VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

SCHEME OF TEACHING AND EXAMINATION OF VI SEM B.ARCHITECTURE (CBCS - 2015 SCHEME)

Sl. No.	Subject Code	Title of the Subject	Teaching Scheme in Periods per Week (50 Mts)				Examination Scheme					Credits
			Lecture	Studio	Pract	Total	Dur (hrs)	Theory Marks	Prog. Marks	Viva Marks	Total	
1	15 ARC 6.1	Architectural Design-VI	-	9	-	9	-	-	150	150	300	7
2	15ARC 6.2	Materials and Methods in Building Construction-VI	1	5	-	6	4	100	50	-	150	4
3	15ARC 6.3	Building Services III	3	-	-	3	3	100	50	-	150	3
4	15ARC 6.4	Contemporary Architecture	3	-	-	3	3	100	50	-	150	3
5	15ENG 6.5	Building Structures-VI	2	2	-	4	-	-	75	75	150	3
6	15 ARC 6.6	Landscape Architecture	3	-	-	3	3	100	50	-	150	3
7	15 ARC 6.7	Working Drawing II	-	5		5	-	-	100	-	100	2
8	15ARC 6.8	Elective IV (any one)										
		a) Culture and Built Environment	3			3			50		50	2
		b) Geographical Information System	3			3			50		50	
		c) Design of High-Rise Buildings	3			3			50		50	
9	15ARC 6.9	Study Tour	-			-	-	-	50	-	50	2
			12 or 15	21 or 24	0 or 3	36	-	400	575	225	1250	29

ARC= Architectural Subjects ART= Art Subjects ENG = Engineering Subjects HUM = Humanities Subjects.

No. of Subjects/Heads = 09 No. of Theory Examinations = 04

Progressive Marks to be awarded by the subject teacher.

Minimum Marks for passing: Progressive Marks 50%, Theory Marks and viva marks 40% in each. ENG 6.5 min. pass 38 out of 75.

15ARC 6.1 – ARCHITECTURAL DESIGN - VI

CONTACT PERIODS: 9 (Studio) per week
PROGRESSIVE MARKS: 150
VIVA MARKS : 150

OBJECTIVE: *To enable the students to integrate design with history, theory, building construction and material science in a more informed way.*

OUTLINE:

To understand the role of built environments of increasing complexity by:

a) Intrinsic factors: Size, volume, levels, functional spaces or zones, structural possibilities
b) External factors: site, approach, traffic, ecology, services
c) Constraints: bye-laws, budget, ideology, attitudes
d) Create an ' Identity' to the Campus through integration of the above.

MODES OF STUDY:

The aim of the studio is to explore STRUCTURING: structuring of a research or a case study, structuring of the program, spatial structuring and informal structuring.

Structuring of research: Case studies, reading material and site studies have to be a directed exercise with the involvement of tutors where visiting the project of concern would be of utmost importance. This studio is also about how one organizes research. It should be mandatory to use analytical models, diagrams to understand the chosen case study in terms of Design Intent, site and spatial structuring. There needs to be emphasis on Graphical consistency and legibility of the study. It is recommended to add a reading list as part of the studio to further enrich this discussion about institutions. Once a week, students could be asked to present the case studies and selected readings to the class.

Structuring program: Studying requirements from various point of views which include relationship between requirements and values, requirements and phenomenology, area of the site and functional area requirements, issues of public and private domains, open and closed spaces, interrelationship between the various components, formal and informal, service requirements, relationship between whole and the part, requirement and climate etc. information resulting from this exercise becomes the individual's program for the project which can then lead to structuring of space.

PROJECTS

a). One major project and one minor/time project to be tackled in the semester. Institutional projects like facilities of higher learning, such as, Engineering college campus, medical college campus, management institute campus, hotel management institute, Law college campus, Dental college campus, Nursing college campus, Juvenile Correction Centre, etc.

b). The minor project could include a case study documentation of the project proposed for the design intervention. This work could be done in a group and as part of its findings shall be an outline program to be a major project.

In view of the current urban contexts where land is precious and resources are scarce, the project could also be institutional buildings on a small urban plot, on multiple levels and still engage with its context and establish an environment within that captures the essential nature of an institution. However, Project selection is left to the discretion of the tutors.

