# *Master of Architecture*

# *in*

# *Sustainable Architecture*

## *Course Structure & Syllabus*



## *Department of Architecture*

## *National Institute Of Technology Hamirpur*

## *Hamirpur (H.P) – 177005, India.*

# Course Structure of M. Architecture (Sustainable Architecture)

**SEMESTER-I**

| Sr. No | Course No. | Course Name | Teaching Schedule | | | Hours/ week | Credit |
|---|---|---|---|---|---|---|---|
| | | | L | T | P/D | | |
| 1 | AR-611 | Sustainable Architecture Theory and Principles | 4 | 0 | 0 | 4 | 4 |
| 2 | AR-612 | Fundamentals of Ecology and Water managment | 4 | 0 | 0 | 4 | 4 |
| 3 | AR-613 | Solar Passive & Energy Efficient Architecture | 4 | 0 | 0 | 4 | 4 |
| 4 | AR-614 | Design Studio-I (Lab) | 0 | 0 | 4 | 4 | 2 |
| 5 | AR-7MN | Programme Elective-I | 4 | 0 | 0 | 4 | 4 |
| 6 | AR-7MN | Programme Elective-II | 4 | 0 | 0 | 4 | 4 |
| | **Total** | | **20** | **0** | **4** | **24** | **22** |

**Programme Elective - I& II:** List of Programme Electives is given in the Annexure.

**SEMESTER-II**

| Sr. No | Course No. | Course Name | Teaching Schedule | | | Hours/ week | Credit |
|---|---|---|---|---|---|---|---|
| | | | L | T | P/D | | |
| 1 | AR-621 | Landscape Architecture | 4 | 0 | 0 | 4 | 4 |
| 2 | AR-622 | Climate Change and Resilience of Urban and regional Planning | 4 | 0 | 0 | 4 | 4 |
| 3 | AR-623 | Intelligent and Smart Building System Integration | 4 | 0 | 0 | 4 | 4 |
| 4 | AR-624 | Design Studio-II (Lab) | 0 | 0 | 4 | 4 | 2 |
| 5 | AR-7MN | Programme Elective-III | 4 | 0 | 0 | 4 | 4 |
| 6 | AR-70N | Institute Elective | 4 | 0 | 0 | 4 | 4 |
| | **Total** | | **20** | **0** | **4** | **24** | **22** |

**Programme Elective - III& IV:** List of Programme Electives is given in the Annexure.

**SEMESTER-III**

| Sr. No | Course No. | Course Name | Hours/week | Credit |
|---|---|---|---|---|
| 1 | AR-798 | M. Architecture Dissertation | -- | 18 |
| | **Total** | | **--** | **18** |

**SEMESTER-IV**

| Sr. No | Course No. | Course Name | Hours/week | Credit |
|---|---|---|---|---|
| 1 | AR-799 | M.Architecture Dissertation | -- | 18 |
| | Total | | -- | 18 |

**Total Credit of the Programme = 80**

# Annexure
## List of Programme & Open Electives

### Programme Elective - I

AR-711 Eco-Tourism and Development
AR-712 Design Thinking
AR-713 Sustainable Mobility Studies
AR-714 Conservation and Preservation of the Historical Built Environment

### Programme Elective- II

AR-715 Sustainable Housing Design
AR-716 Disaster Mitigation & Management
AR-717 Computer Simulations (GIS, BIM and Climate Software) in Sustainable Architecture
AR-718 Sustainable Finance and Project Formulation

### Programme Elective - III

AR-721 Quantitative and Qualitative Research Methods
AR-722 Infrastructure Planning
AR-723 Eco - Cities and Sustainable Communities
AR-724 Sustainable health and wellness Architecture

### Institute Elective

AR-701 Project Planning and Management
AR-702 Urban Conservation

Course Name: **Sustainable Architecture Theory and Principles**
Course Code: **AR-611**
Course Type: **Core**

Contact Hours/Week: **4L** Course Credits: **04**

**Course Objectives**

- Give a preview of the practices, strategies and implementation processes that shape sustainable Architecture.
- To develop analytical skills to understand Global and Local Issues sustainability issues.
- Study Vernacular and Modern Architecture in hill areas.

**Course Content**

Sustainable Architecture: Theory and principles, Concept of Sustainable Development, Principles of sustainable development, Indicators of sustainable development, Variables of Sustainability and relation to real world through appropriate examples, use of sustainability variables in identification of sites and development of habitations, towns and cities. Global and local, economic and scientific issues, key trends, impacts and perspectives relevant to sustainability such as Limits to Growth theory, LOHAS trends, I=PxAxT equation, steady state or circular economy models, triple bottom line, and systems thinking. Efforts to integrate environment and development, watershed its importance. An overview of Vernacular Hill Architecture, Classification of hill areas, Landforms, Slope analysis. Grading on site and its constraints, slope stabilization, Reasons of fragility on the hills, Constraints of climate, topography and availability of materials. A broad view of traditional hill Architecture and medieval European settlements and other places. Modern hills buildings of India. Carrying capacity, Ecological footprints, Land capability classification, Energy consumption pattern, role of green building rating systems and ESG frameworks in achieving sustainability, case studies of energy efficient and sustainable buildings in India, Urban Forms-sustainability of different urban and regional forms of cities, towns, regions, Exercise for students: To identify problems related to sustainable environment/sustainability issues in local context and ways to address the issues.

**Course Outcomes**

Upon successful completion of the course, the students will be able to

- CO1: Identify and summarizes the importance of sustainable theory and principles at both regional and local scale.
- CO2: Identify Sustainasble Indicators as well as Global and Local Sustainability Issues.
- CO3: Demonstrate knowledge about the Application of Sustainability Variables at both regional and local scale.

**Books and References**


1. Towards Sustainable Architecture European Directives and Building Design by Edwards, Brian Butterworth Architecture, London.
2. Alternative Construction Contemporary Natural Building Methods byElizabeth, Lynne and Adams, Cassandra, John Wiley & Sons, New York.
3. Our Fragile Heritage byJayal, N.D. INTACH Publications, Lodi Estate, New Delhi.
4. Motivation and Personality by Maslow, A., Harper and Row, New York.
5. Energy, Environment and Sustainable Development in the Himalayas byMonga, Pradeep, Indus Publishing Company, New Delhi.
6. Art and Architecture of Himachal Pradesh bySingh, Goverdhan, B.R Publishing Corporation, Delhi.
7. TERI/GRIHA manual, “Sustainable Building Design Manual- Volume I-V” by TERI, TERI PRESS, ND.
8. The Urban Pattern byGallion, B. A. and Eisner, F.S, CBS Publishers & Distributors, New Delhi.

