Annex I. For 17th Senate of SPAV held on 27.05.2024

Master of Planning
(Environmental Planning and Management)

Course Structure and Detailed Syllabus for

Two Year Masters Degree Programme in Planning

Effective from the Academic Year 2024-25 onwards

(As Approved by the Senate in its 17th Meeting held on 27.05.2024)

योजना तथा वास्तुकला विद्यालय, विजयवाड़ा

School of Planning and Architecture, Vijayawada

An Institute of National Importance, Ministry of Education, Govt. of India

Introduction to Master of Planning (Environmental Planning and Management)

Master of Planning (Environmental Planning & Management), abbreviated as M.Plan (EPM), is a two-year full-time PG programme in Planning offered by the School of Planning and Architecture, Vijayawada specialising in Environmental Planning and Management.

The overall aim of the programme is to rationally sensitise the students towards the intricate ecological relationship between nature and human settlements and thereby equip them with adequate skills required to comprehend, analyse and plan for urban and regional issues with the pretext of maintaining ecological balance. This broad aim intrinsically shall involve comprehension of physical, socio-economic, cultural, political and ecological dimensions of the human settlements. It shall focus particularly in recording and interpreting environmental resource baseline and their local and regional capacities to deal with human needs. The course structure and syllabus are designed with coherence and reference to the Model Curriculum for Master of Planning by the All India Council for Technical Education (AICTE) 2020 and Model Curriculum for Master of Planning by ITPI, Orienting Planning Education in Line with NEP 2020. The curriculum integrates a variety of subjects, including studios, labs, theory, and field visits. The broad course structure of the programme is as follows:

The **first semester** is an integrated semester common to all master courses of planning offered by the school. The studio focuses on area planning. Subjects offered are introduction to planning theories and concepts, data analytics and techniques in planning, habitat and environmental planning, infrastructure planning, and socio-economic dimensions in planning.

The **second semester** is aimed to inculcate the core specialised competencies of environmental planning in terms of theories and tools like use of environmental monitoring lab, theory of environmental planning, ecological footprint analysis, environmental economics, waste water treatment, planning for healthy cities, etc. The studio aims to take up a small or medium town with development challenges and local/urban environmental issues. It offers two electives, out of which students are expected to select one.

The **third semester** focuses on regional environmental planning issues and imparts advanced level theory courses like EIA techniques, energy studies, and environmental law and professional practise. This semester also introduces project planning and management tools and focuses on waste management and climate change as electives. The students are expected to develop their thesis ideas in the semester through the advanced research methodology course.

The **fourth semester** requires the student to undertake thesis/terminal project with an emphasis on academic or applied research. In addition, two theory subjects are offered on environmental justice, and environmental policy and governance.

There are eight electives (including professional electives) and eight audit courses offered in the second and third semesters in total in MEPM. Each subject is divided into five sections consisting of the subject details, objective, units and suggested readings. The subject syllabus is broken into progressive sections through the units, to be taught over the semester. However, it may be noted that the syllabus covered is not exhaustive and the individual subject teacher may augment the syllabus as per his/her perception of the subject with prior concurrence of the Head of the Department.

The subject faculty members are encouraged to assess the students in a progressive manner throughout the semester through seminars, debates, group/individual presentations, term papers, written exams (open or closed book), take home exams, report submissions, viva voce, etc.

The five underlying principles of 'Sustainability, Equity, Efficiency, Harmony, and Safety' are to be emphasized as a cross-cutting theme in executing planning lab/studio exercises and application of theory subjects. The syllabus also introduces concepts of Indigenous Knowledge Systems (IKS) in Environmental Planning and Management. The syllabus is designed so as to develop strong communication, interpersonal, advocacy and analytical skills of the student. The course endeavours to give real time experience to students through their involvement in the ongoing or live projects. The programme is designed to enable the growth of the students into professionals in the field, who are not only environmentally sensitive in their planning approaches but are versed with the know-how of the state-of-the-art techniques in the industry.

FIRST SEMESTER (INTEGRATED)

S. NO.	SUBJECT CODE	SUBJECT TITLE	Distribution of Periods Per Week			Total Periods Per Week	Credits	Subject Category
			L	T	S/P			
1	MPIS111	Area Planning Studio	3	0	12	15	15	SC
2	MPIS112	Planning Theories and Concepts	2	1	0	3	3	TC
3	MPIS113	Data Analytics and Techniques in Planning	2	1	0	3	3	TC
4	MPIS114	Habitat and Environment Planning	2	1	0	3	3	TC
5	MPIS115	Infrastructure Planning	2	1	0	3	3	TC
6	MPIS116	Socio-Economic Dimensions in Planning	2	1	0	3	3	TC
TOTAL			**13**	**5**	**12**	**30**	**30**	

SECOND SEMESTER

S. NO.	SUBJECT CODE	SUBJECT TITLE	Distribution of Periods Per Week			Total Periods Per Week	Credits	Subject Category
			L	T	S/P			
1	MEPM121	Urban Environmental Planning Studio	3	0	12	15	15	SC
2	MEPM122	Geo-informatics & Analytics in Planning	1	1	1	3	3	JC
3	MEPM123	Environmental Monitoring & Assessment Tools	1	1	1	3	3	JC
4	MEPM124	Theory of Environmental Planning & Design	2	1	0	3	3	TC
5	MEPM125	Environmental Economics	2	1	0	3	3	TC
Elective 1: ANY ONE								
6	MEPM1210	Ecological Footprint and Carrying Capacity	2	1	0	3	3	OE
7	MEPM1211	Water-centric Planning & Management	2	1	0	3	3	OE
8	MEPM1212	Planning for Healthy Cities	2	1	0	3	3	OE
9	MEPM1213	Planning for Resilient Infrastructure	2	1	0	3	3	PE
10	MEPM1214	From other Master programmes (same semester) / online platform duly approved the department	2	1	0	3	3	OE
TOTAL			**12**	**5**	**13**	**30**	**30**	
ECOC Audit Courses: ANY ONE								
11	ECOC1	To be Chosen						A
12	ECOC2	To be Chosen						A
PBOC Audit Courses: ANY ONE								
13	PBOC1	To be Chosen						A
14	PBOC2	To be Chosen						A

Note 1: Compulsory Summer Professional training / internship (of six weeks) after second semester is to be undertaken by each student. The compulsory training shall be deemed as completed only when the Department of Planning examines the work of each student in the subsequent third semester and declares it to be "Satisfactorily Completed".

THIRD SEMESTER

S. NO.	SUBJECT CODE	SUBJECT TITLE	Distribution of Periods Per Week			Total Periods Per Week	Credits	Subject Category
			L	T	S/P			
1	MEPM211	Regional Environmental Planning Studio	3	0	12	15	15	SC
2	MPIS212	Research Methods	2	1	0	3	3	JC
3	MEPM213	Environmental Impact Assessment Techniques	2	1	0	3	3	TC
4	MEPM214	Project Planning & Management	2	1	0	3	3	TC
5	MEPM215	Energy Studies in Planning	2	1	0	3	3	TC
Elective 2: ANY ONE								
6	MEPM2110	Human Settlements and Climate Change	2	1	0	3	3	OE
7	MEPM2111	Integrated Waste Management	2	1	0	3	3	PE
8	MEPM2112	Environmental Data Analytics	2	1	0	3	3	PE
9	MEPM2113	From other Masters programme (same semester)/ online platform duly approved the department	2	1	0	3	3	OE
10	MEPM2114/ MURP215	Disaster Preparedness and Management	2	1	0	3	3	OE
TOTAL			**13**	**5**	**12**	**30**	**30**	
ECOC Audit Courses: ANY ONE								
11	ECOC1	To be Chosen						A
12	ECOC2	To be Chosen						A
PBOC Audit Courses: ANY ONE								
13	PBOC1	To be Chosen						A
14	PBOC2	To be Chosen						A

FOURTH SEMESTER

S. NO.	SUBJECT CODE	SUBJECT TITLE	Distribution of Periods Per Week			Total Periods Per Week	Credits	Subject Category
			L	T	S/P			
1	MEPM221	Environmental Planning Thesis	2	0	22	24	24	JC
2	MEPM222	Environmental Justice and Professional Practice	2	1	0	3	3	TC
3	MEPM223	Environmental Law, Policy and Governance	2	1	0	3	3	TC
TOTAL			**6**	**2**	**22**	**30**	**30**	

Note 2: Credits for each subject are the same as the number of lecture / practical hours per week, whichever is higher.

Subject Code Nomenclature:

MPIS111 is to be read as:

MPIS = Masters in Planning (Integrated Sem);
1 (2nd digit) = 1stSem of 1st Year;
1 (1st digit) = 1st Year;
1 (3rd digit) = 1st Subject.

MEPM211 is to be read as:

MEPM = Masters in Environmental Planning;
1 (2nd digit) = 1stSem of 2nd Year;
2 (1st digit) = 2nd Year;
1 (3rd digit) = 1st Subject.

