

DRAFT SYLLABUS FOR APPROVAL OF FACULTY

**Third year 2015 Pattern**

**Semester V**

<b>Design V</b>			
Subject Code		3201535	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week= 11 (lectures=3, Studio=8)		Sessional (Internal)	100
		Sessional (External)	100
		Viva (Internal)	25
		Viva (External)	25
		In-semester exam	nil
		End Semester exam	nil
		Total Marks	250
		Total Credits	7

**COURSE OBJECTIVES:**

- Design of Campus comprising of more than one building and evolving design in response to the site, its characteristics and the context.
- Designing of buildings with different functions, requiring spaces of different scales and employing suitable structural systems.

**COURSE OUTLINE:**

- Designing in a different socio geographic context [other than where the institute is located].
- Undertake programming research to understand the socio-cultural patterns, geographic context and address the needs of the users and the site and evolve a sustainable design.
- Creation and design of open spaces within the campus.
- Study, analysis and synthesis of various design parameters in built-unbuilt spatial relationship.
- Conceptualizing services such as storm water management, locations of water tanks, sewage disposal system, etc.
- Introduction to functions requiring column free spaces and employing suitable structural systems.
- Modular planning, grid planning and coordination of various grids in plan and three dimensions.
- Time bound decision making and preparing sketch design.

**SESSIONAL WORK:**

- A major design project of duration 10-12 weeks of campus planning. Example : Residential school, Club, Institutional buildings, Home for the elderly, Community centre, Resort etc.
- A minor design project of duration 4-6 weeks which could be stand alone building on a site with a focus on two to three activities housed in one building with area not less than 1500 sq.m. Example : Diagnostic centre, Dining hall, Convenience shopping etc.
- One time bound project of duration around 12 hours. The typology and scale of the project can be decided by the college.

**Important Note :** At least one of the two projects [major or minor] mentioned above has to be in a different socio geographic context. The design has to be communicated through architectural graphics, two and three-dimensional sketches, models and narratives. All the design projects must have different sites.

## REFERENCE BOOKS

It is strongly recommended that students refer books focusing on various building types, journals, magazines to widen their knowledge of design and the readings not to be limited to the list of books given below.

Correa, C. (2010). *A Place in Shade*. Delhi: Penguin Books.

Kanvinde, A., & Miller, H. (1969). *Campus Design in India*. Topeka: ostens/American Yearbook Co. .

Lynch, K. (1962). *Site Planning*. MIT Press.

Pandya, Y., & Foundation, V. S. (2007). *Elements of Space Making*. Ahmedabad: Mapin Publishing Pvt Ltd.

White, S. (1995). *Building in the Garden: Architecture of Joseph Allen Stein in India and California*. Delhi: Oxford India Paperbacks.

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<b>Building Technology and Materials-V</b>			
Subject Code		3201537(SV), 3201536(PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=3, Studio=4)	7	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	25
		Viva (External)	25
		In-semester exam	30
		End Semester exam	70
		Total Marks	200
		Total Credits	5

## COURSE OBJECTIVES:

- To understand the variations in frame structure with options of different types of slab like flat slab, ribbed and waffle slabs etc. along with pre-stressed RCC technology.
- To understand various structural system to be employed for long span structures.
- To introduce materials and technology of assembling interior elements like partitions, suspended ceiling, furniture units etc.

## COURSE OUTLINE:

**Unit-1:** Characteristics, Properties and types of following materials and their application in interior elements.

- a) Wood, wood derivatives and other panel materials used for interior application.
- b) Finishing materials like laminates, veneers, plastics and metal sheets.
- c) Paints and varnishes.
- d) Hardware required for application to interior and furniture elements.

**Unit-2:** Various types of Reinforced Cement Concrete Flooring Systems for medium spans.

- a) Flat plate, Flat slab, Ribbed slab, Waffle slab, Band beam and slab.
- b) Pre-stressed slabs.

**Unit-3:** Partitions and Paneling

- a) Demountable Partition construction using proprietary and non-proprietary systems using all available materials.
- b) Proprietary and non-proprietary systems of paneling in timber, timber derivative materials plastic, metal and other materials.

**Unit 4:** Suspended Ceiling.

- a) Suspended Ceiling construction using proprietary and non-proprietary systems using all available materials.

**Unit 5:** Furniture Design and assembly using timber and other material along with finishing and upholstery.

**Unit 6:** Construction systems used for long span construction.

- a) Section/bulk active systems (beam structure, frame structure, slab structure)
- b) Vector active systems ( portal frames, 2-D and 3-D trusses etc.)
- c) Surface active systems (Shell structures, folded plate structures etc)
- d) Form active systems (Tensile structures, Pneumatic structures, Arch structures etc.)

#### **SESSIONAL WORK:**

- Unit-1:** Compilation of market surveys in form of relevant hand drawn sketches, notes and tabulated information regarding; available types, commercial sizes, properties, unit of measurement, rates etc.
- Unit-2:** Sketches and notes in the journal.
- Unit-3:** Manually drafted scaled drawings of Partitions and Paneling using proprietary and non-proprietary systems of construction using various materials.
- Unit4:** Manually drafted scaled drawings of Suspended Ceiling using proprietary and non-proprietary systems of construction using various materials.
- Unit5:** Manually drafted scaled drawings of furniture units like Bed, Dining Table, etc. using various materials.
- Unit6:** Sketches and notes in the journal.

