

UNIVERSITY OF PUNE

DETAIL SYLLABUS

FOR

THIRD YEAR

BACHELOR OF ARCHITECTURE

(Third Year B.Arch.)

(to be implemented from 2010-11)

FACULTY OF ENGINEERING

BOARD OF STUDIES IN ARCHITECTURE

THIRD YEAR B.ARCH.

Sr. No.	Subject Code	Name of Subject	Head	Teaching Scheme			Examination Scheme		
				Lecture Periods	Studio Periods	Total Periods	Term I Marks	Term II Marks	Total Marks
1	313421	Architectural Design III	SS	4	6	10	300	300	600
2	313422	Bldg. Tech. & Materials III a	SV	2	5	7	150	150	300
3	313423	Bldg. Tech. & Materials III b	Theory				--	100	100
4	313424	Theory of Structures III a	SS	2	1	3	50	50	100
5	313425	Theory of Structures III b	Theory				--	100	100
6	313426	Landscape Arch. and Env. Sciences	SS	1	2	3	50	50	100
7	313427	Building Services I a	SS	2	2	4	100	100	200
8	313428	Building Services I b	Theory				--	100	100
9	313429	Quantity Surveying & Estimating a	SS	1	3	4	--	100	100
10	313430	Quantity Surveying & Estimating b	Theory				--	100	100
11	313431	Specification Writing b	Theory	2	--	2	--	100	100
12	313432	Working Drawing	SS	1	3	4	50	50	100
		TOTAL		15	22	37	700	1300	2000

DETAIL SYLLABUS

Subject Code : 313421 ARCHITECTURAL DESIGN III. (Sessional and Viva)			
Teaching Scheme		Examination Scheme	
Lecture Periods per week	4	Term I and Term II Sessional (Internal) Sessional (External) Viva	125 marks (for each term) 125 marks (for each term) 50 marks (for each term)
Studio Periods per week	6	Total sessional marks for both terms	600 marks
Total Contact Periods per week	10	Paper	nil
		Total Marks	600 marks

OBJECTIVES :

Introduce students to design of buildings with complexities related to services, structure and site planning to accommodate more than one building on a site and help the students to evolve the integrated understanding of the complex relationship between the form, function, context and aesthetics in a building.

COURSE OUTLINE:

1. Introduction to Campus design with reference to design development of campuses developed in the past.
2. Integrating function, structure and services in a building, choice of structural system and resultant effect on visual form / aesthetics of building
3. Development of building design program from client or user's requirements and other social, economic and climate context.
4. Managing a design project – Management of time, compilation, documentation, presentation of information to others and self.
5. Labouring the design process, communicating the design.
6. Introduction to design philosophy.
7. Analysing multiple buildings to be accommodated within a campus and understanding their relationship with each other in context to continuity of form, construction and materials, design theme, climate, etc.
8. Analysing activities around the buildings within a campus and understand the same in context to relation of built form and open spaces, elements of landscape, pedestrian and vehicular movement, their segregation, managing sloping sites, contours, etc.
9. Designing of progressively complex spaces and buildings in terms of area, typology, function etc, with emphasis on either scale or complexity of the project, or both. Complex of low rise and medium rise nature, e.g. – Shopping Mall, Nursing homes / Hospitals with residences, Educational Campus for schools. Auditorium for Cinema / performing arts, Museum, Small industrial complex, Medium scale hotels and resorts, etc.
10. To study a location in a different socio-geographic setting than the Institute, and document the study done during in the tour in the form of a report with emphasis on relevant aspects like climate, social structure, culture, architectural typology, construction technology, urban fabric, economy, etc or any other issues which need to be considered for envisaging a design project in totality.
11. To design in the context of the Location studied, with emphasis on all the aspects that would influence the Design solution.
12. To understand various issues and aspects like sustainability, earthquakes, construction, barrier free environments, etc. and study how these could be integrated in the architectural design process.

SESSIONAL WORK.

Design projects to be given as assignments could be classified into two types.

Type 'A' :- Long duration projects (8-12 weeks)

These could be :

- i. Project based on Campus Design with emphasis on site planning & relationship of built and open spaces, circulation and movement pattern, activity pattern, architectural character and image, philosophy etc.
- ii. System based project (multistoried / service oriented) with emphasis on structural system, services like HVAC, electrical, etc. fire frightening systems, parking, rules & regulations etc.

Either i or ii could be Issue based Projects- designing in the context studied and addressing various issues of the study context like climate, social structure, culture, architectural typology, construction typology, urban fabric, economy etc.

