REVISED SYLLABUS STRUCTURE
7TH - 10TH SEMESTER

SEVENTH SEMESTER			
THEORY		Contact Hours	Credit
Course Code	Subject	L-T-P	
BAR15046	Advanced Structural Systems	2-0-0	2
BAR15047	Green Buildings and Infrastructure	2-0-0	2
BAR15048	Advanced Services	2-0-0	2
BAR15049	Pre-Thesis Seminar	2-0-0	2
BAR15050	Building Construction and Management	3-1-0	4
SESSIONAL			
BAR15051	Advanced Architectural Design -I	0-0-12	12
BAR15052	Advanced Construction and Materials	0-0-6	6
	TOTAL	**11-1-18**	**30**

EIGHTH SEMESTER			
THEORY		Contact Hours	Credit
Course Code	Subject	L-T-P	
BAR15053	Professional Practice	3-0-0	3
BAR15054	Disaster Resistant Architecture	3-0-0	3
BAR15055	Housing	2-0-0	2
BAR15056	**Elective -I** (i) Building Repair and Restoration (ii) Ergonomics and Product Design (iii) Industrial Architecture	3-0-0	3
SESSIONAL			
BAR15057	Advanced Architectural Design -II	0-0-9	9
BAR15058	Interior Design	0-0-6	6
BAR15059	Dissertation	0-0-4	4
	TOTAL	**11-0-19**	**30**

NINTH SEMESTER				**TENTH SEMESTER**			
THEORY		Contact Hours	Credit	**THEORY**		Contact Hours	Credit
Course Code	Subject	L-T-P		Course Code	Subject	L-T-P	
				BAR15062	Architecture and Urbanism in Asia	3-1-0	4
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SESSIONAL				**SESSIONAL**			
BAR15060	Professional Training		20	BAR15064	Design Thesis	0- 0-22	22
BAR15061	Field Observation Studies		10				
	TOTAL		**30**		**TOTAL**	**6-2-22**	30

REVISED DETAIL SYLLABUS

EIGHTH SEMESTER

BAR15053 PROFESSIONAL PRACTICE (3-0-0) CR -3

Module 1

Introduction to Architects duties and liabilities, salient features of Architect's act 1972, Amendments & Provisions, registration of architects, Understanding office management and project awarding; organization structure, responsibility towards employees, consultants & associates; maintenance of accounts; filing of records; balance sheet, Income tax; Service tax; Professional tax.
Architects relation with other parties connected with works such as client, contractor, sub-contractors, consultants, municipal and public authorities, Architects (Professional Conduct) Regulations 1989.
Various architectural services, additional services and scale of professional fees.
Architect's duties, drawings to be prepared, Building regulations related to submission of approval drawings to concerned public bodies, Inspection of work, during construction, certificate of payment to contractor, bill of quantities, Schedule of rates, tenders, public, limited and negotiated tender documents and allied formalities

Module 2

Regulations governing the conduct of competitions, open & closed competitions
Role of development authorities & urban arts commissions, Environmental acts & laws, special
rules governing hill area development & coastal area management, heritage act of India etc.
Pre-requisite for Indians to work in other countries & vice versa, emerging trends in architectural collaborations.

Module 3

Types of tenders, invitation of tender and conditions of tender documents, submission, scrutiny, recommendations & award of contract.
Definitions and general principles of Indian Contract Act and building, contract documents, conditions of contract, Execution of contract, various certifications, defects liability.

Module 4

Need for Arbitration, Principles of Indian Arbitration Act-1974, role of arbitrators, umpire etc, excepted matters, arbitral award. Municipal Acts, Fire prevention, safety and security measures in buildings.

References

1. COA. (1989). Architects (Professional conduct) Regulations, Architectural Competition guidelines. Council of Architecture Publications.
2. COA. (2005). Handbook of Professional Documents. Council of Architecture.
3. R H..Namavati, Professional practice, 7th ed,lakshmi book depot, mumbai,1997.
4. Environmental Acts of the Ministry of Environment & forests, Govt. of India
5. Architects Practice, J.J.Scott.
6. Handbook of Professional Practice, Madhav Deobhakta.