#### **REFERENCE BOOKS**

1. Ching Francis D.K. Building Construction illustrated. John Wiley & sons. 2014
2. National Building Code-2005 & ISI specifications for Materials and Methodology of Various Construction.
3. Technical Manuals of various manufacturing companies for proprietary systems of partitions, paneling and suspended ceilings.
4. Alan Everett, Yvonne Dean. Mitchell building series, Building materials and finishes. Routledge 2014
5. Mackay J.K. Building Construction vol.-1-4. Longman Scientific & Technical, 1988.
6. Barry. 'Building Construction' Vol. 1 – 5
7. Cudley. 'Construction Technology' Vol. 1 – 6

<b>THEORY OF STRUCTURE V</b>			
Subject Code		3201538(PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=2)	3	Sessional (Internal)	nil
		Sessional (External)	nil
		Viva (Internal)	nil
		Viva (External)	nil
		In-semester exam	30
		Semester exam.	70
		Total Marks	100
		Total Credits	2

**COURSE OBJECTIVES:**

1. To design complex RCC structural elements.
2. Different types of staircases.
3. Types of beams like doubly reinforced, 'T' and 'L'
4. Design of continuous equal span slab by I.S.456 factors.
5. Different structural elements like pre-stressed construction and flat slabs.
6. Columns in multistoried buildings.
7. Types of foundations and design of isolated column footing.
8. Need of retaining wall and design of gravity type retaining wall.

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**COURSE OUTLINE:**

**Unit 1: –Staircase Support Systems**

**Numerical** on Design of Dog Legged Staircase with Beams at Various Positions:

**Theory only** on Support Systems and Reinforcement Detailing in the following Cases

- a. Stringer Beams - End Stringer Beams with S.S Slabs Treads.
- b. Stringer Beams - Central Stringer Beams with cantilever Slab Treads.
- c. Folded Plate Staircases.
- d. Open Well Staircases.
- e. Spiral staircase
- f. Dog-legged Staircase with Various Beam Positions.

**Unit 2: Design of Beams**

- I. **Doubly Reinforced Beam** –Concept, Detailing, Need, Locations. **Numerical** on Design of Doubly Reinforced Beams
- II. **T Beams, L Beams / One Way Continuous Slabs:** Divisions of Larger Spaces into smaller one way or two way Slab Units by Using Intermediate Beams. T Beams and L Beams. I.S. Provisions for same.
  1. **Numerical** on Design of T Beams and L Beams - N.A position within flange.
  2. **Numerical** on Design of One Way Continuous Slabs - 3 equal spans using I.S.456 Coefficients
  3. **Theory only** on Design of Coffered Slab.

### Unit 3: Column Design across Multiple Floors:

Design of Columns across Vertical Floors: Vertical Load Calculation, Change of Size, Change of Grades (not for problems), Change of Percentage of Steel.

1. **Numerical** on design of columns with change in size and percentage of steel.
2. **I. S. provisions for eccentrically loaded columns.**

### Unit 4: Pre-stressed constructions and Flat Slabs:

1. **Pre-stressed Concrete:**
  1. Concept and Process of **Pre-tensioning and Post-Tensioning.**
  2. Advantages and Disadvantages over Conventional R.C.C Construction.
  3. Use of High Strength Concrete and Steel in Pre-Stressed Elements
  4. Methods of Pre-stressing - Freyssinet System
  5. **Numerical** on Extreme Fiber Stresses at Mid Span and End Span.
2. **Flat Slab Construction:** Concept of Large Beam less Spaces, Column Capitals, Header Beams  
I.S.456 Provisions for Various R.C.C Elements

### Unit 5: Foundations:

1. Shallow and Deep Foundations
2. Isolated Footings to Combined Footings to Strip Footings to Raft Foundations
3. **Foundations in Soil of low S.B.C** , Piles ,Group of Piles and Pile Caps, Reinforcement Detailing involved
4. **Numerical** on Design of **Isolated Footing** for Square and Rectangular Column, Pad Footing with One Way and Two Way Shear.
5. **Numerical** on Design of **Combined Footing** - Finding Dimensions in Plan only
6. **Theory only on** Design of Combined Footing - B.M.D and Reinforcement Detailing

### Unit 6: Retaining Walls:

1. Need for **Retaining Wall**, Angle of Repose, Rankine's Theory for Active and Passive Earth Pressures. Types of Retaining Walls.
2. **Gravity Retaining Walls** - Height, Proportioning –**Numerical** on Stability Study for O.T.M, Sliding, Maximum and Minimum Pressure at Base

### REFERENCE BOOKS

1. R.C.C. design – Khurmi, Punmia, Sushilkumar.
2. Design of steel structures- L. S. Negi., Vajrani-Ratwani.
3. Structure in Architecture – Salvadori and Heller.
4. Structural Decisions.- F. Rosenthal
5. I.S. 456, I.S. 800, I.S. 875, I.S. 1893, I.S. 13920

<b>LANDSCAPE ARCHITECTURE I</b>			
Subject Code		3201539(SS)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=3)	04	Sessional (Internal)	25
		Sessional (External) Viva (Internal)	25 nil nil
		In-semester exam	nil
		End Semester exam	nil
		Total Marks	50
		Total Credits	2

### **COURSE OBJECTIVES:**

- To introduce the students to Landscape Architecture and its scope.
- To understand the elements and principles of landscape design and role of landscape elements in design of outdoor environments on the site.
- To introduce the students to various traditions in designed and vernacular landscapes.
- To develop understanding of site analysis and site planning and integrated design of open and built spaces.
- Creating awareness about using Landscape design as a tool to address environmental concerns in Architecture.

## **COURSE OUTLINE:** DRAFT SYLLABUS FOR APPROVAL OF FACULTY

- Unit 1.** Introduction to Landscape Architecture and its scope ,elements( natural and manmade)and their application in achieving functional, aesthetic, environmental and cultural goals.
- Unit 2.** Introduction to Landscape history/traditions (Eastern, western, central) with emphasis on Indian Landscape traditions.
- Unit 3.** Study of Hardscape (civil work) details with respect to materials and construction techniques. This study should be conducted through visits to designed landscapes.
- Unit 4.** Study of Softscape (plant material), their characteristics and contribution in terms of creating and imparting character to outdoor spaces. This study should be conducted through site/ nursery visit with emphasis on native and naturalized species.
- Unit 5** Introduction to environmental concerns and sustainable site planning (rain water harvesting, solid waste management, passive climate control, etc)
- Unit 6.** Site analysis including understanding natural and manmade aspects (such as microclimate, topography, hydrology, vegetation), physical and socio-cultural context of the site. Introduction to basics of Site planning.
- Unit 7.** Relevance of Art in landscape design (Land art, art in public spaces, etc) for. Eg. works of Andy Goldsworthy, Richard Shilling, Walter Mason, Jim Denevan, Robert Smithson, Andrew Rogers,Dani Caravan, Simon Beck, Anish Kapoor, Neckchand, Subodh Kerkar.
- Unit 8.** Landscape design Project I- A small scale, theme based Landscape design project culminating into an idea/ concept generation/ 3D visualization that encourages creative thinking.

