

**Rajiv Gandhi Pradyogiki Vishwavidyalaya, Bhopal**  
**BACHELOR OF ARCHITECTURE**

I Semester (CBGS) For batches admitted in July, 19 (w.e.f. July, 2019) as per COA

S.No	Subject Code	Subject Name	Category	Maximum Marks Allotted					Total Marks	CT HRS	Contact Periods per week			Total Credits
				Theory Slot			Practical Slot				L	T	P	
				End Sem.	Mid Sem.	Quiz/ Assignment /Sessional	End Sem.	Lab work & Sessional						
1	AR 111	Architectural Design – I	DC-1	100	30	20	50	50	250	7	2	3	2(1.5)	8

**COURSE OUTCOME:**

After completion of this course student will be able to-

1. Understand the fundamentals of design as a basic creative activity.
2. Understand the characteristics of various graphic elements, shape and form.
3. Learn the art of 2D & 3D compositions with the use of elements and applying principles of design- additive & subtractive forms
4. Learn the art of texture, color compositions applying color theory principles;
5. Learn the art of abstraction - 2D & 3D and form building – geometric & organic forms
6. Develop analytical thinking and move toward spatial analyses of visual culture.

**UNIT-1 GRAPHIC ELEMENTS, COMPOSITIONS & COLOURS – 2D**

Impart elements and principles of design theory with sample exercises supported by Illustrative PowerPoint presentations.

Exercises:

1. Dots, lines, shapes & forms
2. Hatching patterns
3. 2D compositions with geometric & organic shapes
4. Impart colour theory with sample exercises supported by illustrative ppt presentations.
5. Colour compositions on 2D compositions.
6. Textures replacing colours.

**UNIT-2 3D COMPOSITIONS / COLOUR & TEXTURE APPLICATIONS**

1. Texture portfolio
2. 3D compositions with geometric & organic forms ( model )
3. Color compositions on 3D compositions ( model )
4. Texture applications& material compositions ( model )

**UNIT-3 2D& 3D ABSTRACTIONS**

1. 2D image abstraction ( colour, black/white, grey tone/mono colour, textures )
2. 3D image abstraction ( colour, black/white, grey tone/mono colour, textures )
3. 3D model abstraction ( colour )

**UNIT-4 FORM BUILDING(MODELS)**

Make a vivid PowerPoint presentation / video presentation on form building models with ample samples

Exercises:

1. 3D sculpture exercises ( additive& subtractive forms – solids & voids )
2. Space frame model using a linear module ( space creation )
3. Origami models ( space creation + solids & voids ) Life scale models ( group )

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**UNIT-5 PRODUCT DESIGN**

Make a vivid PowerPoint presentation on product design with emphasis on user, purpose, material & form.

Exercises:

- Small scale product design
- Life scale furniture design ( group )
- 3D model abstraction ( colour )

**REFERENCES:**

1. Charles Wallschlag & Cynthia Busic-Snyder, Basic Visual Concepts and Principles for Artists, Architects and Designers, McGraw Hill, New York 1992.
2. V.S. Pramar, Design fundamentals in Architecture, Somaiya Publications Pvt. Ltd., New Delhi, 1973.
3. Francis D. K. Ching - Architecture - Form Space and Order Van Nostrand Reinhold, Co., (Canada), 1979.
4. Elda Fezei, Henry Moore, Hamlyn, London, New York, Sydney, Toronto, 1972.
5. Exner. V, Pressel. D, Basics Spatial Design, Birkhauser, 2009.

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2.	AR112	Building Construction -I	BSAE- 1	50	30	20	20	30	150	5	2	1	2(1.5)	6

### **COURSE OUTCOME**

After completion of this course student will be able to-

1. Study materials and systems, their properties and applications, and their intrinsic relationship to structural systems and environmental performance.
2. Study and compare the material and construction techniques through site visit and market surveys.
3. Develop a fundamental understanding of the relationship of materiality to construction systems and techniques.
4. Understand the basic components of a building with its construction details such as Foundation Footing, Wall section, Roofs, and Interior details.
5. Examine the critical role of materials and methods for the design and construction of buildings.
6. Produce detail construction drawings sets of building components and construction techniques.

### **UNIT-1 BUILDING MATERIALS**

#### **Stones, Wood, Bricks & Clay products**

Basic knowledge of different building materials available, Contextual relevance- what are buildings made of- Natural and artificial materials- where they are used. Materials shall be studied by understanding their properties & applications.

### **UNIT-2 BASIC BUILDING COMPONENTS**

Cross section of a G+1 building to understand foundation, plinth beam, flooring, sill, lintel, roof beam and slabs, parapet & weathering course

FOUNDATION: typical types of foundation in stone, brick, plinth filling, entrance, steps/ramps, plinth protection, D.P.C. Timbering of trenches, tools, plants and equipments for excavation.