Course Name: **Fundamentals of Ecology and Water Management**
Course Code: **AR-612**
Course Type: **Core**

Contact Hours/Week: **4L** Course Credits: **04**

**Course Objectives**

- To Introduce Core Ecological Principals and analyze urbanization Impacts.
- To understand diverse array of existing urban water issues and water management strategies.
- To understand Enviromental Policies to encourage Conservation and Resource Management.

**Course Content**

Ecological concepts: Evolution and process, eco-systems, adaptation, ecological pyramids, material cycles- carbon, nitrogen, and sulphur cycles, watershed, carrying capacity, ecological footprint. Impacts of urbanization: Modifications of the natural environment- causes and consequences, environmental pollution, climate change, solid waste management. Water management: Urban water management, Sustainable water management approaches, Indigenous perspectives on water. Environmental policies: Govt. of India policies on the environment- related to hills, forests, wildlife, wetlands, wastelands, and oceans, EIA and its role in environmental protection, environmental protection- natural reserves, conservation and recycling of resources. Ecological design approaches: Venerability analysis, ecological planning in relation to designing settlements and other man-made eco-systems.

**Course Outcomes**

Upon successful completion of the course, the students will be able to

- CO1: Comprehension of Ecological Proccipales and Impact Assessment of Urbanization.
- CO2: Demonstrate knowledge for Implementation of Water Management Techniques.
- CO3: Utilization of Sustainability Concepts while Appling of Ecological Design.
- CO4: Implementatio strategies for Resource Conservation and Recycling.

**Books and References**

1. Environmental protection of the Himalaya: A mountaineers view by Ali, Aamir, Indus publishing company, New Delhi.
2. The survival of the Himalaya', Eco-systems- A scenario of unsustainability by Bahuguna, Sunder Lal, Singh, TejVir, Sharma, M.L. Indus publishing company, New Delhi
3. Environmental concerns and strategies by Khoshoo, T.N., Ashish publishing house, New Delhi.
4. Fundamentals of ecology by E. P. Odum, W.B. Saunders, Philadelphia, UAR.
5. Himalaya: A regional perspective resources, environment and development by Rawat, M.S.S, Daya publishing house.
6. Niemela, J. (Ed.). (2012). Urban ecology - Patterns, processes, and applications. New York - Oxford.
7. Bansil, P.C. 2004. Water Management in India. Concept Publishing Company, India.
8. Vickers, A. 2001. Handbook of Water Use and Conservation. Water Plow Press.

Course Name: **Solar Passive and Energy Efficient Architecture**
Course Code: **AR-613**
Course Type: **Core**

Contact Hours/Week: **4L** Course Credits: **04**

**Course Objectives**

- To Understand Climate Elements, Factors, Microclimate and Passive Climate Control for Solar Passive Architecture
- To highlight the importance Energy Conservation Techniques, factors affecting energy use in buildings.
- To provide knowledge on Legislative and Regulatory Frameworks and different green rating systems.

**Course Content**

Elements of climate, Global climatic factors, Classification of climates, Bio-climatic classification of India. Introduction of microclimate and the role of landscape and other passive devices for climate control. Introduction of passive solar architecture, appreciation of Built form for different climates, building clusters, solar exposure and thermal environment. Types of passive systems and passive solar configuration. Modern and postmodern passive architecture, methods, strategies, systems, and construction details emphasizing the passive architecture. Energy conservation through site selection, planning, and design, siting and orientation. Introduction to design of shading devices and overhangs. Factors that affect energy use in buildings. Ventilation and its significance. Relevance of Energy conservation, Energy Conservation Act 2001, Introduction to BEE, building envelope design as per Energy Conservation Building Code using prescriptive and trade off method. Introduction to Simulation Software for carrying out thermal design of buildings and predicting performance. Study of the various Green Rating Systems.

**Course Outcomes**

Upon successful completion of the course, the students will be able to

- CO1: Understanding of Climate Elements and Classification as well as Application of Microclimate Concepts.
- CO2: Implementation of passive solar architecture principles, adapting built forms to different climates with a focus on solar exposure and thermal environments while designing building.
- CO3: Understanding and application of Energy Legislation and various Green Rating Systems.

**Books and References**


1. Solar Passive Buildings by Sodha, M., Bansal, N. K., Bansal, P. K., KuMEB, A., and Malik, M. A. S., Pergamon Press, Oxford.
2. Passive Buildings Design: A Hand book of Natural Climatic Control byBansalNarendra, K., Hauser Gerd and MinkeGernot, Elsevier Science, Amsterdam.
3. Energy in Architecture byGoulding, John, R., Lewis, Owen, J., and Steemers, Theo, C., Bastford Ltd., London.
4. Manual of Tropical housing and Building byKoenigsberger, Ingersoll et al. Longman Group Ltd. London (now published by Orient Longman Ltd., Madras, India)
5. Design with climate: bioclimatic approach to architectural regionalism by Olgyay, V., Princeton University Press.
6. Climate responsive architecture: a design handbook for energy efficient buildings by Krishan, A., Tata McGraw-Hill Education.
7. Bureau of Energy Efficiency (2017), “Energy Conservation Building Code 2017”, Ministry of Power, Govt. of India

Course Name: **Design Studio – I (Lab)**
Course Code: **AR-614**
Course Type: **Core**

Contact Hours/Week: **4P** Course Credits: **02**

**Course Objectives**

- This studio intends to facilitate students with the required knowledge and skills and preparing a neighbourhood design with sustainable development startegies.
- To learn from historic and contemporary case studies showcasing various energy and sustainability features.
- To cover sustainable development from site planning and evaluation through construction, commissioning, and occupancy phases.

**Course Content**

Design Studio that explores vernacular strategies for sustainable practices, design, theoretical and/or technological issues that focus for proper scientific architectural thought and practice to lead to energy efficient and environmental friendly solutions. This studio design approaches sustainable development for buildings by examining physiology required for human function and then by considering how building components and systems affect human performance and wellbeing. Sustainable development starts with site planning and evaluation, and proceeds through construction, commissioning, and occupancy phases. The studio includes many case studies of historic and contemporary structures exemplifying various energy and sustainability features.

**Note:** The Concerned course coordinator will prepare the actual list of problems at the start of semester based on above generic list.

**Course Outcomes**

Upon successful completion of the course, the students will be able to

- CO1: Students will be able to implement sustainable development startegies in designing and preparing a neighbourhood design as a self sustainable unit.
- CO2: Students will be able to critically analyze and address theoretical and technological issues in sustainable architecture
- CO3: Students will design buildings that consider occupant physiological needs and enhance occupant performance and wellbeing through appropriate building components and systems.