### **SESSIONAL WORK:**

- Assignments that shall individually or comprehensively cover unit 1 – unit 5. Duration 10-12 weeks.

- Landscape design project with drawings, views, model (optional) holistically representing the concept and the design process .4- 6 weeks.

**NOTE:** It is expected that application of Unit 6 will be demonstrated in landscape design projects.

## REFERENCE BOOKS

1. Mcharg, I, *Design with Nature*. John Wiley and co. 1978.
2. Jellicoe, G and Jellicoe, S, *The Landscape of Man*, London: Thames and Hudson, 1991.
3. Simonds, J .O, *Landscape Architecture: The Shaping of Man's Natural Environment*, N Y: McGraw Hill Book Co.Inc. 1961.
4. Lynch, K, *Site Planning*, Cambridge: The MIT Press, 1962.
5. Shaheer, M, Wahi Dua, G and Pal A (editors), *Landscape Architecture In India, A Reader:* LA, Journal of Landscape Architecture, 2013.
6. Lyall, S, *Designing The New Landscape:* UK:Thames and Hudson, 1998.
7. Dee, C, *Form And Fabric In Landscape Architecture: A Visual Introduction*, UK: Spon Press, 2001.
8. Eckbo, G, *Urban Landscape Design*, N Y: McGraw hill co. 1961.
9. Laurie, M, *An Introduction to Landscape Architecture*, N Y: American Elsevier Pub. Co. Inc. 1975
10. Rutledge, A J. *A Visual Approach to Park Design*. New York: John Wiley and Sons, 1985.
11. Randhawa, M S, *Flowering Trees*, New Delhi: National Book Trust, 1998.
12. Bose, T K and Choudhary, K, *Tropical Garden Plants in Colour*, Horticulture and Allied Publishers, 1991.
13. Krishen, P. *Trees of Delhi: A Field Guide*, Penguin India, 2006.
14. Mukherjee, P, *Trees of India (WWF Natures Guide)*, Oxford, 2008.
15. Sahni, K C, *The Book of Indian Trees (Bombay Natural History Society)*, Oxford, 1998.
16. Krishna, N and Amrithalingam, M, *Sacred Plants of India*, Penguin Books Limited, 2014
17. Motloch, J. L, *Introduction to Landscape Design*, US: John Wiley and Sons, 2001.
18. Dines, N and Harris, C, *Timesavers Standards for Landscape Architecture*, McGraw Hill Education, 1998.
19. Reid, G, L, *Landscape Graphics*, Watson-Guption, 2002.
20. Botkin, D. B and Keller, E. A, *Environmental Science: Earth As a Living Planet*, N Y: John Wiley And Co. 1995.
21. Grosholz, E, *The Poetics of Landscape Architecture*, University of Pennsylvania Press, 2010.

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<b>BUILDING SERVICES III</b>			
Subject Code		3201540 (SS) 3201541 (PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (Lectures = 2 Studio = 2)	4	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	nil
		Viva (External)	nil
		In-Semester exam	30
		End-Semester exam	70
		Total Marks	150
		Total Credits	3

## COURSE OBJECTIVES:

- To comprehend building services as an inclusive part of architectural design process
- To obtain knowledge of technical and design aspects of natural ventilation and HVAC



## **COURSE OUTLINE:**

- Technical and environmental aspects as principles of working, components, construction and materials of natural ventilation and HVAC system
- Functional and aesthetical aspects of services layout for comprehensive architectural design.

## **Teaching Plan:**

### **Unit I: Natural Ventilation**

- 1.1. Indicators for comfortable condition
- 1.2. Wind and stack effects, evaporative cooling
- 1.3. Examples (book/ on site ): Implementation of various methods of natural and composite ventilation system in architectural design

### **Unit II: Mechanical ventilation**

- 2.1. Forced ventilation system
- 2.2. Types of fans and blowers
- 2.3. Mounting, sizes and calculation of fans

### **Unit III: Air-conditioning system 1**

- 3.1. Principles of air-conditioning system
- 3.2. Components of air-conditioning system

### **Unit IV: Air-conditioning system 2**

- 4.1 Types of conventional systems of air-conditioning
- 4.2 Non-conventional systems of air-conditioning

### **Unit V: Air-conditioning 3**

- 5.1 Air-conditioning layout calculation
- 5.2 Air-conditioning layout design

### **Unit VI: Air-conditioning 4**

- 6.1 On site case study: Air-conditioning system

## **SESSIONAL WORK: (with marking scheme)**

- Tutorials for four Units (I to IV): 25% marks
- Layout of air-conditioning (preferably architectural design of the earlier semester to be considered): 50% marks
- On site Case study: 25% marks

## **REFERENCE BOOKS**

1. Tricomi, Ernest. *ABC of Air-conditioning*. 1970
2. Smith, Philips & Sweeney. *Environmental Science*
3. Daniels, Klaus. *Advanced Building Systems – A Technical Guide for Architects and Engineers*. Birkhauser, Boston. 2003
4. National Building Code of India

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<b>History of Architecture IV</b>			
SubjectCode		3201542 (SS)	
TeachingScheme		ExaminationScheme	
TotalContact Periodsperweek (lectures=2, Studio=1)	3	Sessional(Internal)	25
		Sessional(External)	25
		Viva (Internal)	nil
		Viva (External)	nil
		In-semester exam	nil
		End Semester exam	nil
		TotalMarks	50
		Total Credits	2

### **COURSE OBJECTIVES:**

- To understand the architecture and architectural discourse in the nineteenth and twentieth centuries and the various factors like industrialization, modernity, wars, global-local concerns, etc. that shaped it.
- To get acquainted with various important architectural works and the contribution and role of individual designers that distinctively marked the course of architecture in the nineteenth and twentieth centuries.