Project work could be done in 5 stages of activity jointly with research and analysis.

1. Introduction to the initial design parameters which include choice of:
    a. Geography/situation (context)
    b. Constraints (bye-laws, budget, ideology, attitudes, etc.)
2. Spatial structuring: To understand spatial structuring as a set of logical operations after an analytical understanding of the site, surroundings, program and intent expressing diversity of program and its resulting spatial variety and the relationship between the built and the unbuilt established through movement systems ,linkages and nodes etc.
3. Informal structuring: Architecture is an integrative discipline. Establishment of a structure enables reverse integration with other subjects where the students look beyond their studio offering a mechanism to observe the surroundings and document it, understand history and theory analytically, integrate design with building construction, climatic, environmental and material science in a more informed way.
4. The design exercise shall focus on ideas of scale, engagement (social, economic, political), hierarchy, public/private space, and challenge the students to reflect on these as part of the design development. The emphasis should be to establishing these larger goals as part of the discussion on the nature of an institution.
5. Goal of the studio shall be to see the architect as *instigator* - defining the nature of engagement with the city, through the articulation of the program and its relationship with the context. Studio must provoke students to define clearly their agenda and to think of architecture as an active, live engagement rather than a passive and inert one. By having students spell out a hypothesis it then doesn't matter what the type is. This prepares the students to frame a series of questions to address the problem at hand.

READING AND REFERENCE MATERIAL:

1) Roger H. Clark and Michael Pause, " Precedents in architecture", 1984, John Wiley & Sons.
2) Geoffrey H Baker , "Le Corbusier an analysis of form", 1996, Van Nostrand Reinhold.
3) Herman Hertzberger,"Lessons for students in architecture", 1991, Delft University.
4) Charles Correa , "A Place in shade", 2010, Penguin India
5) Rem Koolhaas, "Conversation with students", 1996, Princeton Architectural Press

15ARC 6.2 – MATERIALS AND METHODS IN BUILDING CONSTRUCTION–VI

CONTACT PERIODS: 6 (1 Lecture + 5 Studio) per week
THEORY MARKS : 100
PROGRESSIVE MARKS : 50
DURATION OF EXAM - 4 Hrs

OBJECTIVE*: To acquaint the students with construction practices pertaining to structural glazing, Metal Cladding and roofing systems and to study constructional systems and detailing of alternative material doors, windows and partition.*

OUTLINE:

MODULE 1

1) **Glass as a building material:** Glass manufacturing in various types like plate, tinted, decorative, reinforced, laminated glass block, fiber glass, glass murals, partially colored glass, etching of glass and its applications in building industry for both exteriors and interiors. Glass fabrication techniques, fiber reinforced composite materials and products.
2) **Frameless glass doors and windows and partitions:** Fixing and fabrication details.

MODULE 2

3) **Structural Glazing and cladding:** Fixing and fabrication details.
4) **Point supported glazing:** Fixing and fabrication details**.**
5) **Introduction to metal cladding:** ACP, Aluminum louvers; Fixing and fabrication details.

MODULE 3

6) Metal cladding of facades and building envelopes: Fixing and fabrication details.
7) UPVC, PVC & FRP: Doors and windows and partitions (Detailing and study of joinery)**.**
8) Wooden sliding and folding doors and partitions: Principles and methods of construction and detailing.

MODULE 4

9) Steel sliding and folding doors and partitions: Principles and methods of construction and detailing.
10) Aluminum sliding and folding doors and partitions: Principles and methods of construction and detailing.

MODULE 5

11) **Skylight in steel and glass:** Principles and methods of construction and detailing.

12) **Alternative wall technologies:** Sandwich panel walls, PUF panels etc.

NOTE : Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material applications in the form of portfolio.

REFERENCES:

1. Francis, D.K. (2008), "Building Construction Illustrated", Fourth Edition, Wiley India Pvt. Ltd.
2. Mackay, J.K. (2015) – Volume 1, "Building Construction", Fourth Edition, Pearson India
3. Roy Chudley (2015) – Volume 1, "Construction Technology" Second Edition, Pearson India
4. Barry R. (1999) – Volume 3 & 4, "The Construction of Buildings", Fourth Edition, East-West Press Pvt. Ltd., New Delhi.
5. Lyons Arthur (2014), "Materials for Architects and Builders", Fifth Edition, Routledge.
6. Varghese P.C. (2015), "Building Materials", Second Edition, PHI Learning Pvt. Ltd.

