**BAR 203**	Environmental Science for Architecture - I	1	2	-	3	2
4.	**BAR 204**	Architectural Drawing & Computer Applications - II	1	1	3	5	6
5.	**BAR 205**	Building Construction and Materials- II	2	2	2	6	6
6.	**BAR 206**	History of Architecture & Culture - I	2	2	-	4	3
7.	**BAR 207**	Workshop- II	1	-	2	3	4
		Total	**10**	**10**	**10**	**30**	**30**

Note:

1. **Theory Examination (TE):** Theory exam shall be conducted for Architectural Structures – II (BAR 202), Environmental Science for Architecture - I (BAR 203), History of Architecture & Culture – I (BAR 206).

2. **Theory and Drafting Examination (TDE):** Writing and Drafting exam shall be conducted for the studio subjects of Architectural Design - I (BAR 201),Building Construction & Materials-II (BAR 205), Architectural Drawing and Computer Application -II (Bar 204) in the Studio hall having the provisions of drawing boards.

3. **Sessional Viva-Voce Examination (SVE):** Portfolio examination (as Practical exam) shall be conducted through viva-voce in the subject of Workshop-II (BAR 207) by internal / external examiner.

BAR 201 Architectural Design -I		
Course No.: BAR 201	**Course Title: Architectural Design -I**	**Credit: 6 L-T-P : 1-1-3**
Exam Duration: 3 hr	**Exam : Theory and Drafting Examination (TDE)**	**Max Marks: 100**

OBJECTIVE:

- To initiate architectural design process deriving from first principles.
- To understand of the functional aspects of design and to enable students to formulate and concretize their concepts of architectural design program.

CONTENTS:

Projects involving objects of everyday use, single use spaces with simple movement, predominantly for single person use.

Unit I: Formulating project requirements

- Understanding parameters of design like physical, physiological and psychological requirements of design, enlisting requirements of design, categorizing and interrelating the above parameters and their representation in graphical form like tables, graphs, bubble diagram etc.

Unit II: Concept development

- Visualizing design and concept development, preparing Concept sheet and graphical presentation of design process Aesthetic and psychological experience of form and space in terms of scale, color, light, texture, etc.

Unit III: Human being and Architectural Design

- Understanding, anthropometrics, human anatomy, proportions and its influence in architectural design.

Unit IV: Understanding space requirements

- Function and need: user requirements, space standards and circulation.

Unit V: Aesthetics in Design

- Aesthetics, structure, materials, colors, and texture as part of design process.

EXERCISES:

- Understanding design through Natural Objects.
- Design of Simple object of everyday use furniture to understand design process and presentation
- One Typological Project like Kiosk, Caravan, Studio space etc.

VISITS:

- Nature Study.
- Furniture Shops.
- Case Studies Related to design problem taken.

Suggested Readings:

- Joseph De Chiara, Michael J Crosbie, Time Saver Standards for Building Types, McGraw Hill Professional 2001.
- Julius Panero, Martin Zelnik, Human Dimension and Interior Space, Whitney Library, 1975.
- Joseph De Chiara, Julius Panero, Martin Zelnik, Time Saver Standards for Interior Design and Space Planning, McGraw Hill 2001.
- Ernst Neuferts Architects Data, Blackwell 2002.

BAR 202 Architectural Structures-II		
Course No.: BAR 202	**Course Title: Architectural Structures-II**	**Credit: 3** **L-T-P : 2-2-0**
Exam Duration: 2 hr	**Exam : Theory Examination (TE)**	**Max Marks: 100**

OBJECTIVE:

- To demonstrate the fundamental and essential theory components which effect building structure mechanism.
- To learn relation between structure and architecture design.

CONTENTS:

UNIT-1: Shear Force and Bending Moment

- Deformation of Structures, Types of Loading, Types of Supports, Shear and Bending, Relationship between Shear force and Bending Moment, Bending Moment Diagrams.

UNIT-2: Stress and Strain

- What is Stress? Types of Stress, Direct or Axial Stress, Shear Stress, Tensile Stress, Compressive Stress, Strain, Relation between Stress and Strain, Bending Stress, Parallel Axis Theorem, Hooke's Law, Modulus of Elasticity.

UNIT-3:Tension and Compression

- Tension, Compression, Buckling, Wall, Trusses, Cables, Arches, Space Frames, Beam, Column, Slab, Examples of Bridge models.

UNIT-4: Structural Systems

- Classification of Structural elements, Types of Structural Material, Factors of Material Selection, Forms of Construction.

UNIT-5 : Column

What is Column, Types of Column, Short and Long Columns, concept of elastic stability, Fuler's theory, Concept of effective length, slenderness ratio, Rankine' s formulas, Design of column for Axial, Uni-axial and biaxial bending.

EXERCISES:

- Making of small models of building components and practice on them.
- Writing theory Assignments of each unit
- Case studies of different buildings around the world and its structural analysis.

VISITS:

- Various under construction building sites.
- Visits to structure engineers offices to learn practices of designing.

Suggested Readings:

1. BIS (1987, reaffirmed 2002), Code of Practice for Structural Use of Un-reinforced Masonry.
2. BIS (1991) Handbook on Masonry Design and Construction, SP 20(S & T): Bureau of Indian Standards, New Delhi.

BAR 203 Environmental Science for Architecture - I		
Course No.: BAR 203	**Course Title: Environmental Science for Architecture - I**	**Credit: 2 L-T-P : 1-2-0**
Exam Duration: 2 hr	**Exam : Theory Examination (TE)**	**Max Marks: 100**

OBJECTIVE:

Understand the relationship between Natural and Built environment; influence of climatic parameters on architectural design.