### **COURSE OUTLINE:**

- The course intends to present architecture as a product of its times especially with reference to the salient socio- political, cultural, economic and technological markers of the nineteenth and twentieth centuries. It also intends to bring out the plurality of approaches as a response to the above contexts and examine the different strands of architectural practice and works that developed as a result.
- The study should include examples of architectural works and designers drawn from across the world wherever relevant and necessary while also emphasizing the happenings in India.
- The course should inculcate an analytical thinking about architecture, introduce various theoretical positions, and train the students to research and isolate a thought of their own.

#### **Unit 1: Architecture of the Industrial Period**

Revivalism

Introduction of steel and glass as new materials in architecture

New building types

Reactions to Industrialization: Arts and Crafts, Art Nouveau

#### **Unit 2: Architecture of the Twentieth Century**

Stylistic explorations: Expressionism, De Stijl, Art Deco, etc.

Influences like various manifestoes, congresses, writings, Bauhaus

Modernism and International style

Experiments and explorations around the world

Development of the high-rise

Influential Designers: Frank Lloyd Wright, Mies van der Rohe, Le Corbusier, Louis Kahn, etc.

#### **Unit 3: Architecture of India**

Colonial architecture: European Revivalist and Indian adaptations

Search for a National idiom: Claude Batley to G BMhatre

Indian Modernists: AchyutKanvinde, Charles Correa, BalkrishnaDoshi, etc.

Influence of Indian works of international architects

**SESSIONAL WORK:**

The sessional work shall comprise of individual/ group work of the students completed under the guidance of the subject teacher as follows:

1. Journal: Hand written notes and manually drawn sketches of relevant examples of most of the contents mentioned above. Journal is an individual work. 20 marks
2. Project work: An exploratory or critical report/ graphical presentation/ analytical models/ tutorials/ etc. based on any relevant topic from the contents mentioned above. Project work could be undertaken in groups such that the contribution of individual students in the group is identifiable. 30 marks

**REFERENCE BOOKS**

1. Bhatt, V., & Scriver, P. (1990). *Contemporary Indian Architecture- After the Masters*. Ahmedabad: Mapin Publishing.
2. Chhaya, N. (Ed.). *Harnessing the Intangible*. New Delhi: National Institute of Advanced Studies in Architecture.
3. Ching, F. D. (1997). *A Visual Dictionary of Architecture*. New York: Van Nostrand Reinhold.
4. Correa, C. (2010). *A Place in Shade*. Delhi: Penguin Books.
5. Curtis, W. (1988). *Balkrishna Doshi- An Architecture for India*. New York: Rizzoli International.
6. Curtis, W. J. (1996). *Modern Architecture Since 1900*. London: Phaidon Press.
7. Dhongde, S., & Sahasrabudhe, C. (Eds.). (2009). *Achyut Kanvinde*. Pune: BNCA Publication Cell.
8. Didee, J., & Gupta, S. (2013). *Pune - Queen of Deccan*. Pune: INTACH Pune Chapter.
9. Dwivedi, S., & Mehrotra, R. (2008). *Bombay Deco*. Mumbai: RMA Architects.
10. Ford, E. R. (1997). *The Details of Modern Architecture*. MIT Press.
11. Frampton, K. (1992). *Modern Architecture- A Critical History*. London: Thames and Hudson Ltd.
12. Jain, K. (2012). *Architecture- Concept to the Manifest*. Ahmedabad: AADI Centre.
13. Kagal, C. (Ed.). (1986). *Vistard- The Architecture of India*. Bombay: The Festival of India.
14. Kanvinde, A., & Miller, H. (1969). *Campus Design in India*. Topica-rosens/American Yearbook Co.
15. Lang, J., Desai, M., & Desai, M. (1997). *Architecture and Independence: The search for identity, India- 1880 to 1980*. New Delhi: Oxford University Press.
16. Pallasmaa, J. (2009). *The Thinking Hand : Existential and Embodied Wisdom in Architecture*. London: John Wiley and Sons Ltd.
17. Pandya, Y. (2013). *Concpets of Space in Traditional Indian Architecture*. Ahmedabad: Mapin Publishing.
18. Pandya, Y., & Foundation, V. S. (2007). *Elements of Space Making*. Ahmedabad: Mapin Publishing Pvt Ltd.
19. White, S. (1995). *Building in the Garden: Architecture of Joseph Allen Stein in India and California*. Delhi: Oxford India Paperbacks.
20. Wolfe, T. (1981). *From Bauhaus to Our House*. New York: Farrar Straus Giroux.

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<b>WORKING DRAWING II</b>			
Subject Code		3201543(SS)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=2, Studio=2)	4	Sessional (Internal)	50
		Sessional (External)	50
		Viva (Internal)	Nil
		Viva (External)	Nil
		In-semester exam	nil
		End Semester exam	nil
Total Marks		100	
Total Credits		3	

### **COURSE OBJECTIVES:**

- To Introduce idea of Design Development and detailing and its relevance in converting 'concept design' to working drawing and hence the realization of design on site.
- To imbibe further the importance of working drawings as an essential tool for effective site execution and execution of a building contract.
- To expose to the standard methods, conventions, drawing annotations including International standards, IS codes, its application in working drawing set with material and component and schedules.

### **COURSE OUTLINE:**

- Lecture demonstration/s to elaborate on standard practices, conventions, graphic annotations, sequencing and cross reference systems of a good working drawing set.
- Design development and detailing of own **design** to resolve the design idea to one which can be executed/ constructed, exposing students to construction parameters, limitation and sequencing.
- Generating a working drawing set for the **chosen design/ building** with framed/composite construction including schedules of material, finishes, components and accessories
- Developing and drafting details of Civil work and furniture including schedule of finishes

### **SESSIONAL WORK:**

- Preparing a manually drafted/ CAD generated **working drawing** set of 'own design project' with carpet area not less than 250 Sq. M. and at least Ground plus one storied building having framed/composite construction. **The set to also include** at least two civil details out of following.

