

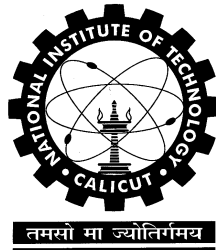
MASTER OF PLANNING

IN

URBAN PLANNING

CURRICULUM & SYLLABUS

2023



Department of Architecture and Planning
NATIONAL INSTITUTE OF TECHNOLOGY CALICUT
Kozhikode - 673601, KERALA, INDIA

The Program Educational Objectives (PEOs) of M. Plan. in Urban Planning

PEO1	Develop planning professionals with a global vision and interdisciplinary skills to diagnose planning issues related to urbanisation and contribute to developing innovative and sustainable solutions for urban areas.
PEO2	Foster a sense of social and environmental responsibility in graduates and encourage them to actively address urban challenges, including socio-cultural equity, diversity, and climate change.
PEO3	Prepare graduates for lifelong learning, adaptability to changing professional and societal needs, and for effective collaboration with diverse stakeholders in urban planning, implementation, and management.

Programme Outcomes (POs) & Programme Specific Outcomes (PSOs) of M Plan in Urban Planning

PO1	Urban Planning Knowledge: Graduates will demonstrate a comprehensive understanding of urban planning principles, theories, and practices and the ability to apply this knowledge to identify problems related to urbanisation and issues in urban areas.
PO2	Problem Analysis and Investigations: Graduates will be able to scientifically diagnose complex urban planning problems using appropriate methods and techniques to identify the root cause of issues and their interlinkages to various domains.
PO3	Sustainable Planning and Development: Graduates will be able to solve complex issues in urban areas by way of planning, implementation, effective management of fiscal resources, developing sustainable and innovative solutions, and also evaluating the social, cultural, economic, and environmental impacts of urban planning and development.
PO4	Usage of Modern Technology: Graduates will have the ability to use a range of latest technical, analytical, and interdisciplinary skills to support evidence-based decision-making in urban planning, implementation and management, including the use of geospatial, remote sensing, and other advanced digital tools.
PO5	Stakeholder Engagement and Communication: Graduates will be able to work collaboratively with diverse stakeholders, including policymakers, community groups, design professionals, administrators, and the public, to facilitate effective planning, implementation and management of urban areas, and communicate effectively with them using appropriate modes of communication and communication technologies.

PO6	Professionalism and Ethics: Graduates will apply ethical and professional standards in all aspects of urban planning practice, workspace, teamwork, and leadership, and formulate financially feasible projects while ensuring the inclusiveness of all stakeholder communities and execute the projects using innovative financial models and appropriate project management strategies to ensure optimum resource utilisation and timely completion.
PSO1	Spatial and Quantitative Analysis: Graduates will be able to apply quantitative and geospatial technologies such as GIS and RS to analyse and model complex urbanisation and regional planning problems and use these tools to support effective decision-making and communication in planning practice.
PSO2	Smart City Planning: Graduates will be able to plan and design smart cities that utilise ICT to enhance infrastructure integration, governance, and economy by employing innovative and sustainable solutions that improve the quality of life of urban residents.
PSO3	Research and Analysis: Graduates will be able to conduct original research and analysis in urban planning and use evidence-based methods and tools to support planning practice, policy development, and decision-making in the field.

CURRICULUM

Total credits for completing M.Plan. in Urban Planning is 85.

COURSE CATEGORIES AND CREDIT REQUIREMENTS:

The structure of M. Plan. programme shall have the following Course Categories:

Sl. No.	Course Category	Minimum Credits
1.	Program Core (PC)	33
2.	Program Electives (PE)	12
3.	Institute Elective (IE)	2
4.	Thesis	19

The effort to be put in by the student is indicated in the tables below as follows:

L: Lecture (One unit is of 50 minute duration)

T: Tutorial (One unit is of 50 minute duration)

P: Practical (One unit is of one hour duration)

O: Outside the class effort / self-study (One unit is of one hour duration)

PROGRAMME STRUCTURE

Semester I

Sl. No.	Course Code	Course Title	L	T	P/D	O	Credits	Category
1.	AP6101E	Planning Principles and Techniques	3	0	0	6	3	PC
2.	AP6102E	Applied Statistics and Demography	3	0	0	6	3	PC
3.	AP6103E	Housing and Habitat Planning	3	0	0	6	3	PC
4.	AP6104E	GIS and Spatial Analysis	2	0	3	8	3	PC
5.	AP6105E	Remote Sensing Application in Urban Planning	2	0	3	8	3	PC
6.		Institute Elective	2	0	0	4	2	IE
7.	AP6191E	Planning Studio I	0	0	9	18	6	PC
Total			15	0	15	56	23	--

Semester II

Sl. No.	Course Code	Course Title	L	T	P/D	O	Credits	Category
1.	AP6106E	Transportation planning	3	0	0	6	3	PC
2.	AP6107E	Urban Infrastructure Planning	3	0	0	6	3	PC
3.	AP6108E	Mini project	0	0	3	6	2	PC

4.	AP6109E	Environmental Planning	3	0	0	6	3	PC
5.		Program Elective I	3	0	0	6	3	PE
6.		Program Elective II	3	0	0	6	3	PE
7.	AP6192E	Planning Studio II	0	0	9	18	6	PC
Total			15	0	12	54	23	--

Semester III

Sl. No.	Course Code	Course Title	L	T	P/D	O	Credits	Category
1.	AP7101E	Regional and Metropolitan Planning	3	0	0	6	3	PC
2.	AP7102E	Urban Economics & Finance	3	0	0	6	3	PC
3.		Program Elective III	3	0	0	6	3	PE
4.		Program Elective IV	3	0	0	6	3	PE
5.	AP7191E	Planning Studio III	0	0	9	18	6	PC
6.	AP7192E	Dissertation and Thesis Programming	0	0	6	12	3	PC
7.	AP7193E	Summer Training				*	1	PC
Total			12	0	15	54	22	--

*: Summer Training duration is inclusive of the Summer Vacation preceding the Monsoon Semester. Load per week (hours) will be based on the policy of the organisation where the Summer Training is undertaken.

Semester IV

Sl. No.	Course Code	Course Title	L	T	P/D	O	Credits	Category
1.	AP7103E	Planning Legislation and Professional Practice	3	0	0	6	3	PC
2.	AP7104E	Term Paper	0	0	3	6	2	PC
3.	AP7194E	Planning Thesis	0	0	24	48	12	PC
Total			3	0	27	60	17	--

List of Electives

Sl. No.	Course Code	Course Title	L	T	P/D	O	Credits
1.	AP6121E	Land Management and Real Estate Development	3	0	0	6	3
2.	AP6122E	Planning for Sustainable Development	3	0	0	6	3
3.	AP6123E	Tourism and Recreational Planning	3	0	0	6	3
4.	AP6124E	Planning for Smart Cities	3	0	0	6	3
5.	AP6125E	Urban Management and Governance	3	0	0	6	3

6.	AP6126E	Advanced GIS for Urban Analysis	3	0	0	6	3
7.	AP6127E	Urban Disaster Management	3	0	0	6	3
8.	AP6128E	Planning for Rural Development	3	0	0	6	3
9.	AP6129E	Environmental Impact Assessment	3	0	0	6	3
10.	AP6130E	Advanced Transportation Planning	3	0	0	6	3
11.	AP6131E	Regional Transport Planning	3	0	0	6	3
12.	AP6132E	Urban Design and Conservation	3	0	0	6	3
13.	AP6133E	Coastal City's Management	3	0	0	6	3
14.	AP6134E	Financial Management of Local Self Government	3	0	0	6	3
15.	AP6135E	Human Settlement and Climate Change	3	0	0	6	3
16.	AP6136E	Systems Modelling and Analysis	3	0	0	6	3
17.	AP6137E	Urban Renewal and Conservation	3	0	0	6	3
18.	AP6138E	Heritage Management and Tourism	3	0	0	6	3
19.	AP6139E	Green City Planning for Sustainability	3	0	0	6	3
20.	AP6140E	Cultural Landscapes	3	0	0	6	3

List of Institute Electives

Sl. No.	Course Code	Course Title	L	T	P/D	O	Credits
1.	ZZ6002E	Research Methodology	2	0	0	4	2
2.	IE 6001E	Entrepreneurship Development	2	0	0	4	2
3.	MS6174E	Technical Communication and Writing	2	0	0	4	2

SYLLABUS

AP6101E - PLANNING PRINCIPLES AND TECHNIQUES

Pre-requisite: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

- CO 1: Understanding the history of planning & the dynamics of human settlements as an expression of culture influenced by climate & geographical location.
- CO 2: Understanding theories, concepts, models, and approaches to planning that have influenced the planning process.
- CO 3: Acquaint with planning terminologies & systems in India.
- CO 4: Comprehend the planning data collection and analysis methods.

Overview of City planning in the ancient, medieval, and modern periods in India and abroad, planned cities in India like Chandigarh, New Delhi, etc. ; Planning Concepts like Garden City, Neighborhood planning, City Beautiful, Linear City, and others. Contribution to Modern City Planning by Lewis Mumford, Patrick Geddes, Peter Hall, Jane Jacobs, etc. ; Theories of Urban Structure and Land Use Concentric Zone Theory, Sector Theory, Multiple Nuclei Theory, Land Use, Land Value Theory, etc. ; Theories of Settlement Systems in Regional Context, Urban Rank Size Rule, Central Place Theory, Losch's Theory; Cumulative Causation Theory, Core Periphery Model, Growth Poles and Centres, Gravity Model.

Urban planning as a profession, scope and prospects, Urban design Vs Urban planning, Definition of Urban and Rural in India and different courtiers, Classification of urban settlements (CT, ST, UA, OG), employment and population classifications by the census. ; Different terminologies in planning, City Regions and their relationships, Rural-Urban Fringes, Metropolitan Regions, Push and Pull Factors, Rural-Urban Migration, and Other Emerging Issues in Planning.

Planning systems in India, 5 stages of multi-level planning in India (National, state, district, block, panchayat plans, 5-year plans), Plan formulation and planning process, Types of Plans its contents and their interrelationships, Perspective Plan, Regional Plan, Development Plan, Master Plan, Special plans, Zonal Plan and Local Area Plans, Annual Plans, Projects and schemes, etc., Urban renewal, Decentralized planning and the role of 73rd and 74th Constitution amendment act, Case studies of different plans.

Socio-Economic surveys their types and methodologies, Primary and secondary data sources, Questionnaire Design, Measurement Scale and their application; Sampling design, Techniques of Conducting Surveys for land use, building use, density, the structural condition of buildings, heights of the building, land utilization and physical Features of land, preparation of base maps and their scales, notations; Techniques for Conducting Regional Surveys; regional delineation techniques, Formulation of Spatial Standards for different land uses and facilities, URDPFI guidelines. ; Introduction to Analytical methods in planning: Economic base theory, input-output model, shift-share analysis, urban carrying capacity, and threshold limits.

References:

1. R. Ramchandran, "Urbanization and Urban Systems in India," Oxford University Press, 1989.
2. K. Siddhartha and S. Mukherjee, "Cities Urbanization and Urban Systems," Kisalaya Publications, 2003.
3. Ministry of Urban Affairs and Employment Govt. of India, "URDPFI Guidelines Volume 1," New Delhi, 2014.
4. M.P. Rao, "Urban Planning: Theory and Practice," CBS Publishers & Distributors, 2012.
5. I. Bracken, "Urban Planning Methods: Research and Policy Analysis," Routledge publication, 2008.

6. P.R. Berke, D.R. Goodschalk, E.J. Kaiser, and D.A. Rodriguez, "Urban Land Use Planning," University of Illinois Press, U.S.A., 5th Edition, 2006.
7. R.T. Le Gates and F. Stout (eds.), "The City Reader," 5th Edition, Routledge, London, 2011.
8. M. Roberts, "An Introduction to Town Planning Techniques," Hutchinson & Co Ltd, London, 1974.
9. Kruckerberg and Silvers, "Urban Planning Analysis: Methods and Models," John Wiley & Sons, New York, 1974.

AP6102E APPLIED STATISTICS AND DEMOGRAPHY

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

- CO 1: Evaluate and employ different statistical tools, techniques, and visualisation as required for urban planning proposals
- CO 2: Interpret development scenarios based on data collected and their systematic statistical analysis.
- CO 3: Apply analysis of time series data for urban planning purposes.
- CO 4: Apply the basic concepts and theories of demography in relating population geography to economic and physical development planned

Importance of statistics in urban planning, Descriptive statistics and data visualization – different types of graphs and their application – frequency plots, bar charts, box plots, scatter plots etc. Types of data and data sources in urban planning, Central Tendency, Dispersion, Data collection methods for urban planning projects, Sampling techniques and sample size determination, Data cleaning and validation, Data transformation and normalization.

Probability concepts and principles, Discrete and continuous probability distributions, Estimation and confidence intervals, Hypothesis testing and p-values, Correlation analysis and scatter plots, One-way and two-way ANOVA, Simple and multiple linear regression models, Logistic regression for binary outcomes, Introduction to nonparametric statistics - Chi square test, Mann-Whitney U test and Kruskal-Wallis test, Principal Component Analysis (PCA), Factor Analysis and Cluster Analysis

Time series data and its characteristics – Trend, Seasonality, Cyclical Patterns, Irregularity -Trend analysis and forecasting – moving average and autoregressive models, time series decomposition, Application of time series analysis in Demographic projections, demand forecasting.

