

B.ARCH SEMESTER I

Detailed Course Curriculum/Scheme of Examination-Semester 1
Bachelors of Architecture,IGDTUW

FIRST YEAR					
First Semester					
S.No.	Code	Subject	(L-S-P)	Credit	Category
1	BAP 101	Introduction to Architectural Design - I	0-8-0	8	DCC
2	BAP 103	Building Materials & Construction Technology – I	0-5-0	5	BSAE
3	BAP 105	Architectural Drawing - I	0-4-0	4	DCC
4	BAP 107	Architectural Graphics - I	0-0-4	2	DCC
5	BAP 109	History of Architecture- I	2-0-0	2	DCC
6	BAP 111	Structures - I	2-0-0	2	BSAE
7	BAP 113	Climatology and Environmental Studies I	2-0-0	2	BSAE
8	BAP 115	Architectural Workshop - I	0-0-2	1	DCC
9	BAP 117	Mathematics in Architecture	2-0-0	2	BSAE
			Total	28	

- Departmental Core Courses (DCC)
- Humanities, Social Sciences, Management and Skill/Entrepreneurship Development Courses (HMC)
- Basic and Applied Science Courses (BSAE)
- Departmental Elective Courses (DEC)
- Generic Open Elective Courses (GEC)

INTRODUCTION TO ARCHITECTURAL DESIGN-I			
Course Code	BAP 101	Credits	08
Contact Hours (Hrs/Week)	08	Semester	01
Course Category	DCC		

INTRODUCTION

This subject introduces students to the idea of space making with emphasis on process, abstraction, and modes of representation.

COURSE OBJECTIVES

- To develop understanding of interconnections between form, volume and function.
- To sensitize students towards the interconnectedness of various elements of a context which impact the architectural design.

PREREQUISITE NIL

COURSE LEARNING OUTCOMES

Having successfully completed this course, the student will be able to understand:

- Anthropometrics pertaining to various areas of space design.
- Determine space requirements for various day to day activities.
- Establish relations between form, space and function with the help of simple flow path, circulation diagrams etc.

PEDAGOGY

- Case studies along with primary and secondary surveys.
- Documentation of various data collected from case studies, research and literature studies.
- Models and sketches.
- Synergy of various layers of data and its application in a small-scale space design.

EVALUATION SCHEME

Course Type			Examination		Relative Weights						
L	P	S	TH	PR	CAT	CAS	MTET	MTES	ETET	ETIS	ETES
0	0	8	--	--	--	50	--	--	-	--	50

CONTENT

S. No	Contents	Contact Hours
1.	Anthropometrics <ul style="list-style-type: none"> • Study of anthropometrics and their relationship with the dimensions of objects of daily use. • Determining space for activities such as living, dining, sleeping and conveniences. • Measured drawing of a small building such as, a small room/studio,etc. of a house ,office etc. 	16
2.	Study of Circulation Simple circulation/flow diagrams for small building projects	16

3.	Spatial Organization Three-dimensional organization of a variety of forms to create built forms, importance of shades and shadows in the entire composition, layout of repetitive units within a site to create interesting and functional compositions	16
4.	Design exercises <ul style="list-style-type: none"> • Evolution of plan in relation to physical, site considerations, selection of materials and construction, study of architectural design vis a vis the concepts of privacy, security, comfort and maintenance • Single room design, such as self-occupied room, tea stall, guard room, canopy, boundary wall etc. • Design of small residential components, such as a kitchen, bathroom, bedroom etc. 	64

REFERENCE BOOKS

1. Ching, F.D.K and Juroszek, S.P (1998). *Design Drawing*. New York: Van Nostrand Reinhold
2. Neufert, P. (2000). *Architects Data*. 3rd Ed. UK: Blackwell Wiley
3. Agkathidis, A., Hudert, M. and Schillig, G. (2007). *Form Defining Strategies: Experimental Architectural Design*. New York: Wasmuth.
4. Watson, D. (Editor). (2005) *Time-saver Standards for Architectural Design: Technical Data for Professional Practice, 8th Ed.*, McGraw-Hill.
5. Ching, F. D. K. (2012). *Architecture: Form, Space and Order*. 3rd Ed. Hoboken: John Wiley & Sons.

BUILDING MATERIALS & CONSTRUCTION TECHNOLOGY-I			
Course Code	BAP 103	Credits	05
Contact Hours (Hrs/Week)	05	Semester	01
Course Category	BSAE		

INTRODUCTION

This course is designed to expose students to the process of building construction, the components of buildings and the materials, skills and equipment used in shaping them.

COURSE OBJECTIVES

- To familiarize students with basic building materials and their properties.
- To make students understand how materials can have architectural application.

PREREQUISITE: NIL

COURSE LEARNING OUTCOMES

Having successfully completed this course, the student will be able to understand:

- Properties and behaviour of some readily available building materials.
- Designing and construction with the building materials.
- Application of available construction technology.

PEDAGOGY

Classroom teaching is supported with preparation of drawings and site visits.

EVALUATION SCHEME

Course Type			Examination		Relative Weights						
L	P	S	TH	PR	CAT	CAS	MTET	MTES	ETET	ETIS	ETES
0	0	5	--	--	--	50	--	--	-	--	50

CONTENT

S. No	Contents	Contact Hours
1.	Introduction to basic building materials <ul style="list-style-type: none"> • Mud: Study of soil map of India, Type of soils, making mud bricks, cob, adobe, Stabilization and use for walling and terracing. • Bricks: Kinds, types, constituents and properties of brick earth, manufacturing of various types of bricks, decorative brickwork and jail work • Stone: Study of stone map of India, Kinds, properties, varieties and their characteristics, stone masonry. • Sand: Sources, classification and properties • Lime and Cement: Sources, classification, properties and method of manufacturing, testing, mixing and uses 	15
2.	Foundations: <ul style="list-style-type: none"> • Definition, safe bearing capacity of soils and methods of improving the depths and width of foundations, causes of failure and remedies, simple, steeped, 	25

	combined and cantilevered footing, RCC footing and raft foundation. Foundation details up to plinth level.	
3.	Walls: <ul style="list-style-type: none"> Masonry walls in bricks and stone, in various thicknesses. Brick bonds English, Flemish, Rat-trap etc. Tee and cross-junctions, corbelling. Different type of stone masonry . Brick jali walls. 	15
4.	Damp proofing: Different types of damp proof materials, their compositions and application, Constructional details of walls, floors, foundations etc. with particular emphasis of their damp proofing and natural ventilation.	15

REFERENCE BOOKS

1. Kumar, S.K. (2001). "Building Construction", 19th Ed., Standard Publishers Distributors.
2. Allen, E. and Iano, J. (2004). "Fundamentals of Building Construction: Materials and Methods", Wiley.
3. Mehta, M., Scarborough, W. and Armpriest, Diane, "Building Construction: Principles, Materials and Systems", Pearson Prentice Hall.
4. Barry, R. (1999). The Construction of Buildings Vol. 2. 5th Ed. New Delhi : East-West Press.
5. Foster, J. and Mitchell, S. (1963). Building Construction: Elementary and Advanced, 17th Ed. London : B.T. Batsford Ltd.
6. Hailey and Hancork, D. W. (1979). Brick Work and Associated Studies Vol. II. London : MacMillan.
7. McKay, W. B. (2005). Building Construction Metric Vol. I-IV. 4th Ed. Mumbai : Orient Longman.