BAR15054 DISASTER RESISTANT ARCHITECTURE (3-0-0) CR-3

Module-1

Overview of disaster, major natural disasters - flood, tropical cyclone, droughts, landslides, heat waves, earthquakes, fire hazards etc; Occurrence of disaster in different climatic and geographical regions; Hazard (earthquake and cyclone) map of the world and India.

Module 2

Climate change and its impact on tropical cyclone; Nature of cyclonic wind; velocities and pressure, Cyclone effects; Behaviour of structures in past cyclones and wind storms, case studies.

Cyclonic retrofitting - strengthening of structures and adaptive sustainable reconstruction; Life–line structures such as temporary cyclone shelter.

General planning/design considerations, Norms and Standards for wind storms & cyclones; Design wind speed; Coastal zoning regulation for construction & reconstruction phase in the coastal areas; innovative construction materials & techniques; traditional construction techniques in coastal areas.

Module 3

Causes of earthquake - plate tectonics, faults, seismic waves; magnitude, intensity, epicenter, energy release and ground motions. Earthquake effects – On ground, soil rupture, liquefaction, landslides

Past effects of earthquake on ground and building - Behaviour of various types of buildings, structures, and collapse patterns.

Seismic retrofitting - Weakness in existing buildings, concepts in repair, restoration and seismic strengthening.

General Planning and design consideration, Norms and Standards; Building forms, horizontal and vertical eccentricities, mass and stiffness distribution, soft storey etc.; Seismic effects related to building configuration. Plan and vertical irregularities, redundancy and setbacks.

Various types and construction details - Foundations, retaining walls, plinth fill, flooring, walls, openings, roofs and boundary walls.

Innovative construction materials and techniques, traditional regional practices

Module 4

Strategies for disaster prevention and mitigation; Post disaster recovery and rehabilitation (socioeconomic consequences) - case studies. Disaster management plan; National crisis management committee; state management group.

References

1. Aga Khan Award for Architecture. Ed. Shelter. (1996). The Access to Hope. AKDN, Istanbul and Geneva.
2. Agarwal, P. and Shrikhande, M. (2009). Earthquake Resistant Design of Structures. New Delhi: PHI Learning.
3. Singh, P. P. and Sharma, S. (2006). Modern dictionary of natural disaster. Deep & Deep Publications.
4. Simiu E. and Scanlan R. H. (1996). Wind Effects on Structures-Fundamentals and Applications to Design. 3rd Edn., John Wiley.
5. Sinha, P. C. (2006). Disaster Mitigation, preparedness, recovery and Response. New Delhi : SBS Publishers.
6. Talwar, A. K. and Juneja, S. (2009). Cyclone Disaster Management. Commonwealth Publishers.
7. Taranath, B. S. (2004). Wind and Earthquake Resistant Buildings: Structural Analysis and Design. CRC Press.
8. U.N.D.P. (2004). Reducing Disaster Risk: A Challenge for Development. New York : UNDP.
9. World Bank. (2009). Handbook for Reconstructing after Natural Disasters.
10. Seismic Design hand book for Buildings
11. Earth quake Architecture: New construction techniques for quake disaster Prevention.

BAR15055 HOUSING (2-0-0) CR-02

Module 1

Evolution of Housing:, Brief review of the historical development of housing in various contexts,
Housing situation in India, Housing need and Demand: Housing and Habitat policy and perspective at the national level, problems and Issues in urban and rural housing, housing agencies and their role in housing development

Module 2

Housing Standards; Issues involved in formulating housing standards for rural and urban areas, desirable and minimum standards, residential densities, Housing strategies: Review of different forms of housing globally- particularly with reference to the third world

countries, brief acquaintances with some strategies such as sites and services upgrading existing shelter, stimulating private- sector production, developing building materials and alternative technologies, improving architectural design, protecting inner-city renters, land sharing, resettlement etc.