MEPM2110 is to be read as:

MEPM = Masters in Environmental Planning;
1 (2nd digit) = 1stSem of 2nd Year;
2 (1st digit) = 2nd Year;
10 (3&4th digit) = 1st Elective Subject.

Subject Category Nomenclature:

SC = Studio Core Subject	TC = Theory Core Subject	JC = Jury Core Subject
PE = Professional Electives	A = Audit Subjects	OE = Electives from Other Masters Programme (Same Semester)/online platform duly approved the department

SC (Studio Core Subject): These subjects are the practical backbone of the curriculum, focusing on hands-on projects and real-world applications, essential for mastering planning skills.

TC (Theory Core Subject): These subjects provide the theoretical foundation, covering key concepts, methodologies, and frameworks necessary for understanding urban and regional planning.

JC (Jury Core Subject): These subjects involve assessments and presentations, where students present their projects and designs before external experts at the end of the semester, fostering evaluation and feedback.

PE (Professional Electives): These subjects focus on advanced professional skills and knowledge, preparing students for specific career paths within the planning industry.

OE (Electives from Other Masters Programme - Same Semester): These subjects provide an interdisciplinary approach by allowing students to take courses from other master's programs, broadening their academic perspective.

ECOC and PBOC are the open electives that are non-graded courses.

Detailed Syllabus
for

Master of Planning
(Environmental Planning and Management)

MPIS111- Area Planning Studio	Subject Category	SC
	Number of Credits	15
	Lecture Periods per Week	3
	Tutorial Periods per Week	-
	Studio/Lab/Workshop/Practical's	12
	Total Periods per Week	15

Objective:

- To enable the students to understand the socio-economic and spatio-cultural, environmental characteristics along with the land-use dynamics of the study area.
- To plan for rational physical and socio-economic interventions for sustainable and harmonious development of the future.

Part A:

Literature and Documentary Review on the selected themes **15**

Area Appreciation at the sub-city level **30**

Understanding the linkages between different aspects of socio-economic life in relation to the land-use in the cities. Preparation of area profiles in the city, such as residential, commercial, recreational, industrial, slum area and institutional area. Studying impact of land use, economic and socio-cultural activities on the physical environment of the area.

Part B: Village Planning **60**

Preparation of plans for the identified village/s by studying the physical, socio-cultural, economic, environmental and governance aspects. Understanding how development impacts villages and the communities. Appreciating the need for balancing development with sustaining the livelihoods of rural communities and drawing plans for suggested interventions for the community. Community Engagement and Integrating Indian Knowledge System (One week field visit including community engagement).

Part C : Local Area Planning/ Area Development Planning **120**

Preparation of neighbourhood plan considering different user groups. This may involve the preparation of local area plans/ area development plans/ residential / site plans (low and high density) preferably for areas where new developments are coming up.

Students need to understand the need for a balanced development with incorporation of elements like sustainability, livelihood, environmental protection, inclusive growth and institutional engagement. In addition, emphasis will be given on planning terminologies, strengthening the planning vocabulary and technical communication skills.

Total: 225 Period

Outcomes:

- Basic knowledge and skillset to prepare the grassroot level plans
- Capability to prepare neighbourhood plans by integrating the sectoral needs
- Students' skills in area appreciation and mapping techniques

References:

1. Government of India (Ministry of Urban Development and Town and Country Planning Organisation) (2015), Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines. Vol. 1, Ministry of Urban Development, New Delhi.
2. Manitoba Intergovernmental Affairs and City of Winnipeg's Planning, Property and Development Department – Planning and Land Use Division (2002), A Guide for Developing Neighbourhood Plan.
3. Thomas Russ. R(2009), Site Planning and Design Handbook. Mcgraw Hill Publications.
4. Singh. K (2009), Rural Development Principles, Policies and Management. Sage Publications, Pvt. Ltd, New Delhi.
5. Gram Panchayat Spatial Development Plans as developed under the guidelines of MoPR, GoI

MPIS112 - Planning Theories and Concepts	Subject Category	TC
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical's	-
	Total Periods per Week	3

Objectives: To equip the students with the required knowledge of conventional and contemporary planning thought, pluralistic nature of values in the profession, planning approaches and models. Focus would be on integrating procedural and substantive elements of planning theory to current and future planning practices.

Unit I Planning Concepts **9**

Settlement systems, Classification of settlements, primate city, central place concept, concepts of complementary area, central goods and services, range, threshold etc; city-region relationship; structure of city regions, area of influence, dominance; rural-urban fringes; push and pull factors; migration; need for planning; Scalar arrangements in Planning (regional, mega, metro regions, city and local area plans).

Unit II Rational Planning Approaches and Models **9**

Systems approach to planning; Comprehensive development plan; Pluralism in planning; Strategic planning; Structure plans; Incremental planning; Equity based planning; Inclusive planning; Participatory planning – Collaborative and communicative planning; Introduction to Political economy model, New economic geography models & globalisation models.

Unit III Techniques of Plan Preparation **9**

Surveys, Techniques of conducting surveys for land use, building use, density, structural condition of buildings, heights of building, land utilization and physical features of land; Techniques of mapping – methodologies, physical surveys, land use classification, base map preparation for various levels of plans; Choice of appropriate scales for various types of plans; Data requirement for various types of plans; Planning standards and regulations – Spatial standards, performance standards and standards for utilities, URDPFI guidelines, development control regulations.

Unit IV Methods and Tools **9**

Analytical methods - linear programming, threshold analysis, simulation, rank size rule, scalogram, sociogram, cluster and factor analysis, delineation techniques, SWOT analysis; location models, gravity models.

Unit V Emerging and Future Trends **9**

Emerging school of thoughts and doctrines; Recent and contemporary contributions to the changing planning paradigms; Planning for future and in future - vision development, strategizing, Implementation of planning policies and development plans.

Total: 45 Periods

Outcomes:

- Application of relevant planning theories and concepts in urban and regional planning

References:

1. C S Bertuglia, G. Leonardi, (eds) (2018). Urban Systems: Contemporary Approaches to Modelling. Routledge, London.
2. Richard E. Klosterman, Kerry Brooks, Joshua Drucker, Edward Feser, Henry Renski (2018). Planning Support Methods: Urban and Regional Analysis and Projection. Rowman & Littlefield Publishers.
3. Wang, Xinhao & Hofe, Rainer (2007). Research Methods in Urban and Regional Planning. Springer-Verlag Berlin Heidelberg. Tsinghua University Press.
4. Philip Allmendinger (2017). Planning Theory. Macmillan Education Publications.

MPIS113 - Data Analytics and Techniques in Planning	Subject Category	TC
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical's	-
	Total Periods per Week	3

Objectives: To acquire proficiency in statistical techniques and able to conduct empirical studies employing statistical software

Unit I Data sources and surveys in Planning **9**

Types of data, data aggregation, units of measurement, standard notation; coding and decoding methods, tabulation and graphical presentation of data; Introducing web-based information portals and datasets as raw information sources; Elementary association models and decision making; Index Numbers (weighted and unweighted); Application of index number in spatial planning; Calculation techniques of vital events; Quantitative and qualitative data collection methods; Validity and reliability of data; Questionnaire design and typology; measurement scales and their applications; Sampling techniques, sample size calculations.

Unit II Introduction to Statistical Methods for planning **9**

Descriptive statistics (Frequency distribution; Measures of central tendency; Measures of dispersion); Introduction to probability; normal and standard normal distribution; Tests of hypothesis- type I & II errors, one-tailed and two tailed tests, chi-square test, student T test.

Unit III Correlation and Regression **9**

Correlation – scatter plot diagrams, correlation coefficients; Least square method; Assumptions of regression analysis, linear regression, multiple regressions; Dummy variables; Functional forms; Binary dependent variables; Instrument variables; Time series analysis;

Unit IV Spatial Data and Geographic Information Systems **9**

Definitions – Geoinformatics, Remote Sensing, Geographic Information Systems (GIS), the concept of earth surface projections; the need for GIS, Spatial Data Infrastructure; accuracy and precision, raster and vector data, spatial thematic models, Components of a GIS; spatial and attribute data- input and output; spatial data entry- data structure for GIS, vector data structures; Coordinate systems; Geodetic data - point positioning, problems, measurements, spatial analysis using lab modules, etc.

Unit V Planning Techniques **9**

Maps as a representation of reality, Elements of Maps; Graphical, linear and areal scales, Notations involving basic discipline of maps; Measurement of areas; Data creation and query; Map preparation – Geo-referencing, digitization, scales, layers, layout, topology creation, spatial data analysis - buffer, overlay and multi criteria decision modelling, Hotspot analysis.

Note: Examples from spatial planning to be applied in each unit using softwares like QGIS, ArcGIS, Geoda, Spreadsheets, SPSS, etc.

Total: 45 Periods

Outcomes:

- Proficiency in using statistical and planning techniques in urban and regional planning

References:

1. Agarwal B L (2007), Programmed Statistics. New Age International Publishers, New Delhi.
2. Alan C. Acock (2012), A Gentle Introduction to STATA. Revised Third Edition.
3. Gupta and Gupta (2012), Business Statistics. Sultan Chand and Sons, Delhi.
4. Wooldridge (2011), Introductory Econometrics: A Modern Approach. Thomson Press, Noida.
5. Gujarati, D.N. and Porter, D.C., 2009. *Basic econometrics*. McGraw-hill.
6. Sachithanandan (2004), Reading material on Planning Techniques, Institute of Town Planners India, New Delhi.