Basics of Population Studies: Population, density, structure, composition and spatial distribution; Reasons and implications of spatial distribution and disparity. Analysis of labour force, mortality and fertility, Life table technique. Migration; Theory, models and measurement of internal migration, internal migration and urban growth. Population estimation and projection techniques, relevant to regions and settlements. Interrelations between Population change and development; Socioeconomic changes and pattern of human settlements as related to demography

References:

1. T. C. Urdan, Statistics in Plain English, Routledge Academic, 2010.
2. B. L. Agarwal, Basic Statistics, New Age International, 2006.
3. S. Weisberg, "Applied linear regression," 4th ed., John Wiley & Sons, 2013.
4. R. H. Shumway and D. S. Stoffer, "Time Series Analysis and Its Applications," Springer Texts in Statistics, Springer International Publishing, 2017. [Online]. Available: <https://doi.org/10.1007/978-3-319-52452-8>.
5. S. Preston et al., "Demography: Measuring and Modeling Population Processes," Wiley-Blackwell, 2000.
6. S. Harper, "Demography: A Very Short Introduction," Oxford UP, 2018.
7. P. K. Majumdar, "Fundamentals of Demography," 2010.
8. D. J. Pevalin and K. Robson, "The basics of social research," 3rd ed., Routledge, 2016.

AP6103E - HOUSING AND HABITAT PLANNING

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total Lecture Sessions: 39 Lecture Sessions

Course Outcomes:

CO 1: Assess the problems and prospects in housing development in India

CO 2: Familiarize the delivery mechanisms in housing sector

CO 3: Comprehend the Housing market mechanism in India

CO 4: Apply the standards, norms and statutory regulations affecting the housing development and design of housing neighbourhoods

Housing as a Right, International declarations and Laws-Housing Types: Typology of Housing based on common Physical Characteristics, Detached, Semi-detached, Row housing, Town house, Apartment, etc. -Typology On the basis of materials used in the construction: Census house -Typology of Housing based on mode of delivery: Plotted, Group Housing, Cooperative, Self Help, Leasehold, Freehold / Condominium, Rental Housing etc.-Role of housing in social and economic development- Housing Situations in developing and developed countries: Housing Policies in Developing Countries-Housing Situations in India: Existing housing stock in India, Countrywide data and regional data, Nature and magnitude of housing problems in India, Housing shortage in India and its Causes

Important Housing schemes in India post-independent for various categories like H.I.G, M.I.G, L.I.G, and EWS etc.- Housing in the informal sector- Problems of slums and squatter settlements-Approaches to shelter development :Settlement upgradation, incremental development, Site and services scheme, Core housing schemes, Self-help schemes, etc.- Approaches to shelter development of disaster affected community-Land management for housing: barriers to land supply, Regulations and planning practices for land supply- Resettlement and Rehabilitation Policies-Affordable Housing: Affordable Housing Policy, Public Private Participation, emerging thoughts in affordable housing-Community participation in design and implementation of housing programs- case studies.

Housing Markets Concepts and definition, Characteristics and operations of the housing market, Rental and ownership housing market, Housing Need vis-à-vis Demand, Housing stock vis-à-vis supply ,Assessment of housing shortage-Housing market behaviour: Law of demand and supply in housing market, Factors affecting local housing market, Housing bubble, Housing affordability, Housing stress-Rental Housing in India: An Overview of current practices and upcoming Initiatives- Housing Finance: Sources and essential characteristics, Types of financing systems and agencies. Various formal and informal systems of financing housing supply in India.

Habitat planning and design-Goals and objectives, Understanding housing as an important land use component of city plan / master plan- Housing in Neighbourhood planning: Approaches to neighbourhood living in traditional and contemporary societies, elements of neighbourhood structure- Concepts of cluster, Blocks & Neighbourhood, Neighbourhood planning principles & examples. Indicators and checklist for safe communities or neighbourhoods-Study of high-rise housing: Problems & Prospects- Sustainable Housing development -Norms & Standards for Housing Development: Planning and design criteria for modern neighborhoods,Factors affecting space standards / land requirements for facilities.

References:

1. A. K. Jain, "Housing and Community Planning: Design, Construction and Infrastructure," 2016.
2. F. Chiodelli, "International Housing Policy for The Urban Poor and The Informal City in the Global South: A Non-Diachronic Review," Journal of International Development, vol. 28, pp. 788-807, 2016.
3. Government of India, "National Housing Policies."
4. K. Gopalan and M. Venkataraman, "Affordable housing: Policy and practice in India," IIMB Management Review, vol. 27, pp. 129-140, 2015.
5. IS Code.

6. "13727 (1993): Guide for requirements of cluster planning for housing," 1993.
7. R. L. Bawa and B. G. Fernandes, "Design for Living: A Guide for Planning of Residential Neighborhoods," Galgotia Publishing Company, New Delhi, 2000.
8. K. T. Poulouse (compiled), "Reading Material on Housing," Institute of Town Planners, India, New Delhi, 2002.
9. ITPI, "Urban Development Plan Formulation & Implementation Guidelines," Ministry of Urban Development & Poverty Alleviation, Government of India.
10. A. Almusaed and A. Almsad (eds.), "Sustainable Housing," IntechOpen, 2022.
doi:10.5772/intechopen.95680.
11. B. Edwards and D. Turrent, "Sustainable Housing: Principles and Practice," 2000.
12. J. R. Tighe and E. J. Mueller, "The Affordable Housing Reader," Routledge, 2012.

AP6104E - GEOGRAPHICAL INFORMATION SYSTEM AND SPATIAL ANALYSIS

Pre-requisites: Nil

L	T	P	O	C
2	0	3	8	3

Total: 26 Lecture Sessions +39 Practical Sessions

Course Outcomes:

- CO 1: Generate various types of maps conforming to the cartographic conventions by acquiring and digitizing spatial information relevant to planning.
- CO 2: Design analysis strategies with the help of basic GIS tools and techniques to solve spatial analysis problems.
- CO 3: Solve planning problems involving networks.
- CO 4: Develop customized tools for specific applications and automation through scripting.

Definition, Components of GIS, Available software packages, ArcGIS and QGIS, Organizational Aspects, data structure for Spatial Data- Raster, Vector, Attribute data, and Irregular Grid Models, Database Creation and Organization, Data preparation – Digitalisation of paper maps, Coordinate systems, Datum, Projection systems. Linking spatial data with attribute data. Preparation of Thematic Maps - Choropleth, Proportional symbol, Isarithmic or Isopleth, Dot, and Cartograms. Elements of Cartographic Maps, Making Cartographic Map, Layouts in GIS.

Attribute Data Analysis and Manipulation – Join and Relate, Query, Calculations, Text operations. Vector Data Analysis and Manipulation- Overlay, Extraction, and Proximity analysis tools.

Raster Data Analysis and Manipulation – Extraction, Raster arithmetic, Conditional operations; Local, zonal and global operations. Three-Dimensional Data in GIS- Inputs of Surface Modelling, Generation of 3-D Model

Types of networks – Directed flow and undirected flow. Basics of directed flow network. Undirected flow Network Analysis in GIS - Elements and Attributes of Network, Data preparation for network analysis - Topology corrections, Creating network data set. Shortest path, Closest facility, Service Area, Location Allocation and Vehicle routing.

Automating GIS operations through model builder – simple models with linear process flow, Complex operations with conditional branching and loops. Basics of scripting with Python. Web GIS – Deploying GIS maps as web service, Real time query and operations on web server.

References:

1. A. K. Jain, "Housing and Community Planning: Design, Construction and Infrastructure," 2016.
2. F. Chiodelli, "International Housing Policy for The Urban Poor and The Informal City in the Global South: A Non-Diachronic Review," *Journal of International Development*, vol. 28, pp. 788-807, 2016.
3. Government of India, "National Housing Policies."
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5. IS Code."13727 (1993): Guide for requirements of cluster planning for housing," 1993.
6. R. L. Bawa and B. G. Fernandes, "Design for Living: A Guide for Planning of Residential Neighborhoods," Galgotia Publishing Company, New Delhi, 2000.
7. K. T. Poulouse (compiled), "Reading Material on Housing," Institute of Town Planners, India, New Delhi, 2002.
8. ITPI, "Urban Development Plan Formulation & Implementation Guidelines," Ministry of Urban Development & Poverty Alleviation, Government of India.
9. A. Almusaed and A. Almssad (eds.), "Sustainable Housing," IntechOpen, 2022. doi:10.5772/intechopen.95680.
10. B. Edwards and D. Turrent, "Sustainable Housing: Principles and Practice," 2000.
11. J. R. Tighe and E. J. Mueller, "The Affordable Housing Reader," Routledge, 2012.

AP6105E REMOTE SENSING APPLICATION IN URBAN PLANNING

Pre-requisites: Nil

L	T	P	O	C
2	0	3	8	3

Total: 26 Lecture Sessions + 39 Practical Sessions

Course Outcomes:

CO1: Comprehend the principles of remote sensing and use spectral signatures to identify features relevant to the study.

CO2: Perform visual image interpretation.

CO3: Implement digital image processing and image classification.

CO4: Conduct studies in Urban Planning and other related areas using remote sensing data.

Introduction of Remote Sensing: Electro Magnetic Spectrum– Interaction with atmosphere –Atmospheric window– Energy interaction with surface features –Spectral signatures – Types of remote sensing– Classification based on platform, energy source, imaging media, electromagnetic spectrum– Remote sensing satellites– satellite systems and data, acquisition – storage – orbits– data products.

Sensor Resolutions: spatial, spectral, radiometric and temporal –photogrammetry: classification, process –acquisition of imagery –geometric distortion and correction –Visual image interpretation, interpretation keys, generation of thematic maps.

Digital image processing: digital image, data recording, storage and distribution, data formats–Image rectification and restoration: pre-processing, geometric correction, radiometric correction and noise removal– Image enhancement: gray level thresholding, level slicing, contrast stretching, spatial filtering, convolution, edge enhancement, spectral ratioing– Image classification: informational and spectral classes, Information extraction –image registration and ortho rectification, resampling– Supervised, Unsupervised and Hybrid classification, fuzzy sets, Artificial Neural Network and expert system classification.

Application of remote sensing: Agriculture, Forestry, Geology, Hydrology, Geomorphology, Urban applications- Land use/land cover change, classification and mapping- Urban Land Use Delineation- Study of Urban Sprawl and Growth Trends- Urban Environment Analysis- Urban infrastructure studies- Transportation network studies- Urban disaster monitoring and mitigation.

References:

1. A. K. Jain, "Housing and Community Planning: Design, Construction and Infrastructure," 2016.
2. F. Chiodelli, "International Housing Policy for The Urban Poor and The Informal City in the Global South: A Non-Diachronic Review," *Journal of International Development*, vol. 28, pp. 788-807, 2016.
3. Government of India, "National Housing Policies."
4. K. Gopalan and M. Venkataraman, "Affordable housing: Policy and practice in India," *IIMB Management Review*, vol. 27, pp. 129-140, 2015.
5. IS Code.
6. "13727 (1993): Guide for requirements of cluster planning for housing," 1993.
7. R. L. Bawa and B. G. Fernandes, "Design for Living: A Guide for Planning of Residential Neighborhoods," Galgotia Publishing Company, New Delhi, 2000.
8. K. T. Poulse (compiled), "Reading Material on Housing," Institute of Town Planners, India, New Delhi, 2002.
9. ITPI, "Urban Development Plan Formulation & Implementation Guidelines," Ministry of Urban Development & Poverty Alleviation, Government of India.
10. A. Almusaed and A. Almssad (eds.), "Sustainable Housing," IntechOpen, 2022. doi:10.5772/intechopen.95680.
11. B. Edwards and D. Turrent, "Sustainable Housing: Principles and Practice," 2000.
12. J. R. Tighe and E. J. Mueller, "The Affordable Housing Reader," Routledge, 2012.

AP6191E - PLANNING STUDIO I

Pre-requisites: Nil

L	T	D	O	C
0	0	9	18	6

Total: 117D

Course Outcomes:

CO1: Plan and execute primary surveys for socio economic profile, map land uses and infrastructure.

CO2: Analyze various types of data with tools like GIS, make inferences, and effectively convey them through suitable infographics and maps.

CO3: Formulate planning proposals to fit in the larger canvas of governance system as laid out by the constitution of India.

CO4: Prepare detailed site planning schemes with provisions for various physical infrastructure, with due consideration to the ecosystem.

The Studio introduces students to the basic process of urban planning. The studio may introduce suitable problem/problems which will give sufficient exposure to the process of detailed site planning for a small community like a municipal ward or residential association. Through the application of urban planning and societal studies, students will learn and develop skills in the analysis and evaluation of the physical and socio-economic characteristics of urban areas. Through the following studio assignments, the students will complete a local area planning project for designated areas.

- Identification of needs of a community through socio-economic and physical survey, mapping using GIS and various analysis.
- Housing cluster and residential sector studies – layout, density, and utility net-work and community facilities locations.
- Develop a thorough understanding of the governance system and constitutional provisions. Apply this understanding to fit the proposals to the existing governing and planning process.
- Introduction to special area problems (slum / new town / rural area) and preparation of their plan program.

AP6106E – TRANSPORTATION PLANNING

Pre-requisite: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

CO1: Comprehend Land use transportation interaction, transportation network and travel pattern

CO2: Design and administer surveys to elicit data required for transportation planning

CO3: Estimate Travel Demand generation and determine travel distribution using methods such as gravity model.

CO4: Compute shortest path and assign trips and perform mode split analysis

CO5: Assess environmental pollution of transportation and formulate strategy for transit-oriented development.

Urban form and urban structure, Impact of urban structure on travel patterns, urban road network classification, Land use – transport interaction, Land use transportation models, Location models - Opportunity Models, Lowry based Land use-Transportation Models.

Urban Transportation Planning – Transportation Problems and Problem Domain; Goals, Objectives and Constraints - Study area delineation – Zoning - UTP survey and their types, survey techniques, sampling methods, analysis and interpretation of survey data, analytical techniques.

Four stage urban transport planning process, trip generation, distribution, modal split and route choice - Methods of travel demand estimation, trip generation analysis and trip generation models - trip distribution analysis and models, gravity model, factor methods-Transportation and Transshipment Models - trip assignment- Minimum path trees, All or Nothing Assignment, Multipath Assignment- Mode Split Analysis - Competing Modes, Mode Split Curves, Probabilistic Models and Two Stage Mode Split Analysis; Route Split Analysis.

