

Master of Planning (Transport Planning)

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, विजयवाडा
School of Planning and Architecture, Vijayawada
An Institute of National Importance, MHRD, Govt. of INDIA.

Introduction to Master of Planning (Transport Planning)

Master of Planning (Transport Planning), abbreviated as M. Plan (TP), is a two-year full-time Master's degree Programme in Planning aimed to equip the students with adequate skills required to comprehend urban and regional transport-based issues. The course is designed to provide the necessary exposure to various transport planning processes, emerging trends and other related advanced technical know-how. It intends to contribute towards the creation of professionals in the field and hence cater to the specific needs of the industry and academics. During this course, the students are provided with ample opportunities to interact with subject experts, relevant organizations, etc. The course enables the students to gain real time experience through their involvement in ongoing live projects. Also, they are exposed to proficient expertise in planning through a full-time faculty and distinguished visiting faculty members. M.Plan (MTP) is a two-year course consisting of four semesters. 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 course structure is a combination of various subjects, which includes studios, labs, theory, and field visits. The broad course structure is as follows:

Semester 1: This is an Integrated semester common to all master courses of planning offered by the institute, it includes area planning studio, Infrastructure planning, Data Analytics and Techniques in Planning, Planning theories and concepts etc. that serves as an introduction to planning for all the students from different background as well as exposure to all sections of urban and rural planning.

Semester 2: This semester focusses on detailed study of transportation sector by developing comprehensive mobility plan of urban areas. Subjects offered are Urban Transport Planning, and Public Transport Planning, Highway Planning and Traffic System Design, Geo-Spatial Techniques in Transportation etc. The students are also given professional exposure through practical training of a month during summer vacation after second semester.

Semester 3: This semester focusses on developing detailed project report for transportation projects. Subjects offered in this semester are Advanced Research Methods, Transport Infrastructure Design, Transport Economics, Logistics and Freight Distribution etc. that dive deep into detailed process of transport planning and related expertise.

Semester 4: This semester students would be required to undertake thesis project or research in the field of transport. In addition, two theory subjects are offered namely Project formulation, transport policies and governance.

In addition to the theory subjects and studios, students are offered several electives to choose from namely Road Safety and Environment, Smart Mobility, Regional Transport Planning, Port Planning, Sociology and Transport Planning, Transport Infrastructure for Tourism Sector, Transport Infrastructure Finance. Also, the curriculum is designed in such a way so that the students pursuing Masters in Transport Planning can take elective subjects from Master Programmes, which gives them diverse knowledge. The department also offers different audit courses such as NSS, Yoga, Dance and Music in all the semesters.



Course Structure

First Semester (Integrated)

S.No.	Subject Code	Subject Title	Distribution of Periods per week			Contact Periods / week	Total Credits	Subject Category
			Lecture (L)	Tutorial (T)	Studio/ Practical (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			Contact Periods / week	Total Credits	Subject Category
			Lecture (L)	Tutorial (T)	Studio/ Practical (S/P)			
1	MTP121	Transport Planning Studio II	3	0	12	15	15	SC
2	MTP122	Geospatial Techniques for Transportation	1	1	1	3	3	JC
3	MTP123	Highway planning and Traffic System Design	2	1	0	3	3	TC
4	MTP124	Urban Transport Planning	2	1	0	3	3	TC
5	MTP125	Public Transport Planning	2	1	0	3	3	TC
Elective 1: ANY ONE								
6	MTP1210	Sociology and Transport Planning	2	1	0	3	3	OE
7	MTP1211	Road Safety and Environment	2	1	0	3	3	OE
8	MTP1212	Smart Mobility	2	1	0	3	3	PE
9	MTP1213	Travel Behaviour	2	1	0	3	3	PE
9	MTP1214	From other Master Programmes (Same Semester) / online platform duly approved the department	2	1	0	3	3	OE
ECOC Audit Courses: ANY ONE								
10	ECOC1	To be Chosen						A
11	ECOC2	To be Chosen						A
PBOC Audit Courses: ANY ONE								
12	PBOC1	To be Chosen						A
13	PBOC2	To be Chosen						A
TOTAL			12	5	13	30	30	