MPIS114 - Habitat and Environmental Planning	Subject Category	TC
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical's	-
	Total Periods per Week	3

Objectives:

- To give insights on global and local issues of environmental concern and introduce fundamental concepts and policies related to housing.

Unit I Components of Nature and Ecology **9**

Meaning and components of nature; Basic concepts of ecology, process of flow of material, water, energy, invasion, succession, perdition, regulatory forces, adaptation, tropic levels, food chains, food web, ecological pyramids; Ecology and their relevance to planning; Modifications in natural environment, causes and consequences.

Unit II Global & Local Concerns for Environment **9**

Evolution of human settlements; Civilizations and impact on environment; Contemporary environmental discourse; Green agenda and brown agenda; Global environmental movement; Environment and poverty; Environmental management and environmental planning; Global warming, climate change; Biological diversity; Brunt land's Commission's Report; Agenda 21; Club of Rome Report; UNEP charters.

Unit III Environmental Resources: Consumption, Conservation and Recycling **9**

Environmental resources and ecosystem services; Concepts of natural reserves; Consumption, conservation and recycling of resources; India's environmental programmes; Government of India's policies relating to forest, wildlife, hill, water resources, wastelands, hills, coastlines, oceans, etc.; local climatic zones; vulnerability analysis; Climate Smart Cities and Sustainable Framework.

Unit IV Housing and Built Environment **9**

Significance of housing in national development goals; Housing as a basic entitlement - core issues of housing, factors affecting residential location, theoretical knowledge of ecological, neo-classical, institutional approach to housing; estimating housing shortage, housing need, current methods of demand assessment, typologies of housing, housing norms; Densities and standards; Urban sprawl and environmental damages; Gender based planning of neighbourhoods and human settlements.

Unit V Housing Sectors, Acts and Policies **9**

Affordable Housing; Housing for the low-income groups – slums and squatter settlements, investment in housing in public and private sectors; Cooperative housing, objectives and principles, management and financing of housing projects; Acts, policies and programmes; Comparative policy analysis.

Total: 45 Periods

Outcomes:

- Understanding of the housing issues and environmental concerns in settlement planning

References:

1. Thomas L. Daniels (2014). The Environmental Planning Handbook for Sustainable Communities and Regions. Planners Press, American Planning Association.
2. Jetske A. Bouma, Pieter J. H. van Beukering (2015). Ecosystem Services: From Concept to Practice. Cambridge University Press.
3. Van Bortel, Gerard, Vincent Gruis, Joost Nieuwenhuijzen & Ben Pluijmers, (Ed.) (2018), Affordable Housing Governance and Finance: Innovations, partnerships and comparative perspectives. Routledge, London.
4. Nicholas Dagen Bloom, Lawrence Vale (2015). Public Housing Myths: Perception, Reality, and Social Policy. Cornell University Press.

MPIS115 - Infrastructure Planning	Subject Category	TC
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical's	-
	Total Periods per Week	3

Objectives:

- To develop skill sets pertaining to provision of physical and social infrastructure services in urban and regional planning.

Unit I Introduction to Infrastructure Planning 9

Importance of infrastructure, objectives of the utilities, services planning and implications on public health and environment; Role of physical planner in planning of utilities and services; Role of line agencies in municipal areas; jurisdiction and scope of work of line agencies; Resilient Infrastructure, Smart cities and its infrastructure.

Unit II Physical Infrastructure 9

Water and Waste Water Scheme, Layouts of distribution system; IUWM, Water and Waste water treatment methods, Low-cost sanitation methods and storm water drains; Zero discharge systems; Integrated Solid Waste Management; MSWM 2000. Environmental Policy 2006; Urban Energy Systems and Civic services. Service Level Benchmarks.

Unit III Social and Economic Infrastructure 9

Types of social infrastructure; Health care - essential service, availability, access and utilisation, standards, public and private institutions, policies, National Rural Healthcare Mission, hierarchy of health care establishments; Education - primary and secondary educational institutions, standards, policies, right to education (RTE); Public and community spaces – recreational, safety and security; Distributional services, Economic Infrastructure.

Unit IV Transportation and Land use Integration 9

Introduction to transport and travel; Understanding travel from the mobility, economic, social-psychologist, time/space perspective; Factors affecting land use-transport integration, and tools for land use and transport integration, land use transport cycle, importance of accessibility, Transportation planning process; Introduction to four stage modelling; Demand and supply of transport; Congestion pricing; Transport Pricing, Basic transport economic model; SLBs; Introduction to carbon footprint.

Unit V Formulation of DPR for Infrastructure Services 9

DPR and its importance; contents of DPR; broad sequences to DPR formulation; capabilities required to prepare a DPR; DPR evaluation, Project Cost, Institution Framework, Project Financial Structuring, Project Phasing, Project O&M planning, Project Financial Viability & Sustainability.

Total: 45 Periods

Outcome:

Knowledge and skillsets on planning for infrastructure services at urban, rural and regional level.

References:

1. Dinesh M, Omer T, Michael S, Michael J, (2009), Road safety in India: challenges and opportunities. University of Michigan, Transport Research Institute.
2. Government of India, (2010), Service level benchmarks for urban transport. Ministry of Urban Development. http://urbanindia.nic.in/programme/ut/Service_level.pdf)
3. Jaun de Dios Ortuzar, Luis G.Willumsen, Wiley, (2011), Modelling Transport (4th Edition), Routledge.
4. Jean-Paul Rorigue, Claue Comtois, Brian Slack, (2006), The geography of transport systems. Routledge.

MPIS116 - Socio-Economic Dimensions in Planning	Subject Category	TC
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical's	-
	Total Periods per Week	3

Objectives: To provide an understanding of the society and the economy of the nation and its importance in spatial planning.

Unit I Introduction to Sociology **9**

Definition and scope of sociology; Concepts-society, social systems, social structure, institution and organisation; Understanding society- theories and methods; Sociology and planning, Planning and Sociology; Man – Environment relations and traditional spatial planning practices; Need for Demographic studies.

Unit II Social Groups, Social Issues, Rural and Urban Sociology **9**

Social groups, social stratification, social exclusion and social inclusion; Agrarian, industrial and modern society and spatial formation; Linking social structure and physical structure of village and urban settlements; Sociology of formal and informal settlements in cities and towns; sustainable society and liveable neighbourhoods; making of smart homes, communities and neighbourhoods.

Unit III Demography and Planning **9**

Traditional and modern theories of population, population dynamics, Population patterns in India and the World; Distribution & structure of population, Population change causes & implications, demographic characteristics of population and their measures, population growth and development, natural growth and migration of population. Basics of population studies, source of demographic data, population structure and composition – age sex composition, sex ratio, dependency ratio, child-woman ratio; Measures of age–sex structure, age–sex pyramid. population projections, cohort analysis;

Unit IV Applied Economics **9**

Definition of economics - fundamental economic principles and concepts related to urban and regional planning; Basics of macro, meso and microeconomics, law of demand and supply- its relevance in planning; Goods, Market, factors of production; Economic concepts of land; Economic rent, land values, market mechanism and land use pattern. Employment mobility and analysis of distribution vis-a-vis place of residence; Economic base theory and techniques; economic development and growth indicators; economic growth vs development.

Unit V Socio-Economic aspects of Physical Planning **9**

Social mix and Urban neighbourhood Planning, communities and neighbourhoods, employment, housing and land use transformation; Urban rich, middle and poor and socio-spatial mobility; Children youth, women, aged and differently abled people and spatial planning; Social and economic Auditing and Social and economic Impact Assessment and urban development. Disaster, Resilience, climate change and socio-economic relevance of physical planning.
Total: 45 Periods

Outcome:

- Exposure to concepts, theory and issues relating to socio-economic aspects in urban and regional planning

References:

1. Benjamin S (2008), Occupancy Urbanism: Radicalizing Politics and Economy beyond Policy and Programs, International Journal of Urban and Regional Research, Vol. 32.3, September, 719-729.
2. Brenner N and Theodor N (2002), Cities and Geographies of "Actually Existing Neoliberalism", Antipode, Vol. 34, Issue 3, 349-379.
3. De Souza M (2010), Which Right to Which City? In Defense of Political- Strategic Clarity. Interface, Vol. 2(1), May, 315-333.
4. Jan L, Christopher M. (2012), The Urban Sociology Reader. Routledge, London.

SECOND SEMESTER

MEPM121 **Urban Environmental Planning Studio**	**Subject Category**	**SC**
	Number of Credits	**15**
	Lecture Periods per Week	**3**
	Tutorial Periods per Week	**0**
	Studio/Lab/Workshop/Practical	**12**
	Total Periods per Week	**15**

Objective:
To initiate planning skills through hands-on exercises of planning and to develop environmental planning perspective at urban/ city/ Town/Sub-City level.