Type B : Short duration Project (1-3 weeks)

These could be projects dealing with a singular aspect at a time, with emphasis on structures / sociology/ sustainability/ earthquake resistant construction/ specialized services / adaptive reuse of buildings / façade design / interiors / industrial building / barrier free environment or any other appropriate aspect

At least one project of type 'A' and one project of type 'B' to be taken up in a term.

- Stress shall be give on three- dimensional studies through sketch perspectives and models prepared at various stages of design process.
- All Architectural Design Assignments and submissions shall lay emphasis on designing Earthquake Resistant Structures, which will be worked out in consultation with the Teacher of Structures and the Submission work will reflect various technologies adopted.

NOTE:

In order to have parity in nature and complexity of Design Projects it is Suggested that teachers from all the Colleges teaching the subject of Architectural Design shall meet at the beginning of First and Second Term and finalise the broad outline of the subject topics, its extent and complexity and also the submission requirements.

RECOMMENDED READING

1. Campus design in India – Kanvinde & Miller
2. Compus Planning _ Richard Dober.
3. Urban Design. The Architecture of towns and cities. –Paul Sprereingen.
4. Exterior design in Architecture __ Ashihara Toshinibu
5. Modern Language of Architecture __ Bruno Zevi.
6. Modern Movements in Architecture __ Charles Jencks
7. Language of Post – modern Architecture - Charles Jencks
8. Complexities and contradictions in Architecture – Robert Venturi
9. Architectural Composition. –Rob Krier.
10. Pattern Language Christopher Alexander.
11. Town Design –Fredrick Gibberd Alexander
12. Various monographs and periodicals

Subject Code : 313422 BUILDING TECHNOLOGY & MATERIALS III. a (Sessional and viva)			
Subject Code : 313423 BUILDING TECHNOLOGY & MATERIALS III b (Paper.)			
Teaching Scheme		Examination Scheme	
Lecture Periods	2	Term I and Term II Sessional (Internal) Sessional (External) Viva	50 marks (for each term) 50 marks (for each term) 50 marks (for each term)
Studio Periods	5	Total sessional for both terms	300 marks
Total Contact Periods per week	7	Paper at the end of Term II	100 marks
		Total Marks	400 marks

OBJECTIVES :

To introduce students to

- A. Soil types & its behavior under different loading conditions
- B. Foundation on low load bearing soil
- C. More about R.C.C. & Steel skeleton structures
- D. Sliding & Sliding folding doors & bay windows in wood
- E. Aluminium & P.V.C. doors and windows
- F. R.C.C. and mass retaining wall
- G. Reinforced cavity and decorative brickwork
- H. Simple joinery and design for wood furniture
- I. Long span structures in R.C.C. & Steel
- J. Modular Co-ordination & introduction to prefabricated types construction using pre-cast building components.
- K. Paneling, partition and suspended ceiling in various materials.
- L. Basement construction & waterproofing
- M. Use of stainless steel in building construction.

Note : The portion covered in Third Year out of following topics shall be taught with special reference to Earthquake Resistant Detailing with local practices and regional responses.

COURSE OUTLINE

- Foundations, Soil Stabilization, Retaining Walls, Plinth Filling
- Flooring, Walls, Openings
- Roofs, Parapets, Terraces, Boundary Walls
- Underground and Overhead Tanks
- Staircases and isolation of structures.

TERM I:

PART – I

Foundation:

- 1.0 Setting out of structures.
- 2.0 Soil types & its behavior under different loading conditions.
- 3.0 Foundation on weak strata.
 - 3.1 Raft Foundation.
 - 3.2 Pile Foundation.

4.0 R.C.C. stub columns & stanchion fixing details (Sketches and notes).

PART- II

Super Structure:

1.0 Study of R.C.C. framed multi-storied structure of about ground +four upper floors with specific study of:-

1.1 Balconies and Canopies.

1.2 Stairs.

1.3 Lift shafts, machine rooms, etc.

Assignment I

2.0 Medium span steel structures using built-up sections, appropriate roof trusses, lattice construction, castellated beams, cladding details, rain water disposal etc.

Assignment II

3.0 Retaining walls and its terminology, mass retaining wall in bricks, stones etc. and cantilever retaining wall in R.C.C.

(Sketches and notes).

4.0 Reinforced brickwork including reinforced brick walls, piers of different thicknesses, reinforced brick lintols and reinforced brick slabs screens and jails

(Sketches and notes).

PART- III

Roofs & Floors:

1.0 Introduction to long span (upto 25 to 30 mts) construction in steel and reinforced concrete (Sketches, notes, models, etc.)