ARCHITECTURAL DRAWING - I			
Course Code	BAP 105	Credits	04
Contact Hours (Hrs/Week)	04	Semester	01
Course Category	DCC		

INTRODUCTION

Drawing is the language used by architects to communicate with rest of the world about their work. It is important for architects to be able to draw what has been visualized by them, in a manner which can be easily understood by clients/ other people. This course enables students to draw, what has been visualized them, in a technically correct manner.

COURSE OBJECTIVES

The objectives of the course are to:

- Introduce and familiarize students with drafting tools and accessories.
- Give basic knowledge of good drafting and lettering techniques.
- Develop the understanding of scales in architectural drawings
- Develop comprehension and Visualization of geometric forms.
- Develop the understanding of representing three-dimensional objects on two-dimensional sheet.

PREREQUISITE: NIL

COURSE LEARNING OUTCOMES

Having successfully completed this course, the student will be able to:

- Represent various building elements in drawings appropriately
- Use various technical drawing instruments.
- Draw basic technical drawings.
- Visualize and draw simple solids in 3D.

PEDAGOGY

Classroom/ studio teaching shall be supported by study of drawing work / graphical representation through books / archival material/ reports/drawings/etc.

EVALUATION SCHEME

Course Type			Examination		Relative Weights						
L	P	S	TH	PR	CAT	CAS	MTET	MTES	ETET	ETIS	ETES [#]
0	0	4	--	--	--	50	--	--	--	--	50

CONTENT

S. No	Contents	Contact Hours
1.	Introduction <ul style="list-style-type: none"> • Drawing Instruments and their uses. • Sheet layout and sketching. • Lettering and dimensioning, • Reduction and enlargement of drawings on different scales, representation of materials and architectural elements through architectural graphic symbols • Pencil drawings, tonal value, variation flight, shading and texture techniques 	20

	<ul style="list-style-type: none"> • Conventions in Architectural Drawings • Fundamentals of Measured Drawing 	
2.	Scales and proportion <ul style="list-style-type: none"> • Scales: Engineers scale, Graphical scale and Representation factor (R.F.) • Scales on drawings. Types of scales: Plain scale and Diagonal scale 	10
3.	Basic projections, <ul style="list-style-type: none"> • Definition, Meaning & concept. Principles and Methods of projection. • Orthographic projections • Orthographic projection (Third angle projection) Planes of projection. • Projection of points, lines & planes and solids. 	10
4.	Axonometric, isometrics projections <ul style="list-style-type: none"> • Projection and three-dimensional views of solids and composition of solids 	16

REFERENCE BOOKS

- Ching, F. D. K. (2012). Architecture: Form, Space and Order, 3rd Ed. Hoboken : John Wiley & Sons.
- Rudolf, A. (1977). The dynamics of architectural form. Berkeley and Los Angeles: University of California Press.
- Criss. B. M. (2011). Designing with models: A Studio guide to Architectural Process Models.3 rd Ed. Hoboken :John Wiley & Sons.
- Morris, I. H. (1902). Geometrical Drawing for Art Students. Longmans
- Lockard, W. K. (1992). Drawing as a Means to Architecture. 6th Ed. New York : Van Nostrand Reinhold Company.
- Zell, Mo. (2008). The Architectural Drawing Course. 1st Ed. Thames and Hudson.
- Bhatt, N.D. and Panchal, V.M., "Engineering Drawing – Plane and Solid Geometry", 48th Ed., Charotar Publishing House. 1996.

ARCHITECTURAL GRAPHICS -I			
Course Code	BAP 107	Credits	02
Contact Hours (Hrs/Week)	04	Semester	01
Course Category	DCC		

INTRODUCTION

Introducing students to fundamental techniques of Visual representation and to equip with the basic principles of representation.

COURSE OBJECTIVES

- To develop presentation skills, visual expression and representation and imaginative thinking.
- To familiarize the students with the various mediums and techniques of art through which artistic creativity through a hand on working with various mediums and materials.
- To familiarize students with the grammar of art by involving them in a series of free hand representations of and to develop comprehension of scale
- To understand still life drawing - from Observation.

PREREQUISITE NIL

COURSE LEARNING OUTCOMES

Having successfully completed this course, the student will be able to understand:

- Building up the vocabulary in visual and basic design principles using various representation techniques.
- To present in graphic form all elements of building design and others - study of shades and shadows, textures, tones, colour ,geometrical form, perspectives and projections, free hand drawing and rendering in different media.

PEDAGOGY

Along with progressive evaluation of class assignments, exercises both indoor and outdoor to understand form, proportion, scale, etc. to involve students in a series of exercises which will look at graphic and abstract. Involving them in a series of exercises which will help them experiment with form and volume and various hands on activity/presentations along with end semester portfolio evaluation.

EVALUATION SCHEME

Course Type			Examination		Relative Weights						
L	P	S	TH	PR	CAT	CAP	MTET	MTEP	ETET	ETIP	ETEP
0	4	0	--	--	--	35	--	15	--	--	50

CONTENT

S. No	Contents	Contact Hours
1.	Principles and elements of design <ul style="list-style-type: none"> • Two-dimensional design elements, such as, point, line, direction, shape, size, colour and texture; • Three-dimensional design profiles of geometric forms and their arrangements in different compositions. • Harmony and contrast in 2-D and 3-D design; interplay of light and shade on building blocks and their effect. • Style, rhythm, balance, unity and order, Scale and proportion in 	20

	architecture; Le Modular and other concepts.	
2.	Colour theory <ul style="list-style-type: none"> • Psychology of colour, colour mixtures, colour systems, colour organization, application of colour schemes, national and international standards on colour. 	10
3.	Study of elementary two-dimensional shapes <ul style="list-style-type: none"> • Compositional exercises in 2D compositions in various materials and media. 	10
4.	Study of elementary three-dimensional volumes <ul style="list-style-type: none"> • Study of elementary three-dimensional form. Compositional exercises in 2D and 3D compositions and models in various materials and media. • Ordering combination principles and their application in building through exercises in design of murals, screens and voids in walls 	16

REFERENCE BOOKS

1. Bhatt, N.D. and Panchal, V.M., "Engineering Drawing – Plane and Solid Geometry", 48th Ed., Charotar Publishing House. 1996.
2. Griffin, A.W. and Brunicardi, V.A., "Introduction to Architectural Presentation Graphics", Prentice Hall. 1998.
3. Ciriello, M., "Architectural Design Graphics", McGraw-Hill. 2002.
4. Ching, F.D.K., "Architectural Graphics", 4th Ed., John Wiley. 2003
5. Carpo, M., "Perspective, Projections and Design: Technologies of Architectural Representation", Routledge. 2008.
5. Parmar, V.S., "Design Fundamentals in Architecture", Somaiya Publications, 1973.

HISTORY OF ARCHITECTURE-I			
Course Code	BAP 109	Credits	02
Contact Hours (Hrs/Week)	02	Semester	01
Course Category	DCC		

INTRODUCTION

Architecture is one of the products of civilization. It is a combined outcome of various factors such as geology, geography, climate, beliefs, religion, society, politics, economy, culture and way of life. This syllabus revolves around the domain of civilization covering prehistoric age and early civilizations.