- I. Façade / skin of the building with fenestration and weather protection.
- II. Stairway/ staircase
- III. Public Washroom

And

Any one detail related interior finishes/ custom made furniture of following

- IV. Floorings,
  - V. False ceiling
  - VI. Paneling or partitions
  - VII. Built in or stand alone furniture
- A rough folio comprising of design development drawings, sketches supporting the final working drawing set shall be retained by the candidate.

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DRAFT SYLLABUS FOR APPROVAL OF FACULTY

# **Third year 2015 Pattern**

## **Semester VI**

DRAFT SYLLABUS FOR APPROVAL OF FACULTY

## DESIGN VI

<b>Design VI</b>			
Subject Code		3201544(SV),3201545(PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week= 11 (lectures=3, Studio=8)	11	Sessional (Internal)	100
		Sessional (External)	100
		Viva (Internal)	25
		Viva (External)	25
		In-semester exam	nil
		End Semester exam	100 [12 hours duration – to be conducted 6 hours for two days en-lodge]
		Total Marks	350
		Total Credits	7

### COURSE OBJECTIVES:

- Designing a building by stacking of different functions vertically and addressing various concerns such as coordinating various building services, vertical circulation, basement parking, and structural grids with introduction to disaster management design strategies/techniques and universal design.

### COURSE OUTLINE:

- Introduction to various concerns of building design in an urban context on sites with limited areas there by necessitating multi storied buildings.
- Strengths and weaknesses of horizontal vis a vis vertical spatial arrangements in buildings.
- Study of buildings in which vertical arrangements are desired.
- Design and layering of different activity areas with different spatial scales.
- Coordination of various building services such as water supply, lifts, drainage, garbage disposal, lighting, air conditioning etc.
- Exposure to natural disaster management or disaster management through design mitigation.
- Exposure to Universal Design or Accessible Design concept.

### SESSIONAL WORK:

- A major design project of duration 10-12 weeks of a building complex. Example : Hotel, Hospital, Office building, commercial complex, bus station etc.
- A minor design project of duration 4-6 weeks which could be stand alone building on a site with area not less than 1500 sq.m. It is recommended that the minor project may be programmed to integrate knowledge of art-architecture history, contemporary art-architecture movements learnt by the student in history / contemporary architecture seminar.
- One time bound project of duration around 12 hours. The typology and scale of the project can be decided by the college.

**Important Note :** At least one of the two projects [major or minor] mentioned above has to be in a different socio geographic context. The design has to be communicated through architectural graphics, two and three-dimensional sketches, models and narratives. All the design projects must have different sites.

## REFERENCE BOOKS

It is strongly recommended that students refer books focusing on various building types, journals, magazines to widen their knowledge of design and the readings not to be limited to the list of books given below.

1. Correa, C. (2010). *A Place in Shade*. Delhi: Penguin Books.
2. Kanvinde, A., & Miller, H. (1969). *Campus Design in India*. Topeka: ostens/American Yearbook Co. .
3. Lynch, K. (1962). *Site Planning*. MIT Press.
4. Pandya, Y., & Foundation, V. S. (2007). *Elements of Space Making*. Ahmedabad: Mapin Publishing Pvt Ltd.
5. White, S. (1995). *Building in the Garden: Architecture of Joseph Allen Stein in India and California*. Delhi: Oxford India Paperbacks.

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<b>Building Technology and Materials-VI</b>			
Subject Code		3201546(PP), 3201547(SV)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=3, Studio=4)	7	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	25
		Viva (External)	25
		In-semester exam	30
		End Semester exam	70
		Total Marks	200
		Total Credits	5

## COURSE OBJECTIVES:

- To understand the construction of basement along with its waterproofing, provision for access and ventilation details. To understand the construction of different types of retaining walls and the detailing of the same.
- To understand issues and construction of earthquake resistant frame structures.
- To understand the concept of modular co-ordination and industrialized building construction along with precast technology.
- Introduction to steel structures and detailing of trusses and deck floors.

## COURSE OUTLINE:

**Unit-1:** Characteristics, Properties and types of following materials and their application in buildings.

- a) Glass
- b) Metal & Metal alloys
- c) Plastics and rubbers
- d) Adhesives and sealants

**Unit 2:** Earthquake resistant frame structures.

1. Ductility and Rigidity of building and earthquake loads
2. Overview of earthquake resisting structural systems.
3. Application of Moment resisting frames, crossed braced frames and shear wall for Earthquake resistance structures.
4. Role of Floor and Roof Diaphragm in earth quake resistance.
5. Retrofitting and base isolation.

**Unit-3:** Single basement construction along with waterproofing details, alternative ways of providing and constructing access and provisions to be made for ventilation.

**Unit-4:** Retaining wall and its terminology (mass/gravity retaining, cantilever retaining, counter-fort retaining wall and precast retaining wall, etc.)

**Unit 5:** Steel structures -

- a) Structural steel sections, Built-up sections.
- b) Assembly of steels structure with trusses with north light truss (Industrial building)
- c) Multi-storey steel building assembly with stanchion, beams and metal deck flooring.

**Unit 6:** Modular co-ordination and Industrialized building construction, Planning and construction details.

1. Precast floor and roof construction along with the following systems developed by CBRI.
2. Floor and roof construction using partially precast planks and joist.
3. Floor and roof construction using precast Waffle unit.
4. Introduction to locally available proprietary Precast systems.

**SESSIONAL WORK:**

Unit-1: Compilation of market surveys in form of relevant hand drawn sketches, notes and tabulated information regarding; available types, commercial sizes, properties, unit of measurement, rates etc.

Unit-2: Sketches and notes in the journal.

Unit-3: Manually drafted scaled drawings of Single and multi-basement construction with various types of waterproofing Techniques. Information on materials and methodology for waterproofing should be included in the journal.

Unit4: Sketches and notes in the journal.