2.0 Modular co-ordination. Pre-cast building components and systems developed by C.B.R.I. and other renowned National and International research organizations. *Assignment III.*

PART- IV

Materials:

Sketches,notes, collecting material samples, brochures, visits to sites, place of manufacture, site reports, etc.

1.0 Light weight concrete.

2.0 Guniting

3.0 Readymix concrete.

4.0 Waterproofing- cement based, chemical based, bituminous and other proprietary systems.

5.0 Metal alloys and stainless steel and their application in the building industry.

TERM II

PART –I

Doors and Windows:

1.0 Sliding and Sliding-folding doors in wood *Assignment IV*

2.0 Aluminium and PVC doors and windows of proprietary type (Sketches, notes and models)

3.0 Bay windows in wood (Sketches and notes)

PART –II

Furniture & Interior Construction:

1.0 Simple joinery in wood and wood based products for interiors.(Models, sketches and notes).

2.0 Paneling and Space dividers using wood, aluminium and steel skeleton and various finishing materials such as Ply-boards,Fibre-boards, Gypsum-boards, metal sheets Plastic extruded sections, etc.- Single skin and Double skin. *Assignment V*

3.0 Suspended ceiling in teak wood or metal framing with A.C. sheets, Gypsum boards, Fibre boards,etc. as finishing material. Proprietary system for suspended ceiling. *Assignment VI*

4.0 Simple residential furniture in wood and wood derived boards like Divan, Bed, Dinning table, Storage cabinet, Kitchen cabinet, Chair, etc -Any 4 items. *Assignment VII*

Note: Total no of drawings to be restricted to between 6 to 8 per term.

PART – III

Misc. Construction:

- 1.0 Single Basement construction with water-proofing details, etc.(Sketches and notes)
- 2.0 Escalator and elevators – planning concepts, terminology and general construction.
(Sketches and notes).

PART – IV

Materials

Sketches, notes, collecting material samples, brochures, visits to sites and places of manufacture, reports, etc

- 1.0 Glass and Glass products applicable in building industry.
- 2.0 Polishing of new and old wood and wood derivatives.
- 3.0 Painting.
- 4.0 Rendering.

SUBMISSION FORMAT:

The above mentioned submission format is indicative only.

It is expected that the students develop all round skills in drafting, sketching, model making, 3-d graphics and innovative use of computers to understand the basic principles and use it to applied construction problems.

The subject should be effectively linked with architectural design and more stress will be laid to on site training and hands on experience.

DISTRIBUTION OF MARKS:

Drawings – 40%,

Site visit reports, presentations etc. with models, 3D graphics etc.– 40%,

Journal – 20%.

REFERENCE BOOKS :

1. Elements of Structures by MORGAN
2. Structures in Architecture by SALVADORI

To Study standard building construction

1. Building Construction by MACKAY WB. Vol. 1 to 4
2. Construction of Building by BARRY Vol. 1 to 5
3. Construction Technology by CHUDLEY R. Vol. 1 to 6
4. Building Construction illustrated by CHING FRANCIS D. K.
5. Elementary Building Construction by MITCHELL
6. Structure and Fabric by EVERET

To study building materials

1. National Building Code and I.S.I. Specifications
2. Materials and Finishes by EVERET
3. A to Z Building Materials in Architecture by HORNOSTLE

Subject Code : 313424 THEORY OF STRUCTURES III a (Sessional)			
Subject Code : 313425 THEORY OF STRUCTURES III b (Paper.)			
Teaching Scheme		Examination Scheme	
Lecture Periods	2	Term I and Term II Sessional (Internal) Sessional (External) Viva	25 marks (for each term) 25 marks (for each term) nil
Studio Periods	1	Total sessional for both terms	100 marks
Total Contact	3	Paper	100 marks

Periods per week		Total Marks	200 marks
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NOTE : While teaching the subject of Theory of Structures Limit State Method shall be adopted instead of Working Stress Method.