Part A Introduction to Environmental Baseline Studies and Assessment 45

Detailed environmental studies to establish baseline of different components of environment at the town level, cause-effects and analysis of key environmental issues; Transformation of environmental conditions; Transformation of physical and socio-economic conditions; Relating physical growth and development aspects with changing environmental conditions; assessing the native characters and application of the indigenous knowledge systems, Review of Case studies, Plan Assessment.

Part B Development Planning for Environmental Management at a Town/Sub-City level 180

Detailed assessment of environmental status (all components) through primary and secondary surveys, Identification of Sources, Levels of Issues and Problem Analysis. Students to be taken to a live case area/town to undertake the exercise culminating in the preparation of Environmental Improvement Plan / Conservation Plan / Management Plan/ Risk Informed – Master Plan / Resilient Plan/ Environmental Regulations; Case studies/projects from towns/cities having/ located along coastline, ecologically sensitive areas, hill terrains, forest areas, deserts, delta regions, hazard-prone regions etc. to be preferred.

Note:
1) Management and implementation of proposals are to be emphasised at every level of strategisation. To bring a holistic and pragmatic dimension to the Masters course, five core underlying parameters of a) Sustainability, b) Equity, c) Efficiency, d) Harmony, and e) Safety, are to be incorporated in the instruction strategies through case studies and examples, wherever applicable.

2) There need to be focus on identifying and analysing environmental concerns in the studio exercise.

Total: 225 Periods

Outcome:
Acquiring skill-sets and knowledge that help understand and integrate environmental components and concerns into spatial planning to prepare management/ conservation/ improvement plans at urban level.

Suggested Readings:

1. Government of India (Ministry of Urban Development and Town and Country Planning Organisation) (2015), *Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines*. Vol. 1, Ministry of Urban Development, New Delhi.
2. Honachefsky W B., (2000), *Ecologically Based Municipal Land Use Planning*. Lewis Publishers, London.
3. Ministry of Urban Development (2012), *Handbook of Service Leve Benchmarks*.Govt of India. Delhi.
4. Randolf, J. (2012), *Environmental Land Use Planning & Management*. Island Press, Washighton.

MEPM122 Geomatics and Analytics in Planning	Subject Category	JC
	Number of Credits	3
	Lecture Periods per Week	1
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical	1
	Total Periods per Week	3

Objective:
Introduce the fundamental concepts of geo-informatics, the associated scientific tools, and their relevance and applicability in environmental planning.

Unit I Basic Spatial Statistics **9**

Data exploration and spatial statistics for urban areas, evaluation, description and representation of spatial data quality, effect of inaccuracy on spatial data analysis. effect of data aggregation and disaggregation, MAUP (Modifiable Areal Unit Problem), Integration of spatial data of different quality Map matching. 3D volumetric analysis and modelling; Condition assessment of specific areas, Quantitative measurement of landscape surfaces; Vulnerability mapping and Monitoring.

Unit II Advance statistics **9**

Point pattern analysis: Point Sets and Distance Statistics, Nearest neighbour methods Hotspot and cluster analysis; Spatial autocorrelation and Spatial regression for urban phenomena; multi-criteria decision-making tools, land suitability analysis, Factor analysis; Cluster analysis.

Unit III Raster and Vector Data Processing **9**

Data Sources; Raster Calculation; Indices (NDVI, NDBI, NDWI, LST etc.); Supervised and Un-supervised Image Classification; Proximity Analysis; Interpolation; Density analysis; Terrain Analysis; slope and aspect calculation, hill Shade analysis, view shed Analysis.

Unit IV Application of GIS in Natural Resource Management **9**

Resource Assessment; Land use Land Cover Change Detection; Wetland mapping; Agricultural Resource development mapping; Mapping of forest; Forest and wild life habitat Assessment; Mapping Surface Hydrology; Energy Resource Management; Risk and Hazard Mapping and modelling (landslide, floods, Cyclones Forest fire and drought).

Unit V Applications of GIS in Urban Areas **9**

Multi-criteria decision-making using Land Suitability, Urban Growth Model, Multi-Hazard Mapping. Geographically weighted regression.

Total: 45 Periods

Outcome:

- Knowledge and skill set on application of geo-spatial techniques and related software in environmental planning.

Suggested Readings:

1. David J. M, Micheal F G and David W R (1991), (Eds.), *Geographical Information Systems – Principles and Applications. Volume I & II.* John Wiley Sons. Inc., New York.
2. Lilles and Keifer (2004), *Remote Sensing and Image Interpretation*. John Wiley and Sons, New York.
3. Singh R.B. (1992), *Environmental Monitoring: Applications of Remote Sensing and GIS*. Geocartho International Centre, Hong Kong.
4. William K.P. (2001), *Digital Image Processing*. John Wiley & Sons, New York.
5. Anil K.Jamwal (2008), Remote Sensing and GIS, JnanadaPrakashan, Delhi.
6. Cambell, J.B. (2002), Introduction to Remote Sensing, Taylor & Francis, London.
7. Jan Van Sickle (2010), Basic GIS Coordinates, Second Edition, CRC Press; 2 Edition, NY.
8. Richards, J.A. and Xia, X. (2006), Remote Sensing Digital Image Analysis: An Introduction, Birkhauser, London.

MEPM123 Environmental Monitoring & Assessment Tools	Subject Category	JC
	Number of Credits	3
	Lecture Periods per Week	1
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical	1
	Total Periods per Week	3

Objective:

Familiarisation of relevant instruments/equipment and procedures related to checking of quality of air, water and soil.

Unit I Water Quality: Physical Parameters 9

Determination of Physical Parameters of Water: Understanding of relevant instruments/equipment and procedures for determination of; Colour, Temperature, Turbidity, Odour, pH, Acidity, Alkalinity, Electrical Conductivity (E.C), Total Solids (TS), Total Dissolved Solids (TDS), Total Hardness.

Unit II Water Quality: Chemical and Biological Parameters 9

Determination of Biological parameters; Dissolved Oxygen (D.O), Biological Oxygen Demand (BOD), and Chemical Oxygen Demand (COD); Determination of Chemical Parameters Nitrates, Phosphates, Sulphates, Chlorides, Fluorides, Potassium and Sodium; Heavy metals) such as Lead, Copper, Nickel, Iron, Chromium etc.

Unit III Soil Quality and Weather Parameters 9

Soil quality - pH, EC, soil moisture, Phosphate, Potassium, Sodium, etc.
Weather - temperature, relative humidity, rainfall, wind direction and speed, etc.

Unit IV Air Quality and Noise Quality 9

Airshed Mapping, Measuring Air Quality Parameters (CO2, CO, TSPM, RSPM, SO2, NOX) Air Quality Index, Air Pollution Modelling: Point Source, Line Source, Area Source; Noise standards and limit values, Noise Instrumentation and Mapping

Unit V Environment Modelling 9

Identifying Problem Statement at select scale, Modelling Prerequisites, Model Domain Setting, Instrument Placement, Scenario Building, Simulation Parameters and conditions, Evaluation and Interpretation - The course may prefer to select a particular sector/issue or topic within the fields of environmental planning and conduct limited research on the same. The outcome shall be a short research paper (about 10 pages) or a presentation

Note:
The modelling may be carried out at local scale like Bus Terminals, Highway Stretches, Parks and Open Spaces etc

Total: 45 Periods

Outcome:

- Knowledge and skill-set on understanding available environmental quality standards and their relevance and usage in spatial planning.

Suggested Readings:

1. Boubel, R.W. (2005), Fox, D.L., Turner, D.B., Stern, A.C., "Fundamentals of Air Pollution", Academic Press.
2. C. S. Rao (2000) "Environmental Pollution Control Engineering", Wiley Eastern Limited.
3. S.M. Khopkar, Environmental Pollution Analysis, New Age International Publications.
4. Trivedi P. R. (2012), *Environmental Pollution and Control.* APH Publishing Corporation, N Delhi.

MEPM124 -Theory of Environmental Planning and Design	Subject Category	TC
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical	0
	Total Periods per Week	3

Objective:
To introduce detailed understanding of theories relating to environmental planning approaches and paradigms.

Unit I Historical Approach to Environmental Concerns 9
Development of habitat patterns and dependence on natural resources; Earliest forms of environmental concerns; Evolution of environmentalism; Characteristics and differences of urban environment and rural environment.

Unit II Growth of Environmentalism 9
Club of Rome report; Tragedy of Freedom of Commons; Environmental determinism concepts; Industrial Ecology concepts; Ecological modernisation concepts, ecology concepts: environmental lessons from the developed economies; Bruntland Report, Green and Brown Agenda environmental problems; NIMBY concepts, Ecosystem Approach.

Unit III Land Capability and Resource Depletion Analysis 9
Land as a threat and resource; Land capability analysis within the ecological context; Multi criteria decision analysis for planned transformation of land; Exploitation, causative factors for environmental and land degradation; Planning for various geographies - Hill area Planning; Planning for coastal areas; planning for islands; planning in deltaic zones; Eco-sensitive area planning etc.