Module 3

Housing Layouts and Design: Traditional pattern of housing design, Row Housing, Cluster Housing
Apartment Housing, Low Rise Versus High Rise Housing, Incremental Housing, Neighbourhood unit; Case studies of housing projects

Module 4

Housing Process: Managing and financing of housing projects, People's participation, Technology transfer, development control rules and environmental aspects

References

1. Alexander Christopher Pattern Language Towns, Buildings, Construction Oxford University Press, New York
2. Chiara De Joseph and Others Timesavers standard for Housing and Residential development 2nd ed McGraw hill Inc New York
3. Desai AR and Pillai Devadas Slums and Urbanization Popular Prakashan Pvt Ltd
4. Poulose K Thomas Reading material on Housing Institute of Town Planners New Delhi
5. Cedric Prgh(1990) Housing and Urbanisation Sage Publication New Delhi

Elective -I

BAR15056 BUILDING REPAIR AND RESTORATION (3-0-0) CR-03

Module 1

ENVIRONMENTAL IMPACT ON BUILDINGS

Life expectancy of different types of buildings – influence of environmental elements such as heat, moisture, precipitation and frost on buildings- Effect of biological agents like fungus, moss, plants, trees, algae, - termite control and prevention - chemical attack on building materials and components- - Impact of pollution on buildings.

Module 2

DEFECTS AND STRENGTHENING METHODS

Common defects in buildings; Building failures- Causes and effects; Cracks in buildings: types, classification, investigation; Measures to prevent and control common defects in building; Maintenance philosophy, phases of maintenance: routine preventive and curative maintenance; Fundamental Strengthening measure: beam strengthening, column strengthening, shoring, under pinning and jacketing.

Module 3

MATERIALS FOR REPAIR AND RESTORATION

Materials for repair: special mortar and concrete, chemicals, special cements and high grade concrete, admixtures of latest origin; Techniques for repair; Surface repair: material selection, surface preparation, rust eliminators and polymers coating; Repair of cracks in concrete and masonry: methods of repair, epoxy injection, mortar repair for cracks: guniting and shotcreting; Waterproofing of concrete roofs.

Module 4

INTRODUCTION TO CONSERVATION

Introduction to conservation - Materials and methods for conservation and restoration work (with specific case studies) - Adaptive reuse of buildings and its advantages - Retrofitting (case studies), Recycling of building components and materials (case studies).

References

1. Chandler, Ian (1992). ' Repair and Renovation of Modern Buildings', Mcgraw-Hill
2. Nayak, B. S. (2013). ' A Manual of Maintenance Engineering', Khanna Publishers, India
3. Guha, P.K. 'Maintenance and Repairs of Buildings' New Central Book Agency, India.
4. Danish Standards Association, (2004).'Repair of Concrete Structure to En 1504: A guide for renovation of concrete structures repair materials and systems according to the EN 1504 series', Elsevier, Boston
5. Roger, G. and Hall, F. (2013). 'Building Services Handbook', Routledge, UK.

Elective -I

BAR15056 ERGONOMICS AND PRODUCT DESIGN (3-0-0) CR-03

Module 1

INTRODUCTION

Human being in the manmade world and importance of ergonomics, Gross human anatomy, Ergonomics for children and old people, Definitions related to Ergonomics and Product design. Historical development in the concept of ergonomics and product design, Role of Product designer.

Module 2

ERGONOMICS AND DESIGN

Application of human factors data. Human activities, their nature and effects, Man-machine interaction and physical environment - Environmental Condition including, thermal, illumination and noise.
Applied anthropometry – Human response to climate, Human performance and system reliability, designer's priorities.

Module 3

ASPECTS OF PRODUCT DESIGN

Visual, Auditory, Tactual, Olfactory human mechanisms, Physical space and arrangement. product display, process of seeing, visual discrimination, quantitative and qualitative visual display, Alphanumeric and related displays, Visual codes and symbols.
Processes of product designing, manufacturing and testing.
Form, Colour, Symbols, User specific criteria, Material selections, Technology and recyclability, Packaging. Multiple Utility oriented approach to Product Design.