COURSE OUTLINE :

1. Soil Mechanics : Introduction to soil Mechanics, trial pits, bearing capacities of common soils, various limits, Foundation problems at site. Bulb of pressure etc.
2. Retaining Walls.
 - (i) Active and passive pressures of soil.
Ranking's theory of Earth pressure.
 - (ii) Masonry retaining walls.
 - (iii) R.C.C. cantilever retaining wall.
 - (iv) Counter fort type retaining wall-concept and general detailing of counter forts.
- 3 R.C.C. columns with Eccentric loading-introduction only. No calculations.
- 4 Staircase : Types, loading and design. Details design of simply supported staircases.
- 5 R.C.C. Foundation : details of isolated footing.
- 6 Combined footing.
- 7 Detailed design of rectangular combined footing.
- 8 Introduction to following :
 - (a) Masonry and R.C.C. underground water storage tanks.
 - (b) Elevated water towers.
 - (c) R.C.C. and steel portal frame.
 - (d) Steel columns.
 - (e) Steel plate girders and Crane girder.
 - (f) Steel castellated girder.
 (Introduction not to include calculation of any of the elements but the selection criteria, placement of main reinforcement, fabrication producer etc.).
9. Introduction to :
 - Trapezoidal footing.
 - Raft footing.
 - Pile foundation.
 - Pile cap.
10. Pre-stressed concrete : Definition, difference between R.C.C. and pre stressed concrete, advantages and disadvantages, type and methods of pre stressing simple problem on calculation of resultant stresses of external forces etc.
11. Ultimate load theory :
Definition and explanation. Why this theory was developed, difference between working stress block, calculation of balance rectangular simply reinforced section, area of steel required for this Mud to develop working load factor(simple problem on beams only).
12. Limit state analysis : Introduction to concept only and I.S. requirements.
13. Compound Stanchions :
 - Simple problems.
 - Lacing : Finding spacing and size of lacing.
 - Battens : Finding spacing and size of battens.
 - No details design
 Design and detailing of a factory building including detailed design and drawings of purlins, trusses and N griders. (Drawing on A2 size sheets).
14. Earthquake Resistance Structural Detailing :

Seismic Design and detailing of R.C.C. and steel buildings :

- IS : 1893-2002, IS : 13920-1993, IS : 456-2000, IS : 800-20045.
- Special reinforcing and connection details in structural drawings.

RECOMMENDED READINGS :

1. Structure in Architecture Salvadori and Heller.
2. Design of steel Structures-Vaziranini and Rathvani.
3. Elements of Structures-Morgan.

Subject Code : 313426 LANDSCAPE ARCHITECTURE & ENVIRONMENTAL SCIENCES (Sessional)			
Teaching Scheme		Examination Scheme	
Lecture Periods per week	1	Term I and Term II Sessional (Internal) Sessional (External) Viva	25 marks (for each term) 25 marks (for each term) nil
Studio Periods per week	2	Total sessional marks for both terms	100 marks
Total Contact Periods per week	3	Paper	nil
		Total Marks	100 marks

OBJECTIVE:

To introduce the students to landscape design and site planning and imbibe importance of integrated design of built & open spaces and evolve understanding of sustainable site development addressing the functional, aesthetic and environmental issues.

TERM 1

- To introduce the students to Landscape architecture and its scope.
- To develop understanding of site analysis and site planning and integrated design of open and built spaces.
- To understand the elements and principles of landscape design and role of landscape elements in design of outdoor environments on the site.
- To study the changing relationship of man with nature in various parts of the world through various ages and study history of landscape design.

COURSE OUTLINE

Introduction to Landscape Design – its scope and objectives; elements and principles of landscape design and their application in outdoor space design; Site studies and site planning : Integration of built and open spaces; Introduction to storm water drainage , planting design & grading. History of landscape design.

TEACHING PLAN

Unit 1 Introduction

Introduction of landscape architecture, its scope and understanding the differences between landscape design and building design. Significance of time in landscape design.

Unit 2 Site Studies and Site Planning

Principles of site planning. Site survey and appraisal – the physical and social context of the site and various site characteristics such as microclimate, topography, hydrology, existing features (natural

and manmade), etc. Site suitability analysis. Process of developing a brief for open spaces. Design issues in site planning and siting of buildings. Integrated approach to design of building and open spaces. Introduction to grading, landform modifications and surface water drainage.

Unit 3 Elements & Principles of Landscape Design

Elements of landscape Design – Landform, water, plants and built elements (hard areas, paths, terraces) . Understanding the visual (colour, form, texture) characteristics and also the non-visual characteristics (smell, touch, sound) characteristics of these elements and their usage to achieve the functional, aesthetic and environmental goals. Principles of landscape design (harmony, balance, contrast, etc.).

Unit 4 History of Landscape Architecture

Changing relationship of man with nature in various phases in history and its influence on the environment. Reviewing landscape design and garden design in history in various parts of the world & phases in history – Eastern (India, China, Japan), Western (Egypt, Mesopotamia, Greece, Roman, Medieval, Renaissance & Baroque, English school) and Central (Persia, Islamic landscapes). Industrialization, New towns, Need for parks, Park movement in America. Contemporary movements.