COURSE OBJECTIVES

- To study the development of civilizations and its architectural implications.
- To study the architecture of the ancient world on a conceptual basis rather than specific and complex questions about the architecture.

PREREQUISITE NIL

COURSE LEARNING OUTCOMES

Having successfully completed this course, the student will be able to understand:

- Development of civilizations.
- Evolution of architecture through times.
- Understand the impact of various factors such as geology, geography, climate, beliefs, religion, society, politics, economy, culture and way of life on architecture.

PEDAGOGY

Classroom teaching through multi-media.

EVALUATION SCHEME

Course Type			Examination		Relative Weights						
L	P	S	TH	PR	CAT	CAP	MTET	MTEP	ETET	ETIP	ETEP [#]
2	0	0	Yes	--	10	--	30	--	60	--	--

CONTENT

S. No	Contents	Contact Hours
1.	Unit 1 Prehistory and Introduction to Three Age System <ul style="list-style-type: none"> • Stone Age (Paleolithic and Neolithic Systems); Cave Dwellings in Europe: Lascaux, Chapelle Aux-Saints; First attempts at Marking Nature: Terra Amata, Skara Brae, the megaliths, obelisks. Compositions such as Stone Henge; • Beginnings of Agriculture and Settled Life, First Settlements like Jericho, CatalHuyuk. 	07
2.	Unit 2 River Valley Civilizations in Egypt and Mesopotamia <ul style="list-style-type: none"> • Growth of Settlements, Religious and Social Architecture. • Egypt: Social systems, religious beliefs, science and writing; Evolution of Tomb Architecture: Mastabas, Pyramids at Saqqara, Meidum and Giza; 	07

	<p>Mortuary Temples: Hatshepsut; Cult Temples: at Luxor and Karnak.</p> <ul style="list-style-type: none"> • Mesopotamia: the Sumerians, Babylonians, Assyrians and the Persians; their Art, Intellectual Achievements and Developments in Law; the Ziggurats at Ur, Choga Zambil, etc.; the cities of Ur, Babylon, Khorsabad and Persepolis. 	
3.	<p>Unit 3 Bronze Age Indus Valley Civilization in India and China</p> <ul style="list-style-type: none"> • Town Planning, Trade and Commerce; Mohenjodaro and Harappa. Early Iron Age Civilization in India: the coming of the Aryans and Vedic Age; Epic Age; development of Hinduism Religious and Caste systems, Wooden Origins of Indian Architecture: Forest Dwellings, Kutiya and Grama. • River Valley Civilization in China: Dynasties such as the Shang, Chou, Ch'in, Ming, etc.; Political History, philosophy, and scientific achievements; palaces like the Imperial Palace, Forbidden City; Altars and Temples; Imperial Tombs. 	07
4.	<p>Unit 4 Beginning of Buddhist and Jain Architecture in India</p> <ul style="list-style-type: none"> • Philosophy and teachings; the Hinayana and Mahayana Sects and their contribution to the development of architecture in India. Ashokan School, Buddhist Rock Cut Architecture: The Chaityas and Viharas at Ajanta and Ellora; the Stupa: Form and Evolution; Buddhist Architecture in Gandhara. 	07

REFERENCE BOOKS

1. Tadgell Christopher (1990). *A History of Architecture in India – From the Dawn of Civilization to the End of the Raj*. London. Phaidon Press Ltd.
2. Fletcher Sir Banister (1987). *A History of Architecture*. London (UK). Butter-worth Heinemann Ltd.
3. Arjun Dev, *The Story of Civilisation*, Vol. I (Old) NCERT History Textbook for Class IX.
4. Kostof Spiro(1995). *A History of Architecture – Settings and Rituals*. N.Y. Oxford University Press.
5. Hiraskar G.K.(1994). *The Great Ages of World Architecture*. Delhi. Dhanpat Rai Ltd.
6. Brown Percy (2004). *Indian Architecture- Buddhist and Hindu Periods*. Bombay. D.B. Taraporevala and Sons Co. Pvt. Ltd.

STRUCTURES - I			
Course Code	BAP 111	Credits	02
Contact Hours (Hrs/Week)	02	Semester	01
Course Category	BSAE		

INTRODUCTION

This subject gives insight about basic principles of structural mechanics which are relevant to simple design elements.

COURSE OBJECTIVES

- To understand basic principles of structural mechanics which are relevant to simple design elements.
- To understand structural behaviour of building elements.

PREREQUISITE: NIL

COURSE LEARNING OUTCOMES

Having successfully completed this course, the student will be able to
 Understand basic principles of structural mechanics.
 Understand structural behaviour of building elements.

PEDAGOGY

Classroom teaching is supported by case studies.

EVALUATION SCHEME

Course Type			Examination		Relative Weights						
L	P	S	TH	PR	CAT	CAP	MTET	MTEP	ETET	ETIP	ETEP
2	0	0	Yes	--	10	--	30	--	60	--	--

CONTENT

S. No	Contents	Contact Hours
1.	<u>Unit 1 : Applied Mechanics-I</u> <ul style="list-style-type: none"> • Nature Study: Study of structure in nature • Centre of Gravity: Definition, CG of plane figures (I, T, L, C, O), CG of hollow and box sections • Moment of Inertia: Definition, MI of plane figures about principal axes (rectangle, triangle, circle), Parallel axis theorem, MI of simple plane figures (I, T, L, C, O, hollow and box sections) 	07
2.	<u>Unit 2: Applied Mechanics-II</u> <ul style="list-style-type: none"> • Statics: Forces, Composition and Resolution of forces, Parallelogram law of forces, Lami's theorem, Moment and couple, Conditions of equilibrium • Concept of Elasticity: Hooke's Law, Stress and strain, Elasticity, Plasticity, Modulus of elasticity, Elastic limit, Stress/strain curve for mild steel, Poisson's ratio • Introduction to Temperature Stresses 	07
3.	<u>Unit 3: Building Structures-I</u> <ul style="list-style-type: none"> • Building Systems: Concept of load bearing wall and framed systems 	07

	<ul style="list-style-type: none"> • Building Components: Concept of distributing system, supporting system, opening system, spanning system • Spanning systems: Form-active and vector-active systems 	
4.	<p><u>Unit 4: Building Structures-II</u></p> <ul style="list-style-type: none"> • Historical perspective: Evolution of structures through time • Equations of Equilibrium: Statically determinate, Support conditions • Loads: Loads as forces, Types of loads (Dead, Live, Wind, Finishing, Snow, Earthquake, Blast, etc.) <p>Introduction to steel structures, connections (Riveted, Bolted and Welding</p>	07

REFERENCE BOOKS:

1. Kumar, A., "Stability Theory of Structures", Tata McGraw Hill Co. Ltd. 1985
2. Jain, A.K., "Strength of Materials and Structural Analysis", 2nd Ed., Nem Chand & Bros. 2008
3. Khurmi, R. S., "Strength of Materials", S. Chand Technical
4. Levy, M. and Salvadori, M., "Why Building Fall Down"
5. Levy, M. and Salvadori, M., "Why Building Stand up"
6. Salvadori, M., "Structure in Architecture"

Course Code	BAP 113	Credits	02
Contact Hours (Hrs/Week)	02	Semester	01
Course Category	BSAE		

INTRODUCTION

In this course the student shall understand Climate responsive architecture and understand and apply various principles underlying them.