**Books and References**


1. Government of India, Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines. Vol. 1, Town and Country Planning Organisation, Ministry of Urban Development, New Delhi.
2. Manitoba Intergovernmental Affairs and City of Winnipeg's Planning, Property and Development, Department of Planning and Land Use Division, A Guide for Developing Neighbourhood Plan.
3. Site Planning and Design Handbook by R.Thomas Russ, Mcgraw Hill Publications.
4. Rural Development Principles, Policies and Management bySingh.K, Sage Publications, Pvt. Ltd, New Delhi.

Course Name: **Landscape Architecture**
Course Code: **AR-621**
Course Type: **Core**

Contact Hours/Week: **4L** Course Credits: **04**

**Course Objectives**

- To providing a comprehensive knowledge regarding ecological aspects and environmental concerns in landscape architecture besides the advanced knowledge of basic elements of landscape design.
- To learn skills in open space design, Site Analysis and Planning.
- To learn Creation of Sustainable Landscapes.

**Course Content**

Introduction (history, nature and scope). Exposure to Historical Landscape (English, French, Italian, Chinese, Japanese, Mughal, Ancient India), Elements of landscape: natural (Earth forms, Water, Vegetation) and manmade, Open space design, Purpose of designed open space, Analysis of various kinds of open spaces. Site analysis and site planning. Ideas of Kevin Lynch, Ian Mcharg, Gorden Cullen, Geoffrey Jellicoe on natural and built environment. Contemporary landscape design projects in India. Case studies of varied urban situations. Landscape design proposal based upon the above-mentioned analysis as a studio exercise. Sustainble landscapes, ecologically and climatically responsible landscaping practices. Sustainble landscapes, ecologically and climatically responsible landscaping practices.

**Course Outcomes**

Upon successful completion of the course, the students will be able to

- CO1: Comprehension of Landscape Design History and various landscape princilpes at site analysis and site planning stages.
- CO2: Analysis and understanding of contemporary landscape design starategies for Open Space Design, Site Analysis and Planning
- CO3: Creation of Sustainable Landscapes design that are ecologically and climatically responsible, using sustainable practices and materials.

**Books and References**


1. Landscape Architecture bySimonds, John Ormsbee, McGraw-Hill New York.
2. Introduction to Landscape Design by Motloch, John L., John Wiley and Sons, New York.
3. Site Engineering for Landscape Architects by Kurt, Nathan, Strom et al. AVI Publishing Co; Connecticut.
4. Flowering trees byRandhawa MS, National Book Trust, New Delhi India
5. Landscape design with Plants by Clouston Brian, Van Nostrand Reinhold Company, New York.

Course Name: **Climate Change and Resilience of Urban and Regional Planning**
Course Code: **AR-622**
Course Type: **Core**

Contact Hours/Week: **4L** Course Credits: **04**

**Course Objectives**

- To understand Impacts of Climate Change on urban and regional planning.
- To introduce concepts and strategies for developing resilient urban and regional planning that can adapt to climate change.
- To examine the role of policy and governance in addressing climate change and enhancing resilience in urban and regional planning.

**Course Content**

Goals & objective, Methodology of goal formation, five-year plans, development plan, structure plan, local plan, district plan, action area plan, public participation, regional plans. Urban development plans structure plans: types, scope, comprehensive planning, structure planning, strategic planning, physical surveys for planning, Landuse, density, National policy on urban settlement. Planning practices in India, classification of regions, regionalization and delineation techniques of various types of regions.

**Course Outcomes**

Upon successful completion of the course, the students will be able to

- CO1: Understanding for Climate change Impacts and application of Resilience Concept.
- CO2: development of climate change mitigation and adaptation strategies tailored to specific urban and regional contexts.
- CO3: Understanding of Policy and Governance in addressing climate change and will be able to evaluate and propose policy measures for enhancing resilience.

**Books and References**


**1.** Golnay Gideon (1976), “New town planning: principles and practice”, John Wiley &Sons, Inc., New York.

2. **Gibson**, J.B (1977), “Introduction to city, designing the new city: a systematic approach,” John Wiley & Sons, Inc., New York.

3. **Gallian**, Arthur B. &Eisner, Simon (1963), “The Urban Pattern”,D.Van Nostrand Company, Inc., New York.

4. **Peter** Hall(2002), “ Urban and Regional Planning”

Course Name: **Intelligent and Smart Building System Integartion**
Course Code: **AR-623**
Course Type: **Core**

Contact Hours/Week: **4L** Course Credits: **04**

**Course Objectives**

- To impart knowledge about the design approach and the special service requirements of Intelligent Buildings. The course outcome will create awareness about the impacts of Intelligent building System on energy optimization, safety and security control management in the buildings.

**Course Content**

Definition and concept of intelligent and Smart building systems, History and evolution of intelligent and Smart buildings. Benefits and challenges of intelligent buildings. Basic components and technologies of intelligent buildings (like sensors, agents and actuators etc). Building Automation Systems: Components and functions of building automation systems (BAS) and Energy management systems (EMS), Design and implementation of BAS, Integration of BAS with other building systems, Case studies of BAS in intelligent buildings, Types of Control strategies for energy efficiency and comfort Integration with other building systems such as HVAC, lighting, and security. Introduction to advanced building technologies,Smart lighting systems, Intelligent HVAC systems, Building security and access control systems, Building information modeling (BIM) and virtual reality (VR) technologies, Integration of advanced building technologies in intelligent buildings, Designing and Evaluating Intelligent Buildings, Introduction to Sustainable design strategies for intelligent buildings. Principles of intelligent building design, Criteria for evaluating intelligent buildings, Tools and techniques for evaluating the performance of intelligent buildings. Case studies of successful intelligent building design system and their integration.

**Course Outcomes**

Upon successful completion of the course, the students will be able to

- CO1: Developed knowledge of sustainable buildings, energy efficiency, zero energy buildings and Intelligent Building Systems.
- CO2: Understand the design and operational strategies for future intelligent Building systems.
- CO3: understand the design strategies of Intelligent and Smart building integration in energy efficient built spaces during this course.

