ASSAM SCIENCE AND TECHNOLOGY UNIVERSITY

Guwahati

Course Structure and Syllabus
For
B.ARCH

Semester IV / B.ARCH

Sl. no.	Subject Code	Subject	L	T	P	C
THEORY						
1	AR141401	History of Architecture-III	2	0	0	2
2	AR141402	Concrete Structure	2	0	0	2
3	AR141403	Building Services-II	2	0	0	2
4	AR141404	Climatology	2	0	0	2
STUDIO						
5	AR141415	Architectural Design -II	0	2	6	4
6	AR141416	Building Construction-IV	0	0	6	3
7	AR141417	Architectural Presentation	0	0	6	3
8	AR141418	Computer Application-II	0	0	4	2
					TOTAL	**20**

THEORY

Subject Code	Subject	Periods per week			Credit
		L	T	P	
AR141401	**History of Architecture-III**	2	0	0	2
		Total Hours : 36			

Objective:

- To understand the emergence of Islamic Architecture with the need for newer typologies of buildings and to know how style is unique in terms of its elements, decor, materials and construction systems.

Content:

Module no.	Heading	Details of the given heading	Hours to teach
I	Introduction To Islamic Architecture	Rise of Indo-Islamic Architecture • Special features of Mosque • Special features of Tomb • Influences of Indo-Islamic Architecture in India • Use of arches, vaults, domes, squinches, pendentives, jaalis, minarets, etc. • Special features – use of landscape, water bodies and gardens. • Ornamentation in structures with interplay of materials – stones, mosaics, gildings.	9
II	Sultanate Architecture	Architecture in different sultanates, • Slave Dynasty • Tughlaq Dynasty • Lodhi Dynasty Examples and salient features in each dynasty	6

III	Provincial Style	Development of the provincial styles in different regions - Punjab, Jaunpur, Bengal, Gujarat, Malwa, the Deccan (Bijapur, Golconda, Bidar and Gulbarga) - important examples for each style.	9
IV	Mughal Architecture	Mughal Style prevalent during the reign of a) Babur; b) Humayun; c) Akbar; d) Jahangir; e) Shah Jahan	8
V	Post Mughal Architecture	Nawabi Architecture of the Post Mughal Period, Awadh, Hyderabad, Punjab.	4

References:

1. Indian Architecture (Islamic Period) Vol II by Brown Percy.
2. Architecture of the Islamic World — (its history and social meaning) by George Michell.
3. Architecture of World, India (Islamic) by Sterlin Henry.
4. The History of Architecture in India by Tadgell Christopher.

Subject Code	Subject	Periods per week			Credit
		L	T	P	
AR141402	**Concrete Structure**	2	0	0	2
		Total Hours : 36			

Objective:

- To lay relatively greater emphasis on the conceptual understanding rather than design calculations.

Content:

Module no.	**Heading**	**Details of the given heading**	**Hours to teach**
I	Cement and its properties	Materials for cement concrete; cement-properties of the various types of cements. ISS tests, storage; Aggregate properties of fine and coarse aggregates, natural and artificial aggregates. ISS tests, grading of aggregates, fineness modulus impurities; brief introduction to admixtures.	6
II	Concrete	Concrete Mixing – ordinary and controlled mixes design of mix-trial and error minimum void ratio, fineness modulus method; tests for workability of fresh concrete; effect of water/cement ratio on strength; properties of hardened concrete; strength tests on hardened concrete.	4
III	Reinforcement	Necessity of reinforcement; characteristics of reinforcing material; elastic theory for reinforced concrete design.	4
IV	Design for safety and economy	• Requirements of good structures, safety, stability, economy, Design concept of factor of safety and limit state; failure modes of a structure, permissible stresses and permissible deflections, loads system, critical combination of	8

		loads, earthquake forces, wind loads on tall building.	
V	Design of R.C.C. construction	• Design of spread footing, combined footing, simple raft foundation. • R.C.C. design – T beams, L beams, Columns and Isolated column footing, • RCC wall, retaining wall. • Design of one way and two way slabs. • Design of RCC cantilevers.	8
VI	Pre-cast and pre-stressed structures	• Details of precast and pre-stressed structures and their elements • Uses and implication • Problems faced and financial factors involved	6

References:

1. RCC by Jain and Jaikrishna
2. RCC by Ramarutham.
3. RCC by N Krishna Raju and RN Pranesh
4. Pre-stressed Concepts" by N Krishna Raju.
5. Form and structure in Architecture by Alexander Zamen
6. RCC- design and practice by N Krishna Raju and RN Pranesh

Subject Code	Subject	Periods per week			Credit
		L	T	P	
AR141403	**Building Services-II**	2	0	0	2
		Total Hours : 36			

Electrical

Objective:

- To develop and understand the fundamentals of all types of services required in a building.
- To learn various equipments and fittings available in the market.
- To prepare basic design layout of various services and its details.