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			Contact Periods / week	Total Credits	Subject Category
			Lecture (L)	Tutorial (T)	Studio/ Practical (S/P)			
1	MTP211	Transport Infrastructure Planning Studio	3	0	12	15	15	SC
2	MPIS212	Research Methods	2	1	0	3	3	TC
3	MTP213	Logistics and Freight Distribution	2	1	0	3	3	TC
4	MTP214	Transport Economics	2	1	0	3	3	TC
5	MTP215	Transport Infrastructure Design	2	1	0	3	3	TC
Elective 2: ANY ONE								
6	MTP2110	Port Planning	2	1	0	3	3	PE
7	MTP2111	Transport Infrastructure for Tourism Sector	2	1	0	3	3	OE
8	MTP2112	Transport Infrastructure Finance	2	1	0	3	3	PE
9	MTP2113	Regional Transport Planning	2	1	0	3	3	PE
10	MTP 2114	Logistics Inventory Management	2	1	0	3	3	PE
11	MTP 2115/MEPM215	Energy Studies in Planning	2	1	0	3	3	OE
12	MTP 2116	From other Masters programme (same semester)/ online platform duly approved the department	2	1	0	3	3	OE
ECOC Audit Courses: ANY ONE								
13	ECOC1	To be Chosen						A
14	ECOC2	To be Chosen						A
PBOC Audit Courses: ANY ONE								
15	PBOC1	To be Chosen						A
16	PBOC2	To be Chosen						A
TOTAL			13	5	12	30	30	

Fourth Semester

S.No.	Subject Code	Subject Title	Distribution of Periods per week			Contact Periods / week	Total Credits	Subject Category
			Lecture (L)	Tutorial (T)	Studio/ Practical (S/P)			
1	MTP221	Transport Planning Thesis	2	0	22	24	24	SC
2	MTP222	Project Formulation and Appraisal	2	1	0	3	3	TC
3	MTP223	Transport 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:

MTP = Masters in Transport Planning;
1st Subject. **MTP211** is to be read as:
2 (1st digit) = 2nd Year; 1 (2nd digit) = 1st Sem of 2nd Year; 1 (3rd digit) =

MTP = Masters in Transport Planning;
Elective Subject. **MTP 2110** is to be read as:
2 (1st digit) = 2nd Year; 1 (2nd digit) = 1st Sem of 2nd Year; 10 (3&4th digit) = 1st

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 by
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
(Transport Planning)

First Year – First Semester – Integrated Semester

MPIS111- Area Planning Studio	Subject Category	SC
	Number of Credits	15
	Lecture Periods per Week	3
	Tutorial Periods per Week	-
	Studio/Lab/Workshop/Practicals	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 Neighbourhood 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 Periods

Outcomes:

- Basic knowledge and skillset to prepare the grassroot level plans
- Capability to prepare local area/ sub-city level plans by integrating the sectoral needs
- Students' skills in area appreciation, mapping and site planning 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.

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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, Go

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/Practicals	-
	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, strategising, 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.

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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/Practicals	-
	Total Periods per Week	3

Objectives:

- To acquire proficiency in quantitative techniques and computing tools that are applicable in planning domain to conduct empirical studies.

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/Practicals	-
	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:

- Thomas L. Daniels (2014). The Environmental Planning Handbook for Sustainable Communities and Regions. Planners Press, American Planning Association.
- Jetske A. Bouma, Pieter J. H. van Beukering (2015). Ecosystem Services: From Concept to Practice. Cambridge University Press.
- Van Bortel, Gerard, Vincent Gruis, Joost Nieuwenhuijzen & Ben Pluijmers, (Ed.) (2018), Affordable Housing Governance and Finance: Innovations, partnerships and comparative perspectives. Routledge, London.
- 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/Practicals	-
	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:

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

MTP121 - Transport Planning Studio-II	Subject Category	SC
	Number of Credits	15
	Lecture Periods per Week	3
	Tutorials per week	0
	Studio/Lab/Workshop/Practical's	12
	Total Periods per Week	15

Objectives:

- This studio would provide a basic understanding of transport planning process, the data collection techniques for transport surveys and analysis of surveys to do a 4-step modelling using standard transport planning software. The aim would be to incorporate the transport model simulation in making transport plan of a city.