**Books and References**


1. Manual of Tropical housing and Building byKoenigsberger, Ingersoll et al. Longman Group Ltd. London (now published by Orient Longman Ltd., Madras, India)
2. Design with climate: bioclimatic approach to architectural regionalism by Olgyay, V., Princeton University Press.
3. Climate responsive architecture: a design handbook for energy efficient buildings by Krishan, A., Tata McGraw-Hill Education.
4. Bureau of Energy Efficiency (2017), “Energy Conservation Building Code 2017”, Ministry of Power, Govt. of India
5. Bureau of Indian Standards, (1987), “SP 41: Handbook on Functional Requirements of Buildings (Other than Industrial Buildings)’, Bureau of Indian Standards, New Delhi

Course Name: **Design Studio- II (Lab)**
Course Code: **AR-624**
Course Type: **Core**

Contact Hours/Week: **4P** Course Credits: **02**

**Course Objectives**

- This studio provides exposure to sustainable building design and enables students to understand the context, building physics, energy efficiency.

**Course Content**

Design Studio where students learn and hone their architectural design skills and required to incorporate the knowledge gained from theory courses into the design solutions. Typically, at the end of the Design Studio, each student or team is required to explain the key concepts and integrated design philosophy with the supporting program of diagnostic and computational tools. A wide covering topics such as energy efficiency, life-cycle cost analysis, Building Physics, Building Diagnostics, role of building and energy appliance codes, Energy policy in designing sustainable buildings with the help of laboratory and simulation software tools. As a part of their involvement, students are required to actively participate in all lectures, discussions, readings, assignments, design tasks as a class group and/or individually. The design work must be actively in progress on a daily basis for collection readings and development of design.

**Note:** The Concerned course coordinator will prepare the actual list of problems at the start of semester based on above generic list.

**Course Outcomes**

Upon successful completion of the course, the students will be able to

- CO1: design various built forms on the concepts of sustainabilty and Energy Efficiency.
- CO2: understand the importance of building and energy appliance codes and energy policy in sustainable design, incorporating these elements into their projects.
- CO3: participate in the design process, continuously developing their projects through lectures, discussions, and effectively use simulation software to predict and improve the thermal and energy performance of their designs.

**Books and References**


1. Edwards, Brian and Hyett, Paul Rough guide to sustainability 2001.
2. Langston, Craig A. and Ding, Grace Sustainable practices in the built environment 2001.
3. GivoniBaruch,"Passive and Low Energy Cooling of Buildings",VNR, New York, 1994.
4. Understanding Sustainable architecture byMartin J Gainsborough, Radford and Helen Bennets, T J Williamson, Spon Press, London.

Course Name: **Eco Tourism and Development**
Course Code: **AR-711**
Course Type: **Programme Elective I**

Contact Hours/Week: **4L** Course Credits: **04**

**Course Objectives**

- To understand the concepts and strategies for planning and development of Eco tourism.

**Course Content**

Introduction to Tourism: Definitions, scope, nature, classification and dimension, tourism as an industry, tourism in developed and developing world. Relationship between Tourism and Urban Development, Tourism multiplier and forecasting methods: capacity building and carrying capacity planning for tourism projects, tourism and cultural and social change: Socio-cultural problems, environmental degradation. Introduction to Eco Tourism: Types of Eco Tourism. Understanding the natural potentials of different regions and to exploit them for tourism, approaches to ecotourism. Costs and benefits of ecotourism. Cases of ecotourism around the world, issues of cultural tourism, policies and laws relating to ecotourism. Community involvement in ecotourism. Enterprise establishment and management and Current ecotourism trends.

**Course Outcomes**

Upon successful completion of the course, the students will be able to

- CO1: Understand the definitions, scope, nature, and classifications of tourism, as well as its economic importance globally.
- CO2: Develop design skills for towns having potential for heritage, environmental, religious, educational and recreational tourisum.
- CO3: analyze the dynamics of tourism in developed and developing countries, considering economic, social, and cultural factors.

**Books and References**


1. Culture on tour: ethnographies of travel by Bruner, E.M., The University of Chicago Press.
2. The Earthscan reader in sustainable tourism by France, L. editor,London: Earthscan Publications.
3. Social change and conservation: environmental politics and impacts of national parks and protected areas by Ghimire, K.B. and M. Pimbert, London: Earthscan Publications.
4. Ecotourism &certification: setting standards in practice by Honey, M., Washington, D.C.:Island Press.
5. Sustainable tourism: a marketing perspective by Middleton, V, Woburn, MA: Butterworth-Heinemann.

Course Name: **Design Thinking**
Course Code: **AR-712**
Course Type: **Programme Elective I**

Contact Hours/Week: **4L** Course Credits: **04**

**Course Objectives**

- To provide a Creative approach to Problem Solving and Creating Impact on Sustainable design development

**Course Content**

Introduction to the word "design" used to describe the visual aesthetics of objects such as products, architecture, books, websites, and fashion. Yet increasingly design as a discipline is expanding to include not just the shaping of artifacts but also the ways people interact with systems, services, and organizations. As the challenges and opportunities facing society grow more complex, and as stakeholders grow more diverse, an approach known as "design thinking" is playing a greater role in finding meaningful paths forward. Design thinking is an iterative problem-solving process of discovery, ideation, and experimentation that employs design-based techniques to gain insight and yield innovative solutions for virtually any type of system challenge, prominently including those within public service. This course aims at introducing students to design thinking. A way of working with user centered innovation to address problems where not all knowledge is available at the outset, i.e. the problem itself is an unknown (wicked problem). Design thinking rests on principles such as user involvement, problem framing, experimentation, visualization and diversity, all critical skills for management and innovation. Design thinking has gained in popularity both in industry and in governments in the last decade and is an important contrast to the more traditional linear view of problem solving. It is argued to develop the creative potential of individuals and enable them to deal with wicked problems.

**Course Outcomes**

Upon successful completion of the course, the students will be able to

- CO1: comprehensive understanding of design as a multidisciplinary approach encompassing visual aesthetics and problem-solving methodologies.
- CO2: apply design thinking methodologies to tackle ambiguous and complex "wicked problems" effectively.
- CO3: develop creativity and innovation skills essential for addressing dynamic challenges and driving meaningful change.

**Books and References**


1. Alan Weintraub and Alan Hess, Frank Lloyd Wright: Natural Design, Organic Architecture: Lessons for Building Green (2012)
2. Charles J. Kibert, Sustainable Construction: Green Building Design and Delivery (2022).
3. Kathryan Rogers Merlino, “Building Reuse: Sustainability, Preservation, and the Value of Design” (2018).
4. Peter Buchanan, “ Ten Shades of Green: Architecture and the Natural World” (2006).
5. Johanna Agerman Ross, et al, .Phaidon, Vitamin Green.(2012).
6. Jason F. McLennan, “The Philosophy of Sustainable Design”( 2004).