### **UNIT-3 Wall and Masonry**

Walls: Types of bricks and stone and their uses.

BRICKS: definition and types of masonry- types of bond: English, Flemish & rat trap bond for one brick and half thick wall for corners, T- Junctions, Quoins, Garden wall bond & ornamental bond

STONE: Types and dressing, walling and joints, facing of brick or stone or brick work.

PIERS :attached or detached pier

### **UNIT -4 Openings**

ARCHES :Different types of arches, arches in brick and stone (flat, segmental, semi circular and pointed) centering materials and methods.

LINTEL: Lintels and sills (in brick and stone)

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**REFERENCES:**

1. W.B. McKay – Building construction Vol. 1 (5th edition), Vol. 2 (4th edition) and Vol. 3 (5th edition).
2. S.C.Rangwala – Engineering materials (Fortieth edition, 2013) – CharotarPublishingpvt.ltd.
3. Harold B.Olin, John L. Schmidt – Construction principles, Materials and Methods – John Wiley & Sons, Inc.
4. Dr. B.C Punmia – Building construction (10th edition) - Laxmi Publications.
5. Roy Chudley (Author), Roger Greeno (Author) -construction Technology, 4th Edition.
6. S.K. Duggal- Building materials (4th edition) – New age international publishers.
7. Bureau of Indian standards - Handbook on Masonry Design and Construction (First Revision).
8. Hans Bans –Building construction details practical drawing, 2001.

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3.	AR113	Graphics – I	DC- 2	50	30	20	50	50	200	6	2	2	2	5

**COURSE OUTCOME:**

After completion of this course student will be able to-

1. Express the language of architecture & buildings as two dimensional and three dimensional representations.
2. To present the fundamental principles of architectural descriptive geometry and its application to architectural problems.
3. To cultivate student's skills of geometric drawing, develop their capability of ideation and modeling with instrumental sketching.
4. To enable the students to describe spatial relationship using sequential thinking.
5. To analyze and solve basic problems involving graphics and spatial manipulations for architectural applications to represent the future forms of her/his projects.
6. To use representation techniques and tools in the spatial concept.
7. To be able to express her/his ideas by drawing.

**UNIT-1 INTRODUCTION TO DRAWING**

Introduction to drawing instruments and their use

**Lettering and Dimensioning:** Introduction to architectural lettering, styles, proportion and scale, Methods of dimensioning

**Lines:** different types of lines, their thickness and applications in architectural drawing.

**Scale:** Architectural Metric scale, necessity of scaled drawing, selection of scale while preparing architectural drawing.

**UNIT-2 GEOMETRICAL DRAWING**

**Introduction to plane geometry:** Construction and development of planar surface—square, rectangle, polygon etc.

**Introduction to orthographic projection:** Representation of geometric solids in terms of plan, elevation and side elevation in first angle projection – exercise on simple solids.

**UNIT-3 ISOMETRIC VIEW / AXONOMETRIC VIEW**

**Isometric view:** Isometric view of solids, Isometric application in building—buildings with different shape and different types of roofs to include pitched roof, hipped roof, flat roof, vault, cone, dome etc. Conversion of solids to orthographic projection and vice versa.

**UNIT-4 BUILDING ELEMENTS AND BUILDING COMPONENTS**

**Building Elements:** Techniques of representing building elements such as doors, windows, steps, chajja, porch, canopy, balcony, parapet, foundation, walls, roofs, column, staircase, difference of levels, furniture fittings such as hand wash basins, WC pans, traps etc. on drawings in plan, elevation and section.

**Material Indications:** Symbolic representation of building materials as specified by Indian Standard Code of practice.

**Building components:** Components of a simple residential building through plan, elevation and section.

#### **UNIT-5 ISOMETRIC VIEW / AXONOMETRIC VIEW OF BUILDINGS**

**Isometric view:** Exterior view of a simple residential building showing all building components.

**Axonometric view:** Axonometric view of a room interior showing all interior components.

#### **REFERENCES:**

- 1.K. Venugopale et al., "Engineering Drawing + AutoCAD", New Age International Publishers, 2010.
2. Francis D.K Ching, "Architectural Graphics- Fifth Edition", John Wiley and Sons, New Jersey, 2009.
3. N.D. Bhatt et al., "Engineering Drawing" (53rd Edition), Charotar Publishing House, Anand, India, 2014.
4. Morris et al., "Geometrical Drawing for Art Students", Universities press, 2012.
5. Leslie Martin C., "Architectural Graphics", The Macmillan Company, New York, 1978.