Content:

Module no.	Heading	Details of the given heading	Hours to teach
I	Basic Electrical Services	• Fundamentals of electricity. • Principles of wiring. • Study of various fixtures, fittings, accessories and equipments used in installation of electrical services in small, large and multistoried buildings of various types viz. residential, commercial, public, industrial etc.	6
II	Planning and design of electrical services in various types of buildings	• Calculation of electric load and its phasing. • Schematic diagram of electric installations with use of symbols. • Study of special fixtures like lightning conductors, earthing, waterproof and spark proof installations, stabilizers, circuit breakers etc. and installation thereof. • Study and application of relevant rules and regulations	10

		of Electricity boards.	
III	Illumination	• Fundamentals of Light • Artificial sources of lights; lamps and their characteristics • Luminaries and their applications, standard level of illuminations for various tasks • Basic lighting design for interiors and exteriors • Designing of lighting for various types of buildings like residential, educational, offices etc. • Lighting for special purposes viz. Exhibitions, Theaters, Stadiums, Swimming pools, Cinemas, Assembly halls, Restaurants, Religious buildings etc along with study of Direct, Indirect, Flood, Concealed, Focus light etc. • Over illumination controlling measures.	20

References:

1. Lighting in Architectural Design by Derek Philips.
2. Elements of Lighting by G. K. Lal.
3. The lighting of buildings by R.G. Hopkinson and J. D. Kay.
4. Philips Lighting in Architectural Design, McGraw Hill, New York, 1964.
5. I.E.S. Handbook.
6. International Lighting Review – Quarterly Journal.
7. Handbook of building Engineers in metric systems, New Delhi 1968
8. National Building Code
9. Electrical Wiring, Estimation by S. L. Uppal.
10. Electrical illustration, Estimation & costing by J. B. Gupta.

11. House Wiring Hand Book, International Copper Promotion Council (India), Powai
12. Guide for Electrical Layout in Residential Building, IS4648–1968, Bureau of Indian Standards, Delhi
13. "Light Architecture" – New Edge city by Cianni Ranulo, Birkhauser – Publishers for Architecture 2001
14. "Lighting Design", Ulrike Brandi Light, 2006, Institute for International Architectural Documentation GMBH & Co. KG
15. "Road Lighting for Safety" by Da. Schrender, Dr. Ir, Dr. Schreuder.

Subject Code	Subject	Periods per week			Credit
		L	T	P	
AR141404	**Climatology**	2	0	0	2
		Total Hours : 36			

Objective:

- To provide information on factors that contribute to climate and what is a comfort zone.
- To understand the various climate elements such as radiation, air temperature , humidity and wind speed and the methods of heat flow in buildings over a 24 hour cycle.
- To enable students to understand the movement of the sun, its paths, angles, the radiation levels and how to overcome the harmful effects through shading devices.
- To make student understand the transfer of heat into buildings through materials and building elements.
- To expose the students to air movements in and around buildings and the resulting effects.
- To provide information on various design considerations and parameters that are required for various climatic zones and as to how landscape could be integrated into building designs.

Content:

Module no.	Heading	Details of the given heading	Hours to teach
I	General Introduction	• Climate and weather • Global climatic factors • Site climate and Urban climate	2
II	Elements of Climate	• Solar radiation, terrestrial radiation, temperature, humidity, wind, cloud, precipitation etc • Factors affecting climate of macro and micro-level • Measurement and quantification.	6
III	Thermal Comfort	• Body heat balance • Thermal Comfort indices • The Bio-climatic chart • Thermal comfort • Psychometric chart and its application.	4