Course Name: **Sustainable Mobility Studies**

Course Code: **AR-713**

Course Type: **Programme Elective I**

Contact Hours/Week: **4L** Course Credits: **04**

**Course Objectives**

- To make aware of the aspects of planning for Sustainable Mobility and transportation, such as urban sprawl, and the linkages between city and region.

To provide exposure to the Neighborhood planning processes and Models.

**Course Content**

Transport activities: Historical development of transport, urban and regional transport system. Urban Transport: Role and importance of transport, urban morphology, urban structure, urban form. Urban transformation: Compression of time and space and birth of suburbia- edge city and peripheral city, study of urban developments like Brasilia, Canberra and Chandigarh. Urban traffic problem: Traffic management, traffic & environment. Transport planning process: Serial vision, TOD Development, transportation system analysis. Mode and Choices: Evaluation, choice, and sequence of activities involved in transport analysis. Need of society: Design for gender, children, elderly and especially abled person.

**Course Outcomes**

Upon successful completion of the course, the students will be able to

- CO1: comprehensive understanding about various transportation planning principles at site and city level planning.
- CO2: understand the need and role of public realm in sustainable Mobility design.
- CO3: proficient in transport planning processes, including serial vision, TOD development, and system analysis techniques.

**Books and References**


1. Principles of Urban Transport Systems Planning, by Hutchinson, B.G. Mc Graw Hill Book Company, New York.
2. Urban Design: Green Dimensions by J. C. Moughtin , Peter Shirley,Rouledge.
3. Traffic Transportation and Urban Planning by George Godwin, International Forum Series.
4. A new theory of urban design ,Center for environmental structure series, Vol 6(1986) by Christopher Alexander, HajoNeis, Artemis Anninou, , Ingrid King.
5. The concise townscape by Gordon Cullen , Architectural press
6. Transportation Engineering and Planning by Papacostas, C.S., and Prevedouros,P.D., Prentice-Hall of India Pvt Ltd.
7. Urban design: Street and square by J. C. Moughtin, Architectural press.
8. Urban design- Architecture of towns and cities by Paul D. Spreiregen, Mcgraw- Hill Inc.
9. Transportation, Traffic Safety and Health - Prevention and Health by Hans v. Holst, Ake Nygren, and Ake E. Andersson, Third International Conference, Washington.
10. Traffic Engineering, by Roger P. Roess, Elena S. Prassas, and William R. McShane.

Course Name: **Conservation Preservation of the Historic Built Environment**
Course Code: **AR-714**
Course Type: **Programme Elective - I**

Contact Hours/Week: **4L** Course Credits: **04**

**Course Objectives**

- To provide a comprehensive understanding of how societies have historically adapted their built environments to meet unique cultural, political, economic, climatic, and environmental challenges, through the study and preservation of architectural heritage.

**Course Content**

Introduction to Built Environment History; Understanding how societies have adapted their built environments over time. Environmental Assessment of Historic Structures; Technical analysis of past technologies in conservation and their effectiveness. Preservation and Adaptation of Historic Sites; Exploring the reasons and methods for preserving and adapting historic structures and landscapes. Documentation and Interpretation Techniques; Methods to document and interpret the significance of buildings, districts, and landscapes. Preservation Policy and Jurisdictional Issues; An overview of policy and legal frameworks affecting preservation at national, state, and local levels. Case Studies; Investigating historical contexts and motivations behind innovations in architecture. Conservation Processes; Learning current approaches and issues in the field of historic preservation and resource management.

**Course Outcomes**

Upon successful completion of the course, the students will be able to

- CO1: have comprehensive understanding of historical, cultural, and environmental factors influence on the development and conservation of the built environment.
- CO2: analyze environmental technologies and strategies used in historic buildings critically.
- CO3: Students will develop skills to document and interpret the historical and architectural significance of various sites.

**Books and References**


1. Build On: Converted Architecture and Transformed Buildings, by L. Feireiss (editor) and R. Klanten (editor).
2. Conservation and Restoration of Built Heritage: A History of Conservation Culture and its More Recent Developments. Author/Editor- D'Agostino Salvatore. Publisher – Taylor and Francis Ltd.
3. Practical Building Conservation: Building Environment. Publisher – Taylor and Francis Ltd.
4. Transform: Promising Places, Second Chances, and the Architecture of Transformational Change. Author – Deborah Berke, Thomas de Monchaux. Publisher - Monacelli Press

Course Name: **Sustainable Housing Design**
Course Code: **AR-715**
Course Type: **Programme Elective II**

Contact Hours/Week: **4L** Course Credits: **04**

**Course Objectives**

- To prepare the students to produce efficient housing solutions based on appropriate analysis and sustainability principles.

**Course Content**

Introduction to human settlements and sustainable housing: Evolution of human settlements, Role of housing in social and economic development of the nation, Census definitions, Housing and health, Sustainable housing, Urban sustainability. Housing demand and supply: Qualitative and Quantitative analysis. Housing situation: Impact of industrialization and urbanization, Impact of environmental and climatic aspects, Impact of location and layout aspects, Impact of social, Economic and physical factors, Housing density, Quality indicators of housing and sustainability. Housing policies: Housing finance, Resources mobilization, Housing institutions, Housing co-operatives, Housing programs and schemes-national and local level, Green/renewable electricity schemes, Analysis of housing policies. Housing Design: Development concepts and human settlement planning, Housing design typologies, Development controls and building byelaws, URDPFI guidelines, NBC provisions. Sustainability in Housing Design: Principles of sustainable design, Integration of three E's (Energy, Ecology and Environment) in housing, Mass Solar Energy generation, Water conservation, Net-Zero communities, Housing and transport Operation and management: Maintenance, Post occupancy evaluation, housing satisfaction.

**Course Outcomes**

Upon successful completion of the course, the students will be able to

- CO1 : Analyze the policies, demand and supply of housing.
- CO2 : Apply the principles of sustainable housing in design solutions.
- CO3 : Exercise appropriate operation and management practices post occupancy.

**Books and References**


1. Time Saver Standards for Housing and Residential Development by Chiara, J. D., Julius, P. and Zelnik, M., McGraw Hill.
2. The Architecture of Affordable Housing by Sam Davis, University of California Press
3. Housing and Dwelling: Perspectives on Modern Domestic Architecture by Barbara Miller Lane , Routledge.
4. National Building Code, 2005 National Housing and Habitat Policies, 1998, 2007 (urban), Govt of India.
5. Hand Book Of Low Cost Of Housin,by Lal, A.K, New Age Publishers.
6. The Sage Handbook of Housing Studies. Sage, London. Levitt, David & Levitt, Bernstein, 2010.
7. The Housing Design Handbook. Routledge, New York. Ferre, A. and Salij, T.H., .2010.
8. Sustainable Housing Principles & Practice by Brian Edwards and David Turrent, published by E & FN Spon.