Transport and environment: Environmental pollution due to transportation related activities- Air pollution; Greenhouse Gas (GHG) Emissions, traffic noise, pollution abatement measures. Traffic safety and Mobility: accident reporting and recording systems, factors affecting road safety-Alternate energy sources- transit oriented development.

References:

1. B. G. Hutchinson, "Principles of Urban Transportation System Planning," Mc-Graw Hill, 1974.
2. J. W. Dickey, "Metropolitan Transportation Planning," CRC Press, 2017.
3. M. D. Meyer, "ITE Transportation Planning Handbook," John Wiley & Sons, 2016.
4. L. R. Kadiyali, "Traffic Engineering and Transport Planning," Khanna publishers, 1999.
5. A. Kanafani, "Transportation Demand Analysis," McGraw-Hill, 1983.
6. M. D. Meyer and E. J. Miller, "Urban Transportation Planning," McGraw-Hill International, 2001.
7. ITPI, "Planning Techniques for AITP," Reader volume by Institute of Town Planners India, Delhi, 2014.
8. Town and Country Planning Organisation, "Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines," Government of India, 2015.
9. I. Bracken, "Urban Planning Methods: Research and Policy Analysis," Routledge publication, 2008.
10. Department of Economic and Social Affairs, United Nations, "Handbook on Designing Household Survey Samples: Practical Guidelines," 2005.
11. C. S. Papacostas and P. D. Prevedouros, "Transportation Engineering and Planning," Pearson India, 3rd ed., 2015.

AP6107E – URBAN INFRASTRUCTURE PLANNING

Pre-requisite: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

- CO1: Apply the science of planning urban infrastructure in varied utility service contexts as applicable to cities
- CO2: Manage the planning and implementation of various urban utility infrastructure services as required in a city.
- CO3: To evaluate and employ infrastructure planning strategies with minimal environmental impacts for a sustainable future of the cities.
- CO4: Devise and plan infrastructure facilities in a sustainable and resilient way

Role of Infrastructure in Development, Major urban services and utility infrastructure categories (physical, social, utilities and services) - Interconnectedness within the urban infrastructure system, Infrastructure ecology approach- Impact of Infrastructure Development: Direct, Indirect, and Induced Impact of all major sectors -Situation Analysis: Infrastructure Development in India, Major Concerns in Urban Infrastructure Sector- Challenges- Infrastructure Development policy, regulatory mechanism, role of government, private sector, public private partnerships in infrastructure development- Land management mechanism : Land use controlling mechanisms, Regulations and planning practices for land supply , Norms and standards.

Strategies for public and private resource mobilisation-Resource analysis: Delivery Models for financing-Government model , Institutional Model - Financing Instruments :Taxes ,Tariff, Debt, Equity shares, Bond , etc- Financial resources of local bodies – their nature, scope and limitations; Municipal Revenue Sources in India :Conventional and non-conventional revenue sources, land related revenue sources - Infrastructure development expenditure of Local Governments- Key Challenges in financing infrastructure projects.

Urban Water infrastructure Characteristics - Drinking Water Planning and management: Accessibility , adequacy, Water stress, Water risk -Issues of Urban Water Infrastructure Planning -Requirements of Public water supply scheme, Factors Affecting Rate of Demand-Problems associated with conventional urban water infrastructure - Planning for water supply system at site level: water supply network, hierarchy of pipes, planning considerations and norms and standards for supply system-Water infrastructure Management: Water supply management , Water demand management , strategies and approaches.

Stormwater Management: Urban Water Balance, Impacts of shift to an urban water balance -Historical development of water supply and management, Virtual water-Planning of sewerage systems :Types of Sewer systems: Combined system and separate system-Urban Drainage management: Sponge City Concept , Water Sensitive Urban Design , LID Techniques ,etc. Urban floods and infrastructural considerations. Case studies

Planning and management of urban sanitation systems -waste generation and their composition in Indian cities, factors influencing waste generation -challenges related to MSWM in India , processes & their operational and management challenges- infrastructure for municipal solid waste management - waste management strategies-criteria for identifying suitable land for sanitary landfill sites-good practices for successful waste management system :waste-to-energy approach , zero waste program .case studies of cities in india and abroad. Policies and programs-Planning for emergency infrastructure: operational planning for emergency evacuation in urban areas, planning for fire emergency, firefighting and fire protections, rules and regulations. Sustainable and resilient infrastructure: concepts and planning considerations, strategies for integrated infrastructure development- blue -green –grey infrastructure integration, e-governance, iot and big data in urban resilience. Case studies in Indian & global context

References:

1. K. Clayton, "Solid Waste Management: The Regional Approach," in Sustainable Solid Waste Management, 2015, pp. 829-847.

2. G. Tchobanoglous, H. Theisen, and S. A. Vigil, "Integrated solid waste management: engineering principles and management issues," McGraw-Hill Education (India) Private Limited, New Delhi, 2014.
3. S. Goodman and M. Hastak, "Infrastructure Planning, Engineering, and Economics," 2nd ed., McGraw-Hill Education, 2015.
4. S. Koster, S. Koester, M. Reese, J. Zuo, and J. Zuo, "Urban Water Management for Future Cities," Springer, 2019.
5. V. Proag, "Infrastructure Planning and Management: An Integrated Approach," Springer, 2021.
6. J. Parkin and D. Sharma, "Infrastructure Planning," Thomas Telford Publishing, 1999.
7. S. Pollalis, A. Georgoulas, S. Ramos, and D. Schodek (editors), "Infrastructure sustainability and design," Routledge, Taylor and Francis, New York, 2012, pp. 9-70.
8. S. Pollalis, A. Georgoulas, S. Ramos, and D. Schodek (editors), "Infrastructure sustainability and design," Routledge, Taylor and Francis, New York, 2012, pp. 71-168, and pp. 169-244.
9. "Sustainable service delivery in an increasingly urbanized world," USAID policy note, 2013.
10. "International Journal of Urban and Regional Research: Special Issue on Cities and Infrastructure Networks," vol. 24, no. 1, March 2000.
11. P. Gardoni, "Routledge Handbook of Sustainable and Resilient Infrastructure," 2019.

AP6108E – MINI PROJECT

Pre-requisites: Nil

L	T	D	O	C
0	0	3	6	2

Total: 39 Design Sessions

Course Outcomes:

CO1: Prepare methodological framework for the Mini Project topic

CO2: Demonstrate the concepts/tools/techniques obtained in the first two semesters

CO3: Defend the work in front of a Jury with colloquial arguments.

CO4: Demonstrate the technical writing skills through the mini project report and publication.

Each student shall identify a topic of interest related to urban planning with in the subject areas of first and second semester in consultation with the coordinator, and submit a synopsis for the approval of the department.

The student is expected to work under the guidance of a supervisor, allotted by the department.

The student is required to finalize the project methodology in consultation with the supervisor and plan necessary data collection relevant to the chosen topic (Primary/secondary) and conduct appropriate analysis.

The students are encouraged to convert the mini project to a publication.

Multiple evaluations will be conducted during the Semester to review the progress of the work. The End Semester evaluation of the work will be conducted by an external Jury appointed by the Department. During the Evaluation of the Mini Project, a student is expected to defend his / her work through a presentation of the work using suitable media and a report.

References:

1. K. L. Turabian, W. C. Booth, G. G. Colomb, J. M. Williams, J. Bizup, and W. T. FitzGerald, "A Manual for Writers of Research Papers, Theses, and Dissertations: Chicago Style for students and researchers," 9th ed., The University of Chicago Press, Chicago, 2018.
2. P. Oliver, "Writing your Thesis," SAGE, Los Angeles, 2014.
3. J. Hayton, "PhD: An Uncommon Guide to Research," James Hayton Publishers, 2015.
4. X. Wang and R. vom Hofe, "Research Methods in Urban and Regional Planning," 1st ed., Springer Berlin Heidelberg New York, 2008.

AP6109E- ENVIRONMENTAL PLANNING

Pre-requisite: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

- CO 1: Recognize appropriate categories of critical environmental data and their sources for use in planning projects
- CO 2: Apply the basic concepts and theories of urban planning in an environmentally sensitive manner with a clear understanding of the environmental norms
- CO 3: Evaluate and employ planning strategies so as to minimize adverse impacts on environment resulting from planning projects and enhance environmental quality wherever feasible
- CO 4: Interpret development scenarios based on its environmental impacts and implications and to modify the plans to proactively correct them.

Introduction to Environmental planning, aims, objectives and Implementation. Introduction to State and National policies Types of Planning interventions, Planning Process and Tools, Definition of Environment, Components of environment, Types of Environments, Population as an environmental resource, Environmental Degradation and Pollution, Low carbon strategies, Environmental Planning methods, Environmental impacts of planning.

Scarcity of natural resources and exploitation of them for development, planning for optimizing the use of natural resources, methods used like water harvesting, waste land management and Carbon emission. Major environmental resources: Air environment and associated issues, Global warming and climate change, Ozone depletion, Water Environment- Water Resources: Types, Water Resources Renewal, Use, Sanitation, Soil Environment- Soil Types, Soil Yield, Soil Pollution. Energy- Evaluation of Energy Resources, Types of Energy Sources Renewable, Non-Renewable, Conventional and Non-conventional.

Environmental resources and mapping, Preparation and analysis of resource inventories and resource matrices, Resource regions in India, their problems and potentials, Integrated resource planning approach; Environmental Sustainability and environmental criteria for location of human settlements, Ecological parameters for planning at different levels: site planning, settlement planning and regional planning.

Objectives of environmental planning and design, Integration of environmental assessments and planning options, Environmental impact assessment and statements, Environmental policies for various geographical regions. Environmental management approach. Global concerns for environment and bio-diversity, Environmental Policies, Protocols and Regulatory Mechanisms- Fundamentals of Environmental Acts, Rio Earth Summit, Stockholm Conference, Kyoto Protocol, Overview of Government of India's policies.

References:

1. P. Revelle and C. Reville, "The Environment, Issues and Choices for Society," 3rd ed., Willard Grant Press, Boston, 1988.
2. J. Lovett and D. G. Ockwell, "A Handbook of Environmental Management," Edward Elgar, Cheltenham, 2011.
3. W. P. Cunningham and M. A. Cunningham, "Environmental Science: A Global Concern," 15th ed., McGraw Hill Education, New York, 2018.
4. J. K. Lein, "Integrated Environmental Planning," 1st ed., Blackwell Science, Oxford, 2008.
5. D. D. Khanna, "Sustainable Development: Environmental Security, Disarmament, and Development Interface in South Asia," Macmillan India, Delhi, 1997.
6. G. T. Miller, "Environmental Science: Working with the Earth," 7th international edition, Wadsworth Publishing Company, Toronto, 2005.

AP6192E - PLANNING STUDIO II

Pre-requisites: Nil

L	T	D	O	C
0	0	9	18	6

Total: 117 Design Sessions

Course Outcomes:

CO1: Plan and execute primary surveys for transportation, utility networks, supply chain etc.

CO2: Analyze various types of data with tools like GIS, make inferences, and effectively convey them through suitable infographics and maps.

CO3: Prepare strategies to achieve planning goals and translate them to actionable spatial and policy interventions.

CO4: Prepare development plans for medium level cities/towns in a geographically and socio-culturally diverse context adhering to the planning and legal conventions.

The objective of this course is to make students integrate planning coursework, prior academic work, their own life experiences and an understanding of urban life in response to a real-world project. The project may aim at imparting planning experience on diverse geographical, socio-economic and political contexts. Hence, the project needs to be conducted at diverse locations in India or abroad.

Through the studio project, the students will complete a development plan for a medium/ small city/town in India or abroad. Outline development plan, Master Plan, Structure Plan, Vision plan and many variations practiced may be taken up in a year for the selected city/town.

The project needs to be formulated in a way to involve student in broad as well as detailed data collection, and analysis. Variety of data collection methods, like remote sensing, household surveys, transportation surveys, industrial and socio-economic surveys, ecological surveys, survey of other utilities and services etc. may be included as required. As such surveys require expertise in various facets of planning, expertise available in the department may be made to involve in different phases of surveys in turn.

The collected information needs to be analysed under different heads like, demography, socio-economic and socio-cultural aspect, transportation and utility networks, industrial and economy, spatial aspects, geographical and climatic contexts, and ecological aspects. Latest tools and techniques may be employed in the analysis of collected information. Due emphasis may be given for the application of GIS and RS techniques for collection, analysis, and presentation of spatial information.

The project includes planning for urban area with emphasis on land use and transportation network, other utilities and public services, one area may be taken up for action area programs and/or urban renewal plan (if required), capital budget, financing, institutional arrangement for implementation, administration and management.

The project includes.

1. One/ two weeks field survey in a suitably identified location in India or abroad.
2. Development Plan preparation in stages
 - a. Theories and principles of urban development plan and preparation for survey and data collection.
 - b. Field survey of the study area.
 - c. Analysis of data and information
 - d. Plan preparation
 - e. Implementation plan
 - f. Budgeting

References

1. G. Beltrao, "Urban Planning and Land Management for Promoting Inclusive Cities," Canada, Feb. 2013.
2. J. Sen, "Sustainable Urban Planning," 1st ed., TERI, New Delhi, 2012.
3. Town and Country Planning Organisation, "Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines," India, 2015.
4. G. Hack, "Local Planning," International City/County Management Association, Washington, D.C., 2009.

AP7101E - REGIONAL AND METROPOLITAN PLANNING

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

- CO 1: Get accustomed with the different regional planning concepts in general.
- CO 2: Understanding the different types of regions in India.
- CO 3: Get accustomed with the types of regional development
- CO 4: Interpret and apply the concepts related to regional planning of human settlements in practice.

Resource Regions, Mega, Macro, Meso, and Micro Regions, Special Regions- SEZ, Agro Regions, Ecological regions, etc. Regional Dynamics: Growth of Mega and Metro Regions: Scale, Complexity and its impact on national and international scenario, convergence and divergence. Regional Economy-competitiveness among regions, backward and leading regions in development.