CONTENTS:

Unit I: Natural Resources

- Understanding Natural resources like Forest resources, water resources, mineral resources, energy resources, land resources and their relationship with buildings.

Unit II: Ecology and Environment

- Natural Environment, Ecology and ecosystems, Bio diversity and co existence, natural disasters and Effects of architectural development on natural resources.

Unit III:Weather and Climate

- Understanding weather and climate, understanding and measuring parameters of climate change like temperature, humidity, precipitation, etc.

Unit IV: Sustainability

- Concepts of Sustainability, Renewable resources, Water cycle and its management, Conservation and generation of energy, energy efficient design and importance of studying climatology in architecture.

Unit V: Climate and Architecture

- Impact of various climatic elements in different regions of our country in building design with a special emphasis on Rajasthan.

EXERCISES:

- News review and writings on related topics.
- Artworks/Collage/ Poster making on given issues.
- Critically examine familiar buildings and locations and understand relationships between built and natural environment
- Power point presentations on climatic zones and their building types.

VISITS:

- Meteorological Department
- IGBC And Science congress events

Suggested Readings:

1. BEE (2007). Energy Conservation Building Code, Bureau of Energy Efficiency, Ministry of Power, Government of India.
2. Szokolay, S. V. (2008) Introduction to Architectural Science, Architectural Press.

BAR 204 Architectural Drawing and Computer Application -II		
Course No.: BAR 204	**Course Title: Architectural Drawing and Computer Application -II**	**Credit: 6 L-T-P : 1-1-3**
Exam Duration: 3 hr	**Exam : Theory & Drafting Examination (TDE)**	**Max Marks: 100**

OBJECTIVE:

- To enhance drafting skills developed in previous semester with Introduction to Architecture drawings and computer aided drafting to represent 2d drawings.

CONTENTS:

UNIT-I : Graphical Representation

- Conventions for Lines, Dimensioning for building drawings & Scale. Graphical representation of various materials. Orthographic projections, isometric and axonometric view of complicated objects and built form.

UNIT-II : Surface development and Intersection of solids

- Surface development of simple geometric form, intersection of solids leading to building forms.

UNIT-III : Learning Perspective

- Perspective One Point, Two Point and Three Points. Exercises from Simple Geometrical Forms Leading To Perspective of Buildings Forms. Plotting of Sciography on Perspective Drawings.

UNIT-IV :Sciography

- Sciography of Simple Geometric Forms Leading To Sciography of Architectural Forms.

UNIT-V: Introduction to Computer drafting

- Basic Introduction to Computer aided drawing software AutoCad. Computer aided drawing software sketchup as 3D visualization.

EXERCISE:

- Hand drafting Studio Assignments on A1 size sheets. Modeling in Architectural software (Sketch up)
- 2D Autocad Drawings of Simple Objects.

Suggested Readings:

1. A Textbook of Engineering Drawing; R.K. Dhawan
2. Engineering Drawing : N.D. Bhatt
3. Form space & order Francis D.K. Ching
4. Drawing a creative process Francis D.K. Ching
5. Rendering with pen & ink : Gill

BAR 205 Building Construction and Materials -II		
Course No.: BAR 205	**Course Title: Building Construction and Materials -II**	**Credit: 6 L-T-P : 2-2-2**
Exam Duration: 3 hr	**Exam : Theory & Drafting Examination (TDE)**	**Max Marks: 100**

OBJECTIVE:

- To study the principles of load bearing structures – foundation, plinth, wall, roofing systems, flooring, spanning of openings, fins and projections.
- To understand the need for and study the principles and practices of monolithic and masonry construction, arches, lintels/ beams, corbelling, cantilever etc.

CONTENTS:

Unit I: Introduction to Construction Systems

- Planning and design of simple load bearing structures- typical parts of the load bearing structure- types of foundations – walling systems ,external envelopes, internal partitions .

Unit II: Construction Using Brick And Other Clay Products

- Principles of brick masonry construction- types of brick masonry- joints, pointing and finishing- types of mortar & mortar mix for brick construction.

Unit III: **Mud and stone Construction**

- Cob, Rammed earth, Wattle and daub construction- Principles of Masonry construction using Adobe, Compressed Stabilized Earthen Blocks; Foundation and plinth for mud structures.
- Principles of stone masonry construction- types of stone masonry- stone finishes- jointing types of mortar for stone construction- Stone masonry for foundation, plinth and wall, retaining wall.

Unit IV:Cement And Concrete

- Definition, properties, specification, proportioning, water-cement ratio, workability, curing and special concretes. The composition, strength, properties, manufacture, test for cement, etc.

Unit V: Alternate Construction Techniques

- Composite walls, Cavity walls in stone and brick, jack arch flooring, domes/ vaults,prefabricated and precast Units of above materials.

EXERCISES:

- Drafting sheets on brick masonry, stone masonry and alternate construction techniques.
- Assignments on cement and concrete
- Workshops on above topics

VISITS:

- Construction Yard and Construction Site Visits.
- Cement factory – Industrial Visit.
- Stone cutting and finishing unit.

Suggested Readings:

1. Arora S.P. and Bindra S.P., "Text book of Building Construction", DhanpatRai&Sons, New Delhi, 2012.
2. Francis D.K. Ching, Building Construction Illustrated John Wiley & Sons 2000.

BAR 206 History of Architecture and Culture -I		
Course No.: BAR 206	**Course Title: History of Architecture and Culture -I**	**Credit: 3 L-T-P : 2-2-0**
Exam Duration: 2 hr	**Exam : Theory Examination (TE)**	**Max Marks: 100**

OBJECTIVE:

- The main objective is to develop an insight into architecture trends and theories and impart an understanding of various parameters influencing architectural design like economic, socio-political aspects, religious and climatic influences.