Course Name: **Disaster Mitigation & Management**
Course Code: **AR-716**
Course Type: **Programme Elective II**

Contact Hours/Week: **4L** Course Credits: **04**

**Course Objectives**

- To let the students understand the type of in natural disasters and its effects on structural and non-structural elements. To understand the mechanism involved in the management of disasters, and techniques related to it.

**Course Content**

Concepts of disaster; Types of disaster: natural and manmade: Cyclone, flood, land slide, land subsidence, fire and earthquake. Issues and concern for various causes of disasters. Management issues related to disaster; Mitigation through capacity building, legislative responsibilities of disaster management; Disaster mapping, assessment, pre-disaster risk & vulnerability reduction, post disaster recovery & rehabilitation; Disaster related infrastructure development. Disaster management, mitigation, and preparedness. Techniques of monitoring and design against the disasters. Remote-sensing and GIS applications in real time disaster monitoring, prevention and rehabilitation.

**Course Outcomes**

Upon successful completion of the course, the students will be able to

- CO1: gain knowledge about creating resilient community designs at both neighbourhood and city level.
- CO2: Understanding legislative responsibilities in disaster management.
- CO3: Exploring disaster-related infrastructure development.

**Books and References**


1. Vulnerability Atlas of India by BMTPC, GOI, India
2. Disaster Management byGhosh, G.K., A.P.H. Publishing Corporation, New Delhi
3. Encyclopaedia of Disaster Management byGoel, S. L., Deep & Deep Publications Pvt Ltd, Delhi
4. Disaster Management - Recent Approaches byArvind Kumar, Anmol Publications, Delhi
5. Disaster Management byNarayan, B., A.P.H. Publishing Corporation, New Delhi

Course Name: **Computer Simulations (GIS, BIM and Climate Software) in Sustainable Architecture**
Course Code: **AR-717**
Course Type: **Programme Elective II**

Contact Hours/Week: **4L** Course Credits: **04**

**Course Objectives**

- To acquire proficiency in creating three dimensional objects in space, which can also be used for the purpose of presentation as well as visualization using different rendering techniques.

**Course Content**

Introduction, Various GIS packages and their salient features, Geographical coordinate systems, Map projections, Projected coordinate system, geo relational vector data model, concepts of topology, Object based vector data model, raster data model, elements of raster data model, Data conversion, Integration of raster and vector data, Data input, Geometric transformation, spatial data editing, Data exploration, Vector and raster data analysis, Role of remote sensing in GIS, Applications of GIS for various natural resources mapping, monitoring, and analysis for design and planning applications. Introduction to latest software for computer Simulations. Advanced techniques in BIM Softwares, Revit, IESVE, Ecotech, Design Builder and other energy modeling/ simulation softwares.

**Course Outcomes**

Upon successful completion of the course, the students will be able to

- CO1: Understand the fundamental concepts and applications of Geographic Information Systems (GIS).
- CO2: To enhance the modeling and simulation skills of students for individual building/ building complexes.
- CO3: Familiarize with techniques in Building Information Modeling (BIM) software including Revit, IESVE, Ecotech, and Design Builder.

**Books and References**

1. Official Courseware of Revit architecture by Autodesk .

Course Name: **Sustainable Finance and Project Formulation**
Course Code: **AR-718**
Course Type: **Programme Elective- II**

Contact Hours/Week: 4**L** Course Credits: **04**

**Course Objective**

- To impart knowledge about the Sustainable Finance, Project formulation and Planning and Feasibility Studies.

**Course Content**

Sustainable Finance: Introduction to the Sustainable Finance, ESG (environment, social, and governance) factors, Sustainability Reporting, Corporate Governance and Corporate Social Responsibility. ESG and Climate Change, Sustainability and Financial Returns, Impact Investing, Overview of Responsible and Sustainable Investment. Financial Planning; preparation of financial feasibility report; project investment decisions; financial risk analysis; Practical problems; case studies, and application to projects. Components of Project Formulation: Methods and techniques of project identification, need identification, recognizing scope of the project, Feasibility study and opportunity study.Basic and supportive information required for a project, Review of literature & sources, Rules governing the preparation of Project Proposal. Formulation of Stages of project and their significance. Formulation of Project Team and role of owner, contractor and consultant in project management. Role of project Manager and his qualities. Type and nature of Project. Aim Characteristics of project. Objective and function of Project management. Project Planning: Identifying the Project area and target group, Determining the goals and objectives of the Project; Project work plan and time frame. Methods for Feasibility studies: Financial, environmental and social, cost estimates, economic and financial analysis. Methods of Financial Appraisal, Net Present Value Method, Profitability Index Method, Internal rate of return Method, Benefit Cost Ratio Method. Role of financial Institute in project Financing and sources of finance project planning.

**Course Outcomes**

Upon successful completion of the course, the students will be able to

- CO1: Understanding the principles and practices of financing that take into account environmental, social, and governance (ESG) factors.
- CO2: Develop skill in preparing and analyzing financial feasibility reports, including project investment decisions and financial risk analysis.
- CO3: develop techniques for identifying project planning and Scheduling.

**Books and References**


1. The Engineering and constructive Contract by Proceedings of the Institute of Civil Engineers.
2. Construction and planning Management- U.K. Shrivastava
3. Total Construction Project management- George J Ritz
4. Construction Engineering and management- S. Seetharaman
5. Construction and Project management- KG Krishnamurthy

Course Name: **Quantitative and Qualitative Research Methods**
Course Code: **AR-721**
Course Type: **Program Elective - III**

Contact Hours/Week: **4L** Course Credits: **04**

**Course Objectives**

- To appreciate the process of research.
- To know various quantitative and qualitative methods of research.
- To make the students aware of the potential of research in the field of architecture.

**Course Content**

Research in architecture – its nature, purpose and scope. Types of research: qualitative and quantitative. Scientific method to conduct a research, with special reference to architectural research. Various steps associated with conduct of research – hypothesis, research design, data collection, data analysis, conclusion and implications. Litrature review, its significance and methods for conducting the Litrature Review. Methods of conducting qualitative research. Methods of conducting quantitative research. The methods of collecting data in case of qualitative and quantitative research. The methods of sampling. Various types of data analysis tools and techniques in case of qualitative and quantitative research. Methods for technical Report Writing.