SESSIONAL WORK

1. At least one landscape design & site development project (limited to one building on a site) in which students should evolve a rational behind design of open spaces based upon functional aspects, microclimatic analysis including building shadow analysis, visual and spatial character desired and then develop a landscape design. (60% of total marks allotted). The design should be presented in form of drawings to explain the landscape development in totality, which shall include comprehensive landscape development plan, site sections, sectional details, planting policy, views etc.
2. Written Assignments (40% of total marks)
 - a. Unit 3 (Landscape elements): Visit to designed landscapes and preparing case study appraisal report of not less than 1000 words supported by graphics. (10% of total marks)
 - b. Unit 4 (History of landscape architecture) : Detailed essay of at least 1500 words with graphical illustrations based upon the topics in the syllabus on themes such as comparisons, case studies, use of landscape elements in history etc. (10% of total Marks)
 - c. Test on units 1 to 4: 20% of total marks.

TERM 2

OBJECTIVES :

- a. To evolve understanding of plant selection for functional, aesthetical and ecological applications in design based upon the plant characteristics and their habits.
- b. To introduce the concepts of sustainable site planning, components of environment and environmental concerns.
- c. To develop understanding of the role of landscape design in evolving sustainable site planning and also in passive climatic control at building and site level.
- d. Introduction to landscape construction and services.
- e. Application of the knowledge of site planning and landscape design to address the environmental issues.

COURSE OUTLINE :

Plants and Design; Introduction to landscape construction and services (drainage, irrigation, lighting); Execution of a landscape proposal; Environment – components and issues; Environmental concerns: landscape design & sustainable site planning; landscape design in situations such as roof tops & indoor locations; role of landscape design in response to environmental issues in urban areas.

TEACHING PLAN

Unit 5 Plants and Design

Study of plant material – trees, shrubs, ground covers and climbers, physical characteristics and habit. Role of plants in landscape design. Plant selection criteria – functional, visual, ecological and micro climatic aspects. Building shadow analysis for ascertaining hard-soft areas and choice of plants.

Unit 6 Landscape Construction and Services

Introduction to the landscape services – lighting, surface water drainage systems, irrigation systems. Introduction to construction in landscape – paths, retaining walls, level changes, fences, boundary walls, decks, gates, trellis, pergola etc. Introduction to landform modifications, earthworks and grading. Roof top landscapes and indoor landscapes. Understanding the process of the execution of a landscape proposal.

Unit 7 Environment: Components and Concepts

Introduction to environment and its components (biotic and abiotic), Concepts of energy and resource conservation, bio-diversity, pollution, green house effect, ozone layer depletion, sustainability.

Unit 8 Environmental Concerns, Landscape Design and Sustainable Site Planning.

Application of the knowledge of site planning and landscape design to address the environmental issues, achieve passive climatic control and evolve sustainable site plan. Water harvesting (roof water, recharging ground water), solid waste management (vermiculture pits, composting, degradable and non-degradable wastes). Root zone treatment. Sewage treatment plant. Landscape design in response to environmental problems in urban areas.

SESSIONAL WORK

1. At least one campus planning project (with more than two buildings on the site) from the third year architectural design which the student has undertaken. A comprehensive site and landscape development plan should be submitted along with supporting background work such as site analysis, slope analysis, zoning rationale, building program analysis. Design proposal should include a comprehensive landscape development plan, Site sections, planting policies, details of civil work items such as steps, retaining wall, planters etc., surface water drainage concept. (70% of total Marks).
2. Written Assignments (30% of total marks)
 - a. Unit 5 (Plants and design): Study and documentation of at least four plants to understand their characteristics and use in landscapes. (10% of total marks)
 - b. Unit 7 & 8 (Environment): Literature or case study review and discussion of any one environmental issues pertinent to the syllabus. (10% of total marks).
 - c. Test on units 5 to 8: 10% of total marks.

RECOMMENDED READINGS:

1. **Appleton, J.** *The Experience of Landscape*, London: John Wiley & Sons. 1995.
2. **Bose, T.K. and Choudhary, K.** *Tropical Garden Plants in Colour*. Horticulture and Allied Publishers. 1991.
3. **Botkin D. B. & Keller E.A.** *Environmental Science: Earth as a Living Planet*. NY: John Wiley & Co. 1995.
4. **Dee, C.** *Form and Fabric in Landscape Architecture : A visual introduction*, UK : Spon Press. 2001.
5. **Eckbo, G.** *Urban Landscape Design*, NY: McGraw Hill Book Company.1964.
6. **Gopalswamiengar, K.S.** *Complete Gardening in India*, 4th ed. Bangalore: Gopalswamy Parthasarathy. 1991.
7. **Jellicoe, G. & Jellicoe, S.** *The Landscape of Man*, London: Thames and Hudson. 1991.