Module 4

UNIVERSAL DESIGN

Design of special elements in buildings for physically challenged and old aged
DESIGN EXERCISES:

- Design of Household elements, tools and devices.
- Design of furniture.
- Design of Industrial Product – Automobiles and Electrical
- Element design for differently able, old and children.

References

1. Time Saver Standards for Interior Design

2. Andrew Alpern, Handbook of Speciality Elements in Architecture, McGrawhill Co., USA, 1982.
3. Francis D. K. Ching, Interior Design Illustrated, VNR Publications, New York, 1987.
4. Helen Marie Evans, An invitation to Design.
5. Crosbie, M. J. and Watson, D. (2005). Time Savers Standards for Architectural Design: Technical data for Professional Practice. 8th Ed. The McGraw-Hill Company.

Elective -I

BAR15056 Industrial Architecture (3-0-0) CR-03

Module1

INTRODUCTION TO INDUSTRIAL ARCHITECTURE

Historic development of industrial architecture; Role of architects in the design of modern industrial buildings; Basic knowledge of types and categories of industries; Considerations for development of master plan for industrial areas and site selection; Design criteria for site layout, loading and unloading area.

Module 2

DESIGN CONSIDERATIONS

Design consideration in development of industrial buildings - flexibility, adaptability, structural selection. Integration of structure and services, roof lighting, internal circulation and material handling; Alternative technologies and materials for industrial use.

Module 3

ENVIRONMENTAL CONSIDERATIONS

Working environment for industrial workers which will contribute to comfort and productivity by considering - work space and ergonomic, use of colour, lighting design, noise and vibration, thermal comfort conditions, ventilation, building fabric, Visual environment and landscaping.

Safety, security and warning control.

Consideration of other facilities like: rest room, locker room, sanitary, changing room, cafeteria, recreational etc. Health, welfare and child care in industrial premises.

Module 4

STRUCTURE

Large Span Construction-flat slabs-shell structures, folded plates, portal frames, space frame & trusses, tensile structures.

Pre-fabricated construction & Pre-engineered building; New Material in Construction, Cold form sections.

References

1. Adam, J., Hausmann, K., and Juttner, F., A Design Manual- Industrial Buildings
2. Blum, M.L., and Naylor, J.C., Industrial Psychology, CBS, Delhi
3. Philips, A., The Best in Industrial Architecture
4. Sinha, R.K., and Heart, S., Cleaner Production-Greening of Industries for Sustainable Development.
5. Drury, J., Factories- Planning, Design and Modernization.

SESSIONAL

BAR15057 Advanced Architectural Design -II (0-0-9) CR-09

Designing in urban context/Designing for Public Spaces

To facilitate understanding and conceptualising design in spaces involving group of buildings in a public realm and having multiple stakeholders. To study all aspects of external environment, movement networks, open spaces, understand the relationship between public and private realm and explore the multitude of activities and the spaces they define in the urban environment. These observations are expected to be applied to design interventions within the context of the given urban setting and infrastructure network in compliance with planning norms.

The students are expected to carry out field study, documentation of the built fabric and area analysis of a given area within a city

Examples of Studio Projects:

Transportation nodes like bus terminus and railway stations, water front developments, development in heritage zones/context of urban conservation, city centre, administrative and legislative areas, streetscape, urban markets, etc.

Study tour of one week duration is mandatory for conducting case study and field study related to the Architectural Design project.

References

1. Carmona, M., Heath, T., Oc, T. and Tiesdell, S. (2010). Public Places Urban Spaces. Oxford: Architectural Press.
2. Lang, J. T. (2005). Urban Design: A Typology of Procedures and Products. Oxford: Elsevier/Architectural Press.
3. Lynch, K. (1984). Good city form. Boston : MIT Press.
4. Marshall, S. (2009). Cities design and evolution. New York : Routledge.
5. Moughtin, C., Cuesta, R., Sarris, C. And Signoretta, P. (2003). Urban Design - Methods and Techniques. Oxford : Architectural Press.
6. Watson, D., Plattus, A. and Shibley, R. (2003). Time-Saver standards for urban design. New York : McGraw Hill.
7. Whyte, W. H. (1980). The social life of small urban spaces. Washington D.C : Conservation Foundation.