15ARC 6.3 - BUILDING SERVICES - III
(AIR-CONDITIONING, MECHANICAL TRANSPORTATION and FIRE PROTECTION)

CONTACT PERIODS: 3 (Lecture) per week
THEORY MARKS: 100
PROGRESSIVE MARKS: 50
DURATION OF EXAM: 3 Hrs

OBJECTIVE: *To develop the knowledge and skills required for understanding the mechanical services in buildings and their integration with architectural design.*

OUTLINE:

MODULE 1

MECHANICAL VENTILATION AND AIR-CONDITIONING - Introduction

1) **Introduction to Mechanical Ventilation:** Need for mechanical ventilation for spaces like Basements, Kitchen, Toilets , etc. Guidelines as per NBC / ISHRAE: Types of ventilation systems.

2) **Introduction to Air-conditioning**: Definition, Psychometric processes and requirements, Air & Refrigeration cycles, Basics of Load Calculations, Zoning and Air Distribution, Heating system,

MODULE 2

AIR-CONDITIONING SYSTEMS

3) **Air Conditioning systems:** Window, Split, Packaged, Basics of Centralized Air-conditioning system, Water & Air Cooled Chillers, Air Handling Units, Basics of duct sizing and routing, preferred locations of equipment and Architectural Requirements of various equipment. Illustration of duct layout through a small example.

4) **Specialized Air Conditioning Systems:** Clean Rooms, Server, Hub & UPS Rooms, Operation Theaters etc.

MODULE 3

MECHANICAL TRANSPORTATION SYSTEMS IN BUILDINGS

5) **Elevators:** Types of Elevator systems, design considerations like Peak Handling capacity, Average Waiting Time, Lift speed etc., Architectural Requirements & Details for Elevator shaft - Elevator pit - Elevator Machine Rooms, Automatic Rescue Device for Elevators , Elevator car interiors, Possible Location and arrangements of Elevators in a building. Lift Acts and National Building Code.

6) **Escalators & Travelators:** Applications, Calculation of Traffic capacity, Location and arrangements of escalators and travelators, inclination factor.

MODULE 4

FIRE SAFETY IN BUILDINGS & PASSIVE FIRE PROTECTION

7) **Introduction:** Classification of fire, causes & hazards**;** Grading of structural elements for its fire resistance as per NBC. Classification of building types as per NBC and brief description of characteristics of combustible and noncombustible materials.

8) **Concepts in passive fire protection in buildings**: Escape routes, fire driveways, fire refuge area, fire assembly areas, pressurization, travel distance, fire tower and compartmentation, fire signages etc.

MODULE 5

ACTIVE FIRE PROTECTION AND FIRE SAFETY IN HIGH RISE BUILDINGS

9) **Active fire control:** Basic concepts in fixed firefighting installations, Fire sprinklers, Fire Hydrants, Automatic fire detection and alarm systems.

10) **National Building Code Requirements for Fire Safety**: Rules for Fire Protection and Fire Fighting Requirements for High Rise Buildings in India.

Notes:

Suggested assessments:

A. The subject teacher could arrange for visits to relevant facilities to provide an understanding of the various provisions and integration of air conditioning, vertical transportation and fire safety in buildings. Case study reports could be submitted as group assignments.

B. Conceptual design of air-conditioning systems, mechanical ventilation, mechanical transportation, active & passive fire fighting systems for a high rise building. Ideally the assignment could be integrated with the Architectural Project of ongoing or previous semester.