Regions in India - Corridors as regions, National, sub-national and State as a region, macro, meso and micro regions in India. Case Studies from India: NCR, MMRDA , Kolkata and Chennai and other Metro Regions in India. Resource Regions in India - Western and Eastern Ghats, North Eastern Region, Coastal and River Valley Regions; Corridors: Golden Quadrilateral, Delhi-Mumbai, Chennai-Bangalore Industrial Corridor, Rural Urban Continuum settlements of Kerala , India and the world, Desakota concept of region.

Balanced and unbalanced development; Regional multiplier, input-output model; Linear programming applications; Different other regional planning theories and models. Growth poles and centers. Tools and techniques available for planning regions in India; Role of 73rd and 74th Constitution Amendment Acts, preparation of regional plans , aim objectives and methodology, its contents, Norms and standards for regional planning. Case studies of regional planning projects.

Metropolitan regions: Metropolitan growth – trends, characteristics, problems. Socio-economic and political issues. Metropolitan region and problems of major agglomerations. migration and sub-urban development; emerging social and economic characteristics of the central city and the suburbs. Inter-city issues and problems, approach to development. Alternative strategies to metropolitan growth - planning for New towns: types, design criteria. New town approach in India. Case studies of metropolitan planning in India and abroad

References:

1. V. Nath and S. K. Aggarwal, "Regional Development and Planning in India," Concept Publishing Company, New Delhi, 2009.
2. J. R. Chaudhuri, "An Introduction to Development and Regional Planning with Special Reference to India," Orient Blackswan, Kolkata, 2009.
3. M. Chand and V. K. Puri, "Regional Planning in India," Allied Publ., New Delhi, 2011.
4. E. M. Hoover and F. Giarratani, "An Introduction to Regional Economics," 3rd ed., Knopf, 1999.
5. G. Bhargava, "Development of India's Urban, Rural, and Regional Planning in 21st Century: Policy Perspective," Gyan Publishing House, New Delhi, 2001.
6. E. L. Birch, "The Urban and Regional Planning Reader," 1st ed., Routledge, London, 2009.
7. R. P. Misra, "Regional Planning: Concepts, Techniques, Policies and Case Studies," Concept Pub. Co., New Delhi, 1992.

AP7102E - URBAN ECONOMICS & FINANCE

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

CO1: Understand the elements of Micro and Macro economics in the context of urban planning.

CO2: Analyze and explain the evolution of urban land use patterns and density.

CO3: Assess the risk involved in the project and choose strategies to manage the risk.

CO4: Prepare urban planning projects in appropriate PPP mode, with detailed feasibility assessment.

CO5: Analyze the costs and benefits of different kinds of land use regulations.

Elements of Micro and Macro Economics: Concepts of demand, supply, elasticity and consumer market; concept of revenue cost; Economies of scale, economic and social cost, production and factor market; Different market structure and price determination; market failure, cost-benefit analysis, public sector pricing; Determinants of national income, consumption, investment, inflation, unemployment, capital budgeting, risk and uncertainty, long-term investment planning. Analysis: facets of project analysis – market, technical, financial, economic, and ecological. Financial Estimates and Projections - project costs, means of finance

The time value of money: concept, future value of single amount, annuity, present value of single amount, annuity. Investment criteria: Net Present Value, Benefit cost ratio, Internal rate of return, payback period, Accounting rate of return. Cash Flow: principles, methods of cash flow preparation. Social Cost Benefit analysis – concept and methods.

Cost of capital: concept, cost of debt, cost of equity, weighted average cost of capital. Risk: concept, sources, measure and perspective of risk. Sensitivity analysis, break-even analysis, and hedging. Project selection under risk.

Public sector investment decision making in India, financing infrastructure projects. Ownership and operation models for public private participation (PPP) - BOT, BOOT, BLT and DBFO comparison. Case studies of public sector projects. Preparation of urban planning projects with PPP models, assessment of feasibility, cash flows, social benefit cost analysis.

References

1. P. Chandra, "Projects," 9th ed., Tata McGraw Hill Education Private Limited, 2019.
2. M. Pandey, "Financial Management," Vikas Publishing House PVT LTD, New Delhi, 2015.
3. K. Wellman and K. M. Spiller, "Urban Infrastructure - Finance and Management - hardback," John Wiley & Sons, 2012.
4. P. Das, "Public-Private Partnership (PPP) and Project Finance," Tata McGraw Hill Education Private Ltd, New Delhi, 2012.
5. P. C. Cheshire, M. Nathan, and H. G. Overman, "Urban Economics and Urban Policy: Challenging Conventional Policy Wisdom," Edward Elgar, Cheltenham, 2016.

AP7191E - PLANNING STUDIO III

Pre-requisites: Nil

L	T	D	O	C
0	0	9	18	6

Total: 117 Design Sessions

Course Outcomes:

- CO 1: Apply different planning theories through a studio exercise.
- CO 2: Prepare strategies to achieve regional planning goals and translate them to actionable spatial and policy \ interventions.
- CO 3: Prepare a Regional / Metropolitan plan for a case study region.

The objective of this course is to make students think planning projects from a metropolitan and regional scale. The different theory subjects learned in previous semesters as well as other tools and techniques learned shall be put into practice by applying them on a case study project. The regional planning project may aim at imparting planning experience on diverse geographical, socio-economic and political contexts. Hence, the project needs to be conducted at diverse locations in India or abroad.

The project needs to be formulated in a way to involve student for detailed data collection, and analysis. Variety of data collection methods, like remote sensing, household surveys, transportation surveys, industrial and socio-economic surveys, ecological surveys, survey of other utilities and services etc. may be included as required. As such surveys require expertise in various facets of planning, expertise available in the department may be made to involve in different phases of surveys in turn

Students shall be trained to undergo detailed data collection and analysis and the development and presentation of appropriate planning goals, concepts, plans and designs, recommendations and policies in a regional scale

Through the studio project, the students will complete a regional/metropolitan plan for region. Due emphasis shall be given for regional land use, disaster management, demography, infrastructure, economy and employment, Tourism, Socio economic development as well as Finance and implementation strategies.

A comprehensive regional planning report shall be the outcome of the studio.

The assignments include a project such as Regional/Metropolitan plan preparation with the following components:

- a) Case studies of various regional/metropolitan plan and preparation for survey
- b) Field survey and data collection of the study area.
- c) Analysis of data and information
- d) Plan preparation with vision and mission, alternatives and detailed proposals.
- e) Financial plan, implementation strategies.
- f) Comprehensive regional planning report.

References:

1. Town and Country Planning Organisation, "Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines," Government of India, 2015.
2. National Capital Regional Planning Board, "Draft Revised Regional Plan 2021 National Capital Region," Delhi, 2013.
3. Department of Town and Country Planning, "District Plan for Kollam," 2018.
4. R. P. Misra, "Regional Planning: Concepts, Techniques, Policies and Case Studies," Concept Pub. Co., New Delhi, 1992.
5. V. Nath and S. K. Aggarwal, "Regional Development and Planning in India," Concept Publishing Company, New Delhi, 2009.
6. Regional planning reports prepared by different authorities in India and Abroad.

AP7192E – DISSERTATION AND THESIS PROGRAMMING

Pre-requisites: Nil

L	T	D	O	C
0	0	6	12	3

Total: 78 Design Sessions

Course Outcomes:

CO1: Conduct a literature review on a selected topic of research

CO2: Create a research framework based on literature review, surveys and analysis

CO3: Conduct a qualitative and quantitative analysis of the data collected

CO4: Prepare a structured report of the conducted research

Each student is required to identify a topic of interest having relevance to Urban Planning profession. The subject of the thesis may be conceptual, historical, analytical, and comparative or in any other innovative area related to urban planning and development. A detailed literature review is required to be conducted on the topic. The students are required to interact with Planners, technocrats, stakeholders and user groups on the topic selected. Based on the literature review and the interaction with the stakeholders, a suitable topic for the Thesis work will be finalized (to be undertaken in the subsequent semester).

In addition to the above, the student is required to identify the study area, with the extent and spread of intervention, collect on ground information and prepare base maps. The student is also required to conduct sample surveys in the study area and conduct a qualitative and quantitative analysis of the data collected.

The evaluation of the course will be conducted twice in the Semester – One in the middle of the semester and one at the end of Semester. The End Semester evaluation of the work will be conducted by an external Jury appointed by the Department.

The student is expected to give a presentation of the work for the reviews and should submit a report containing the literature review, data collected and the analysis performed for the work. The student is expected to work under the guidance of a supervisor, allotted by the department.

References:

1. K. L. Turabian, W. C. Booth, G. G. Colomb, J. M. Williams, J. Bizup, and W. T. FitzGerald, "A Manual for Writers of Research Papers, Theses, and Dissertations: Chicago Style for Students and Researchers," 9th ed., The University of Chicago Press, Chicago, IL, 2018.
2. X. Wang and R. vom Hofe, "Research Methods in Urban and Regional Planning," 1st ed., Springer, Berlin/Heidelberg/New York, 2008.
3. J. Hayton, "PhD: An Uncommon Guide to Research," James Hayton Publishers, 2015.

AP7193E SUMMER TRAINING

Pre-requisite: AR6192E Planning Studio II

L	T	P/D	O	C
-	-	-	-	1

Total: 8 Weeks

Course Outcomes:

CO1: Undertake professional tasks assigned by a firm and work in a team to achieve specific objectives

CO2: Develop an understanding of the working and management of a planning firm.

CO3: Demonstrate skills through presentations and reports.

Each student is required to undergo a professional training for a period of at least 6-8 weeks in an established professional firm approved by the Department/Program Coordinator.

The students are encouraged to get hands on training in planning techniques employed by planning boards and practicing planners.

On the completion of training period students must submit a report on the works carried out by them.

The evaluation will be carried out by an internal jury at the end of the training session, based on a presentation made by the student. The presentation may include drawings/maps/study sheets/digital media and the training report prepared.

AP7103E - PLANNING LEGISLATION & PROFESSIONAL PRACTICE

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

- CO1: Comprehend the Interface between Legislation and Urban Planning
- CO2: Demonstrate the implications of legislations related to urban planning
- CO3: Recognize the Scope, Ethics Nature and Procedure of Professional Practice
- CO4: Prepare consultancy Proposals and Quote Fees and Charges for Professional Work.

Benefits of statutory backing for schemes- eminent domain and police powers. Indian Constitution, Concept and contents, Provisions regarding property rights, Legislative competence of State and Central Governments to enact town planning legislation, National Environmental Policy, Environmental Protection Act, Land Acquisition Act; Model Town Planning Legislation, Regional Planning Legislation Town and Country Planning Act, Urban Planning and Development Authorities Act;

Concept of arbitration, betterment levy, development charges and public participation in statutory planning process; English Law, Concept of structure plan, local plan and action plan; Significance of land Development Control objectives and legal tools, critical, evaluation of zoning, sub-division regulations, Development code, zoning law and law relating to periphery control

The Profession, Roles, Responsibilities and Ethics General overview of the Planning profession, Professional Practice in the Public Sector, Initiation of the Private Sector in Spatial Planning Process, Professional Practice in the Private Sector Professional Practice in the Joint Sector, International Urban Planning Practice under WTO-GATS fields,

Professional fee and preparation of consultancy proposals Scale of Professional Fees and Charges Project Development, Consultancy Proposals, Terms of Reference, Tenders for Government, Non-Government and Multi-lateral agencies. Legal Support: Agreements and Contracts, Establishment and management of an office, Organizing and Establishing Office Personnel Management and Performance Appraisal

References:

1. Government of India, "Indian Contract Act 1872; The Arbitration and Conciliation Act 1996. Constitution of India; Constitution (73rd & 74th Amendment) Acts 1992; Model Rent Control Legislation; Land Acquisition Act 1894 and amendments thereof; NCR Planning Board Act, Environment (Protection) Act 1986; Model Town Planning and Regional Planning Development Law; and other acts."
2. Gosh, "Town Planning: Regeneration of Cities," New India Publishing Agency, New Delhi, India, 2008.
3. P. Healey and R. Upton, "Crossing Borders: International Exchange and Planning Practices," 1st ed., Routledge, London, UK, 2010.
4. S. K. Kulshrestha, "Urban and Regional Planning in India: Handbook for Professional Practice," SAGE Publications, New Delhi, India, 2012.
5. ITPI, "Conditions of Engagement of Professional Services and Scale of Professional Fee and Charges," ITPI, New Delhi, India, 2011.

AP7104E – TERM PAPER

Pre-requisite: AP7192E Dissertation and Thesis Programming

Concurrent: AP7194E Planning Thesis

L	T	P	O	C
0	0	3	6	2

Total: 39 Practical Sessions

Course Outcomes:

CO1: Compile literature review results on a selected topic.

CO2: Create a research paper framework based on the data analysis and synthesis

CO3: Prepare a research paper for journal / conference

CO4: Present and defend the research using poster presentation

Each student is required to formulate and prepare a Research Paper based on the Thesis work undertaken for the Courses AP7192E Dissertation and Thesis Programming and AP7194E Planning Thesis. The technical paper will contain the literature review carried out for the Thesis, the analysis performed and the outcome of the Thesis work.

The evaluation of the Term Paper will be conducted twice in the Semester – One in the middle of the semester as Mid-Term Review and one at the end of Semester as Final Review.

The student is expected to give a presentation of the work for the reviews and should submit the Term Paper in the prescribed format for publication.

References:

1. B. Gastel, R. A. Day, "How to Write and Publish a Scientific Paper," 8th ed., Green Wood Publishing Group Inc., 2016.
2. T. G. Hicks, "Successful Technical Writing: Technical Articles, Papers, Reports, Instruction and Training Manuals, and Books," Forgotten Books, 2016.
3. K. L. Turabian, W. C. Booth, G. G. Colomb, J. M. Williams, J. Bizup, and W. T. FitzGerald, "A Manual for Writers of Research Papers, Theses, and Dissertations: Chicago Style for Students and Researchers," 9th ed., The University of Chicago Press, Chicago, 2018.
4. J. Anderson, M. Poole, and D. Merrington, "Assignment & Thesis Writing," Wiley, Cape Town, South Africa, 2011.
5. K. L. Turabian and J. Grossman, "A Manual for Writers of Term Papers, Theses and Dissertations," 6th ed., University of Chicago Press, Chicago, 1996.