**Course Outcomes**

Upon successful completion of the course, the students will be able to

- CO1: Distinguish qualitative and quantitative type of research.
- CO2: Learn the methodology followed in various types of research.
- CO3:Demonstrate proficiency in conducting literature reviews, data collection and data analysis using appropriate methods.
- CO4: Apply the scientific method to conduct research specifically tailored to architectural inquiries.
- CO5: Develop skills in writing technically proficient reports based on research findings in architecture.

**Books and References**

1. Architectural Research Methods by Linda Groat and David Wang, 2013
2. Research Methodology: Methods and Techniques by C.R. Kothari, 2023
3. Research: How to plan, speak and write about it by C. Hawkins & M. Sorgi, Springer-Verlag, 1985
4. Research Methodology by Rajagopalan, Mathews and Ramamurthy

Course Name: **Infrastructure Planning**
Course Code: **AR-722**
Course Type: **Programme Elective III**

Contact Hours/Week: **4L** Course Credits: **04**

**Course Objectives**

- To provide exposure to infrastructure and its sub-sectors relevant to physical planner in planning and design of urban and regional Infrastructure.

**Course Content**

Elements of physical infrastructure: Water supply, drainage, sewerage, solid waste management electricity, other utilities and services. Data requirements for programme planning of urban network and services; feasibility planning studies and structuring the infrastructure systems. Planning water supply; Resource analysis, quality of water, system design; Technological choices and alternatives. Issues related to the choice of centralized city water supply system versus decentralized systems. Waste generation processes in cities. Waste water disposal system including storm water drainage system. system designs, nodal facilities, technological and environmental considerations. Solid waste disposal; and management. Resource recovery technology options and determinants of type choice of systems as related to land use, density, economy levels and location of urban industrial and commercial activity areas. Planning for fire protection, services and space standards, fire fighting, renewable energy sources.

**Course Outcomes**

Upon successful completion of the course, the students will be able to

- CO1: integrate physical infrastructure in developing sustainable design startegies at local and regional level.
- CO2:Understand and design resource analysis and water supply systems evaluating technological options.
- CO3: Evaluating and determining resource recovery technologies, system types based on urban characteristics and activities.

**Books and References**


1. Alvin Goodman, MakarandHastak (2006), “Infrastructure Planning Handbook: Planning, Engineering, and Economics”
2. Gallian, Arthur B. &Eisner, Simon (1963), “The Urban Pattern”, D.VanNostrandCompany,Inc., New York
3. Infrastructure Development Finance Company (2007), “India Infrastructure Report, 2007: Rural Infrastructure”
4. K.P. Singh (2002), “Infrastructure in India”.

Course Name: **Eco-Cities and Sustainable Communities**
Course Code: **AR-723**
Course Type: **Programme Elective- III**

Contact Hours/Week: **4L** Course Credits: **04**

**Course Objectives**

- To provide exposure to the emerging concepts and issues concerning Eco cities, Sustainable city development, Urban Eco cities and sustainable communities.

**Course Content**

Introduction to eco-city, economic, social, and environmental qualities of an eco-city, carbon-neutral and renewable energy production, Public transportation systems, Resource conservation (water and energy), waste management and its reuse, Urban Farming, Urban Infill, Walkable Urbanism, Sustainable Cities, discussion on international and national eco cities, nature in the city, Urban Eco-Design, Integrating Nature and Urban life, Building healthy Community Systems, Transforming Community Systems. Sustainable communities: Sustainable Community Theory, Transportation for Sustainable Communities, Land Use Planning Strategies, Sustainable Community Models and the Future of Sustainable Community Planning, Designing the Built Environment, healthy neighborhoods, Social Sustainability; Investigating the social dimensions of sustainability, focusing on behavioral, multicultural, and user-centred perspectives.

**Course Outcomes**

Upon successful completion of the course, the students will be able to

- CO1: understand the need and role of eco city design concept, their economic, social, and environmental dimensions.
- CO2: Explore strategies for achieving carbon neutrality and promoting renewable energy production within urban environments.
- CO3: Analyse watse management strategies and the reuse of materials to reduce environmental impact.
- CO4: Understand and Explore strategies for walkable urbanism and its benefits for creating sustainable, livable cities.

**Books and References**


1. Bio polis: Patrick Geddes and the City of Life by Welter, Volker, MIT Press.
2. Car free Cities by Crawford, J. H., International Books.
3. Cities for a Small Planet by Rogers, Richard, Westview Press.
4. The City After the Automobile: An Architect's Vision by Safdie, Moshe, Westview Press.
5. The City in Mind: Notes on the Urban Condition by Kunstler, James Howard, Touchstone Books.
6. Crabgrass Frontier: The Suburbanization of the United States by Jackson, Kenneth T., Oxford University Press.
7. Eco-City Dimensions: Healthy Communities, Healthy Plants by Roseland, Mark, New Society Publishers.
8. The Ecological City: Preserving and Restoring Urban Biodiversity by Platt, Rutherford H., University of Massachusetts Press.
9. Gaviotas: A Village to Reinvent the World Weisman by Alan, Chelsea Green Publishing Company.
10. The Geography of Nowhere: The Rise and Decline of America's Man-Made Landscape Kunstler by James, Touchstone Books.
11. Home from Nowhere: Remaking Our Everyday World for the 21st Century Kunstler by James Howard, Touchstone Books.
12. Human Settlements and Planning for Ecological Sustainability: The Case of Mexico City by Pezzoli, Keith, MIT Press.

Course Name: **Sustainable Health and wellness Architecture**
Course Code: **AR-724**
Course Type: **Programme Elective- III**

Contact Hours/Week: **4L** Course Credits: **04**

**Course Objectives**

- To provide a complete overview of the various aspects of sound hospital infrastructure design and planning. From a very macro level approach of healthcare delivery systems in a country to the departmental planning and detail at the micro level, this course is all inclusive.

**Course Content**

Introduction to Health, wellness and Human heathcare settlements evolution. Healthcare Delivery Systems. Healthcare Matrix: The role of a hospital. Planning Principles. Site Selection for Hospital. Project Feasibility & Viability Analysis.Socio-Economic Analysis; Techno-Economic Feasibility Report; SWOT Analysis. Introduction to Standards. Indian Healthcare and Hospital Standards. Laws Applicable to Medical Practice & Hospitals in IndiaHow to read and Interpret a technical drawing; P.P.R/D.P.R.; Architect's Design Brief; Project Manuals; Facility Management Manual.s Site Planning Principles for Hospitals. Orientation of Buildings. Terrain. Climatological considerations. Master-Planning of Hospitals w.r.t. Urban Design and Landscaping. Introduction to Architecture Design; Balancing Form and Function; Components of a Hospital. Introduction to Evidence Based Healthcare Design (Accident & Emergency, OPD, IPD, Daignosis, ICU, OT Complex, Hospital Labs, Administrative Department, Laundry, Mortuary, CSSD, Deitary Department, Blood bank etc.). Inter-Departmental relationship in a hospital. Balancing Factors. Design considerations for Health Sub-centres, Primary Health Centres, Community Health Centres, District Hospitals. Case Study based upon REVIEW Assessment: Site Selection, SWOT Analysis Study, Preparing Project Report, Creating Masterplan, Design of Ward, Design of Critical Care Centre, Physically Challenged Facilities, Design of a basic Primary Health Centre, Preparation of the programme (flowchart) of a basic hospital.