Unit IV Environmental Management 9
Role of economic deterioration vis-à-vis environmental degradation; Watershed Planning and Management; Ground Water Management; Forest Resource Management; Biodiversity Conservation and Management; Managing environmental concerns through industrial and scientific innovation, traditional and indigenous coping techniques to environmental hazards; Ecological planning tools and techniques.

Unit V Design as a Determinant of Ensuring Environmental quality 9
Evolution of Environmental design for urban and regional context; Crime Prevention through environmental design; Rising material consumption; Zoning of environmentally sensitive areas; Design with nature; Energy efficiency in urban planning; climate-sensitive urban planning - components of Urban climatology, urban heat island and district cooling systems.

Total: 45 Periods

Outcome:
- Knowledge on theories relating to environmental planning approaches and paradigms.

Suggested Readings:

1. Honachefsky W B. (2000), Ecologically Based Municipal Land Use Planning. Lewis Publishers, London.
2. Lien, J. K. (2003), *Integrated Environmental Planning*. Blackwell Publishing. Oxford.
3. Ndubisi, F. (2012), *Ecological Planning*. John Hopkins University Press, Maryland.
4. Randolf, J. (2012), *Environmental Land Use Planning & Management*. Island Press, Washighton.

MEPM125 -Environmental Economics	Subject Category	TC
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical	0
	Total Periods per Week	3

Objective:
To introduce a theoretical base for applying economic concepts to environmental issues.

Unit I Natural Resource and Economics 9

The Economies of resources - natural, renewable and non-renewable, man-made resources; Methods of valuation and quantification; Introduction to Revealed Preference Methods and Stated Preference Methods.

Unit II Values and Assessment of Ecosystem Services 9

Determining environmental values and ethics – User based perspectives; Quotas; Myopic optimal values; Principle of optimal control, Arriving at threshold values of consumption; Hedonic Pricing, Damage Cost, Travel Cost, Averting Behaviour Methods; Contingent Valuation, Contingent Behaviour Methods.

Unit III Pricing Mechanisms – Exhaustible Resources 9

Consumption patterns and its relation; non-renewable resource as a component of GDP, fiscal deficit and PPP; Deriving rents from exhaustible resources, pricing of exhaustible resource; Role of subsidy in non-renewable resources; Non-renewable resource problem: Steady states, conditions, Euler's equation, maximization problems.

Unit IV Pricing Mechanisms – Renewable Resources 9

Renewable resources: principles, theory, estimation, valuation; Case material discussion; Trends in prices and stock depletion.

Unit V Economies of Wastes and Energy 9

Waste as resource; waste as tool for revenue; Circular Economy; Waste to energy; energy needs and its implication to economic development.

Total: 45 Periods

Outcome:

- Knowledge on the theoretical base for applying natural resource economics concepts, including pricing mechanisms, to environmental concerns in the planning perspective.

Suggested Readings:

1. Meadows D H, Randers J., Meadows D L.; (2012), *The Limits to Growth. The 30-year update.* Chelsea Green Publishing, Vermont.
2. Perman R, Ma Y, (2011), *Natural Resource and Environmental Economics.* Addison Wesley, New York.
3. Schumacher E F. (1999), *Small Is Beautiful: A Study of Economics As If People Mattered.* Blond and Briggs, New York.
4. White B., Hanley N, (2013), *Introduction to Environmental Economics.* OUP, Oxford.

MEPM1210-Elective 1: Ecological Footprint and Carrying Capacity	Subject Category	OE
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical	0
	Total Periods per Week	3

Objective:
Detailed understanding of Ecological footprint analysis as a contemporary tool related to carrying capacity.

Unit I Ecology in Planning 9

Definitions, types and principles of ecology and footprints, importance of urban and human ecology; Ecological theories and practices, principles and values towards planning and development

Unit II Carrying Capacity and Limits to Growth 9

Population ecology, carrying capacity and human population, understanding limits to growth; Consumption and its dimensions – food, energy, non-biodegradable items, travel, concept of ecological footprint – a land-based understanding of carrying capacity.

Unit III Ecosystems and footprints 9

Species evolution and interaction, implications of human intervention in ecological niche; biodiversity and its significance, valuation of biodiversity; Ecological impacts within evolving eco-systems; Delta and wetland ecosystems; arid and semi-arid ecosystems; Forest conservation in Asia and Africa.

Unit IV Footprint vis-a-vis Bio-capacity of Region and Settlement 9

Land equivalent of consumption; Energy-Land relation to assess footprints; Cropland footprint, grazing footprint, forest footprint, fishing ground footprint; Urbanisation in the context of footprints; Bio-capacity calculations for a region and its resource base; Assumption factors in bio-capacity, Regional Environmental Carrying Capacity.

Unit V Methods and Applications 9

Consumption land use matrix method for footprint calculations of settlements; Calculating individual footprints; Regional analysis in footprints; National Aggregated footprints; Income – trade – footprint relations; Footprints analysis as tool for sustainability studies, Undertaking case studies – Carrying capacity studies in urban and regional planning.

Total: 45 Periods

Outcome:
- Knowledge and application of the tool of Ecological footprint analysis.

Suggested Readings:

1) Collins A. (2015), *The Ecological Footprint: New Developments in Policy and Practice.* Elgar Publishing. Cardiff.
2) Global Footprint Network (2012), *Living Planet Report 2012: Biodiversity, Biocapacity and Better choices.* WWF International Press. California.
3) Meadows D H, Randers J., Meadows D L. (2012), *The Limits to Growth. The 30 year update.* Chelsea Green Publishing, Vermont.
4) Wackernagel, M. and W. Rees. (1996), *Our Ecological Footprint: Reducing Human Impact on the Earth.* New Society Publishers.

MEPM1211 Elective 2: Water-centric Planning & Management	Subject Category	OE
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical	0
	Total Periods per Week	3

Objective:
To impart detailed understanding of water resource, its planning and management at various spatial scale.

Unit I: Introduction 9

Water as a resource, Natural water cycle, Urban water cycle; Challenges in urban and regional planning; Historical Context and Evolution of Water management approaches including traditional/indigenous knowledge and practices, linkages with SDGs; Key concepts and casual relationships - water scarcity, water stress, water crisis, drought; watershed delineation; Best Practices in Water Management, Urban River Management Plan, Case Studies

Unit II: Water Resource Augmentation 9

Concepts of Water Security, Non-Revenue Water, Methods for assessing water availability, quality, and demand, water audit, impacts of climate change on water resources; examining hydrological data and hydro-geological analysis, Water footprint/budget at various spatial scale and its quantification techniques.

Unit III: Assessment Tools and Techniques 9

Introduction to various analytical, modelling and simulation techniques in hydrology and water quality assessment for spatial planning (Eg. The Soil & Water Assessment Tool, Water Quality Analysis Simulation Program, SCS-CN Method etc), flood assessment, simulation techniques and risk mapping, Sensitivity analysis, participatory approaches in water planning and management.

Unit IV: Integrated Water Resource Management 9

Flood/ Water stagnation risk management, Principles of integrated water resources management (IWRM), Enhancing resilience of water systems: green infrastructure, ecosystem-based approaches, Sustainable Urban Drainage systems, Nature Based Solutions; Case studies; Economic considerations in WRM

Unit V: Application of IWRM 9

Monitoring programs for long-term water management, National Water Policy 2012 and schemes, CHPEEO Guidelines for water supply and storm water systems, Preparation of detailed project report of water centric spatial plans at select scale

Total: 45 Periods

Outcome:
Advanced knowledge on water and wastewater treatment process in environmental planning process.

Suggested Readings:

1. Garg, S.K., (2005), *Environmental Engineering*. Vol.1 Khanna Publishers, New Delhi.
2. Modi, P.N., (2005), *Water Supply Engineering*. Vol. I Standard Book House, New Delhi.
3. Punmia, B.C., A K Jain and A K Jain,. (2005), *Water Supply Engineering*. LaxmiPublications (P) Ltd., New Delhi.
4. Ramesh G and Nagavdevara V P (2010), *Urban Infrastructure and Governance*.Routlege India, Delhi.

MEPM1212 Elective 3: Planning for Healthy Cities	Subject Category	OE
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical	0
	Total Periods per Week	3

Objective:
To introduce and implement the concept of health promotion in urban settlements through urban planning tools and methods.

Unit I Basic Concepts and Terminology of Urban Health 9

Meaning of health, disability, wellbeing, and quality of life in the context of urbanization; Concepts of disease ecology, environmental and public health, health equity, diffusion of diseases in urban system.

Unit II Conceptual and Theoretical Basis for Healthy Cities 9

Public health in new era; health, environment and sustainable development; WHO Healthy Cities – concept and principles of planning for healthy cities; Built environment as a determinant of health; Global climate change and health impacts on cities, SDG and Health.

Unit III Urban Planning to Improve Health and Well-being 9

Understanding Health data for planning, non-segregated land use allocation and its implication on health; Urban green areas and their role; Creating environmentally sound urban corridors; Implications of urban wastes and municipal health; health impact assessment of development projects.