COURSE OBJECTIVES

- The broad intent of the course is to develop the student's insight into the effect of climate and the incumbent of ecology of the sigh, in term of its effect of building design and detailing.
- The course is intended to develop a special insight into the current situation of urban immigration, climate change, environmental stress and pollution and help the student develop strategies to combat there. This could be developed both by looking around the site and by looking inside the proposed building itself, i.e., through its service design for water, electricity and space conditioning.

PREREQUISITE:NIL

COURSE LEARNING OUTCOMES

Having successfully completed this course, the student will be able to understand:

- Various components, elements and importance of climate and environmental study.
- Human thermal comfort as an essential function of a building, its analysis & use in Architecture.
- The elements constituting climate and their role in creating responsive designs.
- The characteristics of varied tropical climates and expected responses of buildings in specific climate types.
- importance of sustainable development and role of architecture.

PEDAGOGY

Classroom teaching through multimedia may be supported by visit to site of historical importance as per syllabus.

EVALUATION SCHEME

Course Type			Examination		Relative Weights						
L	P	S	TH	PR	CAT	CAP	MTET	MTEP	ETET	ETIP	ETEP
2	0	0	Yes	--	10	--	30	--	60	--	--

CONTENT

S. No	Contents	Contact Hours
1.	<u>Unit 1: Introduction to Climatology</u> <ul style="list-style-type: none"> ● Relationship between Architecture and Climatology; Global Warming and the Need for Climate responsive building; Building as a third skin. Climate and weather; Global weather; Seasonal changes, Factors responsible for changes. ● Climatic-Tropics, climatic zones, macro climate, elements of climate, sun, temperature, wind, precipitation, and climatologically data needed for planning of buildings. ● Human Comfort, Human heat balance and comfort; thermal comfort, heat stress, effective temperature, bioclimatic analysis, individuals' variation. Concept of Adaptive Comfort. 	07
2.	<u>Unit 2 : Micro climate</u> <ul style="list-style-type: none"> ● Air Temperature: Factors that influence air temperature – latitude, altitude, 	07

	<p>seasons, water, trees, areas etc.; inversion of temperature, thermal diffusivity, thermal conductivity and heat transmission through building elements.</p> <ul style="list-style-type: none"> • Solar Radiation and its variations over the year. • Wind: Study of diurnal and seasonal variations, heating and cooling, effect of topography; effect of wind on location on industrial areas, airports and other land uses and road patterns; Promoting and inhibiting air movement in and around buildings, wind eddies, size and positions; effect of wind on design and siting of buildings. Understanding Wind Rose diagrams. • Precipitation and humidity: Water vapor, relative humidity, condensation, rain, fog, snow and architectural responses to them. 	
3.	<p><u>Unit 3 : Introduction to environmental studies</u></p> <ul style="list-style-type: none"> • The Multidisciplinary nature of environmental studies, Definition, scope and importance, Need for public awareness, man, environment and ecosystem; Renewable and nonrenewable resources: Natural resources and associated problems with case studies. • Ecosystems -Concept of an ecosystem, Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Introduction to different ecosystems. 	07
4.	<p><u>Unit 4 : Introduction to Sustainable development</u></p> <ul style="list-style-type: none"> • Biodiversity and its conservation-Definition: genetic, species and ecosystem diversity. Biogeographical classification of India, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values, Threats to biodiversity Conservation of biodiversity: in-situ, Ex-situ conservation of biodiversity. • Environmental Pollution, -Definition, Causes, effects and control measures of: Air pollution, Water pollution, Soil pollution, Noise pollution, Thermal pollution, nuclear ☒ hazards Solid waste Management. Role of an individual in prevention of pollution. • Disaster Management: Floods, earthquake, cyclone and landslides. 	07

REFERENCE BOOKS

1. Givoni, B. (1998). *Climate considerations in building and urban design*. New York: Van Nostrand Reinhold.
2. Bansal, N.K., Hauser, G. and Minke, G., "Passive Building Design: A Handbook of Natural Climatic Control", Elsevier Science. 1994
3. Hausladen, G., "Climatic Design: Solutions for Buildings that can Do More with Less Technology", Birkhauser. 2005
4. Drake, S., "The Third Skin: Architecture, Technology and Environment", UNSW Press. 2007.
5. Koenigsberger, O. H., Ingersoll, T. G., Mayhew, A. and Szokolay, S. V. "Manual of Tropical Housing and Building: Climatic design" Hyderabad : Orient Longman. 1980

Course Code	BAP 115	Credits	01
Contact Hours (Hrs/Week)	02	Semester	01
Course Category	DCC		

INTRODUCTION

To equip students with the basic skills necessary to represent their ideas in simple models format using simple materials.
To make students practice with various tools essential for making architectural models.

COURSE OBJECTIVES

- To equip students with the basic skills necessary to represent their ideas in a rudimentary model format using simple materials like paper, thermocol, hardwood, Metals, glass fiber etc.
- Introduction to the various tools and equipment available for executing these exercises.

PREREQUISITE:NIL

COURSE LEARNING OUTCOMES

Having successfully completed this course, the student will be able to understand:

- Need for architectural models. Role of scale-models in design. General practices in model making. Types of models: block, detailed, construction & interior models.

PEDAGOGY

Classroom teaching through demonstrations /hands on activities.

EVALUATION SCHEME

Course Type			Examination		Relative Weights						
L	P	S	TH	PR	CAT	CAP	MTET	MTEP	ETET	ETIP	ETEP
0	2	0	--	--	--	35	--	15	--	50	--

CONTENT

S. No	Contents	Contact Hours
1.	Architectural Modelling General information about various materials and tools to be used in model making. Development of the skill to use the tools with precision to obtain desired results in model making.	07
2.	Introduction to types of model Block models, detailed model, construction model and interior models etc.	07
3.	Introduction to various materials Experimentation with these materials for different geometries and scales of models.	07
4.	Introduction to various materials Methods of presentation in various types of models.	07

REFERENCE BOOKS

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

Course Code	BAP 117	Credits	02
Contact Hours (Hrs/Week)	02	Semester	01
Course Category	BSAE		

INTRODUCTION

In this course the student shall understand the use mathematics by Architects for several reasons, leaving aside the necessary use of mathematics in the engineering of buildings. Understanding and use of geometry because it defines the spatial form of a building. Also the students shall explore and understand the application of mathematics to design forms that are considered beautiful or harmonious.

COURSE OBJECTIVES

- Identifying practical problems to obtain solutions involving trigonometric and exponential functions.
- Studying the properties of lines and planes in space, along with sphere
- Understand functions of more than one variable, along with differentiation under integral sign.
- Analyzing collection of data and interpretation of results using statistical tools.

PREREQUISITE:NIL

COURSE LEARNING OUTCOMES

Having successfully completed this course, the student will be able to understand:

- The topics in mathematics necessary for effective understanding of architecture subjects. At the end of the course, the students would have knowledge of the appropriate role of the mathematical concepts learnt.

PEDAGOGY

Classroom teaching through multimedia may be supported by suitable assignments as per syllabus.