AP7194E – PLANNING THESIS

Pre-requisites: AP7192E – Dissertation and Thesis Programming

L	T	D	O	C
0	0	24	48	12

Total: 312 Design Sessions

Course Outcomes:

CO1: Apply concepts/tools/techniques pertaining to domain of urban planning

CO2: Deduct meaningful inferences from the analysis.

CO3: Propose solutions for the issues identified from the analysis.

CO4: Present & defend the Thesis work in the form of sheets & report

Each student is expected to do the Thesis work on the topic identified in the previous semester (AP7192E Dissertation and Thesis Programming)

In addition to the literature review and sample surveys conducted in the previous semester, the student is required to do case studies related to the topic, full-fledged data collection and/or survey relevant to the Thesis work. A detailed analysis and synthesis will also be carried out.

The student is expected to work under the guidance of a supervisor, allotted by the Department.

Multiple evaluations of the course will be conducted during the semester to review the progress of the work. The end semester evaluation of the work will be conducted by an external Jury appointed by the Department. During the evaluation of the Thesis, a student is expected to defend his / her thesis through a presentation of the work with drawings/maps/study sheets/digital media and reports.

References:

1. K. L. Turabian, W. C. Booth, G. G. Colomb, J. M. Williams, J. Bizup, and W. T. FitzGerald, "A Manual for Writers of Research Papers, Theses, and Dissertations: Chicago Style for Students and Researchers," 9th ed., The University of Chicago Press, Chicago, IL, USA, 2018.
2. P. Oliver, "Writing your Thesis," SAGE, Los Angeles, CA, USA, 2014.
3. J. Hayton, "PhD: An Uncommon Guide to Research," James Hayton Publishers, 2015.

AP6121E LAND MANAGEMENT AND REAL ESTATE DEVELOPMENT

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

CO1: Comprehend the legal framework for property transactions in India.

CO2: Analyse functioning of land market and identify potentials, risks involved in real estate transactions.

CO3: Formulate an appropriate land management technique for the given context.

CO4: Formulate planning projects with thorough understanding of land markets, development models and legal framework

Introduction to real estate, definition, types of real estate, principles of real estate, value concepts, methods of valuation, introduction to real property ownership, leasing, property succession. The status of land and property ownership in the Constitution of India, types of land, ownership and various tenure options of land. introduction to various laws related to real estate - Real Estate (Regulation and Development) Act, 2016.

Market conditions, Real Estate cycles, market fluctuations, market efficiency, market forecasting, type of property development and its impact on supply and demand, Agents in real estate market and their role in market process. Factors affecting supply and demand for property. Method of development: public-private, private, community property and its impact on real estate markets. Real estate investment analysis and portfolio management, Speculations, Risks, Options, hedging, and market access by different interest groups in real estate market.

Techniques of land assembly, development and disposal, financing of land and property development, land pooling/land readjustment, Accommodation Reservation, Transfer of development rights and private sector land pooling, TP Schemes, Public Private Partnerships (PPP), role of the government, para-state agencies and private sector in land and real estate management.

Various policies and regulations for land, township policies of different state governments, international and domestic case studies, institutional, political and socio-economic concerns; Real estate project formulation, real estate development process, asset management, property insurance, taxation and fiscal incentives, industry organization, public-private partnerships and JV'S for corporate real estate development, rating, risk assessment.

References:

1. Institute of Real Estate Management, "Principles of Real Estate Management," 18th ed., Chicago, IL, USA, 2023.
2. S. Mittal, "The ABC of Real Estate in India," 12th ed., White Falcon Publishing, New Delhi, India, 2018.
3. J. Luque, "Urban Land Economics," Springer International Publishing, Switzerland, 2015.
4. F. F. De Souza, T. Ochi, and A. Hosono, "Land Readjustment: Solving Urban Problems through Innovative Approach," 1st ed., Japan International Cooperation Agency Research Institute, Tokyo, Japan, 2018.

AP6122E - PLANNING FOR SUSTAINABLE DEVELOPMENT

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

CO1: Get accustomed with the different sustainable concepts in general.

CO2: Enable the students to quantitatively measure sustainable development using established methods

CO3: Get accustomed with the different sustainable planning concepts related to cities and settlements

CO4: Interpret and apply the emerging concepts of sustainable development in planning of human settlements.

Concept of Sustainable development: Its need and significance, Social, Ecological and economical and cultural dimensions of sustainability, Different Definitions, Sustainability-Time line Assessment, Models of sustainable development- Three pillar model, Egg of sustainability model, Atkinson's Pyramid Model, Prism of Sustainability, The Amoeba Model etc.

Sustainability measurement- indicators and indexes, benchmarks, audits, and accounting concepts in sustainability measurements, different metrics at the global scale- Life-cycle analysis, Eco balance, cradle-to-grave analysis, Ecological foot print, Happy Planet index, Environmental performance index, Environmental Vulnerability Index, Energy Index etc. Social Sustainability measurements- HDI, Child Development Index, Gross national Happiness (GNH).

Sustainability concepts in planning of cities and settlements- Post 1890'S- Garden City Movement, Giddensian Triad, Neighbourhood Planning etc. Post 1980'S- New Urbanism (9 principles of Walkability, Connectivity, Mixed Use and Diversity, Mixed Housing, Quality Architecture & Urban Design, Increased Density, Smart Transportation (Quality of life) Sustainable Urban Neighbourhood (SUN), Green Urbanism and Sustainable Urbanism, Transit Oriented Development etc.

Emerging concepts in sustainable development- Resilient City planning- Climate Change, planning for natural and manmade urban disasters (Heat waves, Flood, draughts Terrorism etc.), Renewable Energy based city planning, zero waste city, Low carbon city planning, Healthy City concept case studies of different concepts.

References:

1. S. R. Curwell, M. Deakin, and M. Symes, "Sustainable Urban Development," London, UK: Routledge, 2005.
2. S. M. Wheeler, "The Sustainable Urban Development Reader," New York, NY, USA: Routledge, 2014.
3. J. A. Elliott, "An Introduction to Sustainable Development," New York, NY, USA: Routledge, 2013.
4. J. M. Harris, "Basic Principles of Sustainable Development," Medford, MA, USA: Tufts University, 2000.
5. R. Riddell, "Sustainable Urban Planning: Tipping the Balance," Malden, MA, USA: Blackwell, 2007.
6. K. Ura, "A Short Guide to Gross National Happiness Index," Thimphu, Bhutan: Centre for Bhutan Studies, 2012.
7. "Healthy Cities and the City Planning Process: A Background Document on Links between Health and Urban Planning," Copenhagen, Denmark: WHO, Regional Office for Europe, 1999.
8. "Sustainable Development: An Introduction by Center for Environment Education," Ahmedabad, India: Centre for Environment Education, 2012.
9. N. Prasad, "Climate Resilient Cities: A Primer on Reducing Vulnerabilities to Disasters," Washington, D.C., USA: World Bank, 2009.
10. Arup, "City Resilience Framework," Rockefeller Foundation, Tech., 2014.
11. Ministry of Urban Development, "Livability Standards in Cities," Delhi, India: Government of India, 2015.
12. B. Kelley, "Sustainable Community Design Introduction to Principles and Practices for Conservation Design 'Municipal Tool Kit'," NB Department Of Environment, Bathurst, Rep., 2009.
13. KPMG, "The Future of Cities: Measuring Sustainability," KPMG International, Rep., 2016.

AP6123E TOURISM AND RECREATIONAL PLANNING

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

CO1: Interpret the development trends in tourism industry

CO2: Assess the economic impacts of tourism plans.

CO3: Comprehend the role of the stakeholder in tourism planning

CO4: Prepare tourism plan for a destination

Tourism industry and tourist destinations; development trends and impacts Tourism as an industry; basic terminologies used in the tourism industry; Butlers destination cycle and tourist destinations; tourism industry in the developed and the developing world; economic, social and environmental impacts of tourism industry; need for tourism planning.

Tourism planning and management; Value chain of the tourism industry; various stakeholders and their roles; concepts and issues in tourism planning and management; host community, visitors and natural resources; partnerships and collaborations.

Tools, techniques and assessment models; Value up gradation using value chain assessment models (VCA); economic impact assessment models using forecasting techniques, tourism multipliers and input – output models; destination carrying capacity assessment; role of education and self-regulation in tourism planning.

Tourism plans and policies; Nature and scope of tourism plans; tourism plans and policies at various levels; key issues in policy formulation and survey requirements; role of various stakeholders in formulation of plans and policies; implementation and management at various levels and issues, Sustainable tourism; SMART tourism; role of ecommerce in the tourism industry; changing role of host communities and hospitality in tourism; responsible tourism; issues and challenges faced by new trends.

References:

1. McKercher and H. D. Cros, "Cultural Tourism: The Partnership between Tourism and Cultural Heritage Management," New York, NY, USA: Routledge, 2015.
2. G. Shaw and A. M. Williams, "Critical Issues in Tourism: A Geographical Perspective," 2nd ed., Malden, MA, USA: Blackwell Publishing, 2013.
3. D. Kadt and Emanuel, "Tourism: Passport to Development? Perspectives on The Social and Cultural Effects of Tourism on Developing Countries," Vol. 1, Washington, DC, USA: World Bank Group, 1984.
4. R. Maitland and B. W. Ritchie, "City Tourism: National Capital Perspectives," Wallingford, UK: CABI, 2009.
5. C. A. Gunn and T. Var, "Tourism Planning: Basics, Concepts, and Cases," New York, NY, USA: Routledge, 2010.
6. S. Page, "Urban Tourism," 5th ed., London, UK: Routledge, 2020.
7. K. Bhatia, "Tourism Development: Principles and Practices," 2nd ed., New Delhi, India: Sterling Publishers, 2020.
8. K. Bhatia, "Tourism in India: History and Development," New Delhi, India: Sterling Publishers, 2002.
9. M. Mowforth and Ian Munt, "Tourism and Sustainability: Development, Globalisation and New Tourism in the Third World," 4th ed., London, UK: Routledge, 2015.

AP6124E - PLANNING FOR SMART CITIES

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

- CO 1: Recognize and assimilate the link between original objectives of city building, influence of forces like urbanization and sustainable development etc. on conceptualizing the idea of smart cities
- CO 2: Apply the basic concepts and theories of urban planning with a clear understanding of urban services' needs to be smart and the ways of achieving this through retrofitting or new developments
- CO 3: Evaluate and employ most suitable smart planning strategies for developing country city contexts like India
- CO 4: Lead or be a good team player in the smart city mission of government of India.

Early cities, change in city structures, changes after Industrial revolution, Theories in city planning, Growth issues of 20th century cities, Urbanization; opportunities and challenges, Managing urbanization, Sustainable development and cities, Concept of urban prosperity, Era of Smart cities, Evolution of the concept.

Smart cities, Definitions, Smart city planning process, Predictive modelling, prerequisites of smart cities, Smart city components and categories, Policy framework for Smart cities, Citizen engagement, open data, integrated approach, Flaws in Smart city planning.

Smart urban mobility, Emerging concepts, ICT supported smart mobility categories, Smart Energy, Objectives and strategies for smart energy, Smart grids and electric vehicles, Smart governance, Open and participatory governance, Benefits of smart governance, Smart Water and Waste management, Important considerations, Smart Economy, SMEs and sharing economy. Crowd sharing, Co-creation.

Smart Buildings, Intelligent buildings as a precursor, Smart services, Smart Environment, Measures towards Smart environment, ICT services for smart cities, Benefits of employing ICT, ICT system components for smart cities, State of the art in ICT, International case studies, Smart city Mission of India, City improvement or retrofitting, Redevelopment, Green Field development, Pancity smart solutions, Case studies from India.

References:

1. Townsend, A., "Smart Cities: Big Data, Civic Hackers, and the Quest for A New Utopia," in the Princeton Mellon Forum for Research on the Urban Environment, 2014.
2. Stimmel, L., "Building Smart Cities: Analytics, ICT, and Design Thinking," Boca Raton, FL, USA: CRC Press, Taylor & Francis Group, 2016.
3. Firodia, V., Pavnaskar, N., and Murthy, N., "Smart City: A Blueprint for a Zero Pollution, Sustainable, Smart Industrial City," 1st ed., Vishwakarma Publications, 2015.
4. Willis, K. S., and Aurigi, A., "Digital and Smart Cities," Abingdon, Oxon, UK: Routledge, 2018.
5. Satyam, S., and Calzada, I., "The Smart City Transformations: The Revolution of the 21st Century," New Delhi, India: Bloomsbury, 2017

AP6125E URBAN MANAGEMENT AND GOVERNANCE

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

CO1: Comprehend the salient demands of management as it is required in a given urban context and to connect it to the available models of management

CO2: Prescribe and structure lean models of management and governance as suited to a given urban area

CO3: Evaluate and employ land use economics for appropriate planning strategies that realizes development aspirations

CO4: Interpret and advocate land-based development scenarios to a given urban body for efficient use of its land base to generate income

Introduction, need and relevance of urban management and governance, An overview of urban governance. Concept, approaches, components and interface with national goals and political/economic system. Urban Development Management Strategies, Tools and Techniques; organizations involved

Institutions for Urban management and governance, structure and functions, Chronological development form pre-independence era. Organizational setup and institutional interrelationship with respect to fiscal and administrative powers and duties. Present organizations and involved in urban governance.

Tools for urban governance, Pillars of good governance, Features of new age governance, E-governance and Smart governance, Emerging issues of urban governance, private sector and social institutions, interface with NGO's, other agencies. Stakeholders' participation, 73rd and 74th Constitutional Amendments and decentralized governance

Land and Real Estate Development, Economic concepts of land, Land Pricing / valuation; Economic principles of land use; demand forecasting for land use: factors affecting land supply and demand; Land development methods, Supply and Demand side Management; Real estate markets, type of property development and its impact on supply and demand, method of development, environmental considerations.