8. **Kanvinde A. & H. James Miller.** Campus Design in India: Experience of a Developing Nation. Jostens/American Yearbook Co, 1969.
 9. **Kaplan, R., Ryan, R. L. and Kaplan, S.** *With People in Mind – Design and Management of Everyday Nature*, Island Press. 1998.
 10. **Laurie, M.** *An Introduction to Landscape Architecture*, NY : American Elsevier Pub.Co Inc. 1975.
 11. **Lyall S.** *Designing the New Landscape*. UK :Thames & Hudson. 1998.
 12. **Lynch, K.** *Site Planning*, Cambridge : The MIT Press. 1962
 13. **McHarg I.** *Design with Nature*. NY : John Wiley & Co. 1978.
 14. **Motloch, J. L.** *Introduction To Landscape Design*, US: John Wiley and sons. 2001.
 15. **National Building Code of India.** New Delhi : Indian Standards Institution. 2005.
 16. **Randhawa M.S.** *Flowering Trees*. New Delhi : National Book Trust. 1998.
 17. **Rutledge, A.J.** *Anatomy of a Park*, NY : McGraw Hill Inc. 1971.
 18. **Simonds, J.O.** *Landscape Architecture : The Shaping of Man's Natural Environment*, NY : McGraw Hill Book Co. Inc. 1961.
 19. **Thompson, I. H .** *Ecology, Community And Delight: Sources Of Values In Landscape Architecture*, London : E & FN Spon.2000.
- Williams, S.** *Outdoor recreation and the urban environment*, London : **Routledge**. 1995.

Subject Code : 313427 BUILDING SERVICES II a (Sessional)			
Subject Code : 313428 BUILDING SERVICES II b (Paper)			
Teaching Scheme		Examination Scheme	
Lecture Periods per week	2	Term I and Term II Sessional (Internal) Sessional (External) Viva	50 marks (for each term) 50 marks (for each term) nil
Studio Periods per week	2	Total sessional marks for both terms	200 marks
Total Contact Periods per week	4	Paper	100 marks
		Total Marks	300 marks

OBJECTIVE : To introduce students to the concepts of, indoor environmental quality control and providing ambient / comfortable habitable conditions, by integrating the knowledge of active as well as passive methods, in architectural design aimed at environmental sustainability.

TERM 1

1. To equip students with the knowledge of mechanical ventilation /HVAC and the required technology for application.
2. Integrating these technologies with their architectural design.
3. Evolving understanding in students to choose appropriate systems.

COURSE OUTLINE:

AIR CONDITIONING

Introduction to mechanical ventilation, forced ventilation, types of fans used, simple calculations to decide on the no. of fans / sizes

Introduction to fundamental principles of air conditioning. Fluid flow, Heat transfer. Psychometrics of air conditioning processes. Health and comfort criteria, comfort chart. Selection of indoor and outdoor design conditions. Air conditioning systems, selection of systems, ventilation for cooling. Transmission and distribution of conditioned air. Duct size calculations.

TEACHING PLAN

Unit 1

- a. Forced ventilation- types of fans used, calculations to decide on the no of fans required
- b. Air conditioning – heating and cooling, air conditioning equipment, air distribution, data and space requirements.

SESSIONAL ASSIGNMENT

Assignments shall consists of

- a. Calculating the sizes and no. of fans required to be provided or a specific interior and its layout for the same.
- b. Preparing an air conditioning layout for part of design project, with duct size calculations.
- c. Compiling of required information collected from site visits, market surveys and finding out latest trends and materials for the same.

SESSIONAL ASSESSMENT

1. 40% marks will be allotted for compilation of literature, brochures, handbooks, market surveys etc.
2. 60% marks shall be allotted for services layouts, with details.

TERM II:

OBJECTIVES:

Understanding of design criteria for good hearing conditions in enclosed and open spaces with relation to spatial characteristics and developing the ability to apply the same to architectural design.

Equip students with the knowledge of acoustics and the required technology, for its application.

Integrating these technologies with their architectural design.

Evolving understanding in students to choose appropriate systems.

Integrating passive and active fire fighting systems in architectural design projects.