REFERENCES:

1) Roy J Dossat , "Principles of Refrigeration" 1961, John Wiley & Sons.
2) Manohar Prasad , "Refrigeration & Air Conditioning Data Hand book" 2013, New Age International, 2nd edition.
3) Don Kundwar , "Refrigeration and Air Conditioning", 2016, Dhanpat Rai & Co. (P) Limited.
4) "National Building Code of India (NBC)", 2016, Bureau of Indian Standards
5) Walter T. Grondzik, Alison G. Kwok, "Mechanical and Electrical Equipment for Buildings", 2010; 11th edition, Wiley Publication.
6) Shan K. Wang , "Handbook of Air Conditioning and Refrigeration", 2000, McGraw-Hill Edu.
7) "National Building Code of India (NBC) 2016"; Part 8 Section 3 and 5 & Part 3 & 4, BIS.
8) NFPA 101
9) IS Codes -
- 1391 (Part 1 & 2) : 1992 - Specification for room air conditioners
- 8148 : 2003 - Specification for packaged air conditioners
- 4591 : 1968 - Code of practice for installation and maintenance of escalators
- 14671 : 1999 - Hydraulic lifts
- 14665 : 2000 - Traction lift
- 15259 : 2002 - Home Lifts
- 15330 : 2003 - Lifts for handicapped persons
- IS codes for Fire Services

15ARC 6.4 – CONTEMPORARY ARCHITECTURE
CONTACT PERIODS : 3 (Lecture) per week
THEORY MARKS: 100
PROGRESSIVE MARKS : 50
DURATION OF EXAM : 3 Hrs

OBJECTIVE : *To do a critical survey of contemporary architecture from the 1960s to the present, and to provide an understanding and appreciation of contemporary issues and trends in Indian and western architecture in terms of ideas and directions.*

OUTLINE:

MODULE 1

1. **Architecture in India (Pre independence):** The Architecture of the Princely States of Jaipur, Bikaner and Mysore: Their city examples – clock towers, railway stations, public offices, assembly halls, water systems, public hospitals, etc.
2. **Modern Architecture in India-1**: Architecture in India(Post-Independence): Works of public nature in Chandigarh and Ahmedabad (Legislative Assembly Complex including High Court, Legislative assembly and Secretariat, Chandigarh and Mill Owners‟ Building, Ahmedabad), IIM, Ahmedabad and its significance.
3. **Modern Architecture in India-2:**Ideas and works of BV Doshi (Institute of Indology Ahmedabad, IIM-Bangalore and Gufa, Ahmedabad) and Charles Correa: (RamaKrishna House, Ahmedabad, Kanchen Junga Apartments, Mumbai and MRF Headquarters, Chennai).

MODULE 2

4. **Modern Architecture in India-3:**Ideas and works of Raj Rewal and Uttam Jain (Pragati Maidan, New Delhi and Asian Games Village, New Delhi), Achyut Kanvinde(IIT, Kanpur and Nehru Science Centre, Mumbai), Uttam Jain(Lecture Theatres, Jodhpur and Engineering College, Kota).
5. **Modern Architecture in India-4:**Enrichment of Indian experience- Cost effectiveness and local influences. Lauire Baker and Anant Raje (Centre for Development Studies, Thiruvananthapuram and St. John Cathedral at Tiruvalla) and Anant Raje(IIFM, Bhopal and Management Development Centre, IIM-A).
6. **Parallel trends in Indian architecture;** a) Revivalistic- monumental, Religious b) Experimental-Pondicherry, Belgium embassy, IITB, Sriram Centre Newdelhi c) Vernacular influence-Cost effective concepts.

MODULE 3

7. **Last phase of Modern Architecture: Ideas and works of Richard Meier** (Smith House, Connecticut and Getty Centre, Brent Wood, LosAngeles) and Charles Moore (Architect‟s Own House at Orinda and Piazza d‟Italia, New Orleans), Bernard Tschumi (Kyoto Railway Station Project and Parc de la Villete, Paris).

8. **Ideas and works of Frank Gehry** (AeroSpace Museum, Santa Monica and Guggenheim Museum, Bilbao).

9. **High-tech architecture or Structural Expressionism-1:** An architectural style that emerged in the 1970s: The High-tech architecture practitioners include British architects Sir Norman Foster(Hong Kong Shanghai Bank and Renault Distribution Centre, Swindon, England), Sir Richard Rogers, Sir Michael Hopkins.