CONTENTS:

Unit I: Architecture and Human Evolution

- Introduction to Prehistoric humans and Primitive Architecture. Neolithic, Megalithic and Paleolithic periods and evolution of Architecture to understand primitive construction techniques.

Unit II: Societies and Structures of Early Human Civilization

- Introduction to concepts of ancient societies, their salient features such as politics, society, culture, religious character, evolution of new architecture form, building materials, construction technology and its influenced on city space. Studying architectural examples from Mesopotamian, Egyptian , Mayan and Indus civilizations.

Unit III: Classical Styles in Architecture

Introduction to various periods in world architecture with an aim to understand orders, theories and aesthetic elements of architectural design. Taking examples from Greek and Roman civilizations.

Unit IV: India during early ages

Vedic period and influence of socio-political conditions and literature on Architecture. Evolution of Religious Architecture in India with Early Buddhist and Hindu Architecture. Terminology and examples from across the country.

Unit V: Early Asian Civilizations

Architectural Developments in other regions across the globe predominantly focusing on continent of Asia.

EXERCISES:

- Making a History Wall of timeline studied
- Writing Paragraph/Essay and notes on related topics
- Developing Sectional models of building structures for thorough analysis.
- Sketches and photographs of examples from given topics.

VISITS:

1. Churches in Jaipur, Goa etc., Lothal and Dholavira (Gujarat), Museum Visits.

Suggested Readings:

1. History of Architecture, Sir Banister Fletcher, Butterworth Heinemann /CBS
2. Indian Architecture Vol. 1 (Buddhist & Hindu) / Percy Brown / D.B. Taraporevala
3. Buddhist and Hindu Architecture in India, Satish Grover, CBS

BAR 207 Workshop -II		
Course No.: BAR 207	**Course Title: Workshop -II**	**Credit: 4 L-T-P : 1-0-1**
Exam Duration: N/A	**Exam : Sessional Viva-Voce Examination (SVE)**	**Max Marks: 100**

OBJECTIVE:

- To equip students with the basic skills necessary to represent their ideas in simple 3D models using Thread, POP & Wood.
- Introducing students to fundamental techniques of Visual representation using different color mediums and to equip with the basic principles of representation.

CONTENTS:

Unit I: Architectural Model making

- Need for architectural models. Role of scale-models in design. General practices in model making. Types of models: block, detailed, construction & interior models using Thread, Wood & POP. Simple joinery details in wood. Interlocking and nut bolt joints.

Unit II: Sketching and visual thinking Fundamentals of Perspectives

- Introduction to perspectives, difference between views & perspectives, Types of perspectives: one, point, two point & three point.

Unit III: Concepts of light and shade

- Principles of shade& shadow, Construction of sciography on building, Application of sciography on pictorial views.

Unit IV: Rendering Techniques using various wet mediums.

- Different themes of rendering, architectural rendering techniques using wet medium-Ink, water color, poster color, oil base colors.

Unit V: Photography

- Outdoor photography- (Street, Still Life, Nature, Portrait), Indoor Photography, Play of Light and Shadow.

EXERCISES:

- A 3D installation using POP.
- A Thread art installation.
- An installation using wood.
- Design a lamp using wood.
- Design a stool or chair using wood.
- Draw a street market view (1 point perspective).
- Draw an exterior view of any building (2 point perspective).
- Shooting Pictures of Interior & Exterior.

.**VISITS: (Field and Site Visits)**

Festivals and events related to Installations, Art and design.

Suggested Readings:

1. Ching, F. D. K. (2009). *Architectural Graphics*. 5th Ed. New Jersey : John Wiley & Sons. Criss. B. M. (2011).
2. *Designing with models: A Studio guide to Arch.Process Models.*3rd Ed. Hoboken :John Wiley & Sons.

Semester-III

S.No	Subject code	Subject Title	Teaching Hours			Total Hours	Credit
			Lecture	Tutorial	Practical		
1.	**BAR 301**	Architectural Design – II	2	1	3	6	7
2.	**BAR 302**	Architectural Structures – III	1	1	1	3	3
3.	**BAR 303**	Environmental Science for Architecture -II	1	1	1	3	3
4.	**BAR 304**	Architectural Drawing & Computer Applications - III	2	-	2	4	5
5.	**BAR 305**	Building Construction and Materials-III	2	2	2	6	6
6.	**BAR 306**	History of Architecture & Culture - II	2	2	-	4	3
7.	**BAR 307**	Theory of Design - I	2	2	-	4	3
		Total	**12**	**09**	**09**	**30**	**30**

Note:

1. **Theory Examination (TE):** Theory exam shall be conducted for Architectural Structures – III (BAR 302), Environmental Science for Architecture - II (BAR 303), History of Architecture & Culture – II (BAR 306), Theory of Design – I (BAR 307).

2. **Theory and Drafting Examination (TDE):** Writing and Drafting exam shall be conducted for the studio subjects of Building Construction & Materials-III (BAR 305), Architectural Drawing and Computer Application -III (Bar 304) in the Studio hall having the provisions of drawing boards.

3. **Sessional Viva-Voce Examination (SVE)**: Portfolio examination (as Practical exam) shall be conducted through viva-voce in the subject of Architectural Design - II (BAR 301) by external examiner.