References:

1. D. Mishra and A. K., "Governance and Planning," New Delhi, 2014.
2. C. Nagaraja Rao, "Urban Governance in India," Delhi: Kalpaz, 2016.
3. S. A. Baud and J. W. De Wit, "New Forms of Urban Governance in India: Shifts, Models, Networks and Contestations," New Delhi: Sage Publications India Pvt. Ltd., 2009.
4. A. P. Singh and K. Murari, "Governance: Issues and Challenges," Paperback. Pearson, 2018.
5. J. Luque, "Urban Land Economics," Springer International Publication, 2016.
6. Working Papers from National Institute of Urban Affairs, Centre for Good Governance, United Nations Centre for Human Settlement and National Institute of Public Finance and Policy.

AP6126E ADVANCED GIS FOR URBAN ANALYSIS

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

- CO1: Prepare interpolations of spatial distributions of quantities using sample data collected from field.
- CO2: Develop the skill to extract meaningful inputs for urban planning from a multitude of spatial data by appropriate special statistic techniques.
- CO3: Develop customised spatial analysis tools through Python scripting.
- CO4: Implement urban analytical models in GIS platform.

Tobler's first law of Geography, Interpolation methods for geographical data: IDW, Kriging, Spline and Trend. Modelling urban density, Modifiable Areal Unit Problem, density surfaces and gradients. Neighbourhood analysis with raster data, Using grids for forecast, travel, and socio-economic data collection.

Spatial auto correlation, measures of Spatial clustering and dispersion, Grouping techniques, Hotspot analysis. Measures of geographical distribution of facilities, utility systems, settlements etc. Shannon's entropy measure of sprawl. Regressions: Spatial OLS regression, exploratory regression techniques, geographically weighted regressions. Spatial econometrics

Python syntax, procedural and object-oriented programming, Concept of ArcPy cursors and geometry objects, Python scripting in QGIS. Develop custom tools for geoprocessing using Python.

Gravity model, intervening opportunities model, Zipf's Inverse Distance Law, and cellular automata. Spatial Decision Support System: Planning Support Systems, definition, goals, and requirements.

References

1. A. Fotheringham and P. Rogerson, "The SAGE handbook of spatial analysis," Los Angeles, CA: SAGE, 2009.
2. D. Manley, "Scale, Aggregation, and the Modifiable Areal Unit Problem," in "Handbook of Regional Science," Berlin, Heidelberg: Springer Berlin Heidelberg, 2014, pp. 1157-1171.
3. M. Fischer and A. Getis, "Handbook of Applied Spatial Analysis," Berlin, Heidelberg: Springer Berlin Heidelberg, 2010.
4. Gaetan and X. Guyon, "Spatial Statistics and Modeling," vol. 147, no. 1975, New York, NY: Springer New York, 2010.
5. Yang, "Introduction to GIS programming and fundamentals with Python and ArcGIS," 1st ed., New York: CRC Press, 2017.
6. M. Batty, "Cities as Complex Systems: Scaling, Interactions, Networks, Dynamics and Urban Morphologies," London, 131, 2008.
7. R. Sugumaran and J. Degroote, "Spatial decision support systems," 1st ed., Boca Raton, FL: CRC Press, 2011.

AP6127E - URBAN DISASTER MANAGEMENT

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

- CO 1: Comprehend the concepts of disaster risk reduction and resilience.
- CO 2: Assimilate various management approaches towards disaster resilience of urban areas
- CO 3: Comprehend policy and institutional mechanisms for urban disaster management
- CO 4: Apply the vulnerability and risk assessment tools and techniques.

Natural and man-made disasters, meaning, factors and significance, Causes and effects. Global and local disaster profile. Typology of disasters in India. Disaster Management Cycle, Scope and objectives of preparedness, response, mitigation. Post Disaster reconstruction and rehabilitation. Hazard, Vulnerability & Risks. From Disaster Mitigation to Disaster resiliency. Roles and responsibilities of various national and international agencies in disaster management

Identify the relationship between urban environment and disaster risks. Impact of disasters in cities and need for risk sensitive urban planning. Socio economic health Environmental Impact. Major issues for unsafe built urban form and space. `Climate Change and its implications on the risk profile of cities: Impact for Present and Future. Identifying Risks & Vulnerabilities in the Urban Context

Approaches for Disaster mapping, Risk Assessment and Vulnerability Analysis Tools and Techniques. Application of Geo-informatics to Natural Hazards Modelling. Role of Urban Planning for Risk Mitigation: National, local and community disaster risk reduction, Community based Urban Risk Management. Technology for Urban Sustainability: Mainstreaming DRR in Urban Development Policies & Governance Techno-legal framework for Urban Risk Reduction Implications of Urban Transport in Disaster Risk Reduction. Indian and global context for urban planning and building design for risk reduction and resiliency.

Disaster resilient infrastructure planning and construction practices, structural as well as Non-Structural Mitigation Measures for Risk reduction. Policies, mechanisms and legislations related to risk sensitive planning of urban areas: Land use zoning for disaster management Green Infrastructure Planning, Sustainable Urban Drainage. Climate resilient cities. Preparedness for climate change, Climate risk mitigation and adaptation. Participatory urban risk mitigation.

Case Study: City Observation Study: Disaster Mapping - Earthquake, flooding, etc. Risk Assessment, Vulnerability Analysis and Mitigation Strategies.

References:

1. S. Modh, "Introduction to Disaster Management," New Delhi: Macmillan India Limited, 2010.
2. "Disaster Risk Reduction: A Handbook for Urban Managers," Delhi: MOHUPA, UNDP, BMTPC, 2016.
3. J. Joerin, R. Shaw, and R. R. Krishnamurthy, "Building Resilient Urban Communities," United Kingdom: Emerald, 2014.
4. "Training Module on Urban Risk Mitigation," Delhi: NIDM, 2014.
5. Ahmed and E. Charlesworth, "Urban Disaster Management Toolkit: An Assessment-Based Approach to World Vision's Disaster Management Dimensions," World Vision International, California, Rep., 2014.
6. "Reducing Urban Risk in Asia," Kyoto University, UNISDR, SEED, Delhi, Rep., 2009.
7. "Integrating disaster risk management into urban management, disaster risk management practitioner's handbook series," Shanghai: ADPC, 2013.

AP6128E - PLANNING FOR RURAL DEVELOPMENT

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

CO1: Get accustomed with the planning concepts related to rural development

CO2: Get accustomed with the different committees and studies related to rural development in different times

CO3: Comprehend the different techniques related to rural planning

CO4: Exposure to different rural planning programs in practice

Introduction to Rural Development Meaning, nature and scope of development; Concepts and Connotations of Rural Development, Nature of rural society in India; Social, economic and ecological constraints for rural development. Issues and need for a balanced urban rural development in India and the world.

Pre-independent and post independent rural programs in India, Rural reconstruction and Sarvodaya program; Constitutional direction, directive principles; Panchayati Raj - beginning of planning and community development. Balwant Rai Mehta Committee - three tier system of rural local Government; Ashok Mehta Committee - linkage between Panchayati Raj, participation and rural development. peoples planning initiatives in Kerala, Five Year Plans and integration of National, State, Regional and District level and local level plans. Planning for Urban and rural interface regions

Post 73rd Amendment Scenario 73rd Constitution (Amendment) Act - XI schedule, devolution of powers, functions and finance; Panchayati Raj institutions - organizational linkages of Gram Sabha, Block and District panchayaths, - resource mapping, resource mobilization including social mobilization; Information Technology and rural planning. Participatory Planning Process: Introduction, purpose, origin, salient features, Methods and steps in participatory planning in local governance: case studies from different parts of India, Participatory Learning and Action (PLA) tools.

Inclusive Development for rural areas: Special Component Plan- Tribal Sub Plan and Weaker Sector Plans, plans for Command Area, Draught Prone Areas, Backward Area, Rural Infrastructure Development Schemes, Rural Employment Schemes. schemes for agriculture and allied industries, Transport, employment, child and women development, Rural electrification, etc. financing, implementation monitoring and evaluation of rural development schemes.

References:

1. K. Singh and A. Shishodia, "Rural Development: Principles, Policies and Management," Thousand Oaks, CA: SAGE Publications, 2016.
2. N. Bartlett, "Introduction to Rural Planning: Economies, Communities and Landscapes," New York: Routledge, 2015.
3. M. Khayesi, "Rural Development Planning in Africa," New York: Palgrave Macmillan US, 2018.
4. M. Jain, "Rural Development Programmes in India," New Delhi: Deep & Deep Publications, 2011.
5. B. M. Sanyal, "India: Decentralized Planning Themes and Issues," 1st ed., New Delhi: Concept Publishing, 2008.
6. B. S. Khanna, "Rural Development in South Asia: (Policies, Programmes, and Organisation)," New Delhi: Deep & Deep Publications, 1991.
7. H. Ramachandran, "Village Clusters and Rural Development," New Delhi: Concept Publication Comp., 1980.
8. H. A. Hye, "Integrated Approach to Rural Development," New Delhi: Sterling Publishers, 1986.

AP6129E - ENVIRONMENTAL IMPACT ASSESSMENT

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

CO1: Apply the principles of EIA on projects of certain threshold scale to decide their environment worthiness

CO2: Conduct rapid EIAs and decide on the need for full-scale EIA based on available project details

CO3: Choose form a number of available project alternatives, one that is environmentally most compatible

CO4: Judge and device suitable mitigation measures when environmental impacts are assessed as manageable

Introduction to Environmental Impact Assessment: Defining the process of impact assessment - Role of EIA in the Planning and decision-making process, Definition and need and objectives, tasks and scope. Rationale for EIA, Basic steps, Rapid EIA and Phases of impact assessment, Environmental impact statement.

EIA steps in detail, Screening, Scoping, Alternatives, Baseline studies, Impact Identification Techniques, Impact prediction, Evaluation, Mitigation, Public consultation, EIS, Review and Decision making, EIA cycle and indicators. Strengths and weaknesses of the various techniques used in the impact identification process.

Predicting Impact on the Physical Environment: Land - indicators for land suitability and vulnerability - Techniques for evaluating alternative land use plans. Air- calculating pollutant emission - predicting ambient concentration - predicting ecological response to air pollutant - predicting human health risks. Water - categorization of pollutants - pollution dispersion - water quality Predicting Impact on Biota: Ecosystem process and impact assessment -energy fixation and flow,

Impact Evaluation Techniques: Techniques used in impact evaluation - Weighting-Scaling techniques, ecological rating systems - Goals-achievement matrix, priority-trade-off-scanning matrix, RIAM, Projects and case studies of relevance through secondary data analysis.

References:

1. B. N. Lohani, J. W. Evans, R. R. Everitt, R. A. Carpenter, and S. L. Tu, "Environmental Impact Assessment: For Developing Countries in Asia," vol. 1, Manila: Asian Development Bank, 1999.
2. L. Canter, "Environmental Impact Assessment," 2nd ed., New York: Mcgraw-Hill Science, 1995.
3. Barthwaland R.R, "Stock Image Environmental Impact Assessment," 2nd ed., New Delhi: New Age International, 2011.
4. R. Dale, "Evaluation Frameworks for Development Programmesand Projects," New Delhi: SAGE Publications, 1998.
5. K. Srivastava, "Environmental Impact Assessment," New Delhi: APH Publishing Corporation, 2012.
6. P. Modak and A. K. Biswas, "Conducting Environmental Impact Assessment in Developing Countries," Tokyo: United Nations University Press, 1999.
7. H. Robinson, "Governance and Knowledge Management for Public-Private Partnerships," Oxford: Wiley Blackwell, 2010

AP6130E - ADVANCED TRANSPORTATION PLANNING

Pre-requisites: AP6106E - Transportation Planning

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

CO1: Suggest as well as adopt suitable models for various stages of transportation planning

CO2: Address issues related to public transportation and undertake public transport planning

CO3: Comprehend the economic principles and perform estimating various cost components in transportation

CO4: Comprehend various IoT applications and develop IoT based systems for transportation

Transport Planning and Modelling: Concepts in transport planning and modelling - forecasting the demand for travel - Analysis and Modelling of Travel Choices-Multivariate Data Analysis and Application to Problems in Traffic and Transportation Planning - Random Utility Model, Probit, Logit and Discriminant Model Formulations, Nested Logit Model, Mixed Logit Model.

Public Transport Planning: Operational Planning Decomposition Process. Service and Evaluation standards, Concept of Viability. Data requirements – Data collection techniques. Frequency and Headway Determination – Max load and Load profile methods. Route Design –Methodology for design of public transit routes-Estimation of fleet size required for a single route-Maxflow technique for fixed vehicle scheduling-Crew assignment procedures.

Transportation Economics: Transport Costs and Benefits: Principles of economic analysis, Fixed and variable cost, cost of improvement, maintenance cost, cost estimating methods, accounting for inflation, external costs; Consequences of transport projects, road user consequences - reduced vehicle operation costs, value of travel time savings, value of increased comfort and convenience, cost of accident reduction, reduction in maintenance cost, non-user consequences – travel time.

Intelligent Transportation System: The use of information and communications technology in transport - Intelligent Transport Systems (ITS) - key technologies in sensing, communications and data management and techniques for evaluation and appraisal of system performance –Application of IoT in transportation – Application of GIS FOR transportation.