MODULE 4

10. **High-tech architecture or Structural Expressionism-2:** The High-tech architecture practitioners include Italian architect Renzo Piano (Pompidou Centre, Paris and Menil Museum, Houston) and Spanish architect Santiago Calatrava (Lyon-Satolas Railway Station and Olympic Stadium at Athens).

11. **Postmodern Architecture**: Development of Postmodernism with its origins in the alleged failure of Modern architecture from 1950s, and spreading in the 1970s and its continuous influence on present-day architecture. Ideas and works of Michael Graves, James Stirling, Robert Venturi etc.

MODULE 5

12. **Hyper theories of Architecture-1:** Development of postmodern architecture in 1980s is the ideas of Deconstructivism including, Frank Gehry (AeroSpace Museum, Santa Monica and Guggenheim Museum, Bilbao), Daniel Leibskind (Jewish Museum, Berlin and World Trade Centre, New York), Rem Koolhas(Dance Theatre, The Hague and Netherlands Sports Museum).

13. **Hyper theories of Architecture-2:** Ideas of Deconstructivism including, Peter Eisenman, Zaha Hadid (The Peak Club, HongKong and IBA Housing Block 2, West Berlin), Coop Himmelb(l)au, and Bernard Tschumi.

REFERENCES:

1) Morgan, Ann Lee & Taylor Colin , “Contemporary Architecture”.
2) Bahga, Bahga and Bahga , “Modern Architecture in India”, 1993, Galgotia Pub. Co.

15ENG 6.5 – BUILDING STRUCTURES - VI

CONTACT PERIODS : 4 (2 Lecture + 2 Studio) per week
PROGRESSIVE MARKS : 75
VIVA MARKS: 75

OBJECTIVE: *Integration of structures with architectural objectives by developing an understanding of building structures and selection criteria for appropriate vertical systems; conceptual design of structures for gravity and lateral wind and seismic loads.*

OUTLINE

1 **Introduction of High Rise Structures.**

2. **Introduction to the Structural design Project**: Design for a 10 story building of dimension 30m X 30m [Suggested Dimension], 35 meter height, 10m X 10m column grid and with service core in the central bay. Calculation of building loads load calculation based on the IS 875 and seismic loads and wind loads and design of gravity and lateral systems.

3. **Gravity loading**: Dead and Live load calculation based on IS 875 (Part 1)and NBC**.**

4. **Seismic loading**: Seismic loading calculation based on IS 1893 Code; Static Analysis Procedure **.**

5. **Wind loading**: Wind loading calculation based on Indian Standard I.S. 875 (Part 3)**.**

6. **Introduction to Lateral Load Resisting System**: The structural systems of buildings designed to withstand lateral loads caused by wind and seismic activity.

7. **Moment resisting frame design:** Design of Moment-resisting 2-dimensional frame assemblies of beams and columns, with the beams rigidly connected to the columns. General moment resisting framing arrangement and sizing and design of beams, columns and slabs for 30m X 30m [Suggested Dimension], 35 meter high building, and basic load path and total structural weight calculation.

8. **Shear Wall System:** Design of Shear walls as lateral load resistance structural systems. Application of lateral loads along the height, transference to the wall by diaphragm slabs in concrete or masonry. General Shear wall framing arrangement and sizing and design of beams, columns/ shear wall and slabs for 30m X 30m [Suggested Dimension], 35 meter high building, and basic load path and total structural weight calculation.

9. **Dual System:** Design of twin structural system typically shear walls (RCC) and beam–column moment frames as combined resistance system to lateral forces. General Dual framing arrangement and sizing and design of beams, columns/ shear wall and slabs for 30m X 30m [Suggested Dimension], 35 meter high building, and basic load path and total structural weight calculation.

10. **Braced frame**: Design of lateral structural system to resist lateral loads (wind and seismic). Braced frames as vertical trusses with members designed to resist in tension and compression due to triangulation in steel or RCC. General Braced frame arrangement for 30m X 30m [Suggested Dimension], 35 meter high building, and basic load path and total structural weight calculation.

11. **Introduction to underground structures:** RCC retaining walls and water tanks, calculation of forces on vertical walls.

Note:

1) Minimum one plate on each loading calculation and vertical structural systems.

2) This course should desirably be conducted involving consulting engineers and architects.