Module I: Traffic Laboratory and Software Applications

The intent of this course (being part of the studio) is to strengthen the capabilities of the students in use of various instruments available in transportation laboratory. In addition, the students will be trained in the field of GIS using standard software such as ARCVIEW, ARCGIS, etc. and use of standard transport planning and traffic engineering software such as TRIPS, CUBE, VISUM, VISSIM, TRANSCAD, TRANSYT, etc. to develop students' transport modelling capabilities.

Module II: Comprehensive Traffic and Transportation Plan for a City

The objective of this studio exercise is to train the students for the preparation of a comprehensive transport plan for a city. The modelling simulations learned through the first module will be applied in creating this plan. This exercise will involve field data collection on road networks, traffic, and travel studies, including household surveys, public transport studies, parking and terminal studies, etc. in addition to secondary data. The collected data will be analysed to assess the existing characteristics and identify various problems and issues. Travel demand models will be developed for the base year, and travel demand forecasts will be finalized based on alternate scenarios of development. Subsequently, a transport plan and proposals will be formulated including environmental aspects.

Total: 225 Periods

Outcomes:

1. Understanding different stages involved in preparation of transport planning.
2. Enhancing modelling capabilities using different transport software.
3. Capability to prepare comprehensive mobility plan for projected plan period.

References:

Daamen, W. et. al. (2017), Traffic Simulation and Data: Validation Methods and Applications, CRC Press, USA.
 Flaherty, C A O' (1996), Transport Planning and Traffic Engineering, CRC Press, USA.
 Ortúzar, J. De and Willumsen, L. G. (2011), Modelling Transport, John Wiley and Sons, United
 Indo Highway Capacity Manual, 2018

MTP122 – Geospatial Techniques for Transportation	Subject Category	JC
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorials per week	1
	Studio/Lab/Workshop/Practical's	0
	Total Periods per Week	3

Objectives:

- To equip with the concepts of geo-informatics and computing skills in the relevant software, associated scientific tools, and their relevance and applicability for transportation and infrastructure 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, National Geospatial Policy.

Unit II Advanced 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 Information Systems for Transportation

9

Transportation Information Systems (TIS), geo-spatial standards, data sources, issues, guidance and services for transportation and infrastructure planning; Intelligent Transport Systems (ITS) for traffic management; Advanced Transportation Management Systems (ATMS), Executive information system; Pavement management system, bridge management, maintenance management, safety management; toll modelling, simulation models; Corridor preservation and right-of-way, construction management; Hazardous cargo routing, overweight/oversize vehicles permit routing, accident analysis.

Unit IV Applications in Transportation Planning

9

Application of standard transport planning and traffic engineering simulation software for travel demand modelling, Junction modelling, Emissions and dispersion modelling and Freight demand modelling, need and demand based software's such as AIMSPUM, VISSUM, CUBE, etc.

Unit V Project work

9

To develop/submit lab based assignments and portfolios on application of geo-spatial techniques for transport related projects.

Total: 45 Periods

Outcomes:

Enhancing the knowledge and skillset for application of GIS tools in Transport planning.

References:

1. Cambell, J.B. (2002), *Introduction to Remote Sensing*, Taylor & Francis, London.
2. Jamwal, A.K. (2008), *Remote Sensing and GIS*, JnanadaPrakashan, Delhi
3. Jan Van Sickle (2010), *Basic GIS Coordinates*, Second Edition, CRC Press; 2ndEd., USA.
4. Richards, J.A. & Xia, X. (2006), *Remote Sensing Digital Image Analysis: An Introduction*, London.
5. Thill Jean-Claude (2000), *Geographic Information Systems in Transportation Research, Transportation Research Part C: Emerging Technologies*, Vol. 8, pp. 3-12

MTP123 - Highway Planning and Traffic System Design	Subject Category	TC
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical's	0
	Total Periods per Week	3

Objective:

- To equip with the knowledge on highway planning and traffic system design with respect to planning, design and management.

Unit I Highway Planning and Management

9

Trends in highway planning and road development in country; classification of highways; locations and functions; planning approaches for rural roads, highway administration and finance; traffic surveys, alignment and route location, drainage studies, soil investigation, pavement design; overview of Highway Asset Management.