References:

1. J. D. Ortuzar and L. G. Willumsen, "Modelling Transport," John Wiley and Sons, 2011.
2. S. G. Makridakis, S. C. Wheelwright, and R. J. Hyndman, "Forecasting: Methods and Applications," Wiley, 2008.
3. F. S. Koppelman and C. Bhat, "A Self Instructing Course in Mode Choice Modeling: Multinomial and Nested Logit Models," USDOT, 2006.
4. A. Ceder, "Public Transit Planning and Operation," CRC Press, 2016.
5. P. Chakraborty and A. Das, "Principles of Transportation Engineering," PHI Pvt Ltd, 2017.
6. P. White, "Public Transport," Routledge, 2008.
7. E. Quinet and R. Vickerman, "Principles of Transport Economics," Edward Elgar Pub Ltd., 2005.
8. K. J. Button, "Transport Economics," Edward Elgar Publishing Ltd, 2010.
9. I. G. Heggie, "Transportation Engineering Economics," McGraw-Hill, 1972.
10. J. S. Sussman, "Perspectives on Intelligent Transportation Systems," Springer, 2010.
11. S. R. Kumar, "Intelligent Transportation System," Orient Blackswan Pvt Ltd., 2021

AP6131E - REGIONAL TRANSPORT PLANNING

Pre-requisites: AP6106E - Transportation Planning

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

CO1: Comprehend Regional planning and regional transport systems

CO2: Estimate Regional travel demand using appropriate model.

CO3: Perform Regional Network Analysis

CO4: Plan Regional transport infrastructure and formulate regional transport policy

Overview of Regional Planning and Regional Transport Systems: Approach to regional planning, types of regions and their characteristics, delineation of region for transport planning, regional transport system, types, characteristics, regional transport supply, regional traffic and travel pattern, emerging issues.

Regional Travel Demand: Regional travel demand determinant, regional demand models, regional accessibility, sequential travel demand models, econometric models, regional public transport demand.

Regional Network Analysis: Regional network system, rural road network planning, graph theory applications connectivity and accessibility measures.

Regional Transport Policy: Regional transport infrastructure, system planning imperatives, integration aspects, system selection, policy aspects at regional level.

References:

1. J. W. Dickey, "Metropolitan Transportation Planning," Tata Mc-Graw Hill, 1980.
2. M. D. Meyer, "ITE Transportation Planning Handbook," John Wiley & Sons, 2016.
3. L. R. Kadiyali, "Traffic Engineering and Transport Planning," Khanna Publishers, 1987.
4. W. A. G. Blonk, "Transport and Regional Development," Saxon House.
5. R. S. Tolley and B. J. Turton, "Transport Systems, Policy and Planning: A Geographical Approach," Longman, 1995.
6. C. S. Papacostas and P. D. Prevedouros, "Transportation Engineering and Planning," Pearson India, 3rd ed., 2015.
7. T. M. Vinod, "Micro Regional Transport Planning," New Delhi: Research Spa.
8. Ministry of Urban Affairs and Employment, "URDPFI Guidelines Vol. 1," New Delhi: Govt. Of India, 2014.

AP6132E - URBAN DESIGN AND CONSERVATION

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

- CO 1: Comprehend the theories, principles, processes methods and practice of urban design and urban conservation.
- CO 2: Comprehend the value of common visions, cultural diversity and community aspirations in the process of design and conservation in the creation of high-quality places
- CO 3: Perform different surveys, documentation and investigation for urban settlements.
- CO 4: Develop skills in preparing urban design and conservation plans for an area.

Introduction to Urban Design, Scope and Objectives of Urban Design, Role of Urban Design in the planning process; Scale of various Urban Design projects - Regional and City Level; Concepts of cities by various Urbanists; Methods and emerging approaches in Urban Design, methods of community involvement; Behavioural issues in Urban Design; Principles of Urban Spatial Organization, Urban Spaces - Hierarchy and Nature, Urban Scale, Sense of Enclosure, Isolation and Continuity and Perception; Urban Massing in Built Form; Imageability and Elements of Urban Design.

Urban Design at Micro Level: Campus Planning, City Centres, Transportation Corridors, and Residential Neighbourhoods; Development Control Guidelines, Zoning concepts; Social, Perceptual, Temporal and Morphological Aspects of Urban Design; Issues of Urban Design interventions and strategies in cities; Case Studies of Urban Design Projects: Best Practices and Analysis of Urban Design Projects in local and international contexts; Role of Urban Art Commissions in the development of cities.

Quality of historic cities and areas: problems and issues, cultural resource management. Guiding principles and legal framework for heritage conservation, as established in international charters and regional legislation, aesthetics, social dimensions, economic, legal and tourism aspects of conservation and cases of their application in Indian and international contexts; Planning procedures: inspection and surveys, investigation techniques, methods for inventories and documentation, identification and reporting on heritage zones; programs for adaptive reuse, restoration, rehabilitation and infill or new constructions; Understanding heritage places using the concept of cultural landscapes – landscapes that reflect distinctive patterns of interaction between people and the natural environment.

Implementation of plans and urban management: phasing, resource mobilization, incentives, acts and legal tools; people's awareness and participation, role of various action groups; Concept of Urban Redevelopment, Urban Renewal, Urban Reconstruction and Urban Rejuvenation; Symptoms and pre-conditions that warrant the need for regeneration of cities; Economic, social and physical environmental aspects; Perception of urban regeneration in the context of evolution of selected urban centers of the West and the East; National urbanization policy, goals and objectives of urban regeneration of Indian cities; Preparation of a Statement of Significance as part of a conservation plan; Challenges of urban conservation in Indian and International context.

References:

1. M. Larice and E. Macdonald, "The Urban Design Reader," New York: Taylor, 2007.
2. M. Carmona and S. Tiesdell, "Public Places Urban Spaces: Dimensions of Urban Design," Routledge, 2017.
3. J. Barnett, "Redesigning Cities Principles, Practice, Implementation," Chicago: Taylor and Francis, 2008.
4. Bentley, "Responsive Environments: A Manual for Designers," Routledge, 2015.
5. K. Lynch, Venard Marie-Francoise, and Venard Jean-Louis, "Image of the City," Paris: Dunod, 1999.
6. P. D. Spreiregen, "Urban Design: The Architecture of Towns and Cities," Malabar, FL: Kreiger, 1981.
7. Urban Design Alliance, "Urban Design Compendium," UK: English Partnerships, 2007.
8. A. Dobby, "Conservation and Planning," London: Hutchinson, 1978.

AP6133E - COASTAL CITIES MANAGEMENT

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

CO1: Recognize the sensitive issues related to planning urban areas in coastal areas

CO2: Apply the basic concepts and theories of urban planning in a coastal zone respecting the coastal forces and livelihoods and the vulnerabilities involved

CO3: Evaluate and employ planning strategies for a coastally compatible development proposal

CO4: Interpret development scenarios of coastal cities based on its coastal impacts and long term sustenance.

Coastal Zones, Definition, Society and systems in a coastal zone, Sustainable Coastal Development, Competing Claims and Visions of the Coast, Coastal development as an interdisciplinary activity. Livelihoods along the Coast, Local Knowledge, Sustainable Livelihoods, Vulnerability and Resilience, Changing Livelihood Dynamics

Ocean polity, Law of the Sea (UNCLOS), UNCED and ocean agenda for the 21st century, Role of marine scientific research and sustainable development, Need for coastal zone management, Concepts of Integrated coastal zone management (ICZM), Systems approach to ICZM, CRZ norms, Agencies for implementation

Coastal Hazard, Natural vs. Man-made hazard, Cyclones, Coastal Erosion, Tsunami, Floods, Storm surges, Sea Level Rise and Others – Impacts on Natural and Human environment, Governance of the Coast: Institutions, Policy and Jurisdictions, Technological Hazards, Coastal hazard management framework and mitigation: approaches, types and examples, Hazard Mitigation Planning

Coastal Cities: Profile of coastal cities in the world. Importance of planning coastal cities, Sensitive systems in coastal zones, Growth Management of coastal cities, tools, plans and principles for the same, Vulnerability mapping and rehabilitation planning

References:

1. L. E. Visser, "Challenging Coasts: Transdisciplinary Excursions into Integrated Coastal Zone Development," Amsterdam: Amsterdam University Press, 2011.
2. T. Beatley, D. J. Brower, and A. K. Schwab, "An Introduction to Coastal Zone Management," Washington: Island Press, 2009.
3. R. J. Burby, "Cooperating with Nature: Confronting Natural Hazards with Land-Use Planning for Sustainable Communities," Joseph Henry Press, 1998.
4. D. R. Godschalk, "Natural Hazard Mitigation: Recasting Disaster Policy and Planning," Washington, D.C.: Island Press, 1998.
5. "Keeping Natural Hazards from Becoming Disasters: A Mitigation Planning Guidebook for Local Governments," Raleigh, NC: The Division, 2003.
6. B. Cicin-Sain, R. Knecht, and G. Kullenberg, "Integrated Coastal and Ocean Management Concepts and Practices," Washington DC: Island Press, 2013.

AP6134E - FINANCIAL MANAGEMENT OF LOCAL SELF GOVERNMENT

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

- CO 1: Assess potential central and state funding available to local self-governments in the fiscal federal system of India.
- CO 2: Identify suitable urban local financing options for planning projects and devise innovative methods for the same.
- CO 3: Formulate planning proposals to fit in the budgeting system of different level of government.
- CO 4: Manage planning projects with adherence to the financial and social accountability.

Fiscal Federalism in India –Principles of Fiscal Federalism –Centre –State –Local Financial Relations; Local Finance: Structure of Local Finance: Village Panchayats, Panchayat Samitis, Zilla Parishads, Municipalities and Municipal Corporations. Local Finance in 11th to 13th Finance Commission.

Urban Local Finance: Powers of Taxation of Urban Local Government, Major Sources of Revenue, Expenditure patterns, Reasons for Critical Financial Condition of Urban Local Bodies, Suggestions for Augmenting Municipal Finance, Municipal Finance Corporation, Urban Development Finance Corporation, Municipal Finance Commission.

Budgeting and Fiscal Federalism: Union, State and Local Government Budgeting: Budgeting-Preparation –Enactment – Implementation –Monitoring. Gender Budgeting, SC/Budgeting.

Accounting & Auditing: Accountability –Utilization of Fund –Maintaining Accounts –Linkage between Bank and Local Bodies, Auditing: Local Fund Audit -Social Auditing and Local Governments –Audit by District Administration.

References:

1. P. Sachdeva, "Local Government in India," New Delhi: Dorling Kindersley, 2011.
2. S. Goel, "Public Financial Administration," New Delhi: Deep & Deep Publications, 2008.
3. S. Chand, "Public Finance, Vol. 2," New Delhi: Atlantic Publishers & Distributors Pvt Ltd, 2008.
4. Shah, "Local Governance In Developing Countries," Open Knowledge Repository, Washington, DC: World Bank, 2006.
5. Shah, "Local Public Financial Management," Washington, D.C.: World Bank, 2007.
6. P. Mohanty, "Financing Cities in India: Municipal Reforms, Fiscal Accountability and Urban Infrastructure, 1st ed.," New Delhi: SAGE Publications India Private Limited, 2016.
7. Shah, "Local Budgeting," Washington, D.C.: World Bank, 2007.

AP6135E - HUMAN SETTLEMENT AND CLIMATE CHANGE

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

- CO 1: Comprehend the concept of climate change and also to summarize the international organization's efforts in climate change mitigation
- CO 2: Demonstrate the understanding of the anthropogenic actions causing climate change
- CO 3: Distinguish the relationship between climate, environment, society and its manifestation in human settlements
- CO 4: Associate climate change and water resources depletion in India.

Understanding Climate Change: Greenhouse gases, Anthropogenic causes, Carbon Cycle, Global Warming, Inventory of GHGs, Urban Heat Islands. International and National Efforts: United Nations Framework Convention on Climate Change (UNFCCC), Conference of Parties, Kyoto Protocol, Intergovernmental Panel on Climate Change (IPCC), National Communication Process, Indian Network of Climate Change Assessment, Global Environment Facility (GEF), Clean Development Mechanism (CDM)

Role of Human Settlements: Impacts of Climate Change: Climate as forcing Variable, Locational Attributes, Sensitivity and Vulnerability of Different Sectors, Extreme Events and their Effects Contribution to GHGs, Sectoral Contributions, Mitigation Possibilities, Low Carbon Settlements Adaptation Strategies: Resilience, Threshold Variables, Risk Avoidance, Risk Mitigation, Risk Coverage, Mitigation and Adaptation Linkage, Case Studies of Adaptation approaches

Climate Change – Settlements: An introduction to the Earth's Climate System and Climatic Zones as Basis for Human Activity and Settlements, The Development of Society in Relation to the Local Climatic and Topographic Conditions, Resources Availability (Food, Building Material, and Energy), Technical Skills and the Societal Framework, An Assessment of Population Development and its Implications on Settlements, Buildings and Resource Consumption with Particular Focus on Energy Consumption

Climate Change – Implications for India's Water Resources: Impact of Global Warming on India's Climate, Impact of Global Warming on Floods and Droughts, Impact of Floods and Droughts on Human Society and Development, Potential of Surface Water Sources, Ground Water Potentials, Potential of the Monsoons to Supplement Water Supply, Future Demand and Supply of Water, Long-Term Water Supply Prospects, Coping with Climate Change and Adaptation

References:

1. J. T. Hardy, "Climate Change: Causes, Effects, and Solutions," Chichester: John Wiley & Sons, 2006.
2. T. M. Letcher, "Climate Change: Observed Impacts on Planet Earth," 2nd ed., Amsterdam, Netherlands: Elsevier, 2015.
3. W. N. Adger, Kajfež-BogatajlučKa, M. L. Parry, O. Canziani, and J. Palutikof, "Climate Change 2007: Impacts, Adaptation and Vulnerability," Cambridge: Cambridge University Press, 2007.
4. M. M. Q. Mirza and Q. K. Ahmad, "Climate Change and Water Resources in South Asia," 1st ed., Leiden: A.A. Balkema, 2005.
5. K. D. Frederick, D. C. Major, and E. Z. Stakhiv, "Climate Change and Water Resources Planning Criteria," Dordrecht: Springer, 1997.
6. M. Sethi, "Climate Change and Urban Settlements: A Spatial Perspective of Carbon Footprint and Beyond," 1st ed., London: Routledge, Taylor & Francis Group, 2017.
7. J. Bicknell, D. Dodman, and D. Satterthwaite, "Adapting Cities to Climate Change: Understanding and Addressing the Development Challenges," London: Earthscan, 2009.
8. Un-Habitat, "Cities and Climate Change: Global Report on Human Settlements," Earthscan, London, Publication, 2011.