BAR 301 Architectural Design - II		
Course No.: BAR 301	**Course Title: Architectural Design- II**	**Credit: 7 L-T-P : 2-1-3**
Exam Duration: N/A	**Exam : Sessional Viva-Voce Examination (SVE)**	**Max Marks: 100**

OBJECTIVE:

- To understand principles of design for experiential form/space, space planning and activities, user perception and behavior.
- To understand aspects of building design responsive to site conditions of site planning.

CONTENTS:

Projects involving organization of multiple functions in space with predominantly horizontal movement. Residential and single use public buildings of small scale; passive energy

Areas of concern/ focus:

- Individual development of subjective and objective capacity to take up design process for spaces.
- Built form-open space relationships, spatial organization.
- Human behavior studies, especially those relating to children and individuals.
- Site planning and micro climate.

EXERCISES:

- Design projects related to residential buildings, small institutional, civic and public buildings- nursery/ primary schools, schools for children with special needs, primary health center, and neighborhood library.

VISITS:

- Related case studies

Suggested Readings:

1. Joseph De Chiara, Michael J Crosbie, Time Saver Standards for Building Types, McGrawHill Professional 2001.
2. Julius Panero, Martin Zelnik, Human Dimension and Interior Space, Whitney Library of Design, 1975.
3. Steen Eiler Rasmussen, Experiencing Architecture; MIT Press; 1959.

BAR 302 Architectural Structures -III		
Course No.: BAR 302	**Course Title: Architectural Structures -III**	**Credit: 3 L-T-P : 1-1-1**
Exam Duration: 2 hr	**Exam : Theory Examination (TE)**	**Max Marks: 100**

OBJECTIVE:

- Introduction to design of various building elements in Steel and concrete
- To understand importance of surveying and leveling for site studies and analysis.

CONTENTS:

Unit-I Foundation Design

- Principles of foundation design, bearing capacity of soil, force distribution, types of footing and foundations.

Unit-II Slab Design

- Types of Slab, Slab depth and reinforcement design according to span and load. Design of Two way slab by I.S. Code method, Flat Slab, Slabs continuous over support, Circular slabs, Lift slab construction.

Unit-III Surveying & Leveling-I

- Introduction to surveying and its principles. Types of surveying, Map, plan its Scale and uses. Accurate and approximate methods. Chain Surveying, Compass Surveying, Plane Table surveying.

Unit-IV Surveying & Leveling-II

- Leveling and contouring, Automated Surveying – Introduction to use of Digital Surveying Instruments such as distomat, total station, Electronic Theodolite, G.P.S. Remote sensing. Geographical Information systems and their applications.

Unit-V Analysis of composite sections

- Introduction to composite section, Steel and Concrete, RCC components, IS standards, Reinforcement, T-Beams, Bond, Precast RCC, Prefabricated Steel and in situ concrete composite members.

EXERCISES:

- Making of small models of building components and practice on them.
- Survey exercises of varied topography and contoured land.
- Site visits and report making on various foundation buildings projects.

VISITS:

- Visits to under-construction projects and civil material testing labs.

Suggested Readings:

1. Applied Mechanics and Strength of Materials, R.S. Khurmi
2. Basic Structures for Engineers and Architects, Philip Garrison
3. Structure and Architecture, Angus J. Macdonald
4. Why things don't fall down, J.E. Gordan
5. Design of Reinforced Concrete Structures, S. Ramamrutham and R. Narayana

BAR 303 Environmental Science for Architecture - II		
Course No.: BAR 303	**Course Title: Environmental Science for Architecture - II**	**Credit: 3 L-T-P : 1-1-1**
Exam Duration: 2 hr	**Exam : Theory Examination (TE)**	**Max Marks: 100**

OBJECTIVE:

- To familiarize students with the design and settings for buildings for daylight and factors that influence microclimate.
- To expose the students to the various design strategies for building in different types of climatic zones.

CONTENTS:

Unit I: Climate And Human Comfort

- Components of climate and their influence on human body, Climate classifications for building designers in tropics, Human comfort parameters.

Unit II: **Solar Shading Devices**

- Sun path diagram- Solar shading- design of appropriate shading devices.

Unit III: Heat Flow through Building Envelope Concepts

- The transfer of heat through solids – Surface resistance and air cavities, Time lag and decrement, Types of building envelops and related software for design analysis.

Unit IV: Air Movement Due to Natural and Built Forms

- The effects of topography on wind patterns, Air currents around the building ,Air movement through the buildings — Stack effect, Venturi effect etc.

Unit V: Climate and Design of Buildings

- Passive Design strategies .Climate responsive design exercises for various contexts.

EXERCISES:

- Sun Path and Wind rose diagram
- Environment lab Reports
- Live Case reporting analysis of Residential and Institutional buildings.

VISITS:

- Related case studies.

Suggested Readings:

1. O.H. Koenigsberger and Others, Manual of Tropical Housing and Building – Part I - Climate design, Orient Longman, Madras, India, 2010.
2. Bureau of Indian Standards IS 3792 (1987), Hand book on Functional requirements of buildings other than industrial buildings, (Part I – IV), Manakbhavan, New Delhi – 110 002.
3. Martin Evans Housing Climate and Comfort – Architectural Press, London. (1980).
4. B. Givoni Man, Climate and Architecture, Architectural Sciences Series – Applied Science Publishers Ltd., London (1981).
5. Climate Responsive Architecture- A Design Handbook for Energy Efficient Buildings, Arvind Krishnan, Szokolay et.al, Tata McGraw Hill, 2010.

BAR 304 Architectural Drawing and Computer Application -III		
Course No.: BAR 304	**Course Title: Architectural Drawing and Computer Application -III**	**Credit: 5 L-T-P : 2-0-2**
Exam Duration: 3 hr	**Exam : Theory & Drafting Examination (TDE)**	**Max Marks: 100**

OBJECTIVE:

- To develop skill on Computer drafting, Graphical presentation and Drawings for approvals and construction purposes on site.