Unit IV Integrated Health Based Planning 9

Morbidity and mortality indicators; Integration of health elements with land uses; steps to promote healthy cities: identification of major health issues and health inequities, explore proximate and distal causes.

Unit V Urban HEART as Tool to Plan Intervention 9

Introduction to Urban Health Equity and Assessment and Response Tool (Urban HEART); Principles and pillars of Urban HEART; Social and economic determinants of health; social gradient in health; Tools and mapping of health inequities in urban areas.

Total: 45 Periods

Outcome:

- Understanding of implementation of concept of healthy cities for a sustainable future.

Suggested Readings:

1. Barton H. (2005), *A Health Map For Urban Planners: Towards A Conceptual Model For Healthy Sustainable Settlements*. Built Environment, Vol. 31:339-355.

2. Barton H., Claire M. and Catherine T. (2009), *Healthy Urban Planning in European cities*. Health Promotion International, Vol 24 (Suppl 1) : 91-99.
3. Barton H., Claire M. and Catherine T. (Eds.) (2003), *Healthy Urban Planning in Practice Experience of European Cities. Report of the WHO City Action Group on Healthy Urban Planning*. WHO Regional Office for Europe, Copenhagen.
4. WHO, Centre for Health Development (2008), *Our cities, Our health, Our future*. Report to the WHO Commission on Social Determinants of Health. NY.

MEPM1213 – Planning for Resilient Infrastructure	**Subject Category**	**PE**
	Number of Credits	**3**
	Lecture Periods per Week	**2**
	Tutorial Periods per Week	**1**
	Studio/Lab/Workshop/Practical	**0**
	Total Periods per Week	**3**

Objective:
To inculcate advanced knowledge on building resilience for infrastructure systems at various scales

To be Developed

THIRD SEMESTER

MEPM211 Regional Environmental Planning Studio	**Subject Category**	**SC**
	Number of Credits	**15**
	Lecture Periods per Week	**3**
	Tutorial Periods per Week	**0**
	Studio/Lab/Workshop/Practical	**12**
	Total Periods per Week	**15**

Objective:
To be able to apply environmental planning techniques for detailed environmental impact assessment at a regional scale.

Literature and Documentary Review on the selected themes **15**

Part A Natural Resource Baseline Studies and Regional Assessment **30**

Detailed environmental studies to establish baseline of different components of environment at the regional level; Identification of key environmental issues at the regional level and their interrelations.

Part B Environmental Assessment towards Integrated Environmental Development Plan at a District / Regional level **180**

Detailed Assessment of Environmental Status (all components) through primary and secondary surveys, identification of sources, levels of issues and problem analysis. Students to be taken to live case area/ region/ district to undertake the exercise culminating in the preparation of Integrated Environmental Development plan at a district / regional level / special investment regions/ DFC/ Industrial Development Corridors/ Coastal Regions/ environmental regulations at a district or regional level OR development of conservation plan

Note:
1) Management and implementation of proposals are to be emphasised at every level of strategisation. To bring an holistic and pragmatic dimension to the Masters course, five core underlying parameters of a) Sustainability, b) Equity, c) Efficiency, d) Harmony, and e) Safety, are to be incorporated in the instruction strategies through case studies and examples, wherever applicable.
2) Focus is to be on identifying and analysing environmental concerns in the studio exercise.

Total: 225 Periods

Outcome:
Acquiring knowledge and skill-sets on baseline studies, detailed analysis, projections etc. of environmental components and other development sectoral components at regional level to prepare management plans.

Suggested Readings:

1. Daniels T (2012): *Environmental Planning Handbook: For Sustainable Communities and Region.* APA Planners Press. NY.
2. Government of India (Ministry of Urban Development and Town and Country Planning Organisation) (2015), *Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines*. Vol. 1, Ministry of Urban Development, New Delhi.
3. Ministry of Urban Development (2012): *Handbook of Service Leve Benchmarks.*Govt of India. Delhi.
4. Padt (2007): *Green Planning: An Institutional Analysis of Regional Environmental Planning in the Netherlands.* Taylor & Francis, NY.

MPIS212 Research Methods	Subject Category	JC
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical	0
	Total Periods per Week	3

Objective:
To initiate the planning thesis by enabling students to identify a topic and then develop a proposal and methodology in detail besides providing them with the required theoretical inputs on the syllabus contents.

Unit I Introducing Research 9

What is research? Types of research, basics of academic and applied research; Different approaches to research; Research philosophies – positivist and phenomenological philosophies. Introduction to elements of research: epistemology, theoretical perspective, methods, methodology; Justification of choice and use of methods and methodology; Paradigms in research.

Unit II Developing Thesis 9

Research methodology: Quantitative – surveys, experimental, longitudinal, cross-sectional studies; Qualitative – case studies, action research, ethnography, participative enquiry, grounded theory. Content development - Developing contextual background; Research design; Identification of research problem; Research questions; Formulation of hypothesis; Writing aims, objectives, scope and limitations; Review of relevant literature; Identification of suitable research methods/ techniques/ instruments; Data collection – questionnaires, sampling techniques, observation, interviews; Analysis - qualitative and quantitative analysis, data synthesis; Research outcome – research findings

Unit III Research Ethics 9

Prior permission and intimation, conduct of interview, asking right question, confidentiality, elimination of bias and suspicion; Roles and social responsibilities of the researcher; Time management in research.

Unit IV Field Work Plan 9

Survey format preparation, study area identification and map preparation; Work plan schedule.

Unit V Research Communication 9

Research vocabulary, Reading – notes taking, material organisation, indexing; Technical writing – content synthesising, paraphrasing, citation and referencing; Academic writing – research proposal / synopsis, abstract writing, report writing and mapping; Presentation: effective oral communication – content structuring, voice modulation, body language, audio-visual aids, hand-outs.

Total: 45 Periods

Outcomes:

1. Basic knowledge on research methods and techniques.
2. Capability to formulate research design and proposal.

References:

1. Crotty M. (2012), Introduction: The Research Process, the Foundations of Social Research, Meaning and Perspective in the Research Process. Sage Publications, New Delhi.
2. Frankfort, Nachmias, C., &Nachmias, D. (2008), Research Methods in the Social Sciences. Worth, New York.
3. Keith F. Punch (2013), Introduction to Social Research: Qualitative and Quantitative Approaches. Sage Publications, London
4. Neville, Colin (2007), An Introduction to Research and Research Methods. Effective Learning Services, School of Management, University of Bradford, United Kingdom

MEPM213 Environmental Impact Assessment Techniques	Subject Category	TC
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical	0
	Total Periods per Week	3

Objective:
To introduce a theoretical base for application of environmental impact assessment in development planning.

Unit I Role of EIA in the planning and decision-making process 9

Need for EIA; approaches to EIA and its relation with planning practise; EIA: Origin and Development; EIA in Indian context; Legislative context of EIA in India– EIA Notifications and amendments; SEA and Land use Planning.

Unit II Overview of Processes for Impact Studies 9

Conceptual Approach; Proposal, Study Formulation, Responsibilities assignment; Overview of key steps and procedures; Screening of Projects for EIA in Indian context; Process Flow of EIA; Guidelines and Terms of Reference for EIA.

Unit III EIA Methods 9

Categories of EIA Methodologies; Check List Methods - Quantitative Checklists, Multi Attribute checklists, Matrixes Methods - Leopold Matrix, Magnitude Matrix, Weighted Matrix; Network Methods – Causal Diagrams for Impact Predictions.

Unit IV Impact Prediction and Mitigation Methods 9

Determination of Environmental Impact; Importance and Determination of Weightages; Measurement of Impacts: Impact Prediction and Evaluation – CBA, Planning Balance Sheets; Impact Mitigation case studies and best practices; Comparison of Alternatives; Evaluating non-technical summaries; critical evaluation and appraisal of EIA reports; case studies.

Unit V Concept of Social Impact Assessments 9

Types of Socio-economic Impacts; Basic Steps in carrying out socio-economic impact assessment; Environmental Settings Description; Analysis of Public Services and Facilities; Impacts of Economic Profile of Community; Prediction and Changes in Socio-economic Factors; Case studies.

Note: Identifying and analysing environmental concerns in the concurrent studio exercise of may be taken up for detailing.

Total: 45 Periods

Outcome:

- Knowledge on EIA and SIA and its application in spatial planning.

Suggested Readings:

1) Richard K. M. (2002), *Environmental impact assessment, a methodological perspective*. Kluver Academic Publishers, Boston.
2) Morris P. and Therivel R. (2010), *Methods of EIA – 3rd Edition*.Routledge, London.
3) Ministry of Environment and Forests (2010), Environment (Protection) Rules, 1986 – Amendment – National Environmental Policy"
4) Ministry of Environment and Forests (2012),*Terms Of Reference [ToR] For EIA Report*.Govt. of India, Delhi.

MEPM214 Project Planning & Management	Subject Category	TC
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical	0
	Total Periods per Week	3

Objective:
To introduce aspects of project planning, management, implementation and appraisal.