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4.	AR114	Workshop – I	SEC -1	-	-	-	20	30	50	4	-	-	4	2

**COURSE OUTCOME:-**

After completion of this course student will be able to-

1. Review various tools and techniques and incorporate them in visual communication and model making.
2. Develop the ability to appreciate the three dimensional implications of design and techniques of model making.
3. Critique the property of different materials for various products for designing and model making.
4. Incorporate basics of rendering, presentation skills & model making with various materials
5. Produce art works from various materials and will be able to incorporate these materials in further studies

**UNIT-1 VISUAL ART**

General characteristics of visual art/Fundamentals of visual art: Space, Form, size, Shape, Line, Color, Tone values, Perspective, Design and aesthetic organization of Visual elements in art object (Composition). The use of two and three dimensions in visual art. Tactile quality in art. Environment and art. Perceptual and conceptual aspects in art. Use of various kinds of papers in art making.

**UNIT-2 CARPENTRY**

Introduction to the carpentry tools, processes, joints and wood working machines. Preparation of various carpentry joints, fixing of plywood, Blackboards, commercial boards and their application in furniture. Models in appropriate materials for understanding of joinery in wooden construction.

**UNIT-3 FOUNDRY**

Introduction, type of patterns, pattern making, preparation of moulds and moulding equipment details

**UNIT-4 FABRICATION**

Introduction to welding equipments, processes and its applications.

**UNIT-5 PAINTING & POLISHING**

Classification of paints, varnishes ingredients of paints, painting methods-brush, spray, hot spray etc.

**REFERENCES:**

1. BENN, the book of the house ,Ernest Benn limited London
2. Jannsen, Constructional Drawings & Architectural models, Kari Kramer Verlag Stuttgart, 1973.
3. Harry W.Smith, The art of making furniture in miniature, E.P.Dutton Inc., New York, 1982.
4. Thames and Hudson Manual of Rendering with Pen and Ink-Robert W Gill.

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5.	AR115	Building Materials	BSAE-2	50	30	20	-	-	100	3	2	1	-	3

**COURSE OUTCOME:**

The basic idea of the subject is to make them aware of the primary building materials used in construction. Their properties, types and common usage. This will enable students to equip themselves with the knowledge of materials and their judicious usage.

1. To classify the different types of building materials used primarily in building construction work.
2. To identify the types of materials and their compositions.
3. To list, label and define the materials.
4. To illustrate use of materials and ascertain their application.
5. To identify the specific use and related technique for a required material.
6. To evaluate, compare and select the techniques for finalizing specific building materials for different types of buildings and analyze its influence on prevailing architectural styles.

**Course Content:**

**UNIT-1**

- Clay and clay products (bricks, tiles), stones.
- Cement, lime, sand, aggregate mortar and concrete blocks.

**UNIT-2**

- Timber types, qualities and defects in timber seasoning etc. complete.
- Processed materials- plywood, laminates, fiberboards, light weight boards, panels etc. & clay products.

**UNIT-3**

- Special functional need and category of building materials abrasives, adhesives, asbestos, asphalt, bitumen, cork, electrical insulators, fuels, gypsum, heat insulation materials, lubricants, rubber sheets, roof coverings, solders, sound absorb materials, tar, turpentine etc.
- Proprietary building materials:- Paints, Varnishes, distempers wall paper, floor coverings, tiles, vinyl's, polyesters, fittings, furnishing materials for interiors & exteriors polymers, plastics resins and advanced surface finishes for interior and exterior etc.

**UNIT-4**

- Metals- ferrous and non ferrous, glass and its uses in building industries
- Prefabricated and pre-stressed building component: roof slabs, wall units, beams, columns, lintels, shelve etc. of different types, their specification & technique of construction and its use in architecture.



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**UNIT-5**

- Low-cost construction techniques and materials, combinations in mud, terra - cotta, Bamboo as plant classification, species, geographical distribution, Anatomy of Bamboo, Properties, strength, processing, harvesting, working of Bamboo tools – Treatment and preservation of Bamboo and uses of Bamboo. Termite protection, sewage protection, fire protection materials etc. of special need.
- Industrial, agricultural and mineral wastes and their utilization as building materials: Fly ash, blast furnace slag, calcium carbonate, lime kiln rejects, by-product, gypsum, red mud, throw-away packages, rice husk, saw dust, wooden chips, choir waste, wood wool, tailings etc. their application in components of different types of buildings.

**Note:** Assignments should be in the form of small reports, market surveys, seminars and notes on above mentioned topics. The works of CBRI, NBO, HUDCO and other related institutions be referred and discussed.