CONTENTS:

UNIT-I Technical and Presentation Drawings

- Detailed technical and presentation Drawings – Need and importance of Working Drawing for various purposes on site and for approvals.

UNIT- II Working Drawings for Civil and Structural works on site

- Working drawing for structures, site layout and civil works on site, centre line plans, foundation drawings, superstructure drawings, staircase and Ramps.

UNIT-III Technical Rendering

- Rendering techniques in Hand and Computer drafted drawings.

UNIT-IV Detail drawings on Software

- Introduction to detailed building drawings in Autocad and Introduction to Autodesk Revit.

UNIT-V Presentation drawings using Software

- Photoshop, Digital Brush, Digital Sketching, Pattern making, Photo editing.

EXERCISES:

- Working Drawings for civil works , Building measured drawings in CAD.

Suggested Readings:

- Drawing a creative process Francis D.K. Ching
- Building construction ; Makky
- Architectural Graphics : D.K. Ching
- Tutorials on Photoshop

BAR 305 Building Construction and Materials -III		
Course No.: BAR 305	**Course Title: Building Construction and Materials -III**	**Credit: 6 L-T-P : 2-2-2**
Exam Duration: 3 hr	**Exam : Theory & Drafting Examination (TDE)**	**Max Marks: 100**

OBJECTIVE:

- An understanding of timber, bamboo, straw as building materials in methods of construction and in detailing.
- To understand the material's workmanship and performance for the topics discussed and to understand how these materials come together to create a building as a whole.

CONTENTS:

Unit I: Timber for building construction:

- Joinery works and finishes in various forms of Natural and Artificial timber .
- Various building elements like Door, Window shutters , frames.

Unit II: Timber for structural use:

- Methods of construction using timber in various structural components of a building such as walls, floors, balconies, roof trusses and staircases.

Unit III: Timber for interior use-

- Use of Timber products and natural wood in Interiors for furniture, partitions, wall paneling, false ceiling, etc.

Unit IV: Construction using bamboo and Straw bales:

- Design and Construction Techniques using bamboo and Straw bales for building components for Load bearing, Post and Beam systems, Foundations systems, Roofing options including detailing of doors and windows, arches, barrel walls, weave structures, landscaping, etc.

Unit V: Composite Construction:

- Design of structures combining bamboo, straw, timber, mud and stone as structural and non structural components for single storey and temporary constructions such as snack bar, tree house, etc.

EXERCISES:

- Drafting Sheets On Timber Joinery and building elements.
- Theory notes and case studies on related topics
- Workshops on Above Topics

VISITS:

- Furniture industry, Timber mart, bamboo workshop and related site visits.

Suggested Readings:

1. W.B. McKay, "Building Construction" Vol, 1 and 2, Longmans, UK, 1981.
2. S.C Rangwala "Building Construction" Charotar Publishing House, India, 2000.
3. Dunkelberg(K), "Bambus – Bamboo, Bamboo as a Building Material", Karl KramerVerlag Stuttgart, 2000.
4. "Building with straw - Design and Technology of a Sustainable Architecture" Gernot Minke and Friedemann Mahlke Birkhauser – Publisher for Architecture Berlin –Bostan, 2005.

BAR 306 History of Architecture and Culture -II		
Course No.: BAR 306	**Course Title: History of Architecture and Culture -II**	**Credit: 3 L-T-P : 2-2-0**
Exam Duration: 2 hr	**Exam : Theory Examination (TE)**	**Max Marks: 100**

OBJECTIVE:

- To understand the impact of religion into architecture styles and techniques.
- Parameters like social and cultural belongingness and their effect on architecture.

CONTENTS:

Unit I: Christian Architecture

- Church Anatomy, Evolution of plans, and building elements like domes, arches, walls and roofing systems. Examples from Early Christian, Byzantine, Gothic and Romanesque styles.

Unit II: Renaissance and Classical Architecture

- Social reforms, renaissance art, literature and culture. Examples from Early, High and Late Renaissance buildings, Humanism, Mannerism, Baroque and Rococco styles.

Unit III: Islamic Architecture across the Globe

- Origin and philosophy of Islam, Vocabulary and building typology evolution, Examples from Iraq , Iran and European continent.

Unit IV: India- Evolution of Hindu Architecture

- Early Hindu Architecture. Philosophy, vocabulary and types of Temple Architecture across the country.

Unit V: Early Buddhist and Islamic Architecture in India

- Islamic invasions and spread. Islamic building typology and examples.Rock cut architecture. Evolution and spread of Buddhism. Building typology and vocabulary of Buddhist Architecture.

EXERCISES:

- Panel presentations.
- Writing Paragraph/Essay on related topics.
- Developing Sectional illustration of buildings in model.

VISITS:

- Temple study in and around Jaipur and Rajasthan.

Suggested Readings:

1. A History of Architecture, Sir Banister Fletcher, Butterworth Heinemann /CBS
2. Indian Architecture Vol. 1 (Buddhist & Hindu) / Percy Brown / D.B. Taraporevala
3. Buddhist and Hindu Architecture in India, Satish Grover, CBS
4. Islamic Architecture in India, Satish Grover, CBS
5. A World History of Architecture, Marian Moffett, McGraw-Hill
6. The Great Ages of World Architecture, G. H. Hiraskar and Dhanpat Rai.
7. A Global History of Architecture. 2nd ed. John Wiley & Sons, 2010. ISBN: 9780470402573.