**Course Outcomes**

Upon successful completion of the course, the students will be able to

- CO1: understand the need and role of Health care facilities in Sustainable communities.
- CO2: Apply planning principles to site selection for hospitals considering socio-economic and climatological factors.
- CO3: Conduct feasibility and viability analyses including socio-economic and techno-economic aspects, SWOT analysis, and interpretation of technical drawings.
- CO4: understand and interpret Indian healthcare and hospital standards and laws applicable to medical practice and hospitals in India.

**Books and References**


1. Innovations in Hospica Architecture, Stephen Verderber & Ben J. Refuerzo, 2006 Taylor & Francis.
2. Modern Trends in Planning, Designing of Hospitals: Principles and Practices, Shakti Kumar Gupta, Sunil Kant, R Chandrashekhar and Sidhartha Satpathy, 2007, Jaypee.
3. Hospitals and Nursing Homes Planning, Organisations and Management, Syed Amin Tabish, 2003, Jaypee.

Course Name: **Project Planning and Management**
Course Code: **AR-701**
Course Type: **Open Elective**

Contact Hours/Week: 4**L** Course Credits: **04**

**Course Objective**

- To impart knowledge about the design approach and the special service requirements of Tall Buildings; and to create awareness about the impacts of tall buildings in the urban environment.

**Course Content**

Introduction and Definitions of Project Management: Type and nature of Project. Aim Characteristics of project. Objective and function of Project management. Project Cycle. Preparation of per-feasibility and detailed project reports. Project identification- Methods and techniques of project identification, need identification, recognizing scope of the project, Feasibility study and opportunity study. Components of Project Formulation: Basic and supportive information required for a project, Review of literature & sources, Rules governing the preparation of Project Proposal. Formulation of Stages of project and their significance. Formulation of Project Team and role of owner, contractor and consultant in project management. Role of project Manager and his qualities. Project Planning: Identifying the Project area and target group, Determining the goals and objectives of the Project; Project work plan and time frame. Methods for Feasibility studies: Financial, environmental and social, cost estimates, economic and financial analysis. Methods of Financial Appraisal, Net Present Value Method, Profitability Index Method, Internal rate of return Method, Benefit Cost Ratio Method. Role of financial Institute in project Financing and sources of finance project planning. Organising and Staffing the project Team: Role of actors in completion of project i.e. owner, consultant and contractor. Project Organisation and type of task Force Organisation Tendering Procedure, Procedure for selection of Contractor. Project Scheduling and Monitoring: Introduction to Bar charts, Milestones, Standard oriented cost control techniques. Stages of project form Network analysis, Event scheduling of project through CPM, Event scheduling of project through PERT. Resource Scheduling. Tenders: Type and process of calling, security and selection system, pre-tender qualifications and registration of contract. Contract: preparation of contract documents, Type of contracts, general condition of contract, interim certificates defect liabilities. Project Evaluations and Termination of project: Project evaluation: meaning, objectives, scope. Stages of Project evaluation, Project Audit report, what is project Termination and its types.

**Course Outcomes**

Upon successful completion of the course, the students will be able to

- CO1: Understand Project Fundamentals, Formulation, Life cycle and Fesiability.
- CO2: Understand the procedure for Tendering and Contractor Selection.
- CO3: Develop Project Scheduling and Monitoring.
- CO4: develop Project Evaluation and Termination reports.

**Books and References**


1. The Engineering and constructive Contract by Proceedings of the Institute of Civil Engineers.
2. Construction and planning Management- U.K. Shrivastava
3. Total Construction Project management- George J Ritz
4. Construction Engineering and management- S. Seetharaman
5. Construction and Project management- KG Krishnamurthy

Course Name: **Urban Conservation**
Course Code: **AR-702**
Course Type: **Open Elective**

Contact Hours/Week: **4L** Course Credits: **04**

**Course Objectives**

- This course aims to provide students with appropriate knowledge to urderstand the various concerns of Urban conservation and make them familiar with the initiatives taken to improve the conditions of existing urban areas.

**Course Content**

Understanding conservation; Preservation and restoration; Socio-cultural-economic and environmental significance of conservation; Various aspects of built and natural heritage; Conservation practice; understanding various concepts of urban conservations like redevelopment, revitalization, regeneration, rehabilitation and renewal, transformations. Basic Principles of Conservation and Degrees of Interventions: Conservation principles; Conservation conventions and practices adopted at International, National and local levels for heritage buildings, sites and cities. Introduction an role of UNESCO and ICOMOS, Introduction to various important UNESCO charters like: Venice Charter, Burra Charter, COMOS Charter. Urban Conservation: Planning & Management**.** Conservation polices, norms and guidelines, Govt. initiatives, programs and mission for urban conservation, Building byelaws for heritage areas or sites in India. Role of national, state level organizations and Urban Local Bodies for Urban Conservation, ASI, state archaeology departments, Significance of INTACH and other NGOs for conservation. Study of successful Case examples of urban conservation in India and abroad, New and emerging concepts of urban conservation and summarization of the course.

**Course Outcomes**

Upon successful completion of the course, the students will be able to

- CO1: Understand Concepts, Principles, Tehniques and Practices of Urban Conservation.
- CO2: Undestand Legislation and Governance about Urban Conservation.
- CO2: Review and assess successful case examples of urban conservation in India and abroad to develop concerns and initiatives for conserving urban environments.

**Books and References**


1. Cohen, N., “Urban Conservation”, MIT Press. 1999
2. Jokilehto, J., “History of Architectural Conservation (Conservation and Museology)”, Routledge. 2002
3. Fielden, B. “Conservation of Historic Buildings”, Architectural Press. 2003
4. Orbasli, A., “Architectural Conservation: Principles and Practice”, Wiley Blackwell. 2007
5. Croci, J., “The Conservation and Structural Restoration of Architecture Heritage: Theory and Practice”, Computational Mechanics Publications. 2008
6. Aygen, Z., "International Heritage and Historic Building Conservation: Saving the World's Past", Routledge. 2012.