AP6136E SYSTEMS MODELLING AND ANALYSIS

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

CO1: Quantify interactions between drivers and sub-systems of urban system

CO2: Anticipate impact of alternate development strategies on futures

CO3: Develop models and simulations for urban systems

CO4: Implement analytical models with a suitable software.

History of urban simulation: Concept of urban simulation. Examples of Jay Forester's Urban Dynamo to University of Washington UrbanSim. Classification of urban models: Based on representation of space, representation of time, formalisation, and how indeterminism is handled, based on modelling techniques like spatial interaction, Discrete choice models, Introduction to tools like SPSS / R / ArcGIS / Python / Matlab / Stella.

Approaches: Cellular Automata, Multi-Agent Simulation, Spatial Input-Output, Spatial Interaction. Discussion of alternative modelling approaches, their data requirements, their strengths and weaknesses. Urban models and simulations: Concept of modelling, simulation and flavours of models – static and dynamic models, aggregated vs disaggregated models, simulations, Conventional and New generation models like cellular automata, agent based models and flow dynamics, Land use and Urban Development model and simulations.

Transportation Modelling and Transportation-Land Use Interaction. Discussion of the design and application of transportation models in a planning context, focusing on the Puget Sound Regional Council models. Discussion of the interactions between transportation and land use, and how these interactions can be represented by linked models. Emerging directions for model integration and activity-based travel modelling approaches.

Managing uncertainty and data limitations: Uncertainty in urban systems and its impact on models, scenarios and solution findings Methods to manage uncertainty and data limitations

Indicators, Evaluation, and Human-Computer Interaction Techniques. Discussion of evaluation of model results using indicators of efficiency, equity, and environmental impact. Alternative visualizations and user-interfaces for indicators. Issues in applying Value Sensitive Design. Different user roles and interactions: model developer, scenario creator, and scenario evaluator. Methods for evaluating usability. Model Specification, Estimation, Calibration and Validation

References

1. P. Waddell and G. F. Ulfarsson, "Introduction to Urban Simulation: Design and Development of Operational Models," in Handbook in Transport, Volume 5: Transport Geography and Spatial Systems, Stopher, Button, Kingsley, Hensher eds., Pergamon Press, 2004, pp. 203-236.
2. M. Batty, "Cities and Complexity: Understanding Cities with Cellular Automata, Agent-based Models, and Fractals," The MIT Press, 2007.
3. K. E. Train, "Discrete Choice Methods with Simulation," Cambridge University Press, 2009.
4. A. Field, "Discovering Statistics Using IBM SPSS Statistics," Sage, 2013.
5. M. Wegener, "New Spatial Planning Models," International Journal of Applied Earth Observation and Geoinformation, vol. 3, no. 3, pp. 224-237, 2001. doi: 10.1016/S0303-2434(01)85030-3.

AP6137E URBAN RENEWAL AND CONSERVATION

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

CO1: Comprehend the concept of Architectural Conservation, its Philosophy, Principles and Practices by various organizations.

CO2: Effectively deal and manage with Urban Conservation and Urban Renewal projects through the understanding of various theories, techniques and approaches practiced globally.

CO3: Recognize and assimilate the Heritage Charters, acts and legislations for effective implementation in projects that involve a multi-disciplinary approach.

CO4: Recognize conservation as an effective planning tool and employ Conservation Management Strategies.

Role of conservation in sustainable urban development- Need, Debate and Purpose for Conservation - Understanding Heritage & Types of Heritage - Agencies involved in conservation, Scope, principles and approaches to conservation, Role and responsibilities of UNESCO, ASI, NMA, INTACH, Urban Arts commission, other allied bodies and institutions.

International charters, guidelines, and standards for conservation, Overview of evolving heritage management systems and linked legislation in India

History of integrated urban conservation approaches in the world with select examples, Approaches to integrated conservation in India with select examples explaining urban conservation tools and methods: Urban renewal, inner city regeneration, adaptive reuse, infill development etc, Concepts and Theories Relevant of Urban Renewal - Case studies – Brownfield development Infrastructure upgradation, economic regeneration, financing models; urban renewal schemes

Institutional framework for urban conservation and renewal strategies in India, Legal and Policy Framework for Urban Renewal and Conservation, Review of Existing Frameworks and Masterplans in India, Policies and models for heritage-led development --selected case studies, Contemporary Issues in Urban Renewal and emerging Participatory processes and frameworks, community engagement and inclusivity in decision-making.

References:

1. M. S. Mathews, "Conservation Engineering," Karlsruhe: Universität Karlsruhe, 1998.
2. B. M. Feilden, "Conservation of Historic Buildings," London: Butterworths, 2008.
3. B. Kuriakose, N. P. Khanna, and M. B. Saini, "Guidelines for Preparation of a Heritage Management Plan," New Delhi: INTACH, 2010.
4. J. M. Fitch, "Historic Preservation: Curatorial Management of the Built World," Charlottesville: University Press of Virginia, 2007.
5. P. W. Roberts, H. Sykes, and R. Granger, "Urban Regeneration," Los Angeles: SAGE, 2017.
6. D. Adams, "Urban Planning and the Development Process," London: Routledge, 1994.
7. J. Diamond, "Urban Regeneration Management: International Perspectives," London: Routledge, 2011.
8. M. S. Gibson and M. J. Langstaff, "An Introduction to Urban Renewal," London: Hutchinson, 1982.
9. C. Couch, "Urban Renewal: Theory and Practice," London: Macmillan, 1990.
10. D. J. Timothy, "Cultural Heritage and Tourism: An Introduction," Bristol: Channel View Publications, 2011.
11. A. Dobby, "Conservation and Planning (Living Environment)," Nelson Thornes Ltd, 1978.
12. I. Bentley, "Responsive Environments: A Manual for Designers," London: Architectural Press, 1985.

AP6138E HERITAGE MANAGEMENT AND TOURISM

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

CO1: Comprehend the concept of Heritage Management and tourism, assimilate its relevance through understanding its theories, techniques, and approaches implemented for various case studies.

CO2: Recognize and employ appropriate strategies for the management of Heritage Tourist destinations.

CO3: Assimilate and evaluate World heritage sites and their Management and effectively approach future projects with a more sensitive management approach.

CO4: Effectively apply Management strategies when dealing with Heritage in an Urban scale through various techniques and approaches.

Introduction to Heritage Management and Heritage Tourism- Definition, Significance, Understanding the relationship, Principles of Heritage Conservation and Sustainable Tourism, Conservation ethics and responsible tourism practices, Balancing conservation with visitor experiences, Charters, guidelines, standards provided by various national, international agencies and institutions, Cultural tourism as a tool for heritage management and sustainable development

Types of tourism, Cultural heritage tourism- interpretation and immersive experiences, Natural Heritage Tourism- Ecotourism principles and sustainable nature-based tourism, Rural Tourism, Agro Tourism, Dark Tourism, Food Tourism, Ghost Tourism

Tourism at World heritage Sites and management- selected case studies, Heritage Interpretation and Storytelling, Interpretive techniques for heritage sites and museums, potential and prospects marketing aspects, nature of heritage demand, visitor characteristics, visitor typology and their motivations, Marketing and Promotion of Heritage Tourism – case studies, Branding and positioning tourism experiences,

Community involvement in heritage tourism planning, Empowering local communities through heritage-based tourism, Heritage Tourism Policy and Governance, Crisis Management and Resilience in Heritage Tourism, sustainable practices and emerging trends in heritage tourism – selected case studies

References:

1. R. Longstreth, "Architectural History and the Practice of Historic Preservation in the United States," Journal of The Society of Architectural Historians, vol. 58, no. 3, pp. 326–333, 1999.
2. J. C. Henderson, "Conserving Colonial Heritage: Raffles Hotel in Singapore," International Journal of Heritage Studies, vol. 7, no. 1, pp. 7–24, 2001.
3. D. C. Harvey, "Heritage Pasts and Heritage Presents: Temporality, Meaning and the Scope of Heritage Studies," International Journal of Heritage Studies, vol. 7, no. 4, pp. 319–338, 2001.
4. D. J. Timothy, "Managing Heritage and Cultural Tourism Resources," 1st ed., vol. 1, Routledge, 2017.
5. D. J. Timothy and S. W. Boyd, "Heritage Tourism: Themes in Tourism," Harlow: Prentice Hall, 2003.
6. I. Bentley, "Responsive Environments: A Manual for Designers," Abingdon, Oxfordshire: Architectural Press is an imprint of Routledge, 2015.
7. D. G. Pearce and R. Butler, "Contemporary Issues in Tourism Development," London: Routledge, 2005.
8. T. Edensor, "Tourists at the Taj: Performance and Meaning at a Symbolic Site," London: Routledge, 2006.

AP6139E GREEN CITY PLANNING FOR SUSTAINABILITY

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

CO1: Understand the development of green city planning concept within the framework of sustainable development

CO2: Comprehend the approaches used in achieving Urban Environment Sustainability

CO3: Develop an awareness of the values, benefits and functions of different types of green infrastructure.

CO4: Understand the methods used in green city planning process

Introduction to green city planning, History of the development of green infrastructure- environmental and green movements- Ecological resilience in urban ecosystems- linking urban patterns to human and ecological functions – introduction to landscape ecology and resilience- Spatial Development for Green Cities and Urban Containment, smart concepts for green cities, Green city action plan, Urban metabolism, Greening challenges and opportunities- Measuring and monitoring Green growth, Financing Green growth.

Sustainable neighbourhoods, Eco Cities, Eco villages, Low carbon cities, Carbon Neutral cities, Role of green spaces in urban environment, Heritage & Green city, Green Urbanism, Energy Strategy for Green cities, green city index, urban agriculture, green mobility integration, city on foot, zero waste city, greening the public services

A smart solution, benefits of green infrastructure, Green transportation, Green infrastructure for storm water management, Green & Sustainable built environments, Green infrastructure & cities biodiversity, Role of blue- green infrastructure, urban resilience

Toyama's Compact city strategy, City planning, strategy and governance for compact capital – Paris, Green growth policy –Toronto's Green economic development strategy, multi-level governance for energy efficiency (MLGEE), Boulder's Carbon Tax, and Flood risk assessment and policy in the Netherlands

References:

1. S. A. Johnston, S. S. Nicholas, and J. Parzen, "Greening from the Inside," in *The Guide to Greening Cities*, 2013, pp. 17–38.
2. P. Newman and I. Jennings, *Cities as Sustainable Ecosystems Principles and Practices*. Washington: Island Press, 2012.
3. T. Haas, *Sustainable Urbanism and Beyond: Rethinking Cities for the Future*. New York: Rizzoli, 2012.
4. Z. Shen, L. Huang, K. H. Peng, and J. Pai, *Green City Planning and Practices in Asian Cities: Sustainable Development and Smart Growth in Urban Environments*. Cham: Springer International Publishing, 2018.
5. N. Low, B. Gleeson, R. Green, and D. Radovic, *The Green City: Sustainable Homes, Sustainable Suburbs*. Sydney, Australia: UNSW Press, 2016.
6. E. V. Bueren, H. V. Bohemen, L. C. M. Itard, and H. Visscher, *Sustainable Urban Environments: An Ecosystem Approach*. Dordrecht: Springer Netherlands, 2012.
7. R. Yao, *Design and Management of Sustainable Built Environments*. Berlin: Springer, 2015.
8. D. Sinnett, N. Smith, and S. Burgess, *Handbook on Green Infrastructure: Planning, Design and Implementation*. Cheltenham, UK: Edward Elgar Publishing, 2015.
9. R. C. Brears, *Blue and Green Cities: The Role of Blue-Green Infrastructure in Managing Urban Water Resources*. London: Palgrave Macmillan UK, 2018.

AP6140E CULTURAL LANDSCAPES

Pre-requisites: Nil

L	T	P	O	C
3	0	0	6	3

Total: 39 Lecture Sessions

Course Outcomes:

CO1: Understand the essential characteristics of cultural landscapes

CO2: Comprehend theories, practices, charters and conventions in cultural landscapes

CO3: Appreciation of the interface between culture and the natural environment in history

CO4: Formulate management plans for cultural landscapes

Landscapes and cultural landscapes- history of the landscape concept- landscape protection- World Heritage convention and landscapes- categories- cultural and natural values in landscapes- outstanding universal value in the context of cultural landscapes- authenticity and integrity.

Conventions, charters and recommendations on natural heritage- international conventions related to biodiversity and natural heritage- sustainability and Agenda 21 programmes internationally- European strategies in biological and landscape diversity- World Cultural Heritage Sites- Burra Charter- World Commission on Protected Areas- cultural landscapes of India

Reading landscapes- Cultural Geography and Environmental Determinism- Ethnoecology; Concepts of Place- Managing Natural Resources: Common property theory, Co-management- Complexity theory; Social-Ecological Systems- Ecosystem Services; Conservation and Cultural Landscapes

Landscape documentation and assessment- Stakeholder involvement- interaction between nature and culture- guiding change to retain cultural and natural values- integration into the target landscape context- contribution to sustainable development- common issues in cultural landscape management- conservation treatments for landscapes- managing threats.

References:

1. M. Roe and K. Taylor (Eds.), *New Cultural Landscapes*. Routledge, 2014.
2. B. Wallach, *Understanding the Cultural Landscape*. Guilford Press, 2005.
3. H. H. Birks, H. J. B. Birks, P. E. Kaland, and D. Moe (Eds.), *The Cultural Landscape: Past, Present and Future*. Cambridge University Press, 1988.
4. T. Plieninger and C. Bieling (Eds.), *Resilience and the Cultural Landscape: Understanding and Managing Change in Human-Shaped Environments*. Cambridge University Press, 2012.
5. L. Head, *Cultural Landscapes and Environmental Change*. Routledge, 2017.
6. A. Sinha, *Cultural Landscapes of India: Imagined, Enacted, and Reclaimed*. University of Pittsburgh Press, 2020.