BAR 307 Theory of Design -I		
Course No.: BAR 307	**Course Title: Theory of Design -I**	**Credit: 3 L-T-P : 2-2-0**
Exam Duration: 2 hr	**Exam : Theory Examination (TE)**	**Max Marks: 100**

OBJECTIVE

- To make the students understand principles of design through theory.
- To understand the various principles of architecture design from works of master architects.

CONTENTS

Unit I: Introduction to Theories of design

- Discuss and develop vocabulary and principles of design like fractals, golden ratio etc.

Unit II: Aesthetics and principles in building design

- Principles of composition, symmetry, focal point, parallelism etc. Building examples and their analysis.

Unit III: Principles of plan development and form

- Composition of Shapes / Forms in Building design. Positive and negative spaces, axis, symmetry, massing, additive and subtractive spaces, massing , etc. Geometry in architectural examples.

Unit IV: Colour, texture and finishes in building design

- Colour theory for buildings. Themes and effects in outdoor and indoor spaces. Use of various materials, finishes and textures in architecture.

Unit V: Philosophies and principles of master architects

- Understanding trends and ideologies of architecture design through examples and works of master architects in India and World.

EXERCISES

- Analysis and writings on topics in syllabus.
- Model making and compositions leading to building design.
- Architectural writings and monographs.

VISITS

Architectural exhibitions, festivals and seminars.

Suggested Readings:

1. Francis D.K. Ching, Architecture-Form, Space and Order, Van Nostrand Reinhold Company, New York, 2007.
2. Simon Unwin, Analysing Architecture, Routledge, London, 2003.
3. V.S.Pramar, Design Fundamentals in Architecture, Somaiya Publications Pvt. Ltd., New Delhi, 1973.

Semester-IV

S.No	Subject code	Subject Title	Teaching Hours			Total Hours	Credit
			Lecture	Tutorial	Practical		
1.	**BAR 401**	Architectural Design – III	1	1	3	5	6
2.	**BAR 402**	Architectural Structures – IV	2	2	-	4	3
3.	**BAR 403**	Workshop – III	1	2	-	3	2
4.	**BAR 404**	Architectural Drawing & Computer Applications - IV	2	-	2	4	5
5.	**BAR 405**	Building Construction and Materials-IV	2	2	2	6	6
6.	**BAR 406**	History of Architecture & Culture– III	2	2	-	4	3
7.	**BAR 407**	Building Services - I	1	1	1	3	3
		Total	**11**	**10**	**8**	**29**	**28**

Note:

1. **Theory Examination (TE):** Theory exam shall be conducted for Architectural Structures – IV (BAR 402), History of Architecture & Culture –I II (BAR 406), Building Services - I (BAR 407)

2. **Theory and Drafting Examination (TDE):** Writing and Writing and Drafting exam shall be conducted for the studio subjects of Building Construction & Materials-IV (BAR 405), Architectural Drawing and Computer Application -IV (Bar 404) in the Studio hall having the provisions of drawing boards.

3. **Sessional Viva-Voce Examination (SVE):** Portfolio examination (as Practical exam) shall be conducted through viva-voce of sessional work for the subject of Architectural Design - III (BAR 401) and Workshop – III (BAR 403) by external examiner.

BAR 401 Architectural Design -III		
Course No.: BAR 401	**Course Title: Architectural Design -III**	**Credit: 6 L-T-P : 1-1-3**
Exam Duration: N/A	**Exam : Sessional Viva-Voce Examination (SVE)**	**Max Marks: 100**

OBJECTIVE

- To understand the built environment as a holistic, living, entity shaped by socio-cultural, geographic and economic aspects.
- To understand vernacular/traditional architecture and their details, including local materials and construction techniques.

CONTENTS

- Study projects involving social and economic influences on design ; Design projects involving public and community oriented buildings within the context of human settlements–multifunctional spaces maximum G+3 storeyed, simple horizontal and vertical movement; Effect of micro and macro level climate parameters; Use of appropriate building technologies and passive energy.

- Area of concern/ focus : rural or peri-urban settlements and architecture, community oriented simple public buildings set within community

EXERCISES:

- Suggestive Typologies/ projects: Projects that involve studies and design at settlement and building level- noon meal centre, market, community centre, local buildings for economic activities; small community/ need oriented urban projects such as department store, campus students centre, trading and market area etc.

VISITS:

- Related Case Study

Suggested Readings:

1. Amos Rapoport, House, Form and Culture; Prentice hall; 1969.
2. Bernard Rudovsky, Architecture without Architects; Cost reduction; Architectural Press; 1964.
3. Joseph De Chiara, Michael J Crosbie, Time Saver Standards for Building Types, McGraw Hill Professional 2001.
4. Ramachandran H, Village Clusters and Rural development, Concept Publications 1980.

BAR 402 Architectural Structures -IV		
Course No.: BAR 402	**Course Title: Architectural Structures-IV**	**Credit: 3 L-T-P : 2-2-0**
Exam Duration: 2 hr	**Exam : Theory Examination (TE)**	**Max Marks: 100**

OBJECTIVE:

- Understanding advance level structures.
- To learn designing of structural components and members.
- To understand importance of surveying and leveling for site studies and analysis.

CONTENTS:

UNIT-1 Infrastructure structure Design

- Load transfers and design of various types of retaining walls. Types of bridges and their design.

UNIT-2 Cantilever and staircase Design

- Types of staircases in various materials. Load transfers and design of cantilevers.

UNIT-3 Roads and surfaces design

- Elements, terminology and standards of road design. Site internal and external road designs. Hard paved surfaces for vehicular and pedestrian movement.