COURSE OUTLINE

Introduction to architectural acoustics. Acoustical problems in architectural design. Criteria for good hearing conditions in enclosed and open spaces. Properties of sound. Human ear and its cognizance to hearing. Reverberation; Sabine's formula for reverberation time. Sound absorbing materials, their properties and applications. Acoustical requirements in an auditorium design. Acoustical designs of rooms for speech, music and recording studio. Sound amplification systems. Environmental noise control, air-borne and structure borne noise, control of mechanical noise and vibrations. Transmission of sound, noise reduction.

Methods of fire-fighting, rules, regulations and equipment.

TEACHING PLAN

Unit 1. Acoustics

- a. Brief history of architectural acoustics, acoustical problems as outcome of contextual influences and limitations of materials and technologies.
- b. Characteristics of sound.
- c. Study of acoustical materials, their classification and application.
- d. Acoustical treatment to various enclosed spaces with calculations of the time of reverberation.
- e. Noise control.
- f. Sound amplification systems.

- g. One live case study.

Unit 2. Fire fighting and fire safety.

- a. Causes and spread of fire, combustibility of building materials, structural elements and their fire resistance.
- b. Passive control- fire protection in buildings, safety codes, rules and regulations.
- c. Active control- fire fighting using fixed and portable fire fighting equipment.

SESSIONAL ASSIGNMENT

Assignments shall consists of

- a. Calculating the time of reverberation for an enclosed space and designing an acoustical treatment for the same, to achieve good hearing conditions.
- b. Compiling of required information collected from site visits, market surveys and finding out latest trends and materials for the same.
- c. Case study for fire fighting and fire control for an apartment building, with basement parking.

SESSIONAL ASSESMENT

- 1. 40% marks will be allotted for compilation of literature, brochures, handbooks, market surveys etc. .
- 2. 60% marks shall be allotted for acoustical treatment of an interior space.

RECOMMENDED READING

- 1. Ernest Tricomi-ABC of Air conditioning
- 2. Heating and Air Conditioning of buildings.
- 3. Smith, Philips and Sweeney-Environmental Science
- 4. Doelle Leslie-Environmental Acoustics
- 5. Knudsen and Harris-Acoustical designing in architecture
- 6. K.A.Siraskar-Acoustics in building design
- 7. National Building code.

Subject Code : 313429 QUANTITY SURVEYING & ESTIMATING a (Sessional)			
Subject Code : 313430 QUANTITY SURVEYING & ESTIMATING b (Paper)			
Teaching Scheme		Examination Scheme	
Lecture Periods per week	1	Term I and Term II Sessional (Internal) Sessional (External) Viva	25 marks (for each term) 50 marks (at the end of both terms) nil
Studio Periods per week	3	Total sessional marks for both terms	100 marks
Total Contact Periods per week	4	Paper	100 marks
		Total Marks	200 marks

OBJECTIVES :

- 1. To train students in computing quantities of various building items for simple load bearing structures and acquaint them with various types of estimates including mode of measurements as adopted by I. S. 1200.
- 2. To train students in computing quantities of various building items of R.C.C. framed structure, steel structure, building services such as water supply, sanitation and drainage, electrical installations and acquainting them with rates of various building items.

COURSE OUTLINE

- 1. Introduction to the definition, aim and scope of "Quantity Computation"
- 2. Study of different types of estimates
- 3. Study of mode of measurements as stipulated in I. S. 1200

4. Methods of computing quantities for load bearing types of structure and preparing abstract and bills of quantities including units of measurements.
5. Computing quantities of various building items for r.c.c. framed structure, steel structure and building services such as plumbing and water supply. Preparing of quantities for estimation and tendering purposes.
6. Study of composition of rates of various building items, percentage distribution in the rates of materials, labour, tools and plant, contractor's profits and overheads etc.
7. Analysis of rates of main items of building work with reference to prevalent market rates of materials and labour wages.
8. Preparation of indent of various building materials for r.c.c. framed structure.
9. Measurements of completed items for payment to contractor's interim and final certificate.
10. Introduction to use of computer for computation of quantities of various building items.

SESSIONAL ASSIGNMENTS

Computation and Bills of Quantities shall be prepared of following :

1. Load bearing structure of total plinth area between 15 to 25 sq. mts.
2. Load bearing structure having total built-up area between 100 to 150 sq. mts. Including staircase and toilet block
3. R.C.C. framed structure comprising of Ground and First Floor having total built-up area between 100 to 150 sq. mts. Including staircase and toilet block
4. Computing quantities of single storied steel framed factory building or workshop having total built-up area between 100 to 150 sq. mts. Including m. s. trusses, purlins and sheet roofing.
5. Working out rate analysis of routine civil items.