REFERENCE:

1. Martin Bechthold, Daniel L Schodek, "*Structures*"; 2014, PHI Learning Private limited.
2. Francis D.K. Ching, "*Building Structures Illustrated*", 2nd Edition; 2013, John Wiley & Sons.
3. Francis D.K. Ching, "*Building Construction Illustrated*", 4th Edition; John Wiley & Sons
4. Indian Standard Codes - IS456-2000, IS-875 (Part I to IV), IS-1893; National Building Codes, SP-34 Steel detailing.

15ARC 6.6 – LANDSCAPE ARCHITECTURE

CONTACT PERIODS : 3 (Lecture) per week
PROGRESSIVE MARKS : 50
THEORY MARKS: 100
DURATION OF EXAM : 3 Hrs

Objective:

1. *To introduce the students to the discipline of Landscape Architecture.*
2. *To advance analytical and planning skills for Architectural project sites.*
3. *To develop design skills for small landscape projects.*

Course Outline:

Introduction, design philosophies and contemporary approaches to landscape architecture and design are reviewed through various landscape design projects over time while modules on site analysis, site planning, elements of landscape architecture and landscape design process are supported with theoretical inputs.

Mode of study:

i. **Lecture component:** Various landscape design projects to explain the design philosophies, theoretical aspects of site analysis and site planning, element of landscape architecture and design process will be delivered as lecture component.
ii. **Literature study:** Exercise on 'relating architecture and landscape' may be undertaken as a literature study exercise.
iii. **Studio component:** Studio exercises in site analysis, site planning and a small landscape design project.

Module 1: *Introduction to the discipline of landscape architecture*

a. Landscape as a broad terminology, Natural and Man-modified landscapes.
b. Brief history and the growth of landscape architecture as a design and planning profession from gardens to regional landscapes.
c. Scope and nature of professional work in contemporary landscape architecture, changing priorities of disciplinary approach: ecology, biodiversity and sustainability.

Module 2: *Relating Architecture and Landscape, Site analysis and Site planning*

a. Study of architectural response to landscapes and understanding the relation between architecture and landscape through case examples.
b. The idea of site as part of whole/larger landscape, Site inventory and analysis: physical, biological, social contextual studies and layers of site analysis, site suitability analysis, inferences and response for architectural interventions.
c. Design considerations and approaches to site planning, site program, siting of buildings and open spaces, introduction to grading and land modifications, working with sloping sites.

Demonstration of understanding of site analysis and site planning through studio exercise.

Module 3: *Elements of landscape architecture and their application in landscape design*

a. Primary landscape elements: Landform, water and vegetation, Design considerations and their role in articulating outdoor spatial design
b. Secondary landscape elements: Street furniture, landscape walls, paving, inert ground covers, trellis, outdoor shading structures, embellishments, etc. Design considerations and their role in spatial design. Hard and soft landscapes.

Module 4: *Works of noted landscape architects and landscape projects*

a. Eastern landscape philosophies: Chinese and Japanese gardens, Asian landscapes: Mughal and Persian gardens, Western landscape designs: Italian and French gardens, English romantic gardens and American parks, Examples in modern landscape: works of Garret Eckbo, Lawrence Halprin and Peter Latz.
b. Examples of contemporary landscape projects: works of Martha Schwartz , Maya lin, Peter Walker & Partners, Hargreaves Associates, Sasaaki, SWA, Michael Van Valkenburgh, Andropogon Associates, Field Operations, Turenscape etc. Landscape projects in India: works of RavindraBhan, Shaheer Associates etc.

Examples should cover various categories of landscape design such as residential, commercial, institutional, public plaza, water/riverfront and other categories. The content of this module should emphasis on design philosophies, the changing styles and changing priorities of the profession over time.

Module 5: *Landscape Design project*

Demonstration of an understanding of landscape design through simple and small design exercise as studio project. Clarity in design process, detail development and representation of the landscape design scheme is to be emphasized.

NOTE: Studio exercises should be introduced after relevant theoretical inputs are delivered utilizing the contact periods.