**TEXT BOOKS:**

1. S.C. RANGWALA, “ Engineering Materials”
2. S.P. ARORA & BINDRA, “Building Construction”

**REFERENCE BOOKS:**

1. Advances in Building Materials and Construction, CBRI.

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6.	AR116	Structure -I	BSAE- 3	50	30	20	-	-	100	3	2	1	-	3

**COURSE OUTCOME:-**

After completion of this course student will be able to-

1. Understand various principles of strength of materials and behavior of forces .
2. Define the pure bending and outline the relationship between the bending to the material property and geometry
3. Apply the pure bending and shear equation to compute the stresses at various level of beam
4. Analysis the stress and strain conditions due to bi-axial stress system
5. Compute the deflection in simply supported, cantilever and over-hang beams for a given set of loading

**Course Content:**

**UNIT-1**

Statics of a particle, composition and resolution of forces, moment of a force, parallel forces, couples, general conditions of equilibrium.

**UNIT-2**

Center of gravity and moment of inertia of composition and cut out sections, parallel and Perpendicular axes theorem, stability of equilibrium.

**UNIT-3**

Simple stresses and strains, direct stresses, compound stresses.

**UNIT-4**

Shear force and bending moments for strained beams subjected to concentrated load and Distributed loadings (Simply supported and cantilever only) support reactions.

**UNIT-5**

Stress in beams: Direct, bending and shearing stress in beams.

**Note:** Assignments work should include design and analysis of simple elements as stated above with drawings.

**TEXT BOOKS:**

1. S.B. JUNNARKAR, "Applied Mechanics"
2. RAMAMURTHAM, "Applied Mechanics"
3. S.B. JUNNARKAR/H.J. SHAH, "Mechanics of Structure Vol.1"
4. DR. B.C. PUNAMIA, "Strength of Materials"

**REFERENCE BOOKS:** IS Codes

1. IS 465: 2000
2. SP-16 3
3. SP-34

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7.	AR117	COMMUNICATION ENGLISH	SEC -2	50	30	20	-	-	100	2	1	1	-	2

**COURSE OUTCOMES:**

1. Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, and argue using appropriate communicative strategies.
2. Read different genres of texts, infer implied meanings and critically analyze and evaluate them for ideas as well as for method of presentation.
3. Listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings.
4. Write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.

**UNIT I: INTRODUCTION** : Listening- short talks, interviews and discussions from various media Speaking-negotiating meaning, convincing people- describing places- Reading- texts on architecture-Writing-process descriptions -Vocabulary Development-Abbreviations and Acronyms. Grammar-Suitable tenses to write descriptions and describe.

**UNIT II SPEAKING, READING AND WRITING:** Listening –listen to talks for specific information- Speaking- Speaking- preparing a presentation using the computer, participating in small group discussion- Reading- lengthy articles related to architecture and construction Writing- writing formal emails , vocabulary-appropriate words to describe topics in architecture, Grammar- suitable grammar for writing a report.

**UNIT III DESCRIPTIVE PRESENTATION**

Listening- Descriptions of place, conversations and answering questions, Speaking- making a power point presentation on a given topic, Reading- architecture manuals, Writing- writing a report, writing essays-descriptive essays, Vocabulary- adjectives of comparison, Grammar-collocations.

**UNIT IV ANALYTICAL PRESENTATION**

Listening- TED talks, Speaking- participating in group discussions, Reading- reading and interpreting visual information, Writing- writing analytical essays and argumentative, Vocabulary- suitable words to be used in analytical and argumentative essays, Grammar-subject-verb agreement.

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**UNIT V PROJECT PROPOSAL PRESENTATION**

Listening- ink talks and longer talks, Speaking- talking about one's project proposal,  
Reading- reading essays on construction, buildings, different schools of architecture,  
Writing-writing proposals, Vocabulary- related vocabulary, Grammar- Cohesive devices.

**TEXTBOOKS:**

1. English for Architects and civil Engineers - Sharon Hendenreich Springer, 2014 ISBN 978-3-658-030-63- (e-book).
2. [www.cambridgescholars.com](http://www.cambridgescholars.com)
3. [www.robertdwatkins.com/Englishworkbook.pdf](http://www.robertdwatkins.com/Englishworkbook.pdf)
4. [arkenglish.com](http://arkenglish.com)

**REFERENCES:**

1. Chris Mounsey: **Essays and Dissertation** (Oxford University Press) February 2005.
2. Sidney Greenbaum: **The Oxford English Grammar** (Oxford University Press) March 2005.
3. Krishna Mohan and Meera Banerji: **Developing Communication Skills** (Mac Millan india Ltd)[2000].
4. Krishna Mohan and Meenakshi Raman: **Effective English Communication** (Tata Mc-Graw Hill)[2000].