Unit5: Manually drafted scaled drawings of various steel trusses, north light truss etc with details of fixing of roofing sheets and sheet cladding. Details of multi-storied steel structure with construction of steel deck and steel staircase.

Unit6: Manually drafted scaled drawings of modular coordinated building using precast building components. Sketches and notes in the journal.

**REFERENCE BOOKS**

1. Central Public Work Department, Indian Building Congress. Handbook on Seismic Retrofit of Buildings. Narosa Publishing House. 2008 Andrew Charleson. Seismic Design for Architects: Outwitting the Quake. Elsevier Ltd 2008
2. Terri Meyer Boake. Understanding Steel Design: An Architectural Design Manual. Birkhauser Basel 2012.



3. Stephen Emmitt. Barry's advanced construction of buildings. Wiley, 2006
4. Central Public works Department CPWD), IBC, CEAI & CCPS. Guidelines on use of Glass in Buildings - Human Safety.
5. Mackay J.K. Building Construction vol.-1-4. Longman Scientific & Technical, 1988.
6. IS 7921 : Recommendations for modular coordination in building industry Horizontal coordination
7. IS 7922 : Recommendations for modular coordination in building industry Vertical coordination
8. M. M. Mistry. Modular coordination & prefabrication, Principles of Modular Coordination in building.
9. BMTPC. Standards & Specifications for Cost-Effective Innovative Building Materials and Techniques. BMTPC 1996

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THEORY OF STRUCTURE VI			
Subject Code		3201548(PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=2)	3	Sessional (Internal)	nil
		Sessional (External)	nil
		Viva (Internal)	nil
		Viva (External)	nil
		In-semester exam	30
		Semester exam	70
		Total Marks	100
		Total Credits	2

DRAFT SYLLABUS FOR APPROVAL OF FACULTY

#### COURSE OBJECTIVES:

1. Types of RCC retaining walls and their use.
2. Different types of liquid retaining structures and their structural detailing.
3. Design of Steel structure elements by L.S.M.
4. To Develop in Students the Feel for **Structural Principles** and their Relates to Building Design
5. To Develop in Students the Concept that **"Every Structure is a System that Forms the Space"** and the fact that **Architecture and Structure cannot be conceived independently.**
6. To Develop in Students the fact that Structural Engineering is a Specialist Discipline and that the Architect has to appreciate the consultant's concern and make an **informed** choice about the most appropriate Structural System for his Building with Reasonable Understanding of its **Economic and Operational Implications.**
7. To Develop in Students the Mathematical logic that would enable him to Design the Structural System for Ground +2l Storey R.C.C Structure and a medium span Factory Building in steel.
8. To instill in the Students a Confidence that they could develop and explore a Structural System of their own design and execute the same.

## COURSE OUTLINE:

### Unit 1: Retaining Walls

**R.C.C Cantilever Retaining Wall** - Proportioning and Need. **Numerical** on Stability and Design of Stem Reinforcement: **Theory only**. Detailing of Base Reinforcement, Shear Key, Retaining Wall without Toe and without Heel

1. **Counter Fort and Buttress type Retaining Walls** – **Theory only** on parts and Structural Action and Reinforcement Detailing
2. **Theory only** on Weep Holes and Effects of Surcharge on Retaining Walls

### Unit 2: R.C.C Water Tanks and Portal frames: *Theory only*:

#### a. Water Tanks

1. Joints in Water Tanks, Minimum Percentage of Steel, Other Standards.
2. R. C.C. Circular Water Tank with Flexible and Rigid Joint between Wall and Base -Concept of Hoop Tension – Reinforcement Detailing.
3. R. C.C. Square and Rectangular Water Tanks -Reinforcement Detailing.
4. R.C.C. Under-Ground Water Tanks - Pressure Conditions -Reinforcement Detailing.
5. Over Head Water Tank - An Intze Tank - Parts and General Detailing

#### b. Portal Frames: *Theory only*:

1. Basic Concept - Rigid, Two Hinged and Three Hinged Portal Frames with B.M.D.
2. Advantages and Disadvantages of R.C.C Portal Frame - Detailing of Hinged and Pinned Column to Footing Junction.
6. Advantages and Disadvantages of Steel Portal Frame - Detailing of Hinged and Pinned Column to Footing Junction, Rigidity at Beam to Column Junctions.

### Unit 3: Design of RCC structure:

- a) Total review of design of ground + two storied RCC building.
- b) Defining Structural system, different loads, Design sequence, transfer of load, actual design procedure.
- c) Understanding structural schedules and drawings.
- d) R.C.C Detailing- Diagrams from Schedules: Sketching Based on Given Schedule

### Unit 4: Design of Steel Structures

#### 1. Introduction to Limit State in Steel i.e. Plastic Design in Steel:

- a. **Theory only** on Yield Strength, Ultimate Strength, Partial Factors of Safety for Yield and Ultimate Strength, Shear, Load as per I.S.800 2007
- b. **Numerical** on Design on Steel Beams for Flexure, Shear and Deflection. Plastic Flexure Diagram,  $Z_p$  (Section Modulus Plastic). Classification of Sections as Plastic, Compact and Semi Compact.
- c. **Numerical** of Analytical type in Increasing the Strength of a Beam Section by adding Flange Plates.
- d. **Theory only** on Castellated Girders, Plate Girders and Gantry Girders.
- e. **Numerical** on Design of Stanchions in Limit State and **Analytical Numerical** on Stanchion with Flange Plates to Increase Their Strength:
- f. **Numerical** on Design of Compound Stanchions - Design and Analytical Problem.
- g. **Theory only** on Lacing and Battening Systems – I.S. Provisions – Need and Sketches.

h. **Theory only** on Moment Resisting Columns – for wind load and gantry load.

**Unit 5: Elements of a Factory Building in Steel Structures:**

- a) Total review of design of medium span factory building in steel.
- b) Structural systems, different loads, Design sequence, transfer of load, actual design procedure.
- c) Understanding structural drawings.