BAR15058 Interior Design (0-0-6) CR-06

Module 1

Interior space programming, Introduction to basic physical factors/ elements of interior design i.e walls, floors, ceiling, doors, windows etc.
Historical evolution of interior styles and furniture, vernacular interior elements (design and materials used)
Usage of modern, traditional as well as cost effective materials

- An assignment to be submitted on market survey of various interior materials.

Module 2

Study of the relationship between furniture and spaces, human movements & furniture design as related to human comfort. Function, materials and methods of construction, changing trends and lifestyles, innovations and design ideas. Study on furniture for specific types of interiors like office furniture, children's furniture, residential furniture, display systems, etc.

- Assignment on different furniture types and product design.

Module 3

Study of interior lighting, different types of lighting their effects types of lighting fixtures. Other elements of interiors like accessories used for enhancement of interiors, paintings, objects-de-art, etc. Interior landscaping elements like rocks, plants, water, flowers, fountains, paving, artefacts, etc. their physical properties, effects on spaces and design values.

- Assignment on two interior schemes of different functional types: residential/commercial /Public buildings at different scales will form the major design assignment and include Concept development and furniture layout.

Module 4

Details like false ceiling, partition, flooring, wall panelling/cladding. Use of daylight and artificial lighting for specific functions, electrical layout , colour scheme, furnishings, interior landscape to be included in each design portfolio.

- Presentation on eminent interior designers' work
- One time problem of 3 hours (one week) to be conducted.

References

1. Ching, F. D. K. (1987). Interior Design Illustrated. New York : V.N.R. Publications.
2. Doshi, S. (Ed.) (1982). The Impulse to adorn - Studies in traditional Indian Architecture. Marg Publications.
3. Kathryn, B. H. and Marcus, G. H. (1993). Landmarks of twentieth Century Design. Abbey Ville Press.
4. Penero, J. and Zelnik, M. (1979). Human Dimension and Interior space: A Source Book of Design Reference Standards. New York : Whitney Library of Design.
5. Slesin, S. and Ceiff, S. (1990). Indian Style. New York: Clarkson N. Potter.
6. Dorothy, S-D., Kness, D. M., Logan, K. C. and Laura, S. (1983). Introduction to Interior Design.Michigan : Macmillan Publishing.

BAR15059 DISSERTATION (0-0-4) CR-04

Dissertation shall be a pre-thesis research on a topic of student's interest related to any aspect of Architecture, Urban design, Landscape Architecture, Sustainable Architecture, Architectural Conservation, which the student shall subsequently take up as Thesis topic. The student will conduct in depth analysis, so as to develop and strengthen the topic leading to the architectural design thesis.

The selected topic of each student shall be considered as the first phase of the Design Thesis where the students will finalise their area of interest and the subsequent research will act as the primary literature review for the Design Thesis. By the end of the semester along with the research paper the students are required to prepare their preliminary proposal for the Design Thesis, further, more specific research and case studies can be done on their respective topics during the professional training semester.

Broad Course Structure

1. Introduction, overview of subject, Research Methodology, critical reading, writing, referencing etc.
2. Lectures/ seminars to clarify/discuss common mistakes/doubts among the students, and to discuss the common topics students would be dealing with.
3. Research Proposal, including the Research Problem, Background, Aim, Objectives and Research questions, Panel review to finalise the research topics.
4. Critical Reading/ Literature Review, continuous assessment and assignments.
5. Writing, Referencing and Citations with review of stage wise submissions.
6. Submission of a final paper.

NINTH SEMESTER

BAR15060 PROFESSIONAL TRAINING CR-20

1. **Office Training:** This semester would comprise compulsory practical professional training for the entire academic session of the Ninth Semester . The chief Architect in the firm should be registered with the Council of Architecture and have a minimum of five years of practical/professional experience after her/his graduation.
   Students are required to be involved in all aspects of office works-conceptual design; presentation drawings and detail working drawings; 3 D modelling; estimation and specification of small buildings; interaction with clients, structural consultant and other building services consultants. The students are also expected to familiarise themselves with coordination of structural and services drawing with architectural drawings.