Unit I Introduction to Project Planning 9

Introduction to Projects, Project Classification, Nature of planning projects, Project life cycle, Methodology for project identification and formulation; Preliminary screening, Project Rating, Detailed project report, and feasibility studies

Unit II Project Formulation and Appraisal 9

Projects and planning issues including sectoral policy at local, State, and National levels; Project appraisal: technical, financial, social, economic, environmental, Approaches of appraisal - World Bank and Asian Development Bank methods, institutional approaches, SCBA, UNIDO etc.

Unit III Project Management 9

Project characteristics; techniques of management, Importance of project management; PERT & CPM; new techniques of management by objective (MBO).

Unit IV Pre-implementation Planning Phase 9

Work-Break Down Structure; Network Analysis; CPM, PERT; Resource Levelling and Allocation; Time-Cost Trade Off Aspects. Hands on exercise using Project Management Software like MS Project, Primavera, etc.

Unit V Project Implementation, Monitoring and Evaluation 9

Project implementation, stages of implementation; actors in projects implementation; project monitoring; meaning objectives and significance; monitoring techniques; integrated reporting, milestones, time and cost over-run and under runs, unit index techniques; project evaluation; Techniques of project evaluation; Case studies in urban and regional planning projects.

Total: 45 Periods

Outcome:

- Capability to formulate, appraise and manage the projects related to spatial planning

Suggested Readings:

1. Albert Lester (2007), *Project Management, Planning and Control*, Butterworth Heinemann publishing house, United Kingdom.
2. Harold R. Kerzner (2013), *Project Management: A Systems Approach to Planning, Scheduling, and Controlling*, John Wiley & Sons, New Delhi.
3. Jose Maria Delos Santos (2013), *Project Management Absolute Beginner's Guide – A Book Review*, QUE Publishing house, New Jersey.
4. Ramakrishna K (2010), *Essentials of Project Management,* PHI Publishing house, New Delhi.

MEPM215 Energy Studies in Planning	Subject Category	TC
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical	0
	Total Periods per Week	3

Objective:
To introduce the fundamental concepts of quantification-based assessment of energy consumption.

Unit I Principles of Energy: Sources and Consumption 9

Energy Demand and Supply; sources of energy and typology of energy available at source; Quantification of Resource Consumption and patterns of consumption; Relating energy consumption patterns with sectors – residential, commercial, transport, etc.

Unit II Cluster & Group Based Energy Use 9

Energy efficiency and ISO; Introduction to ISO; ISO-14000 and its Planning Implications; Case Study of an ISO certified industry, Environmental and Financial Benefits of ISO; Cluster Based Environment Management approach & Group Environmental Management System.

Unit III Monetary valuation techniques 9

Monetary valuation techniques – Cost Benefit Analysis, Natural Resource Accounting, Pricing, Non-use Value, Techniques of monetary evaluation/ valuation methodologies; Energy Audit; Conservation Issues.

Unit IV CDM and Carbon Credit 9

Concepts of cleaner development mechanism; Life cycle analysis; Carbon trading / GHG emissions.

Unit V Integrating Energy Efficiency in Planning 9

Energy vis-a-vis concept of smart cities; Solar city mission in India; Renewable energy concept and its application in planning; Green cities and its energy implication, energy footprint, Carbon neutrality, Net-Zero Pathways.

Total: 45 Periods

Outcome:

- Understanding energy consumption, assessment, accounting and auditing for promoting efficient energy use.

Suggested Readings:

1. Ercoskun O Y (2012): *Green and Ecological Technologies for Urban Planning: Creating Smart Cities.* IGI Global.
2. Khalil H and Khalil E. (2015): *Energy Efficiency in the Urban Environment.* Taylor & Francis, London.
3. Sheperd W and Shepard D (2014): *Energy Studies.* Imperial College Press, London.
4. UN Habitat & ICLEI (2009): Sustainable Urban Energy Planning. A handbook for cities and towns in developing countries. UN Press, NY.

MEPM2110 Elective 1: Human Settlements and Climate Change	Subject Category	OE
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical	0
	Total Periods per Week	3

Objective:
To study human settlements in climate change perspective and understand strategies for adaptation and spatial planning tools for mitigation of GHG emissions.

Unit I Introduction to Climate Change 9

Concern, Climate science, evidences of climate change, human settlements as a major source of emissions, Impacts of climate change, emission paths, strategies, location of settlements, socio-economic characteristics, cultural practices and governance structure, suitable interventions.

Unit II Climate Risk and Vulnerability in the City 9

Hazard and Vulnerability mapping, Risk assessment, Impacts on settlements due to flooding, cyclones and landslides, Critical infrastructure; Urban governance and participation.

Unit III Urban GHG Emissions 9

Emission pathways, Sectoral emission – residential, industrial, transport, waste disposal, reducing emissions and urban carbon footprints, carbon trading and other alternatives.

Unit IV Climate Change Mitigation and Low-Carbon Cities 9

Climate governance and Climate Finance; Energy efficient approaches and transportation systems for the future; land-use planning and compact cities, future and smart cities in the light of climate change; reducing the urban heat islands, protecting urban water systems from climate change risks.

Unit V Adaptation – Towards Climate Resilient Cities 9

Climate change adaptation – migration as adaptation, climate change experiments and alternatives, Climate change, Vulnerable Regions and Groups – Tropics, farmers, gender, children, poor and migrants, Climate Risk Assessment Frameworks.

Total: 45 Periods

Outcome:

- Estimating urban GHG emissions, risk assessment, vulnerability and adaptation to climate change

Suggested Readings:

1. Betsill M (2005): *Cities and Climate Change*. Routledge, London.
2. Harriet Bulkeley (2013): Cities and Climate Change. (Routledge Critical Introductions to Urbanism and the City), Routledge, New York.
3. Rosenzwieg C. (2011): *Climate Change and Cities: First Assessment Report of the Urban Climate Change Research Network*. Cambridge University Press, Cambridge.
4. Zimmermann O (2011): *Resilient Cities. Cities and Adaptation to Climate Change - Proceedings of the Global Forum 2010*. Springer.
5. Lehmann S (2015), Low Carbon Cities- Transforming Urban Systems, Routledge Publications, New York.
6. Nikolas Bader and Raimund Bleischwitz (2009) Measuring Urban Greenhouse Gas Emissions: The Challenge of Comparability, Cities and Climate Change, Vol. 2 (3).
7. P.Neeraj et al (2008), Climate Resilient Cities: A Primer on Reducing Vulnerabilities to Disasters, World Bank Publications.

MEPM2111 Elective 2: Integrated Waste Management	Subject Category	PE
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical	0
	Total Periods per Week	3

Objective:
To study wastes as a by-product of urbanisation, with particular emphasis of hazardous wastes, its treatment and legislative implications.

Unit I Wastes, Hazardous Wastes and its Types 9

Typology of wastes – municipal wastes, domestic wastes, industrial wastes, bio-medical wastes – dry and wet wastes, organic and inorganic wastes; characteristics of wastes; generation of wastes - sources and composition, standards and rates off generation; collection, transportation and disposal of wastes; municipal waste management rules.

Unit II Industrial Waste and Related Legislative Frameworks 9

Industrial wastes as sources of pollution for water, air and soil; legislations related to industrial pollution; categorisation of industries as per pollution; industrial consumption of energy and its relation to waste generation; disposal standards in industries; legislative procedures of waste management in industries, industrial estates and corridors.

Unit III Bio-Medical Wastes and related Legislative Frameworks 9

Categorisation of bio-medical wastes, process of transport, treatment and disposal of medical wastes, generation standards as per beds; Existing rules related to disposal of bio-medical wastes.

Unit IV Liquid Waste Management 9

Waste water generation and characterisation, collection, treatment systems in urban and rural areas, Criteria for selection of Technology, On-site Waste water treatment systems, Decentralised Waste water treatment systems, Technological options for composting of Organic wastes, Types of Drain, Components of Sewer System, Technology for Waste Water Treatment.

Unit V Integrated Waste Management Plan 9

Different methods of waste treatment; Refuse, Reduce, Reuse, Recycle – comparative analysis; Requirements of land, expertise, energy and costs related to different treatment methods, City sanitation plans in India; Service level benchmarks in waste management; Waste to energy as a concept – advantages and disadvantages; Waste to Wealth - earning from wastes; Circular Economy, Governance models in waste management. Case Studies on Integrated Waste Management Plans.

Total: 45 Periods

Outcome:

- Specialised knowledge on waste management, and how to incorporate this into spatial planning.

Suggested Readings:

1. Bhatt M S. and Illiyan A. (2012). *Solid Waste Management: An Indian Perspective.* Synergy Books India. Delhi
2. Kreith F. and George T. (2002). Handbook of Solid Waste Management. McGrawHill Publishers. New York.
3. Micheal D L. Philip B. (2010) Hazardous Waste Management. Waveland Press. London.
4. Vaughn J. (2009). *Waste Management: A Reference Handbook. Contemporary world issues.* ABC Press, New York.