RECOMMENDED READING :

1. Professional Practice by R. H. Namavati
2. Estimating and Costing by Rangawala and B. N. Dutta
3. Civil Engineering Contracts and Estimates by B. S. Patil
4. I.S.I. Handbook of measurements of building works.
- 5.

Subject Code : 313431 SPECIFICATION WRITING (Paper)			
Teaching Scheme		Examination Scheme	
Lecture Periods per week	2	Term I and Term II Sessional (Internal) Sessional (External) Viva	Nil Nil Nil
Studio Periods per week	--	Total sessional marks for both terms	Nil
Total Contact Periods per week	2	Paper	100 marks
		Total Marks	100 marks

OBJECTIVES :

To acquaint students with methodology of writing specifications with reference to building trades, materials, workmanship and performance of different items of work and introducing the students to specifications as an integral part of contract document for building projects.

COURSE OUTLINE

1. Specification as part of contract document, definition, need and importance, its relationship with working drawings, bill of quantities and schedule of rates.

2. Types of specifications, open, closed, restricted, prescriptive, performance based, or combination of above types. Use of manufactures guide etc.
3. Specification writing method to include master list, sectional formats, page formats, general material items, tests, performance, mode of measurements etc.
4. Methodology of writing item wise detailed specifications including methods and forms of writing descriptive notes on materials and workmanship based on working drawings.
5. Collection of catalogues and technical information on various materials, products and specialized items.
6. Preparation of checklist for writing detailed specifications.
7. Study of different building trades, their scope and contents
8. Introduction to writing specifications for building services and checklist for services such as Water Supply, Drainage, Acoustics, Electrical and HVAC installations.
9. Broad outline of specification for other service-installations in building such as
 - Communication systems – elevators, escalators, telecommunication
 - Accessibility – arrangements for disabled person.
 - Water-proofing. (Cement, bitumen, polymer based).
 - External development like roads (flexible and rigid construction) pavements, kerbs, lighting, security – systems, fencing.
 - Environment Responsive Systems, Renewable energy applications, efficient fuel-systems.

NOTES:

1. A journal may be prepared which will cover notes on the portion mentioned above as study material.
2. Specification writing shall be studied in conjunction with working drawings and the first assignment of Load bearing structure of 15 to 25 sq. mt. plinth area will be covered by preparing specification for common building materials and trades.
3. Technical literature on various specialized items and manufacture’s catalogues shall be collected and studied.

RECOMMENDED READING :

1. Indian Standard Specifications
2. C.P.W.D. Specifications and schedule of rate analysis
3. Specification Writing for Architects and Engineers. By Donald A. Watson.
4. Specification Writing for Architects and Surveyors by Arthur J. Wills

Subject Code : 313432 WORKING DRAWING (Sessional)			
Teaching Scheme		Examination Scheme	
Lecture Periods per week	1	Term I and Term II Sessional (Internal) Sessional (External) Viva	25 marks (for each term) 25 marks (for each term) nil
Studio Periods per week	3	Total sessional marks for both terms	100 marks
Total Contact Periods per week	4	Paper	nil
		Total Marks	100 marks

AIM : To enable the students to prepare working drawings of an architectural project and imbibe the significance of working drawings from the point of view of execution of the work on site and as important component of tender documents.

OBJECTIVES :

- The students should be able to prepare drawings in sufficient details such that the contractor is able to construct a building as per the design.
- Graphical presentation of all the components of a building along with dimensioning and annotations.
- Understand and apply IS Codes and internationally accepted norms / conventions / methods of preparing a working drawing along with tabulation of schedules of materials, finishes and hardware.
- Linking up working drawings / specifications / bill of quantities in an architectural project.

COURSE OUTLINE:

TERM I :

- One working drawing of a 2nd yr. architectural design project having load bearing structure with minimum 100 sq. m. carpet area.
- At least two details such as doors/windows/railings/kitchen otah etc.
- Total no of drawings (approx 6 to 8 of A1 size).

TERM II :

- One working drawing of any project of minimum 200 sq.m. from Third Year Architectural Design project having frame construction and minimum G+1 structure.
- Introduction to preparing drawings for approval of local authorities for a residential unit having G+1 structure
- Details of civil work of staircase and a toilet.
- Interior working drawing of a room from the project with at least details of two furniture types : 1 drawing A1 size.
- Total No of drawings (approx.6to 8 of A1 size.)

The drawings may be manually drafted or computer generated as per the choice of students and availability of computers with the college.

REFERENCES:

Architects Working Details