REFERENCES:

1. **Laurie, M**. *An introduction to landscape architecture*, Elsevier. 1975.
2. **Motloch, J**. *Introduction to landscape design*, John Wiley & Sons, 2001.
3. **Holden, R &Liversedge, J**. *Landscape Architecture: An Introduction*, Laurence King publishing ltd. 2014.
4. **Girot, C**. *The course of landscape architecture: A history of our designs on our natural world*, Thames & Hudson. 2016.
5. **Simonds, J O**. *Landscape Architecture: A manual of site planning and design*, McGraw-Hill, 1997.
6. **LaGro, J**. *Site Analysis: Sustainable site planning and design*, John Wiley & Sons. 2013.
7. **Birksted, J**. *Relating architecture to landscape*, E&FN Spon. 2004.
8. **Shaheer, M &Dua, G.** Landscape Architecture in India: A reader, LA, Journal of landscape architecture. 2010.

15ARC 6.7 – WORKING DRAWING II

CONTACT PERIODS : 5 (Studio) per week
PROGRESSIVE MARKS: 100

OBJECTIVE: : *Introduction to 'Good for Construction' drawings; Preparation of Structural, Electrical, Water Supply and Sanitary drawings for the project from previous semester; Comprehensive set of drawings.*

OUTLINE:

1. Project Work: Project continued from previous semester; Preparation of structural and services
drawings and details.

2. Structural drawings: Conventions & symbols; Foundations, Columns, Beams, Slab.

3. Electrical drawings: Conventions & symbols; Plans at all levels.

4. Water Supply drawings: Conventions & symbols; Plans at all levels.

5. Sanitary drawings: Conventions & symbols; Plans at all levels; Site Plan, Terrace Plan

6. Mechanical drawings: Conventions & symbols; Plans at all levels; Details of Lift.

7. Complete integration of Architectural, Structural and Services drawings and details.

15ARC 6.8 – ELECTIVE IV

CONTACT PERIODS : 3 (Studio) per week
PROGRESSIVE MARKS : 50

a) CULTURE AND BUILT ENVIRONMENT

Objective:
To sensitise students to culture and behavioral sciences and their influence on design and built environment

Culture is a major attribute of humans with deep evolutionary roots. It has an important role in fostering economic, social and environmental dimensions of development. This elective course explores to gather insight into cultural identity, the nature of culture as it relates to the physical environments and how people shape environments, use them and interact with them.

The course needs to address two primary enquiries:

A. Understand the interrelationship between design and behavioral sciences
B. Understand the contributions to the design field that behavioral sciences have made and can make.

Architect Amos Rapport, well-renowned for his seminal contributions to the field of environmental behavioral studies, raises three questions regarding the relationship between culture and the built environment:

1) What biosocial, psychological, and cultural characteristics of human beings, as members of a species, as individuals, an as members of various groupings, influence (and, in design, should influence) what characteristics of the built environment?.
2) What effects do what aspects of what environments have on groups of people, under what circumstances and why?.
3) Given these two-way interactions between people and environments, what are the mechanisms that link them?.

Guided by Rapport's questions, this course examines the role of culture in shaping built environment that varies with the type of environment, over time, for different groups, in different situations and contexts with the help of comparative studies of built environments across Indian subcontinent, South Asia and Latin Americato understand the intersections of cultural practices and the built environment and their influence over one another.

References:

1. Rapoport, "A. *Culture, Architecture and Design"*, Locke Science publication, 2005.
2. Zube, E & Moore, G(Ed.), *"Advances in environment, behaviour and design*", Springer, 1991.

b) GEOGRAPHICAL INFORMATION SYSTEM

Objective:

Geographic information system (GIS) integrates hardware, software, and data for capturing, managing, analyzing, and displaying all forms of geographically referenced information.

The course is intended to provide students with a foundation for basic GIS techniques which are relevant to architectural analysis and Presentation. The elective is intended to establish a bridge between the conceptual realms - Architecture /Site -Terrain Analysis/ Landscape architecture/Urban planning. Output being digital, online and printed maps.

Outline:

1. **Introduction to GIS:**

   GIS as a Hardware/software/application? GIS data, Vector date, Raster data, attribute data, Data capture & methods, Coordinate reference systems

2. **Introduction to Google Earth**

   An overview of Google Earth & KML, Google Objects, Descriptive HTML in Placemarks, Ground overlays,

   Screen overlays, Paths, manipulating a path Polygon, taking profiles of site, creating KML files and exporting to GIS format.