2. **Site Supervision Work:** The aim of this training is to give exposure to the students on different stages of construction on the site and to learn how drawings are executed at the construction site. It is desired that the students undertake site visits and understand construction practices.

At the end of the practical training, the students are required to present selected works, which are best representative of the training undergone in the form of drawings. The students are also required to submit a report describing various concepts learnt during training, experiences of site visit and estimation / costing activities etc. Training attendance log sheets shall also be submitted as part of the report.

Evaluation:
The detailed report and drawings prepared during practical training by students will be evaluated through viva-voce by a jury consisting of one external and one internal faculty member.

BAR15061 Field Observation Studies CR-10

This has to be undertaken during the period of Professional Training.

1. Technical Study of any one of the topics given in the Training Manual. Critical appraisal and detail technical study of the selected projects to be done. The study is to be presented in the form of a report comprising drawings, photographs supported by brief analysis and observation etc.

2. Field study and Documentation of any one of the topics given in the Training Manual. The study is to be presented in the form of a report comprising drawings, photographs supported by brief analysis and observation etc.

Evaluation:
The detail report and drawings prepared during practical training by students will be evaluated through viva-voce by a jury consisting of one external and one internal faculty member.

TENTH SEMESTER

BAR15062 Architecture and Urbanism in Asia (3-1-0) CR-04

Module 1
Understanding and Asia's urban shift and its multiple dimensions; Evolution of the Asian cities: Morphology of pre-modern, market, colonial and contemporary Asian cities.

Module 2
Understanding contemporary issues: Demographic transition, urbanisation trends, economic momentum and environmental consequences.

Module 3
Looking Towards East and Southeast Asia:
Understanding underlying socio-political dynamics and critiquing new architecture and urban development patterns in Asian metropolises such as Tokyo, Beijing, Shanghai, Hong Kong, Singapore, Bangkok and Jakarta.

Module 4
Looking Towards South and West Asia:
Understanding underlying socio-political dynamics and critiquing new architecture and urban development patterns in Asian metropolises such as Dubai, Abu Dhabi, Karachi, Dhaka and Paro. Locating Indian cities in changing Asia: Economic transformation and settlement patterns

References
1. Asian Development Bank. (2008). Managing Asian Cities : Mandaluyong City, Philippines.

2. Hamnett, S. and Forbes, D. (2011). Planning Asian Cities. Routledge.
3. MeeKam, N. and Hills, P. (2003). World cities or great cities? A comparative study of five Asian metropolises. Cities. Vol. 20, No.3, pp. 151-165.
4. Srivastava, S. (2014). Entangled Urbanism: Slum, Gated Community and Shopping Mall in Delhi and Gurgaon. New Delhi : Oxford University Press India.
5. UN Habitat. (2011). The State of the Asian Cities. 2010/11.
6. Weightman, B. A. (2011). Dragons and Tigers. A Geography of South, East and Southeast Asia. Wiley.
7. World Bank. (2010). Coastal Risks and Adaptation in Asian Coastal Megacities - A Synthesis Report. Washington DC : World Bank.

Elective - II

BAR15063 Real Estate Management (3-1-0) CR-04

Module1

Type of land and property; Land use planning & Urban Land Management; Land as a resource of Urban Development (supply and demand of land); Basic components of Urban Land Policy; Land assembly; Land Pooling techniques; Land Holding (Free Hold and Lease Hold).

Module 2

Land and Building related regulations; Building Bye-laws, Real Estate laws; Apartments' Act, Land registration and Society Registration Act.

Module 3

Comparision of Housing policies and Real Estate development in India; Master Plan guidelines in relation to real estate growth; Real Estate management concepts.

Module 4

Concepts of mixed use development; condominium; Gated Community and serviced apartments.