**Unit 6: Advance structural systems for long span and high rise buildings**

1. Long span structural systems like, cable structure, arches, shell, dome, vaults, folded plate, geodesic domes, space frames, tensile structure, fabric etc
2. Appropriate use of structural system in Architectural design.
3. Advantages and disadvantages of different systems.
4. High rise buildings structural system like Rigid frame, Framed truss, Framed tube, Tube in tube, Shear wall etc.

**References :**

1. R.C.C. design – Khurmi, Punmia, Sushilkumar.
2. Design of steel structures- L. S. Negi., Vajrani-Ratwani.
3. Structure in Architecture – Salvadori and Heller.
4. Structural Decisions.- F. Rosenthal
5. I.S. 456, I.S. 800, I.S. 875, I.S. 1893, I.S. 13920

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DRAFT SYLLABUS FOR APPROVAL OF FACULTY

<b>LANDSCAPE ARCHITECTURE II</b>			
SubjectCode		3201549(SS)	
TeachingScheme		ExaminationScheme	
TotalContact Periodsperweek (lectures=1, Studio=3)	04	Sessional(Internal)	25
		Sessional(External)	25
		Viva (Internal)	nil
		Viva (External)	nil
		In-semester exam	nil
		End Semester exam	nil
		TotalMarks	50
		Total Credits	2

**COURSE OBJECTIVES:**

- To study use of Landscape design as a tool to address environmental concerns in Architecture.
- Application of site planning principles in integrated design of open and built spaces.
- To study the work of Master Landscape Architects and their contribution to built environment.

**COURSE OUTLINE:**

- **Unit 1.** Study of Works of Master Landscape Architects like Humphrey Repton, Andre Le Notre, 'Capability' Lancelot Brown, William Kent, Sir Geoffrey Jellicoe, Fredrick Law Olmstead and Calvert Vaux, Ian Mcharg, Lawrence Halprin, Gertrude Jekyll, Edwin Lutyens, Dan Kiley, Luis Barragan, Bernard Tschumi, Peter Walker, Martha

Schwartz, Robert Burle Marx, Geoffrey and Bevis Bawa, Ram Sharma, Mohammad Shaheer, Ravindra Bhan, Prabhakar Bhagwat, etc. and contemporary landscape projects.

- **Unit 2.** Introduction to site services like lighting and water management to be integrated in the landscape design project II.
- **Unit 3.** Landscape design Project : Essentially related to III Year Architectural Design studio (sem V / VI) which demonstrates application of all studied theory units.

### SESSIONAL WORK:

- Assignment based in the form of drawings /report/ presentation on theme based topics from Unit 1 wherein the students are encouraged to critically appraise the works of the landscape architects, understand various design approaches, undertake comparative studies, region specific design language etc. Duration 4-6 weeks.
- Portfolio comprising of drawings , views, model (optional) representing built and open space relationship, circulation (vehicular and pedestrian) parking, levels , schematic planting, schematic site services, material palette , nomenclature of outdoor spaces. All the theoretical aspects in Semester V and VI must be applied in this Landscape design Project II. Duration 10-12 weeks.

### REFERENCE BOOKS

1. Mcharg, I, *Design with Nature*. John Wiley and co. 1978.
2. Jellicoe, G and Jellicoe, S, *The Landscape of Man*, London: Thames and Hudson, 1991.
3. Simonds, J .O, *Landscape Architecture: The Shaping of Man's Natural Environment*, N Y: McGraw Hill Book Co.Inc. 1961.
4. Lynch, K, *Site Planning*, Cambridge: The MIT Press, 1962.
5. Shaheer, M, Wah-Dua, G and Pal A (editors), *Landscape Architecture In India. A Reader*: LA, Journal of Landscape Architecture, 2013.
6. Lyall, S, *Designing The New Landscape*: UK:Thames and Hudson, 1998.
7. Dee, C, *Form And Fabric In Landscape Architecture: A Visual Introduction*, UK: Spon Press, 2001.
8. Eckbo, G, *Urban Landscape Design*, N Y: McGraw hill co. 1961.
9. Laurie, M, *An Introduction to Landscape Architecture*, N Y: American Elsevier Pub. Co. Inc. 1975
10. Rutledge, A J. *A Visual Approach to Park Design*. New York: John Wiley and Sons, 1985.
11. Randhawa, M S, *Flowering Trees*, New Delhi: National Book Trust, 1998.
12. Bose, T K and Choudhary, K, *Tropical Garden Plants in Colour*, Horticulture and Allied Publishers, 1991.
13. Krishen, P. *Trees of Delhi: A Field Guide*, Penguin India, 2006.
14. Mukherjee, P, *Trees of India (WWF Natures Guide)*, Oxford, 2008.
15. Sahni, K C, *The Book of Indian Trees (Bombay Natural History Society)*, Oxford, 1998.
16. Krishna, N and Amrithalingam, M, *Sacred Plants of India*, Penguin Books Limited, 2014.
17. Motloch, J. L, *Introduction to Landscape Design*, US: John Wiley and Sons, 2001.
18. Dines, N and Harris, C, *Timesavers Standards for Landscape Architecture*, McGraw Hill Education, 1998.
19. Reid, G, L, *Landscape Graphics*, Watson-Guptill, 2002.
20. Botkin, D. B and Keller, E. A, *Environmental Science: Earth As a Living Planet*, N Y: John Wiley And Co. 1995.
21. Grosholz, E, *The Poetics of Landscape Architecture*, University of Pennsylvania Press, 2010.