EVALUATION SCHEME

Course Type			Examination		Relative Weights						
L	P	S	TH	PR	CAT	CAP	MTET	MTEP	ETET	ETIP	ETEP
2	0	0	Yes	--	10	--	30	--	60	--	--

CONTENT

S. No	Contents	Contact Hours
5.	Unit 1: Mathematics in Architecture and Trigonometry and Mensuration Introduction to Mathematics in Architecture :Proportion, Golden ratio and Beauty, Scale, fractal design, Euclidean geometry, Understanding non-parallel surfaces, Symmetry and Anti-symmetry. Introduction to basic principles and concept of Fuzzy Logic. Review of Trigonometric (sine, cosine and tan functions) and exponential functions - De-Moiver's theorem - Expansion of $n \sin \theta$, $\cos n \theta$ in terms of $\sin \theta$ & $\cos \theta$ and $n \tan \theta$ in terms of $\tan \theta$ - Real and Imaginary parts of Circular and Hyperbolic Functions - Area of plane figures, computation of volume of solid figures (cone, cylinder, prism, pyramid, sphere etc).	07
6.	Unit 2 : Three dimensional analytical 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 –	07

	Equation of Sphere – Tangent Plane to a Sphere. Translation/extrapolation of equations to Forms.	
7.	<u>Unit 3 : Integration and functions of two variables and ordinary Differential equations</u> Review of Integration of rational, trigonometric and irrational functions - properties of definite integrals - Reduction formulae for trigonometric functions ($n \sin \theta$, $\cos \theta$ & $n \tan \theta$) - Taylor’s Theorem - Maxima and Minima (Simple Problems). Linear equations of second order with constant coefficients – Homogeneous equation of Euler type .	07
8.	<u>Unit 4 : Basic Statistics and Probability</u> Review of arithmetic mean, median, mode, standard deviation and variance - Regression and correlation - Elementary probability - Laws of addition and multiplication of probabilities - Conditional probability – Independent events – Baye’s theorem (problems only).	07

REFERENCE BOOKS

1. Grewal B.S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 41st Edition, 2011.
2. Bali N., Goyal M. and Watkins C., “Advanced Engineering Mathematics”, Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.), New Delhi, 7th Edition, 2009.
3. Ramana B.V., “Higher Engineering Mathematics”, Tata McGraw Hill Co. Ltd., New Delhi, 11th Reprint, 2010.
4. Greenberg M.D., “Advanced Engineering Mathematics”, Pearson Education, New Delhi, 2nd Edition, 5th Reprint, 2009.
5. Salinger, N. A. (2006). A Theory of Architecture. Solingen : Umbau-Verlag.
6. BIPM. (2014). The International System of Units (SI). 8 th Ed. Bureau International des Poids et Mesures

B.ARCH SEMESTER II

Bachelor's of Architecture, IGDTUW

Second Semester					
S.No.	Code	Subject	(L-S-P)	Credit	Category
1	BAP 102	Architectural Design-II	0-8-0	8	DCC
2	BAP 104	Building Materials & Construction Technology – II	0-5-0	5	BSAE
3	BAP 106	Architectural Drawing - II	0-4-0	4	DCC
4	BAP 108	Architectural Graphics -II	0-0-4	2	DCC
5	BAP 110	History of Architecture- II	2-0-0	2	DCC
6	BAP 112	Structures - II	2-0-0	2	BSAE
7	BAP 114	Climatology and Environmental Studies -II	2-0-0	2	BSAE
8	BCS 101	Introduction to Computers & Programming in C Language	3-0-2	4	BSAE
			Total	29	

- Departmental Core Courses (DCC)
- Humanities, Social Sciences, Management and Skill/Entrepreneurship Development Courses (HMC)
- Basic and Applied Science Courses (BSAE)
- Departmental Elective Courses (DEC)
- Generic Open Elective Courses (GEC)

ARCHITECTURAL DESIGN-II

Course Code	BAP 102	Credits:	08
Contact Hours (Hrs/Week)	08	Semester	02
Course Category	DCC		

INTRODUCTION

This subject introduces students to the design of small buildings with respect to site including its various parameters.

COURSE OBJECTIVES

- To familiarize students with architectural design process pertaining to site specific conditions with emphasis on vernacular architecture, local geo climatic and socio-economic factors.
- To develop understanding of local geo climatic and socio-economic factors and how they shape architectural design
- To sensitize students towards designing in different climatic conditions.

PREREQUISITE: Student should have undertaken Course BAP 101.

COURSE LEARNING OUTCOMES

Having successfully completed this course, the student will be able to understand:

- Design of small buildings, preferably in cold climate, with respect to site, especially its climatic conditions

PEDAGOGY

- Case studies along with primary and secondary surveys
- Models/sketches /perspectives to be included in key submissions for development of communication skills.
- Students may be encouraged to conduct simulations for passive climatic control as a design tool.

EVALUATION SCHEME

Course Type			Examination		Relative Weights						
L	P	S	TH	PR	CAT	CAS	MTET	MTES	ETET	ETIS	ETES
0	0	8	--	--	--	50	--	--	--	--	50

CONTENT

S. No	Contents	Contact Hours
1.	Proxemics <ul style="list-style-type: none"> • Study of human use of space and the effects that population density has on behaviour, communication, and social interaction through exercises. Impact of proxemics on architectural design • Sensitization towards application of principles of climatology. 	10
2.	Study of Vernacular Architecture <ul style="list-style-type: none"> • A visit to rural organic settlement (introduction to vernacular architecture) with repetitive composition with site orientation, prevailing wind direction and the use of local building materials. • Measure drawing of a small scale building (Can be part of the Vernacular Settlement study/visit) and/or elements of Architecture of any other building of architectural importance. Scale of the building should be small for thorough understanding of Measure Drawing principles. 	10
3.	Minor Design Problem/ Time Problem <ul style="list-style-type: none"> • Minor design problems such as a small weekend cottage, monument, food kiosk in a park. 	12
4.	Major Design Problem <ul style="list-style-type: none"> • Major design problem such as a house in a rural setting with focus on climatology and local materials and techniques. The structure may be load 	80

	<p>bearing type. Interrelation of design to construction, structures, climatology and building material Single room design, such as self-occupied room, tea stall, guard room, canopy, boundary wall etc.</p> <ul style="list-style-type: none"> • Development of understanding of load bearing structures for G+ 1 structure. 	
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REFERENCE BOOKS

1. Agkathidis, A., Hudert, M. and Schillig, G. (2007). Form Defining Strategies: Experimental Architectural Design. Wasmuth.
2. Watson, D. (Editor). (2005). Time-saver Standards for Architectural Design: Technical Data for Professional Practice, 8th Ed., McGraw-Hill.
3. Bansal, N.K., Hauser, G. and Minke, G. (1998). Passive Building Design: A Handbook of Natural Climatic Control. Elsevier Science.

Course Code	BAP 104	Credits	05
Contact Hours (Hrs/Week)	05	Semester	02
Course Category	BSAE		

INTRODUCTION

This course is designed to expose students to the process of building construction, the components of buildings and the materials, skills and equipment used in shaping them.

PREREQUISITE: Student should have undertaken Course BAP 103.

COURSE OBJECTIVES

- To acquaint students to basic building materials & construction technology associated with it.
- To familiarize students with basic building materials and their properties.
- To make students understand how materials can have architectural application.

PREREQUISITE: NIL

COURSE LEARNING OUTCOMES

Having successfully completed this course, the student will be able to understand:

- Properties and behaviour of some readily available building materials.
- Designing and construction with the building materials.
- Application of available construction technology.