UNIT-4 Alternate roofing techniques

- Folded plates, Vaults and domes. Load transfer and construction in various materials.

UNIT-5 Material testing

- Lab and site tests of various materials used for civil works like cement, concrete, stones , bricks, soils, lime, etc.

EXERCISES:

- Analysis for various components and their designs.
- Study of examples related to the topics.
- Theory notes and tutorials.

VISITS:

- Visits to various large scale public and infrastructure project.

Suggested Readings:

1. Design of Reinforced Concrete Structures, S. Ramamrutham and R. Narayan.
2. Basic Structures for Engineers and Architects, Philip Garrison.
3. Design of Steel Structures B.C. Punmia & A.K. Jain,; Laxmi Publications, 2006.
4. CPWD Specifications (Vol. 1&2), Director General of works, New Delhi; 2009.
5. Specifications for Road and Bridge Works, Indian Roads Congress (IRC), Ministry of Road Transport & Highways; 2013.
6. Alan Blanc, Stairs, Steps and Ramps, Butterworth, Heinemann Ltd., 1999.

BAR 403 Workshop - III		
Course No.: BAR 403	**Course Title: Workshop - III**	**Credit : 2 L-T-P : 1-2-0**
Exam Duration : N/A	**Exam : Sessional Viva-Voce Examination (SVE)**	**Max Marks : 100**

OBJECTIVE:

- To equip students with the advanced skills necessary to represent their ideas in complicated models format using metal, Paper Mache, fabric, bamboo & waste material. To make students practice with various tools essential for making architectural models.
- Introducing technology in model making.

CONTENTS:

Unit I: Interior spaces model making

- Interior design projects and detailed models.

Unit II: Technology and model making

- Use of CNC & laser cutting machines for model making. Using latest technology of 3d printing and Fabrication.

Unit III: Use of alternate materials

- Various forms of artificial wood, paper mache, metal , bamboo, glass, films and plastic in model making.

Unit IV: Architectural photography

- Appropriate technology and tools for building photography. Various effects and building types.

Unit V: Rendering techniques and light effects

- Creating finishes in architectural models like wall texture, landscaping, fabric texture etc. using various materials and mediums.
- Adding light and other mechanical devices in models.

EXERCISES:

- Building models and interior spaces using advance techniques in model making.
- 3D Installations using using metal, paper mache, etc.
- Furniture models using 3d printing.

VISITS:

- Art exhibitions and museums.

Suggested Readings:

4. Criss. B. M. (2011). Designing with models: A Studio guide to Architectural Process Models.3rdEd. Hoboken :John Wiley & Sons.
5. Kieran, S. and Timberlake, J. (2008). Loblolly House : Elements of a New Architecture. NewYork : Princeton Architectural Press.
6. Morgan, C. L. and Nouvel, J. (1998). The Elements of Architecture. London : Thames and Hudson.

BAR 404 Architectural Drawing and Computer Application -IV		
Course No.: BAR 404	**Course Title: Architectural Drawing and Computer Application -IV**	**Credit: 5 L-T-P : 2-0-2**
Exam Duration: 3 hr	**Exam : Theory & Drafting Examination (TDE)**	**Max Marks: 100**

OBJECTIVE:

- To enhance Architectural drawings details, Graphical presentations of drawings and 3D conceptual visualization.

CONTENTS:

UNIT-I Introduction to services Drawing

- Working Drawings for plumbing & sanitary layout.

UNIT-II Services Design

- Working Drawings for site layout, civil works, plumbing and drainage network for design exercise done in 3rd Semester.

UNIT-III Presentation using advanced Software's

- Adobe Illustrator as useful tool for graphical representation. Introduction to Coral Draw.

UNIT-IV Services layout in Autodesk AutoCAD

- Working Drawings in CAD for civil works, plumbing and sanitary .

UNIT-V 3D Visualisation-

- Introduction to 3D max . Basic 3D Modelling for building interiors , Light effects & Rendering.

EXERCISES:

- Studio Assignments Based On Above Topics.
- Architectural Presentation, Concept Sheets and Panel Presentation using software.

VISITS:

- MEP consultant office.
- Ongoing project and Architect's office to understand coordination of Drawing and site activities.

Suggested Readings:

1. AutoCAD 2018 Training Guide, Linkan Sagar; BPB Publications;,2018.
2. Autodesk 3ds Max 2014 Bible, Kelly L. Murdock; Wiley International, 2014.
3. Adobe Illustrator CC Classroom in a Book, Adobe Creative team; Adobe, 2017.
4. Mastering Coral DRAW, Arti Rajput; Aartigallery,2017.
5. The Construction of Buildings, Volume 1,2,3,4; Barry; Wiley International Publications,1992-2014.
6. Time Saver Standards for Construction Details, Nicolas Dines; 1998

BAR 405 Building Construction and Materials -IV

Course No.: BAR 405	Course Title: Building Construction and Materials -IV	Credit: 6 L-T-P : 2-2-2
Exam Duration: 3 hr	Exam : Theory & Drafting Examination (TDE)	Max Marks: 100

OBJECTIVE:

- To develop an understanding of Advanced Construction Technology and application of contemporary materials and such as glass, ferrous and nonferrous metals, plastics, fabrics and other materials.

CONTENTS:

Unit I: Construction with Iron and Steel –

- Introduction to Iron & Steel as construction materials. Application of Iron and Steel in Various Building elements such as Foundation, column, Beam, truss, Industrial roof and floor, Door Window openings, Methods of connections in steel.

Unit II: Construction with Aluminum and alloys-

- Manufacturing, Properties and Market form of aluminum. Application of aluminum in various building elements such as door-window, structural glazing and Curtain wall.