Reference

1. Gelbtuch, H.C., Mackmin, D. and Milgrim, M.R., Real Estate Valuation in Global Markets, Amazon Books

2. Rangwal, S. C., Valuation of Real Properties, Charotar Publishing House, 2003
3. Chapin, S., and Keeble, L., Urban Land Use Planning
4. Urban Development management- I.T.P.I. Journal
5. Reading Material on Land Economics- I.T.P.I. Journal

Elective - II

BAR15063 Environmental Impact Assessment (3-1-0) CR-04

Module 1

Definition, concepts, need & relevance of Environmental Impact assessment in decision making process; Evolution of EIA and its importance in global, Indian and local context; Principles of EIA; Classification of EIA projects.

Module 2

PROCESS AND METHODOLOGIES

Measurement of environmental impact, Process of EIA in India & Abroad; Importance of scoping & screening in EIA process; Role of public participation at various levels of decision making; Methodologies, checklists, matrices, network & social cost-benefit analysis, habitat evaluation systems, comprehensive study of various project types, impact calculation & ways to mitigate.

Module 3

ENVIRONMENTAL AUDIT AND MANAGEMENT

Definitions & concepts of audits, GHG Emissions, energy foot print, carbon foot print, partial audits, compliance audits, methodologies & regulations.

Module 4

EIA IN INDIA

EIA regulations in India, initiatives, environmental appraisal procedure, problems associated with relocation, resettlement, refugees & environmental justice, future strategies. Study of an environmental appraisal report and EIA statement of any two projects of national importance.

References

1. Glasson, J. R. and Chadwik, A. (2012). Introduction to Environmental Impact assessment. Routledge Publications.
2. Kulkarni, V. and Ramachandra, T. V. (2006). Environmental Management. The Energy and Resources Institute.

3. Richard, K. M. (2002). Environmental impact assessment, a methodological perspective. Boston
: Kluver Academic Publishers.
4. Thorpe, A. (2007). The Designer's Atlas of Sustainability. Washington DC : Island Press.

Elective - II

BAR15063 Urban Transportation Planning (3-1-0) CR-04

Module 1

INTRODUCTION TO TRANSPORTATION SYSTEMS

Transportation systems and modes; Demand and supply of transportation services; Physical structure of the city and transportation system.

Module 2

TRANSPORTATION PLANNING

Inter-relationship of land use and transportation; Transportation planning process; Systems approach to transport planning; Travel demand forecasting; Planning for public transport system, goods transportation.

Module 3

TRAFFIC STUDY AND DESIGN

Traffic flow characteristics; Transportation survey: Type of surveys, origin destination survey, Traffic analyses and design considerations; Design of intersections; Traffic signals and signs; Street design: street lighting, street furniture; street plantation; Parking: Parking problems, Parking space requirement standards.

Module 4

ENVIRONMENT AND POLICY ASPECT

Environmental impact of traffic; Energy issues in transportation, Transportation policies and safety standards.

References

1. Khisty, C. J. and Lal, B. K., Transportation Engineering: An Introduction.
2. Papacostas, C. S., Fundamentals of Transportation Engineering.
3. Bruton, M. J., Introduction to Transportation Planning.
4. Khanna, S. K., and Justo, C. E. G., Highway Engineering.

SESSIONAL

BAR15064 Design Thesis (0-0-22) CR-22

Each student is expected to prepare a design thesis under a department approved guide/ advisor. The thesis should be a design-oriented project approved by the department. The thesis should reflect the knowledge gained from the entire course taken by the student in all the previous semesters.

The topic should be related to the student's Dissertation topic. The time schedule, content presentation, format etc. as decided by the department, from time to time, shall be strictly followed.
The scope and extent of the thesis work shall be substantial and realizable in application
or concept as appropriate to the selected area of work.

At the end of the semester each student is expected to submit all original drawings prepared as per the department specification, 3 copies of thesis report in the specified format and a model to the department after obtaining the approval of the respective guide / advisor.

The department shall schedule the final viva voce, which is to be conducted by external jury panel after the Thesis submission.