PEDAGOGY

Classroom teaching is supported with preparation of drawings and site visits.

EVALUATION SCHEME

Course Type			Examination		Relative Weights						
L	P	S	TH	PR	CAT	CAS	MTET	MTES	ETET	ETIS	ETES
0	0	5	--	--	--	50	--	--	--	--	50

CONTENT

S. No	Contents	Contact Hours
1.	Roofing systems <ul style="list-style-type: none"> • Flat, curved, sloping roofs • Timber roofs: Method of construction including terracing details; lean to roof, closed couple roof, collar roof for small spans and nail joineries. • Large timber trusses (12-meter span). • Roofing: Different types of roofing systems- investigation of roofing systems in vernacular traditions of India. Pitched timber roofs, Steel roofs 	25
2.	Staircases <ul style="list-style-type: none"> • Staircases: Different types of staircases, Special staircases in steel. Fire Escape Stair Cases. 	20
3.	Arches and Lintels Elementary principles of Arch construction. Definition of various technical terms and Types of Arches. Construction of Brick and Stone Arches.	15
4.	Building Materials <ul style="list-style-type: none"> • Timbers of India, Forest cover, Timber sawing and seasoning, timber products, roof tiles, and sheets, Introduction to secondary elements door, windows, railing and sunshades, staircase etc. 	10

	<ul style="list-style-type: none">• Identification of basic woods like teak, sal, sheesham, mango, eucalyptus etc.	
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REFERENCE BOOKS

1. Kumar, S.K. (2001) "Building Construction", 19th Ed., Standard Publishers Distributors.
2. Allen, E. and Iano, J. (2004) "Fundamentals of Building Construction: Materials and Methods", Wiley.
3. Mehta, M., Scarborough, W. and Armpriest, Diane. (2008) "Building Construction: Principles, Materials and Systems", Pearson Prentice Hall
4. Rangwala, S.C. (2001) "Building Construction", 19 th Ed., Charotar Publishing House
5. Mckay, W.B., (2005) "Building Construction", Vols. I, Longman.
6. Mckay, W.B., (2005) "Building Construction", Vols. II, Longman.
7. Mckay, W.B., (2005) "Building Construction", Vols. III, Longman.

ARCHITECTURAL DRAWING - II			
Course Code	BAP 106	Credits	04
Contact Hours (Hrs/Week)	04	Semester	02
Course Category	DCC		

INTRODUCTION

This course would enable students to visualize and draw what they have imagined in their minds and this is one of the effective tools for architects in communication with clients. This course would increase visualization power of student and would enable them for better designing.

COURSE OBJECTIVES

The objectives of the course are to:

- Equip students with the skill of being able to do the 3D representation of designs on a 2D plane for better understanding of designs.
- Introduce the students to graphic treatment of two-dimensional drawings.
- Develop perception and presentation of simple architectural forms and building.
- Sensitize students to application of sciography in development of solar passive architecture.
- Familiarize the students with preparation of perspectives by innovative methods.
- Introduce the students with perspectives of interiors.

PREREQUISITE: Student should have undertaken Course BAP 105.

COURSE LEARNING OUTCOMES

Having successfully completed this course, the student will be able to:

- Draw effective presentation drawings for clients.
- Represent building / building elements in 3D for better understanding.
- Develop skills for 3D visualization of various elements.

PEDAGOGY

Classroom/ studio teaching shall be supported by study of drawing work / graphical representation through books / archival material/ reports/drawings/etc.

EVALUATION SCHEME

Course Type			Examination		Relative Weights						
L	P	S	TH	PR	CAT	CAS	MTET	MTES	ETET	ETIS	ETES
0	0	4	--	--	--	50	--	--	--	--	50

CONTENT

S. No	Contents	Contact Hours
1.	Section of Solids: <ul style="list-style-type: none"> • Section plans, Sections, True shape of a section. • Section of solids (Prisms, Pyramids, Cylinders, Cones, Spheres.) 	16
2.	Perspective <ul style="list-style-type: none"> • Definition of perspective technique (picture plane, stationary point etc.) and their role in drawing perspectives, • One point, two-point perspectives of geometrical shapes leading to 	16

	<p>perspectives of built forms, exercises in parallel, angular and bird's eye views.</p> <ul style="list-style-type: none"> • Difference with metric projections. • Anatomy of perspective: Station point, Eye level, Cone of vision, Picture plane, • Horizon line, Ground line, Vanishing points. 	
3.	<p>Development of surfaces</p> <ul style="list-style-type: none"> • Introduction and Methods of development of surfaces. • Development of lateral surfaces of right solids like Cubes, Prisms, Cylinders. • Method of drawing the development of the lateral surface of a pyramid & Cone. 	16
4.	<p>Sciography</p> <ul style="list-style-type: none"> • Introduction/ Meaning of sciography • Projection of sciography in plan and elevations 	16

REFERENCE BOOKS

1. Bhatt, N.D. and Panchal, V.M., "Engineering Drawing – Plane and Solid Geometry", 48th Ed., Charotar Publishing House. 1996.
2. Griffin, A.W. and Brunicardi, V.A., "Introduction to Architectural Presentation Graphics", Prentice Hall. 1998.
3. Ciriello, M., "Architectural Design Graphics", McGraw-Hill. 2002.

ARCHITECTURAL GRAPHICS -II			
Course Code	BAP 108	Credits	02
Contact Hours (Hrs/Week)	04	Semester	02
Course Category	DCC		

INTRODUCTION

To enable students to develop the ability to present all the elements of design in graphic forms to enhance the potential of a student in presenting concepts and ideas in terms of drawing using different techniques.

COURSE OBJECTIVE

- To introduce the students to the various two- and three-dimensional Graphical techniques of Architectural drawings and to enhance their visualization skills.
- To introduce the students to graphic treatment of two-dimensional drawings.
- To develop perception and presentation of simple architectural forms and building.

PREREQUISITE: Student should have undertaken Course BAP 107.

COURSE LEARNING OUTCOMES

Having successfully completed this course, the student will be able to:

- Draw effective presentation drawings for clients.
- Represent building / building elements in 3D for better understanding.
- Develop skills for 3D visualization of various elements.
- Use various rendering techniques and types of rendering methods for presentations.

PEDAGOGY

Classroom/ studio teaching shall be supported by study of drawing work / graphical representation through demonstrations, lectures, books / archival material/ reports/drawings/etc. and visit to various outdoor spaces.