MEPM2112 **Elective 3: Environmental Data Analytics**	**Subject Category**	**PE**
	Number of Credits	**3**
	Lecture Periods per Week	**2**
	Tutorial Periods per Week	**1**
	Studio/Lab/Workshop/Practical	**0**
	Total Periods per Week	**3**

Objective:
To impart advanced knowledge and skillsets related to the data analysis for various environmental projects.

FOURTH SEMESTER

MEPM221 Environmental Planning Thesis	**Subject Category**	**SC**
	Number of Credits	**24**
	Lecture Periods per Week	**2**
	Tutorial Periods per Week	**0**
	Studio/Lab/Workshop/Practical	**22**
	Total Periods per Week	**24**

Objective:
To enable the students to undertake original and independent study / research in the form of terminal thesis / project on a topic of their choice approved in the previous semester.

Each student of the M. Planning (Environmental Planning and Management) course is required to undertake a terminal project on a subject related environmental planning concern with respect to urban, rural, or regional development as approved by the Department in the third semester in the course Research Methods (MPIS 212).
The terminal project will provide an opportunity to the student to synthesise the knowledge and skills acquired through the learning of various theories and practices during the course and apply it for strategy formulation for a live planning challenge.
The terminal project shall be monitored continuously and periodically through internal marked reviews to check the consistency of work, the relevance of the analysis with respect to the data collected and project scope, and the progress towards logical proposals. The final output shall be firstly in the form of an extended abstract, which once approved by the department will be followed by the submission of a detailed report and drawing/visuals for external jury members, in a given format. The terminal project shall also be presented orally in external jury by each student in the form of visuals / drawings as necessary for each topic. Each stage shall be evaluated by a panel. These stages may broadly be outlined as:

Unit I Thesis Proposal
Unit II Development of Suitable Methodology / Framework
Unit III Literature Search and Review
Unit IV Data Collection, Analysis and Synthesis
Unit V Findings / Proposals

Total: 225 Periods

Outcome:
The final output shall be in the form of a draft report, which once approved by the department will be followed by the submission of a detailed report and drawing/visuals for external jury members, in a given format. The thesis shall also be presented orally in external jury by each student in the form of visuals / drawings as necessary for each topic.

Suggested Readings:

1. Elizabeth A. Wentz (2013), *How to Design, Write, and Present a Successful Dissertation Proposal*, Sage Publications.
2. John Biggam (2015), *Succeeding with Your Master's Dissertation: A Step-By-Step Handbook*, Open University Press, McGraw Hill Education, UK.
3. Murray, Rowena (2011), *How To Write A Thesis*, Open University Press, McGraw Hill Education, UK.
4. Tayie, Sami (2005), *Research Methods and Writing Research Proposals*, Pathways to Higher Education, Cairo.

MEPM222 Environmental Justice and Professional Practise	Subject Category	TC
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical	0
	Total Periods per Week	3

Objective:

To make the students aware of the different aspects of the environmental problems and their relationship to culture and to raise important issues related to ethics, justice and politics in environmentalism.

Unit I Cultural Landscapes 9

Cultural landscapes; ideas of Carl Sauer, elements of cultural landscape; people, nature, values, places; World Heritage cultural landscapes – clearly defined, organically evolved and associative cultural landscapes; Cultural values and urban planning.

Unit II Ethics and Environmentalism 9

Dispersal of causes and effects of the current environmental problems; social implications of ecologically sensitive land transformation; issues of spatial equity -differential consumption patterns around the globe; inter-generational equity; ethical questions in the environmental debate and the idea of the moral storm; environmental movements in India – networks; organised action, civil societies and citizens as environmental actors; SIA in India.

Unit III Climate Justice 9

Climate change Protocols and Conventions; National action plan for climate change (MoEF) and other related initiatives; the idea of climate justice; environmental rights, positive and negative rights; survival and luxury emission rights, international law and climate justice; the role of international organisations in ensuring climate justice; Adaptation, new technologies with examples.

Unit IV Society and Nature: Social construction of global climate change 9

Ecosystem services; social systems in relation to environmental systems; environmental determinism and cultural determinism; capitalism, consumerism and society and its impacts on the environment; Urban sprawl and climate change; Transport and Environment; Tourism and Environment; international case studies on social and environmental systems; Ecological responsibility; Smart urban systems.

Unit V Professional Practice in Environmental Projects 9

Terms of references (ToRs) – development, significance and adherence; detailed feasibility reports as per ToRs; compliance reports; inception reports; closure documents in context of ToRs; Scale of professional fees and charges; preparation of consultancy proposals; Agreements and contracts; Organising and establishing office; Performance appraisal etc.

Total: 45 Periods

Outcome:

- Inculcate awareness, concepts of justice and environmental ethics in the planning process, and technical know-how on professional practice with respect to Indian context.

Suggested Readings:

1. Steve Vanderheiden (2008) *Political Theory and Global Climate Change*, MIT Press, Massachusetts
2. Konstantinos T, Kalevi K, Stephen V, VesaYli-Pelkonenc, Aleksandra Kazmierczak, JariNiemelac, Philip James (2007), "Promoting ecosystem and human health in urban areas using Green Infrastructure: A literature review", *Landscape and Urban Planning*, 81 (2007) 167–178
3. Brian Roberts, Peter Atkins, Ian Simmons (2014) *People, land and time: an historical introduction to the relations between landscape, culture and environment*, Routledge, New York.
4. Sandler R (2007): *Environmental Justice and Environmentalism: The Social Justice Challenge to the Environmental Movement.* MIT Press, Massachusetts.
5. Campbell, H. and Marshall, R. (1998) Acting on Principle: Dilemmas in Planning Practice, Planning Practice and Research, Vol.13, No.2, pp.117-128.
6. Kulshreshtha, S.K. (2012) Urban and Regional Planning in India - A Handbook for Professional Practice. SAGE Publications India Private limited, New Delhi.

MEPM223 Environmental Law, Policy and Governance	Subject Category	TC
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical	0
	Total Periods per Week	3

Objective:

To develop knowledge of key policies, legislations and regulations related to Environment in India by discussing aspects regarding constitutional mandates, bare act provisions, institutional reformation brought about, role of judiciary and role of civil society.

Unit 1 Introduction to Environmental Law and Governance **9**

Concept of Law; Sources of law; meaning of the term of law, legislation, ordinance, bill act, regulations and bye-laws; legislations as a tool for environmental protection; Evolution of environmental legislation in India and over view; The doctrine of separation of powers; judiciary, legislature and executive – rule of law; significance of law and its relationship to environmental planning; Right to property versus power of eminent domain; concept of governance and good governance; International actors, conventions and protocols.

Unit II International Environmental Principles **9**

Introduction to internationally practiced environmental principles; Permanent Sovereignty over Natural Resources; Polluter Pays Principle; Precautionary Principle; Obligation not to cause transboundary environmental damage; Intergenerational Equity; Sustainable Development; Cases of environmental principles in practice.

Unit III Natural Resources and Man-made Resources and their Governance in India **9**

Constitutional Provisions related to Environment in India; Environmental Protection Act of India1986; Environment in 73/74 CAA; the Indian Forests Acts 1927, Forest Conservation Act (1980); Forest Rights Act (2006); Air (Prevention and Control of pollution) Act; Water (Prevention and Control of pollution) Act; The Indian Wildlife Protection Act, 1972; Mines and minerals Act 1952 and 2011; Hazardous Waste Management and Handling Rules / Biomedical Rules / Solid Waste Management Rules; related case laws.

Unit IV Environmental Policies **9**

National Conservation Strategy and Policy Statement on Environment and Development, 1992; National Environmental Policy 2006, Coastal Regulations Zone Act, Sector based policies – Agriculture; Population; Water etc.; National Land Utilization Policy; Significance of National Biodiversity Boards and State Biodiversity Boards.

Unit V Disaster Management and Environmental Jurisprudence in India **9**

Natural and manmade disasters and the role of state apparatus, judiciary, civil society and media in developing disaster resilience; Planning for Disaster Management – DRR, DM Act and Policy, preparedness and post disaster management. Role and significance of MoEF; Establishment of PCBs; Appellate Authority Act; National Green Tribunal; other related notifications.

Total: 45 Periods

Outcome:

- Knowledge on select Indian constitutional provisions and environmental legislation related to spatial and environmental planning; and governance and administrative/government bodies wrt. environmental components.

Suggested Readings:

1. Banerjee,D. (2008). Environmental Jurisprudence in India: a look at the Initiatives of the Supreme Court of India and their Success at Meeting the Needs of Enviro- Social justice. Paper selected for oral presentation at International Congress of Environmental Research, December 2008.
2. Damodaran A. (2012), 'The Challenge of Multi Level Environmental Governance In India', PeriodicaOeconomica, Pp. 29–37.
3. Raghav Sharma, 'Green Courts in India: Strengthening Environmental Governance?' 4/1 Law, Environment and Development Journal (2008), p. 50, available at http://www.lead-journal.org/content/08050.pdf.
4. Verghese, B.G.(2013).Environmental governance in India: The challenge of multiple transitions. Commonwealth Governance Handbook 2013/14, pg. 120-122.