Unit III: Construction with other metals and plastic –

- Introduction to Plastic, copper, zinc, cobalt, lead, tin and their alloys as Construction materials. Design and construction details using metal alloy and plastic building products for walls, partitions and roofs. Use of GI Sheets, Polycarbonate sheets, Teflon.

Unit IV: Construction with Glass and Glass Products –

- Manufacturing and composition of glass, Types of glass properties and application in building industry, glazing and energy conservation measures. Construction methods using glass for single storey glass structures like pavilions, green houses, staircases.

Unit V: Construction with Advanced Construction Techniques–

- Design and detailing of concrete used in advanced construction – Precast concrete, pre-stressed concrete, Folded plates, Shell structures, vaults, domes, decorative concrete, insulated concrete forms (ICF), concrete for Seismic design.

EXERCISES:

- Exercises drawings of selected building types on above topics.
- Class Assignments On Syllabus topics
- Workshops on Above Topics

VISITS:

- Construction Yard and Construction Site Visits

Suggested Readings:

1. CPWD Specifications (Vol. 1&2), Director General of works, New Delhi; 2009.
2. S.P. Arora, S.P. Bindra, "Building Construction Including Engineering Materials", Dhampat Rai Publications Ltd., New Delhi.; 2010.
3. Schittich, Staib, Balkow, Schuler, Sobek, Glass Construction manual, 2nd revised and expanded Addition, Birkhauser.; 2007.
4. S.K. Duggal, Building materials, Oxford and IBH publishing Co, put, Ltd, New Delhi 110001, 1997.
5. Pamphlet and Manuals supplied or published by SERC, BMPTC, HUDCO and Other research organization.

BAR 406 History of Architecture and Culture -III		
Course No.: BAR 406	**Course Title: History of Architecture and Culture -III**	**Credit: 3 L-T-P : 2-2-0**
Exam Duration: 2 hr	**Exam : Theory Examination (TE)**	**Max Marks: 100**

OBJECTIVE:

- To learn and understand transformation and journey of architecture styles with time and cultural changes in societies.
- Influence of Arts and new philosophies of the modern world.

CONTENTS:

Unit I: Art Movements and there influences in architecture

- Fairs and exhibitions around 1900, Beaux-Arts, Art Nouveau, Arts and crafts, Art deco, etc. Art movements and their influence on society and buildings. origin and spread of these movements. Masters and their works.

Unit II: **Modern Architecture**

The " modern movement" in Architecture. Master architects of the time, their philosophies and examples of work. Spread of modern movement across Europe and United states.

Unit III: Mughal Architecture in India

- The Mughal rulers and their contribution to administrative and infrastructure development across the country. Features and examples of Mughal architecture. Understand influence of political and social changes to building typology.

Unit IV: Colonial Architecture in India

- Amalgamation of Indian and European styles during colonial rule in India. Portugese, Dutch and British colonial architecture features and building typologies. Influence of these styles in regional architecture and vice-versa.

Unit V: Architecture of south east Asia, China, and Japan

- Growth and development of societies and architecture in Asian continent. Spread of Buddhist architecture. Development of new cities and communities. Influence of vernacular architecture on new developments.

EXERCISES:

- Making a Timeline wall of world architectural history
- PPT and panel presentations
- Understanding Indian architecture pre independence.

Suggested Readings:

1. The Story of Architecture FROM ANTIQUITY TO THE PRESENT, Jan Gympel, KÖNEMANN
2. The Great Ages of World Architecture, G. H. Hiraskar and Dhanpat Rai.

BAR 407 Building Services -I		
Course No.: BAR 402	**Course Title: Building Services -I**	**Credit: 3 L-T-P : 1-1-1**
Exam Duration: 2 hr	**Exam : Theory Examination (TE)**	**Max Marks: 100**

OBJECTIVE:

- Appreciating and designing layouts of water supply, plumbing, drainage and sanitation for residential and institutional buildings.

CONTENTS:

Unit I: Introduction to Services in building

- Introduction building services, recurring cost and importance. Traditional sources of water supply, treatment of water, transportation and distribution at town level. Classification of water based on its usage. Surface water movement and problems.

Unit II: Water supply network

- Water supply systems, fittings, direct and indirect supply, layout and sizes of pipes, hot water supply, storage

Unit III: Sanitation network

- Drainage and Sewerage systems, fittings and fixtures, sizes and layout, sewage collection, sewage treatment and disposal at site and town level.

Unit IV: Building services Design

- Site level planning for services layout. Location of STP, Site slope, etc.

Unit V: Services for Environmental conservation.

- Solid waste management, Rain water harvesting, ground water recharge, etc.

EXERCISES:

- Assignments on Various services in syllabus
- Project case study report on above listed topics

VISITS:

- To understand services of a house, society and institutional building.

Suggested Readings:

1. Birdie J.S. and Birdie G.S. (1998) Water Supply and Sanitary Engineering, Dhanpathray Publishing Company, New Delhi.
2. Burke, Ken (1982) Basic Plumbing Techniques, Ortho Books, Chevron Chemical Company, San Ramon, Canada.
3. Hussain, S.K. (1982) Water Supply and Sanitary Engineering, Dhanpatray and Sons, New Delhi.
4. Rangwala, S.C. (1969) Fundamentals of Water Supply and Sanitary Engineering, Charotar Publishing Company, Anand.
5. Wise, Alan Frederick Edward & Swaffield, J.A. (2002) Water, Sanitary & waste Services for Building, 5th edn, Butterworth-Heinemann, Oxford.

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