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<b>BUILDING SERVICES IV</b>			
Subject Code		3201550 (SS) 3201551(PP)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (Lectures = 2 Studio = 2)	4	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	nil
		Viva (External)	nil
		In-Semester exam	30
		End-Semester exam	70
		Total Marks	150
		Total Credits	3

### **COURSE OBJECTIVES:**

- To understand building services as integral part of comprehensive architectural design
- To obtain knowledge for fire safety measures and aspects of good acoustics and treatment in comprehensive architectural design

### **COURSE OUTLINE:**

- Fire fighting: Active and passive criteria as norms, recommendations, components, and specifications of construction and materials used for fire-fighting system in a building
- Acoustics: Properties of sound, Technical aspects of acoustic layout for comprehensive architectural design.
- Comprehensive architectural design for both fire fighting and acoustics

### **Teaching Plan:**

#### **Unit I: Fire Fighting I**

- 1.1. Fire triangle, Causes and spread of fire in buildings, fire resistance
- 1.2. Active control systems of fire: fixed and portable fire fighting equipments

#### **Unit II: Fire Fighting II**

- 2.1. Passive control of fire: fire safety codes, rules and regulations

#### **Unit III: Acoustics I**

- 3.1. Properties and defects of sound
- 3.2. Parameters for good acoustical condition of a room

#### **Unit IV: Acoustics II**

- 4.1. Noise control methods for air-borne and structure-borne noises
- 4.2. Acoustical materials and construction
- 4.3. Sound amplification system

#### **Unit V: Acoustics III**

- 5.1. Reverberation time calculation and recommendations for acoustical treatment
- 5.2. Acoustical treatment Layout design

## SESSIONAL WORK:

- Tutorials for four Units (I to IV): 25% marks
- Reverberation Time calculations and recommendations for acoustical treatment with layout (preferably architectural design IV of the earlier semester to be considered): 50% marks
- Live case study: 25% marks

## REFERENCE BOOKS

5. Leslie, Doelle. *Environmental Acoustics*. McGraw Hill.1972
6. Kundsen, V.O. & Harris, C.M. *Acoustical designing in Architecture*. John Wiley. 1950
7. Egan, M. David. *Architectural Acoustics*. McGraw-Hill, NY.1988
8. Mehta, Madan, Johnson, J., Rocafort, J. *Architectural Priciples and Design*. Prentise\_Hall, NJ. 1999
9. National Building Code of India

CONTEMPORARY ARCHITECTURE SEMINAR			
Subject Code		3201552 (SS)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1, Studio=3)	4	Sessional (Internal)	25
		Sessional (External)	25
		Viva (Internal)	-
		Viva (External)	-
		In-semester exam	nil
		End Semester exam	nil
		Total Marks	50
		Total Credits	3

## COURSE OBJECTIVES:

- To establish a critical and comprehensive viewpoint about the contemporary trends/approaches in architectural production in terms of design, practices, its perception, appreciation and critical discourses.
- To develop the ability in students to position themselves in today's time so as to be able to establish an argument and testify the same.

## COURSE OUTLINE:

- Course aims at critical inquiry into the contemporary (post 1980s) thought processes involved in architectural production, its perception and appreciation.
- Seminar should encourage students to assess and establish their relevance and/or validity in today's context.
- Though it's a seminar course, subject teachers are advised to take introductory lectures about today's (post 1980s) trends, various critical discourses and current architectural issue so as to put students in the frame of critical thinking.

## SESSIONAL WORK:

Each student to write a paper of about 1500-2000 words critically discussing or deliberating the current phenomenon in architecture especially related to its production and appreciation. Preferably paper should be focusing on local and regional issues in architecture. This paper to be presented at the end of the semester orally with the help of computer media as required.

Students should be encouraged to write this paper manually and to follow the formalities of writing a paper in terms of references and acknowledgements.

Students should be assessed primarily for the identification of issues, ability to take position and development of an architectural argument.

## REFERENCE BOOKS

1. Hays, K. Michael. *Architecture Theory since 1968 (2000)*. MIT Press., Oct 1997, Feb. 2000.
2. Buchanan, Peter. "*The Big Rethink*". *The Architectural Review (AR)*, (Articles – December 2011, January to May 2012, July – September 2012, November 2012)
3. Leach, Neil. *Anaesthetics of Architecture*, MIT Press, 1999
4. Plasmas, Juhani. *The Eyes of the Skin: Architecture and the Senses*. Academy Press, 2 edition, 2005
5. Correa, Charles. *A Place in the Shade: The New Landscape and Other Essays*. Penguin Books India, 2010.
6. Mehrotra, Rahul. *Architecture In India: Since 1990*. Pictor Publishing, 2007.

# DRAFT SYLLABUS FOR APPROVAL OF FACULTY

<b>ELECTIVE I – INTERIOR DESIGN</b>			
Subject Code		3201553(SS)	
Teaching Scheme		Examination Scheme	
Total Contact Periods per week (lectures=1,Studio=2)	03	Sessional (Internal)	25
		Sessional(External)	25
		Viva	NIL
		In-semester exam	nil
		End Semester exam	nil
Total Marks		50	
Total Credits		2	

## COURSE OBJECTIVES:

- To enable students to comprehend relationship between Architecture and Interior Design as a Space making disciplines.
- To evolve understanding about thoughtful design of interior spaces & how it can increase efficiency and add depth and meaning to the built environment.
- To enable students to comprehend the connection that the subject of Interior design has with other Design Disciplines like Conservation, Preservation, Restoration, Sustainability, Art ,Product design and Graphic design.

## **COURSE OUTLINE:**

Individual College may offer topics depending upon the availability of experts and resource material. The colleges will have the opportunity to focus on a particular group of topics according to the overall philosophy and mission statement of the College. The probable Interior Design elective topics are – [the list is only suggestive and individual colleges can frame newer topics which meet the course objectives].

- Exhibition Design
- Set Design
- Commercial & Office Space Design
- Residential Interiors
- Specialized interiors – Hospitals, Laboratories, Auditoriums, Gymnasiums.
- Furniture Design
- Product Design
- Graphic Design
- Retrofitting of Buildings

## **SESSIONAL WORK:**

The faculty is expected to set out the broad contour and sub aspects (including basic principles, case studies, application in building projects etc.) of the particular elective and conduct input and demonstration interactions and define the nature of the sessional work to be done by the students.

The students are expected to present the work done in an **A4 report format of 20 pages**, to include summary of interactions and sessional work prescribed by the faculty with a signed certificate from the concerned Teacher / Expert stating that the study was carried out under his /her guidance and countersigned by the Principal / Academic coordinator.

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