EVALUATION SCHEME

Course Type			Examination		Relative Weights						
L	P	S	TH	PR	CAT	CAP	MTET	MTEP	ETET	ETIP	ETEP
0	4	0	--	--	--	35	--	15	--	--	50

CONTENTS

S. No	Contents	Contact Hours
1.	Presentation Techniques <ul style="list-style-type: none"> • Introduction to represent different textures and finishes in plan and elevation. • Graphical representation of furniture, automobiles, human figures, etc. in plans and elevations and 3 dimensions. Preparation of presentation drawing. 	20
2.	Collage, Mural and Sculptures <ul style="list-style-type: none"> • Collage with paper and various waste materials with theme and presentation. Mural with different materials on live scale. Sculpture with different materials like P.O. P, clay, metal, wood, plastic, ceramic etc. • Study of Solids and voids to evolve sculptural forms and spaces and explore 	20

	the play of light and shade and application of colour. Analytical appraisal of building form in terms of visual character, play of light and shade, solids and voids etc.	
3.	Presentation Techniques: Digital <ul style="list-style-type: none"> • Introduction to vector and raster images, creating and saving images, image editing, understanding of layers, special effects etc. (Preferred software: Adobe Photoshop, Adobe Illustrator and Adobe after Effects). Rendering techniques using digital tools. • 3D Rendering: -Introduction to 3D Rendering, Simulating the Sunlight angle, adding shadows, Adding Materials and adjusting its appearance, adding a background scene, Effects with light, Adding Reflections and details with Ray Tracing, Creating and adjusting Texture maps, Adding Landscape and people and Improving your images and editing. 	10
4.	Introduction to other 3D medium like lithography,metal/wood Installation etc.	06

REFERENCE BOOKS

1. Bhatt, N.D. and Panchal, V.M., "Engineering Drawing – Plane and Solid Geometry", 48th Ed., Charotar Publishing House. 1996
2. Griffin, A.W. and Brunicardi, V.A., "Introduction to Architectural Presentation Graphics", Prentice Hall. 1998
3. Ciriello, M., "Architectural Design Graphics", McGraw-Hill. 2002
4. Ching, F.D.K., "Architectural Graphics", 4th Ed., John Wiley. 2003
5. Carpo, M., "Perspective, Projections and Design: Technologies of Architectural Representation", Routledge. 2008
5. Rasmusson, S.E., "Experiencing Architecture", Chapman and Hall Ltd,1964
6. Licklidan, H., "Architectural Scale", The Architectural Press. 1966
7. Ching. F.D.K., "Architecture Theoretician", Wiley. 2007
6. Fisher, T., "Architectural Design and Ethics: Tools for Survival", Architectural Press. 2008

HISTORY OF ARCHITECTURE-II			
Course Code	BAP 110	Credits	02
Contact Hours (Hrs/Week)	02	Semester	02
Course Category	DCC		

INTRODUCTION

This syllabus is an introduction to the early Iron Age civilizations and the associated architectural developments.

COURSE OBJECTIVES

- To understand early Iron Age civilizations and the architectural developments that took place during various locations of early Iron Age civilizations.
- To study the development of early Iron Age civilizations and their architectural implications.
- To study collapse of civilizations with respect to the hitherto studied topics.

PREREQUISITE: Student should have undertaken Course BAP 109.

COURSE LEARNING OUTCOMES

Having successfully completed this course, the student will be able to understand:

- Iron Age architecture.
- Collapse of civilizations.

PEDAGOGY

Classroom teaching through multi-media.

EVALUATION SCHEME

Course Type			Examination		Relative Weights						
L	P	S	TH	PR	CAT	CAP	MTET	MTEP	ETET	ETIP	ETEP
2	0	0	Yes	--	10	--	30	--	60	--	--

CONTENT

S. No	Contents	Contact Hours
1.	<u>Unit 1: Early Iron Age Civilizations in Greece</u> <ul style="list-style-type: none"> • Minoan, Mycenaean and Classical Greek Minoan and Mycenaean: Palace at Knossos, the Lion Gate, the appearance of the Megaron. Classical Greek: Developments in philosophy: Socrates, Aristotle, Plato; science; literature; Greek City states; • Evolution of the Temple; the Orders; the Parthenon, Temple of Zeus, Temple of Athena; Polis and Acropolis. 	07
2.	<u>Unit 2: Early Iron Age Civilizations in Rome</u> <ul style="list-style-type: none"> • Political, social, philosophical and military developments. • Structural and Engineering Achievements: the arch, vault and the dome; Developments of the orders; • Temples: Pantheon; Arenas: Colosseum; Thermae: Caracalla; Aqueducts; the forum and the basilica 	07
3.	<u>Unit 3 : Early Iron Age Civilisations in India</u> <ul style="list-style-type: none"> • Beginning of Hindu Temple Architecture under the Guptas and Chalukyas. 	07

	Appearance and Evolution: Experiments at Badami, Aihole of examples such as Ladh Khan, Durga, Maleguti	
4.	<p>Unit 4: Collapse of some civilizations</p> <ul style="list-style-type: none"> Causes of collapse with suitable examples; economical, environmental, social and cultural, natural disaster, overpopulation or resource depletion, lack of loyalty to a central power structure and result in an oppressed lower class rising up and taking power from a smaller wealthy elite, Foreign Invasions, Sub-replacement fertility. 	07

REFERENCE BOOKS

1. Tadjell Christopher (1990). A History of Architecture in India – From the Dawn of Civilization to the End of the Raj. London. Phaidon Press Ltd.
2. Fletcher Sir Banister (1987). A History of Architecture. London (UK). Butter-worth Heinemann Ltd.
3. Arjun Dev, The Story of Civilisation, Vol. I (Old) NCERT History Textbook for Class IX.
4. Kostof Spiro(1995) A History of Architecture – Settings and Rituals. N.Y. Oxford University Press.
5. Hiraskar G.K.(1994) The Great Ages of World Architecture. Delhi. Dhanpat Rai Ltd.
6. Brown Percy (2004). Indian Architecture- Buddhist and Hindu Periods. Bombay. D.B. Taraporevala and Sons Co. Pvt. Ltd.

STRUCTURES -II			
Course Code	BAP 112	Credits:	02
Contact Hours (Hrs/Week)	02	Semester	02
Course Category	BSAE		

INTRODUCTION

This subject gives insights about structural behaviour of Building Elements-trusses, design of building elements using Timber/Masonry/Steel.

COURSE OBJECTIVES

- To understand Structural behaviour of Building Elements used for distribution system.
- To understand design of building elements using Timber/Masonry/Steel.

PREREQUISITE: Student should have undertaken Course BAP 111.

COURSE LEARNING OUTCOMES

Having successfully completed this course, the student will be able to:

- Structural behaviour of Building Elements used for distribution system.
- Design of building elements using Timber/Masonry/Steel.

PEDAGOGY

Classroom teaching is supported by case studies.

EVALUATION SCHEME

Course Type			Examination		Relative Weights						
L	P	S	TH	PR	CAT	CAP	MTET	MTEP	ETET	ETIP	ETEP
2	0	0	Yes	--	10	--	30	--	60	--	--

CONTENT

S. No	Contents	Contact Hours
1.	<u>Unit 1: Axial load -I</u> <ul style="list-style-type: none"> • Columns: Definition, understanding through nature and history, Analysis, Design in Steel and timber using relevant BIS codes. • Walls and Piers: Definition, understanding through nature and history, Analysis, Design in masonry using relevant BIS codes. 	07
2.	<u>Unit 2: Axial load -II</u> <ul style="list-style-type: none"> • Foundation: Definition, understanding through nature and history, Analysis, Design in masonry using relevant IS codes. 	07
3.	<u>Unit 3: Eccentric and lateral load-I</u> <ul style="list-style-type: none"> • Columns: Understanding eccentric and lateral load, Analysis due to combined axial and eccentric loading, Design in Steel and timber using relevant IS codes. • Walls and Piers: Understanding eccentric and lateral load, Analysis due to combined axial and eccentric/ lateral loading, Design in masonry using relevant IS codes. 	07
4.	<u>Unit 4: Grillage Foundation</u> <ul style="list-style-type: none"> • Foundation: Understanding eccentric and lateral load, Analysis, Design in Steel using relevant IS codes. 	07

Reference books:

1. Dayaratnam, P., "Brick and Reinforced Brick Structures", Oxford & IBH Publishing Co. 1997
2. Arya, A.S., "Masonry and Timber Structures Including Earthquake Resistant Design", Nem Chand Bros. 2001.