3. **Creating & analysing GIS data:**

   Capturing survey data through hand held GPS or mobile application. Traversing boundary of site , bringing routes and way point data into GIS.

   Spatial data, loading raster files, Mosaic raster, Geo referencing raster and vector files, Loading data from OGC web services, databases.

   Creating vector data layers, joining tabular data, Topology errors & tools, Analyzing raster data, Combining raster and vector data, Raster surface through interpolation, leveraging the power of Spatial database, Vector and raster analysis, Vector Spatial analysis (Buffers), Spatial analysis (interpolation)

4. **Terrain Analysis& scientific computing of Raster dataset:**

   Creating Digital elevation model (DEM) from point data, Hill shade, Slope, Aspect

   Creating great Maps: Composing maps: Vector styling, Labelling, Using adobe illustrator for composing multiple vector layers of maps, Designing print maps, Publishing GIS 2D maps on the web

5. **Create 3D maps:**
   3D maps in html format and navigate in the internet browser

References:

1) https://sites.duke.edu/envgis/tutorials/introduction-to-google-earth/
2) Anita Graser , "Learning QGIS" PAKT open source, 2016.
3) GISP Dr. John Van Hoesen, Dr. Luigi Pirelli, GISP Dr. Richard Smith Jr., GISP Kurt Menke, " A refreshing look at QGIS: Mastering QGIS", PACKT Pub., 2016.
4) Displaying and analysing 3D data in Surfer software.
5) **Carson**, Tom, **Baker**, Donna L., "Adobe® Acrobat® and PDF for Architecture, Engineering, and Construction", Springer publication, 2006 ,available as Google Ebook.

c) DESIGN OF HIGH - RISE BUILDINGS

Objective:

The design and construction of skyscrapers involves creating safe, habitable spaces in very tall buildings. The buildings must support their weight, resist wind and earthquakes, and protect occupants from fire. Yet they must also be conveniently accessible, even on the upper floors, and provide utilities and a comfortable climate for the occupants. The problems posed in skyscraper design are considered among the most complex encountered given the balances required between economics, engineering, and construction management. The students may be given a snapshot of this very important typology that gives them an insight into complex world of various services that form the backbone of any skyscrapers.

Outline:

1. Evolution of Sky scrapers
2. Basic design considerations
3. Loading and Vibrations
4. Structural systems for high rise buildings; Trussed tube & X bracing, Bundled tube, etc.
5. Economic rationale
6. Environmental Impact
7. Services in Skyscrapers
8. Fire safety in Skyscrapers
9. Skyscrapers in India

The faculty in-charge should organise inputs by inviting various consultants and visits to few high rise buildings in the area. Students may be given assignments on relevant topics.

References:

1. Basem M.M., "Construction Technology for High Rise Buildings: Handbook", 2014, CreateSpace.
2. Basem M.M., " Mechanical and Electrical Services for High Rise Buildings: Handbook", 2014, CreateSpace.
3. Mark Sarkisian, " Designing Tall Buildings: Structure as Architecture" Routledge, New york, 2012.
4. Johann Eisele & Ellen Kloft, " High-rise Manual : Typology and Design, Construction, and Technology" Birkhäuser, 2003.
5. Nigel Clark and Bill Price, ″ Tall Buildings: A Strategic Design Guide", RIBA & BCO, 2016.

15ARC 6.9-STUDY TOUR

PROGRESSIVE MARKS : 50

OBJECTIVE*: To expose students to historical, vernacular and contemporary architecture.*

OUTLINE:

A minimum of two Study tours are to be undertaken before the commencement of 6th semester B.Architecture classes. The study tour may include places of architectural interest in India or Abroad. The choice of places and buildings to be visited is left to the concerned department / college. The students have to submit a study tour report as group work (4 to 6 students per group) within 15 days after the end of the study tour. The two reports are to be assessed by the department / colleges for progressive marks. The department/ college may use its discretion about the choice of places for study tour and suitable time schedule.