IV	Solar Geometry & Design Of Sun shading Devices	Apparent movement of the sun, sun path diagrams **(**solar chart) - Solar angles, Shadow angles, solar shading masks. etc	4
V	Heat Flow Through Materials	• Basic Principles of Heat transfer • Performance of different material 'U' value • Time Lag and design of Building elements.	2
VI	Day lighting	• Sources of Light, climate and light • Classification of Daylight, daylight factor and Sky component. • Day lighting in Tropics and hot dry climates and warm humid climates • Supplementary artificial lighting. • Shading devices-Egg crate devices	2
VII	Ventilation And Air Movement	• Wind Rose and wind shadows • Air movement around the buildings • Natural and induced ventilation • Stack Effect • Thermally induced air currents.	6
VIII	Tropical Climate	• Classification & characteristics of tropical climates • Design considerations for warm humid, hot dry, composite and upland climates • Case studies of climate responsive building design in India for the various climate types. • Design analysis of traditional shelter of each climatic zone • Climatic data sets – analysis – climate graph – the Mahoney tables & its recommended specification .	10

References:

1. Manual of Tropical Housing and Building - Climatic Design," by O. H. Koenigsberger and others.
2. Climatic Building Design: Energy Efficient Building Principles & Practices" by Donald Watson and Kenneth Labs.

3. Climate Responsive Architecture – A Design handbook for Energy efficient buildings" by Arvind Krishnan.
4. Energy Efficient Buildings in India by Mili Majumdar.
5. Housing, Climate and Comfort by M. Evans.
6. Planning and Design Criteria by Joseph de chiarra and Le Copplemann.
7. Man, Climate and Architecture, Applied Science by B. Givoni.
8. The Climatic Data Hand Book by P.K.Bhargava – Tata Mcgraw Hills Pulications, New Delhi – 2004.
9. Environmental Science in Building by Randall Mcmullan.
10. Environmental Physics in construction & its application in Architectural Design by E. Schild & M. Finbow.

STUDIO

Subject Code	Subject	Periods per week			Credit
		L	T	P	
AR141415	**Architectural Design –II (Primary school, Hobby centre, etc)**	0	2	6	4
		Total Hours : 144			

Objective:

- Towards developing his/her own language and philosophy of architecture to guide towards exploring alternative building forms for different activities which help in understanding the relationship of structure and possibilities in building forms
- To familiarize with the given design topic by choosing, relevant and appropriate case studies within the region, visiting the sites and analyzing the same.
- Expose themselves to knowledge available on the relevant design at international level, through books and websites.
- To understand architectural forms, and corresponding functions for different types of buildings.
- Analyze the spaces requirement for various activities, infrastructure and services

Content:

Module no.	Heading	Details of the given heading	Hours to teach
I	Time Test/ Minor Design Exercise	Designing for one important component from the Major Design Exercise like Parking lots, Cafeteria, Tot lot areas etc.	30
II- Part A	Major Design Exercise: Articulate design with a sense to glorify spaces with respect to buildings with specific functions. Mostly working with small scale, small span,	• Identifying the various component requirement and important specifications through an exhaustive literature workout • Understanding the inter component relations and the relation of the overall	20 40

	horizontal and vertical movements (two or three levels), incorporating barrier free elements and other details. Designing might include buildings like primary health clinic, nursery school, neighborhood shopping unit incorporating services andbasic elements of structural systems.	built with the site context through different cases and part studies • Understanding and analyzing the site context through site visits • Formulation of Conceptual idea and zoning criteria • Initial Design Idea: Incorporation of design on site (Basic Plans and3D if required)	
II- Part B		• Design Development: Site Plan, All Floor Plans, Elevations and Sections • Pre- Final Design: All Drawings with basic 3-Dimensional representation • Final Design Submission: Composed rendered Sheets with physical model	54

References:

1. "Time-saver Standards for Building Types" by De. Chiara and Callender.
2. The Handbook of Building Types, NEUFERT ARCHITECTS DATA.
3. Time – Saver Standards for Architectural Design Data, seventh edition.
4. Handbook on Building Construction Practices (Excluding Electrical Work). Bureau of Indian Standards, New Delhi, 1997
5. National Building code of India 2005, Bureau of Indian Standards, New Delhi
6. A visual dictionary of Architecture by Francis D. K. Ching.

Subject Code	Subject	Periods per week			Credit
		L	T	P	
AR141416	**Building Construction-IV**	0	0	6	3
		Total Hours : 108			

Objective:

- To understand the concept of R.C.C building construction techniques.
- Also preparation of light weight concrete mix placing.

Content:

Module no.	**Heading**	**Details of the given heading**	**Hours to teach**
I	Concrete RCC slabs	One-way, two way, continuous & cantilever.	20
II	Concrete RCC beams	Singly reinforced, doubly reinforced, cantilever & continuous beams.	25
III	Advance RCC roof	Coffered roof, ribbed filter slabs waffle roof, vaults, domes	15
IV	Pile foundation	Piles, cast-in-situ piles, types of piles, method of driving piles, pile caps etc.	20
V	Special concrete and concreting method	High density, fiber Reinforced, polymer concrete – properties & uses. Ready mixed concrete – grunting – cold weather & underwater concreting Light weight concrete construction – Composition of lightweight concrete & its advantages – its application in building walls, roof, foundations & ornamental works.	20
VI	Pre stressed and Post stressed concrete	Case study presentation of Pre stressed and Post stressed concrete	8

References:

1. Building Construction by McKay, G.B.
2. Mitchell's Advanced Building Construction by Foster, Stroud.
3. Building Construction Engineering by Gurucharan Singh.
4. Building Drawing and Detailing by Dr. T. S. Balagopal Prabhu.
5. Building Construction by Sushil Kumar.
6. Construction technology by Chudley R.
7. Building construction by Ambrose James.
8. Engineering materials by Rangwala S C.
9. Constructing Architecture: Materials, Processes, Structures by Deplazes, Andrea.
10. Methodologies are poised to transform building construction, McGraw-Hill Professional.
11. Building Construction by D.K Ching
12. Building Construction –R Barry VOL 1-5
13. Building Construction by Hans Banz
14. "Building Design and Civil Engineering Drawing" by Balagopal T. S. Prabhu.
15. "Construction Technology" by 15. R. Chudley.
16. "Light Weight Building Construction" by Gyala, Sabestyen.

Subject Code	Subject	Periods per week			Credit
		L	T	P	
AR141417	**Architectural Presentation**	0	0	6	3
		Total Hours : 108			

Objective:

- The purpose of this subject is to develop the student's capability to study, analyze and to improve their presentation skills on the knowledge acquired in the architectural subjects.
- They are required to do exercises and prepare presentations on the topics pertaining to the Documentation work carried out in the previous semester.

Content:

Module no.	**Heading**	**Details of the given heading**	**Hours to teach**
I	Introduction to Architectural Presentation	• Need for Architectural Presentation • Understanding the Components • Basic Techniques of Presentation	20
II	Medium of Presentation	Manual Presentation • Use of different textured sheets • Rendering equipment and ways Computer Aided Presentation • Use of computer aided drawings and 3D views	24
III	Composition	Creating a sheet format Using different components (3D, 2D drawings, texts, images, charts etc.) Scales and Proportions Colour Composition	34
IV	Physical Model	Model making skills (Site model, Block model and detailed building model, Topographic model etc.)	30

References:

1. Rendering in Pen and Ink by Arthur L. Guptill, Watson.
2. “Architectural Rendering Techniques” by Albert. O. Halse.
3. Architecture – Form Space and Order by Francis D.K. Ching.
4. The Technique of Sculpture by John W. Mills.
5. ‘Architectural Visions” by Jonathan Andrews.

Subject Code	Subject	Periods per week			Credit
		L	T	P	
AR141418	**Computer Application-II**	0	0	4	2
		Total Hours : 72			

Objective:

- To enhance the visualizing skills of the students by exposing them to the latest software
- To introduce the advanced level of computer system, operation principles, use of other related hardware, with a thrust on raster based editing software and 3d drafting tool as a necessity for architects.

Content:

Module no.	**Heading**	**Details of the given heading**	**Hours to teach**
I	Introduction to Adobe Photoshop (Basics)	Understanding the Photoshop workspace & preferences, Introduction to Toolbox, use of basic tools like selection, move, crop, transform, text, etc, Using layers and basic effects, saving in different formats & resolutions, printing & basic exercises	32
II	Advanced Autocad (2D & 3D)	Editing drawings with advanced tools, organizing object properties, drawing complex objects, plotting & printing, working with blocks & adding attributes, drawing in 3d, viewing 3d drawings, creating 3d surfaces, editing in 3d, etc.	40

References:

1. Adobe Photoshop Bible by Lisa Danae Dayley & Brad Dayley (Latest Edition)
2. Autocad & Autocad LT Bible by Ellen Finkelstein (Latest Edition).

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