CLIMATOLOGY AND ENVIRONMENTAL STUDIES- II			
Course Code	BAP 114	Credits:	02
Contact Hours (Hrs/Week)	02	Semester	02
Course Category	BSAE		

INTRODUCTION

In this course the student shall understand Climate responsive architecture and understand and apply various principles underlying them.

COURSE OBJECTIVES

- Equip the students with scientific background required to design climate responsive buildings, by offering a clear understanding of the various climatic zones and its climate responsive considerations in architectural design of building and built up areas
- List the different elements of climate classify them and Identify the factors of comfort
- Infer the impact of climatic forces on built structures and assessment of the effects of site, sun and wind in building response and understand designing of shelters in different climatic conditions.

PREREQUISITE: Student should have undertaken Course BAP 113.

COURSE LEARNING OUTCOMES

Having successfully completed this course, the student will be able to understand:

- Human thermal comfort as an essential function of a building, its analysis & use in Architecture.
- The elements constituting climate and their role in creating responsive designs.
- The characteristics of varied tropical climates and expected responses of buildings in specific climate types.
- Utilize existing traditional/vernacular/ historical structures in the city as case study to learn the various attributes of climate & the desirable responses.

PEDAGOGY

Understanding tools & instruments utilized for measurement of climatic elements using the climatology lab. Documenting case studies of vernacular/ traditional/ historical buildings for understanding their responses to prevailing climate, Collecting and analysing data of temperature, humidity, radiation light & wind for specific cities and making solar charts, bioclimatic charts & Mahoney tables for the same as part of group assignments. Understanding of solar sun path diagram in 2D and 3D using prototypes and other tools.

EVALUATION SCHEME

Course Type			Examination		Relative Weights						
L	P	S	TH	PR	CAT	CAP	MTET	MTEP	ETET	ETIP	ETEP
2	0	0	Yes	--	10	--	30	--	60	--	--

CONTENT

S. No	Contents	Contact Hours
1.	<u>Unit 1</u> <ul style="list-style-type: none"> • Understanding Solar Geometry & Building Orientational principles through Physical Models and through modeling software, for.e.g. Ecotect, Revit, Google Sketchup and other solar tools. • Study in relation to Sciography exercises in the Design Studio. 	07
2.	<u>Unit 2</u> <ul style="list-style-type: none"> • Understanding solar radiation and its effects on various kinds of surfaces (walls, roofs, Paved surfaces). • Calculation of solar radiation on building surfaces, solar charts. "Solar Heat gain 	07

	coefficient” for fenestration systems. Types of Shading Devices for buildings.	
3.	<p>Unit 3</p> <ul style="list-style-type: none"> • Opaque building elements and heat transfer through these surfaces/elements. U& R values for Building envelope elements. “Traditional and Modern” Insulation, Heat Absorbing and Reflective materials for walls, roofs and fenestrations. 	07
4.	<p>Unit 4</p> <ul style="list-style-type: none"> • Passive Architectural Design Principles in various climates. Case studies of Buildings and visits to Solar Passive structures and preparation and discussion of visit reports. • Design Exercise on small scale climatically responsive house/shelter together with modeling of solar insolation and exercises on shading devices. This can also be carried out in the Corresponding Architectural Design Studio. 	07

REFERENCE BOOKS:

1. Bansal, N.K., Hauser, G. and Minke, G., “Passive Building Design: A Handbook of Natural Climatic Control”, Elsevier Science. 1994
2. Givoni, G., “Climatic Considerations in Building and Urban Design”, Van Nostrand Reinhold. 1998
3. Hausladen, G., “Climatic Design: Solutions for Buildings that can Do More with Less Technology”, Birkhauser. 2005
4. Drake, S., “The Third Skin: Architecture, Technology and Environment”, UNSW Press. 2007.
5. Koenigsberger, O. H., Ingersoll, T. G., Mayhew, A. and Szokolay, S. V. (1980). Manual of Tropical Housing and Building: Climatic design. Hyderabad: Orient Longman.

INTRODUCTION TO COMPUTERS & PROGRAMMING IN C			
Course Code	BCS 110	Credits	04
Contact Hours (Hrs/Week)	03+02	Semester	02
Course Category	BSAE		

Introduction: This course briefs about basic introduction to computers and its corresponding concepts in benefit of students coming from non-computer background. Apart from this, programming concepts are also discussed in this course using C programming language.

Course Objectives

1. To provide an understanding of basic computer architecture including Number System. Discussion of computer history and overview of operating systems.
2. To impart adequate knowledge on the need and concept of algorithms and programming.
3. Develop, execute and document computerized solution for various problems using the features of C language.
4. To enable effective usage of arrays, structures, functions, pointers and to implement the concepts of file organization.

Pre-requisite: None

Course Outcome: Explain the fundamentals of computers and programming. Apply problem solving skills in programming.

Pedagogy: Classroom teaching along with hands on practical session of programming.

Evaluation Scheme: Class Participation and Assignments (10%), Midterm exam (30%), Final exam (60%).

Course Type			Examination		Relative Weights						
L	P	S	TH	PR	CAT	CAP	MTET	MTEP	ETET	ETIP	ETEP
2	0	0	Yes	--	10	--	30	--	60	--	--

Content:

UNIT-I	10 Hours
Basic Computer Fundamentals: Introduction to computer systems, number system, integer, signed integer, fixed and floating-point representations. IEEE standards integer and floating-point arithmetic. CPU organization, ALU, registers, memory. Concepts of the finite storage, bits bytes, kilo, mega and gigabytes. Idea of program execution at micro level. Introduction to system software: operating systems, compilers, assemblers, interpreter and multi-user environments. Concept of flow chart and algorithms, algorithms to programs.	
UNIT-II	10 Hours
Programming using C: Concept of variables, program statements and function calls from the library (Print for example), C data types: int, char, float etc., C expressions, arithmetic operation, relational and logic operations, C assignment statements, extension of assignment of the operations. C primitive input output using getchar and putchar, exposure to scanf and printf functions, C Statements, conditional executing using if, else, switch case, goto and break statements.	
UNIT –III	10 Hours
Iterations, array and Subprogram: Concept of loops in C using for, while and do-while. Arrays: single and two--dimensional arrays, initializers, array parameters, example of iterative programs using arrays and use in matrix computations. Concept of Sub-programming: Functions, parameters and return values, standard library functions.	
UNIT –IV	10 Hours
Pointers, Strings and Structure:	

Pointers, relationship between arrays and pointers, Call by reference. Array of pointers, passing arrays as arguments. Character strings: processing strings using loops, and string library functions Structure and Unions: structure concepts, structures as parameters, arrays of structures.	
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Text Books

- The Complete Reference C - Fourth Edition, Herbert Schild, McGraw-Hill.
- Yashwant Kanetkar, "Let us C", BPB Publications, 2nd Edition, 2001.

Reference Books

- Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.
- E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill.