

COURSE STRUCTURE: SECOND YEAR B.ARCH PROGRAMME

IIIrd SEMESTER				
Sl.No.	Code	Theory	Contact Hrs (L-T-P)	Credit
1.	AH312	Environmental Psychology	2-0-0	2
2.	AS323	Building Services – I (Water supply and Sanitation)	3-0-0	3
3.	AS333	Structural Analysis	3-0-0	3
4.	AR343	History of Architecture- II	3-0-0	3
5.	AR352	Climatology	2-0-0	2
TOTAL			13	13

Sl No.	Code	Sessionals	Contact Hrs (L-T-P)	Credit
6.	AR366	Architectural Design – I & Measured Drawing	0-0-9	6
7.	AR372	AutoCAD – I	0-0-3	2
8.	AR382	Climatology Lab	0-0-2	2
9.	AR394	Bldg Const - III	3-0-3	4
TOTAL			20	14
Credits				27

IVth SEMESTER				
Sl.No.	Code	Theory	Contact Hrs (L-T-P)	Credit
1.	AH412	Sociology	2-0-0	2
2.	AR423	Building Services – II (Acoustics)	3-0-0	3
3.	AS432	Surveying	2-0-0	2
4.	AR443	History of Architecture- III	3-0-0	3
5.	AR452	Environmental Studies	3-0-0	2
TOTAL			13	12

Sl No.	Code	Sessionals	Contact Hrs (L-T-P)	Credit
6.	AR466	Architectural Design – II	0-0-9	6
7.	AR472	AutoCAD – II	0-0-3	2
8.	AR484	Bldg Const - IV	3-0-3	4
9.	AS492	Surveying Lab	0-0-3	2
10.	AR4102	Architectural Photography	0-0-2	2
TOTAL			23	16
Credits				28

AH312 **Environmental Psychology (2-0-0)**

Human beings are in constant interaction with the environment. With the growth of civilization, men are making more and more artificial environments, and architects and planners play a significant role in this process. The present course is designed to acquaint the students with some fundamental aspects of the course content.

Module-1

Environmental Psychology- What is it and its relation to Architecture and planning. Meaning of environment; Measurement of environmental stimuli from psychological aspect

Behavioral effects of Environmental conditions.

- a. Physical - Noise, Temperature and air pollution
- b. Social- Overcrowding and isolation.
- c. Extra ordinary- Catastrophe.

Module-2

Perceptual factors of environment- perception of distance. Size and movement. Meaning of colour and form. Social and Cultural influences on environmental perception.

Module-3

Personal space- individual and situational as determinants of personal space. Consequences of too much or too little of

Personal space. Personal space and environmental space as implications for design aspects.

Module-4

Psychological aesthetics - Measurement of communication through art; determination of pleasantness and unpleasantness as psychological factors in environmental design.

Adaptation to environment - Behavioral aspects of adaptation to familiar and unfamiliar environment.

References:

Francis D.K. Ching, Architecture-Form Space and Order, Van Nostrand Reinhold Company, New York.

Wicius Wong, Principles of colour composition

Robert Gill, Rendering With Pen and Ink

Ramsay and Sleeper, Architectural Graphic standards

V.S Parmer, Design fundamentals in architecture.

Bell, P.A Fisher, J.D. Leomis, R.J- Environmental psychology

Munn, N.C. Psychology, Fundamentals of Human adjustment.

AS323 **Building Services-I (3-0-0)**

(water supply and sanitation)

To impart the knowledge and skills required for understanding the building services of water supply and sanitation and their integration with architectural design.

Module-1

Water supply - General idea of sources of water supply: qualitative and quantitative aspects, Impurities, hard and soft water treatment and distribution systems
Domestic water supply systems, sump, overhead tank, pipe size, pipe fittings.
Cold water and hot water supply for multistoried buildings, types of taps, types of valves etc. provision for fire fighting and code requirements.

Module -2

Sanitation

Importance; refuse types; collection and disposal. Basic principles of sanitation and disposal of waste water from buildings. Urban and rural drainage and sanitation, different collection and disposal systems.

Module - 3

A brief on sewage treatment, septic tanks, oxidation ponds, soak pits, aqua privy, manholes, inspection chambers, intercepting chamber, cast iron manholes, Self cleansing velocity, drains on sloping sites, subsoil drainage, garage drainage and layout of simple drainage systems and testing of drains.

Module - 4

Sewers, materials, workmanship, laying and testing of sewers; Cleaning of sewers; ventilation of sewers; sewer recycling of water.

Site visits - Water treatment plant, Sewage treatment plant.

Multistoried apartments for studying water supply and sanitary arrangements.

References:

S. Birdi, Water supply and sanitary engineering

B.C. Punmia, Water supply and sanitation

S.C. Rangwala, Water supply and sanitation

AS 333 **Structural Analysis-I (3-0-0)**

Module 1

1. Introduction to Statically determinate/ indeterminate Structures with reference to 2D and 3D structures. Free body diagram of structures.
2. B.M. and S.F. diagrams for different loading on simply supported beam, cantilever, propped cantilever and overhanging beams. Three hinged arches, tangential shear and normal thrust

Module 2

3. Deflection: Different methods, Castigliane's theorems, Reciprocal theorems, Conjugate beam method, Unit load method.
4. (a) Deflection of joints /supports for trusses.
(b) Application of Clapeyron's three moment theorem; Continuous beams.

Module 3

5. ILD for determinate structure for reactions at supports, S. F at a given section, B.M. at a given section, maximum shear and maximum B. M at a given section; problems relating to series of wheel loads, udl less than or greater than the span of the beam,
6. ILD for B.M., S.F normal thrust and radial shear of a three hinged arch.

Module 4

7. Suspension cables, 3 hinged stiffening girders
8. Introduction to space frames.

References:

Structural Analysis - C. S. Reddy, TMH Publisher

Structural Analysis - Norvis and Wilber

Mechanics of Materials - J. M Gere and S. P. Timoshenko, CBS Publishers and Distributors.

AR 343 **History of Architecture-II (3-0-0)**

(World Architecture)

To develop strong historical sense of architecture in ancient world and majorly in Europe. Also to understand the link in architectural development in terms of planning principles, material used, techniques involved and effects of socio- cultural, economical and political conditions.

Module 1

1. Development of prehistoric and historic architecture

2. Egyptian Architecture

Characteristic features

Secular Architecture

Mastabas, Ex: Mastaba of Thi Sakkara

Pyramids Ex: Stepped pyramid of Zoser, Sakkara , Bent pyramid of Dahshur, Great pyramid of Cheops.

Temples, Ex: Temples of Khons, Karnak

3. Ancient Near East Architecture

Characteristic features

Sumerian Architecture, Ziggurats, Ex: White Temple, Warka.

Babylonian Architecture, Ex: City of Babylon

Assyrian Architecture, Ex: City of Khorsabad

Persian Architecture, Ex: City of Susa

Module 2

4. Classical Greek Period

Characteristic feature of Aegean Architecture

Hellestic period and Hellenistic period

Greek orders, Doric , Ionic and Corinthian

The Acropolis at Athens, Parthenon, Propylea, Theatre, Stadium and Agora

Module-3

5. Classical Roman Period

Characteristic features of Etruscan and Roman Architecture

Roman Orders, Doric, Ionic, Corinthian

Tuscan and Composite

Temples, Ex: Temple of Saturn and Pantheon

Basilica of Trajan, Thermae of Carcalla

Amphitheatre, Ex: Coliseum

Forum, Circus, Triumphal arch, Aquaduct, Bridge, Road Sewer and Fountain

Module-4

6. Early Christian period

Characteristic features

Basilican Churches, Ex: St. Peter, Rome

7. Byzantine Period

Characteristic feature, Ex: Hagia Sophia

8. Romanesque Period

Characteristic feature, Pisa Cathedral complex

9. Gothic Period

Characteristic features

Early Gothic style and Late Gothic style, Ex Notre Dame, Paris

References:

1. *Sir Banister Fletcher. A History of Architecture. University of London.*
2. *G.K.Hiraskar. World History of Architecture. Dhanpat Rai and Sons*

AR352 **Climatology** (2-0-0)

To apply the principles of climatology in architectural design

Module-1

Introduction to climatic environment and its effect on human comfort.

Macroclimate and microclimate, study of world climatic zones, tropical climate in particular.

Climatic elements- sun, solar radiation, temperature, wind, humidity, cloud, precipitation etc.

Sun path diagram and uses of sun path diagram, design of shading devices.

Module -2

Ventilation and air flow principles, principles of natural ventilation, air change, wind flow around buildings and air flow patterns inside buildings.

Micro climate and Macro climate.

Tropical climate. Characteristics of warm and humid, hot and dry and composite climates. Orientation of single building. Building material and construction in the tropical climate.

Module-3

Effect of landscape elements on climate /building. Thermal effects of buildings, thermal insulation of building, Techniques of thermal insulation of roofs, exposed walls ;exposed windows, doors and ventilators. Introduction to passive solar techniques of thermal comfort in design

Module- 4

Day lighting- sky as the source of internal light, day light factor,

Components of daylight factor - the sky component, the internal and external reflected Component, glare, recommended levels of illumination for different types of building interiors.

NB: Buildings of architectural value to be measured in details and drawings in appropriate scale to be prepared. Use of different survey instruments to measure the height of building. . Free hand perspective and scio-graphy of the building

References:

OH Koenigsberger and others. Manual of Tropical housing and building (Part-I) Climatic design. Longmans. London-1974.

M. Evans. Housing, Climate and Comfort Architectural Press. London 1980.

B.Givoni. Man, Climate and Architecture. Applied science. Barking Essex. 1982.

A Konva. Design primer for hot climates. .A.rchitectural Press London.

Anthony Sealey. Introduction to building Climatology.

Dr. VNarasingham. An Introduction to building physics.

C.P.Kukreja. Tropical .A.rchitecture.

Olgyayand Olgyay. Solar Control and shading devices.

AR366 **Architectural Design-I** (0-0-9)

To continue to develop analytical skills, creative ideas and synthesis of the same.

1. Evolution of plan form in relation to physical, climate and site consideration, form and their relationships to total environment and site, selection of materials and construction.
2. Analysis and formulation of design criteria and concepts for eating places, community gathering places, memorials and pavilions and composite residences. Data collection and analysis, climatic conditions, socio economic and user requirements.

N.B. Minimum two projects and one time problem must be conducted. Time problem is to be of 9 hours duration.

AR372 **Cad Lab-I** (0-0-3)

To develop an awareness in Computer aided Architectural Design and Drafting.

1. Introduction to computer aided design in architecture. Introduction to two dimensional drafting in CAD.
2. Understanding commands like Draw, Modify, Use of tools, layers, plotting system and its applications etc.
3. Application of CAD in small Architectural projects done in the previous semester design class through site plan, floor plan, presentation plan, elevation and section using appropriate software.

AR382 **Climatology Lab** (0-0-2)

The course is designed to develop the awareness of students on the problems faced due to the unwanted direct or indirect solar radiation penetration into the building. The main idea of the architect is to utilize daylight to create visual links between indoor and outdoor spaces, to let the direct solar radiation in when is required during under heated periods of the year and to avoid solar radiation entering the building during over heated periods.

The students will learn various solar control methods and their applicability. Various architectural applications are to be added into the course to exemplify the theoretical information and to encourage the students to think of more creative design solutions.

Assignment No-1

Visit to the climatological observatory and study of different Instruments.

Assignment No-2

Function of different instruments with sketches:

- a) Stevenson screen
- b) Sunshine recorder
- c) Anemograph
- d) Wind vane
- e) Rain gauge

Assignment No- 3

Study of Psychrometric charts to find the various parameters of air vapour mixture.

Assignment No- 4

Relation of climatic elements to comfort conditions.

Bio-climatic chart and climatic evaluation by region.

Solar analysis, Wind analysis and Humidity analysis.

Assignment No- 5

Effective Temperature nomograph

Assignment No-6

The motion of the Earth around the Sun.

Graphical method to determine Sun path

Assignment No-7

Stereographic projection Sun path Diagram

Method of calculating solar altitude, Azimuth angle and Shadow angle.

Assignment No- 8

Obstruction of the sky vault and shading mask.

Shadow angle and shadow angle protractor.

Assignment No- 9

External solar control and external shading devices

Assignment No- 10

Wind effects and air flow patterns

Wind analysis.

Local factors in wind orientation.

Flow pattern inside building.

Assignment No-11-13

Case study of five buildings (Group wise)

References:

1. O. H. Koenigsberger and others. *Manual of Tropical housing and building (Part-I) Climatic design*. Longmans. London-1974.

2. M. Evans. *Housing, Climate and Comfort*. Architectural Press. London 1980.

3. B. Giovanni. *Man, Climate and Architecture*. Applied science. Barking Essex. 1982.

4. IS:3362-1977 *Code of Practice for natural ventilation of residential building*

5. Victor Olgyay, "*Design with Climate: Bio climatic approach to Architectural Regionalism*", Van Nostrand Reinhold, New York, ISBN - 0 -442-01110-5

AR 394 **Building Construction-III** (3-O-3)

To acquaint the students with construction practices pertaining to framed RCC structures, understanding of Steel structures, foundation types and form work.

Advanced foundations-combined and eccentric footings, raft foundations, pile foundations, details of pile and pile cap.

Advanced doors and windows, heavy paneled moulded doors in timber, fully glazed sliding and folding doors and windows and bay windows, rolling shutters.

Arches and portals in R.C.C., steel and laminated timber construction

Curtain walls-curtain walls in glass, aluminium, precast concrete units etc.

Folded plates and barrel shells, hyperbolic, parabolic and domes in R.C.C.

Raking shore, flying shore, scaffolding, centering etc.

References:

W.B. Mackay, *Building construction*

Barry, *Building construction*

4TH SEMESTER,

AH412 **Sociology** (2-0-0)

To understand socio-physical environment and its implication to architectural space planning and design. To give emphasis on concepts and idea in sociology and relate to elements of settlement and built form.

Module-1

Introduction

Man, his social and physical environment, social groups and social structure, utility and relation with architecture.

Indian communities

Rural and Urban communities, their social structure and problems, cultural heritage, rituals and community gatherings etc.

Module-2

Urbanization

Trends and characteristics, dynamics of urban growth and social change, urban attitudes, values and behaviour, review of commissions reports etc.

Module-3

Social aspects of physical environment .

Its implications and limitations on buildings, neighbourhood planning, slum improvement and city fabric, etc. significance of public opinion and participation.

Module-4

Case studies

Sociological studies of communities with their habitats and built environment.

References:

Vidya Bhusan, Dr.D.R.Sachdeva, An introduction to Sociology

G.K.Agarwal, Principles of Sociology.

AR423 **Building Services-II** (3-0-0)

(Acoustics)

To develop the knowledge and skill required for understanding acoustics in buildings and its integration with architectural design.

Module-1

Introduction to architectural acoustics-characteristics and measurement of sound, frequency, intensity, decibel scale.

Acoustics and acoustical environment behavior of sound in an enclosed space. Principle of geometrical acoustics, different acoustical defects in auditoriums and its solutions; reverberation & reverberation time calculations-Sabine's formula and its interpretation, dead and live room.

Module-2

Design of auditorium –size, shape, sitting arrangement design criteria for speech and music, acoustical correction, design and modification.

Module-3

Open air acoustics: Free field propagation of sound, absorption from air and natural elements, effects of barriers, effects of landscape elements, design of open air theatre

Module-4

Acoustical material: general description of acoustical materials –acoustical tiles, fibre board, acoustic plaster, composite materials etc –their use, selection criteria and construction methods.

References

A.B Wood, A textbook of sound.

T.M Yarwood, acoustics.

David Egan, Architectural acoustics.

Perich, Peter, Acoustics: Noise and Buildings.

AS432 **Surveying** (2-0-0)

Module-1

1. Linear measurement and chain survey: use of various types of tape measurement etc of correct length of line, direction and indirect ranging, changing along sloping ground. Obstacles in changing, errors, and their elimination

Module-2

2. Compass surveying: Use of prismatic compass, temporary adjustment, bearing of a line, local attractions, correction of bearing.

3. Plane table surveying : Methods of plane table, radiations. Intersections , traversing and resection. 2-point and 3-point problem, adjustment and common error in plane table survey.

Module-3

4. Levelling: Use of dumpy level and leveling staff. Temporary and Permanent adjustments of dumpy level. Reduction of levels by H.I and rise and fall method. Curvature and refraction error, sensitiveness of level tube, reciprocal leveling, leveling difficulties and common errors.

Module-4

5. Contouring: Contour interval and horizontal equivalent . Characteristics of contours, methods of contouring - direct and indirect method, contour gradient.

6. Theodolite Survey: Use of theodolite, temporary adjustment, measuring horizontal and vertical angles, theodolite traversing or measurement of included angles

References:

Surveying and levelling Vol - 1, T. P. Kanetkar and S. V. Kulkarni

Surveying - Vol - I, B. C. Punmia

Surveying, Husain and Nagnas

Surveying and leveling – R. Agor

AR443 **History of Architecture-III** (3-0-0)

(Islamic Architecture in India)

OBJECTIVE: to give an understanding of the evolution of Islamic architecture in its various stylistic modes, characterized by technology; ornamentation and planning practices.

Module-1

1. Development of Islamic Architecture in India
 2. Characteristic feature of Islamic Architecture
- Islamic Architecture in Delhi
- a. Qutab Complex
 - b. Jama Masjid
 - c. Humayun's Tomb
 - d. Red Fort

Module-2

3. Islamic Architecture of Agra and Fatehpur Sikri
- a. Agra Fort
 - b. Taj Mahal
 - c. Moti Masjid , Agra
 - d. Jami Masjid ,Fatehpur Sikri .
 - e. Panch Mahal,Fatehpur Sikri
 - f. Diwan-i-Khas and Diwan-i-Aam, Fatehpur Sikri

Module-3 Provincial Style of Bijapur

- g. Characteristic features
- h. Gol Gumbaj
- i. Ibrahim Rouza
- j. Jami Masjid

4. Provincial Style of Gujarat

- a Characteristic feature
- b. Jami Masjid of Ahmedabad
- c. Teen Darwaza

5. Provincial Style of Bengal

- a. Characteristic feature
- b. Adina Mosque
- c. Dakhil Darwaza

Module-4

6. Provincial Style of Golconda and Malwa

Characteristic feature and examples

- Golconda
- Charminar
- Malwa
- Jahaz mahal

7. Colonial Architecture influenced by Islamic Style with specific reference to:

- a. Rastrapati Bhawan
- b. Victoria Terminus (CST)

References:

Percy Brown, "History of Architecture-Islamic period"

Satis Grover, "Architecture of India: Islamic"

G.K. Hiraskar. World History of Architecture. Dhanpat Raj and Sons.

AR452 **Environmental Studies** (3-0-0)

Course objectives: To enable the student to understand the ecosystem, effect of pollution, environmental degradation, and eco sustainable development.

Module-1

Fundamentals of Ecosystem, our earth's Environment.

Module-2

Human impact on Environment, Resources and Environment, Environmental pollution, Management of Environment .

Module-3

Environmental legislation, Environmental quality and indicators, International Protocols regarding environmental issues and management.

Module-4

Environmental planning and Design guidelines (Green Building and sustainability criteria)

References

-Ecology/ Principle and application ; J.L Chapman and M.J Ress; Cambridge

-Environmental Economics; Charles. D Kolstad: Oxford University Press

-The Hidden Connection; F.capra , Harper and Collins

AR466 **Architectural Design-II** (0-0-9)

To continue to develop the skill of analysis, creative idea finding and their synthesis.

1. Evolution of plan form in relation to physical, climate and site consideration, form and their relationships to total environment and site, selection of materials and construction.
2. Analysis and formulation of design criteria and concepts for design problems such as Primary Schools, Day Care Centres, Health Care Centres, Post offices, Banks, Daily markets/Weekly Haats. Data collection and analysis, climatic conditions, socio economic and user requirements.
3. Minimum two projects and one time problem must be conducted.
4. Time problem is to be of 8 hours duration.

AR472 **CAD LAB-II**(0-0-3)

To acquire 3D drawing skills using a computer

1. CAD application in 2D and 3D architectural drawings, modeling, UCS generation, creation of entities, dimensioning, application of solids and surfaces
2. Customization of autoCAD, autoCAD express tools, creation of architectural library elements and blocks, applying materials and rendering

AR484 **BUILDING CONSTRUCTION – IV**(3-0-3)

Different types of trusses and Girders – North light, N-type, K-type, Tubular; Space frames – Hyperbolic paraboloids, Single layer, Double Layer; Expansion and Contraction joints, Water proofing, Rain water Harvesting – Recharge pits.

Structural Glazing, External-Composite- panel- cladding.

Non-conventional construction techniques – Filler slabs, Prefabricated components, Application of Ferro-cement, Bamboo construction techniques, Frameless doors and windows Walling techniques (Laterite and granite stones, Adobe, Rammed earth, Wattle and Daub, Sundried Mud Blocks, Fly Ash, Brick Jaalis, Hollow bricks, Chequered bricks, etc.)

AS492 **SURVEYING LABORATORY** (0-0-3)

Testing of chain and measurement of correct length of the line.

Traversing by chain survey.

Traversing by Compass survey.

Intersection method of plane table survey.

Traversing by plane table.

Use of dumpy level and fly leveling.

Longitudinal Section and Cross Section.

Contouring.

Measurement of horizontal and vertical angle of theodolite.

Traversing by theodolite by measurement of included angles.

AR402 **ARCHITECTURAL PHOTOGRAPHY** (0-0-3)

To enable students to understand photography as a strong medium of visual presentation, documentation work, overlapping images to create illusions and bring in newness in presentation works; to develop skill in 3D perception and presentation.

1. Photography for documentation work. Use of Photography for making audio-visual Presentation projects.

2. Use of Photography for simulating, overlaying or just positioning of building in different background /environments.

3. Special skills and equipment required for photography of buildings-Effects of using various lenses / filters in Photography of buildings.

4. Effects of outdoor light on buildings for photography, study of shadow in architectural photography.

5. Scale relationships in photography of buildings.-Photographing interiors-special skills and equipment required.

Comparative values / effects black and white effects/ colour photography in architecture. .