Unit II Highway Capacity and Geometric Design Elements

9

Highway capacity fundamentals, norms for various types of highways; Cross sectional elements of highways- horizontal and vertical alignment, types of curves and their design – simple, compound, reverse, transition; sight distances along highways, principles of hill road design; intersections designs along highways, types of pavement, fundamentals of pavement design.

Unit III Traffic Flow and Capacity

9

Road user and vehicle characteristics, fundamentals of traffic flow and relationship between the traffic flow variables Definition of capacity and level of service, factors affecting capacity and level of service, static and dynamic PCU, design service volume, capacity norms for urban roads with different widths, Level of Service; Macroscopic and Microscopic traffic flow models, fundamentals of queuing theory, models of delay at Intersections and Pedestrian Crossings.

Unit IV Design of Road Infrastructure System

9

Design principles of intersections. Footway and pathway design - Criteria, network design principles, cross-section design, signage and marking, lighting and barriers; pedestrian precincts; Cycleway design - low cost bicycle supply and promotion; design criteria; classification; network design principles; cross-section design; signage and marking; bicycle parking facilities; Pedestrian and bicycle crossing facilities - crossing facilities; pedestrian crossing behaviour; crossing signals.

Unit V Traffic Management Systems

9

Introduction to traffic control devices- signage's, markings, signals; Principles of Traffic Control, warrant for signals, Uncontrolled Intersection, Channelization, Traffic Rotary, Grade separated Intersection, principles of signal design; Evaluation of Traffic signal: Delay Models, Capacity and LoS Analysis of Signalised Intersections, phasing and inter green period, saturation flow, optimization of signals, Vehicle actuated signal facilities, co-ordination of traffic signal, area traffic control system; Traffic System Management (TSM) with IRC standards -- Traffic Regulatory Measures.

Total: 45 Periods

Outcomes:

1. Understanding the fundamentals of highway planning and design.
2. Apprehension of micro and macroscopic fundamentals of traffic system design.

References:

1. Fred L. Mannering, Scott S. Washburn and Walter P. Kilareski (2011), *Principles of Highway Engineering and Traffic Analysis*, Wiley India Pvt. Ltd., New Delhi.
2. Garber and Hoel (2010), *Principles of Traffic and Highway Engineering*, CENGAGE Learning, New Delhi.
3. Khanna. S.K., Justo. C.E.G. and Veeraragavan A. (2014), *Highway Engineering*, Nemchand Publishers, Delhi.
4. Tyworth, J. E. (1996), *Traffic Management Planning, Operations and Control*, Addison Wesley Publishing Company, USA
5. Roess, RP., McShane, WR. and Prassas,ES.(1998), *Traffic Engineering*,Prentice Hall.

MTP124 - Urban Transport Planning	Subject Category	TC
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical's	0
	Total Periods per Week	3

Objective:

- To introduce various components of transport planning in urban areas and familiarize with transport planning methods.

Unit I Urban Transport and Land Use 9

Urban activity systems, urban road structure, urban forms and structure and its impact on travel pattern, concept of accessibility and its impact on land use; urban structure and public transport, urban passenger transport system characteristics, public transport modes; urban freight transport; land use-transport cycle, Landuse-Transportation Models - Opportunity Models, Lowry Model; Transit Oriented Development (TOD).

Unit II Urban Transport Planning Process 9

Types of Plans; Long Term vs. Short-Term Planning; Transport Planning Process, study area delineation and zoning, data needs and outputs; Data Collection Techniques, Transport surveys – Traffic and Travel Surveys, Network Surveys etc. Sampling Techniques, Expansion Factors, Accuracy Checks, quick response techniques for travel demand estimation; vehicle ownership forecasting.

Unit III Transport Demand Modelling 9

Sequential and Simultaneous Approaches, Aggregate and Disaggregate Techniques, UTPS Approach; trip generation models, trip distribution models and its calibration, modal split models-measurement of choice, stated preference techniques, willingness to pay, stated discrete choice models- probit model, logit model; calibration of choice models, abstract mode choice, value of time, generalized cost, etc., traffic assignment techniques; calibration and validation checks; model testing and evaluation; travel forecasting, graph theory application in network analysis.

Unit IV Planning for Sustainable Transport 9

Concepts of sustainability; Sustainable transport systems, NMT, public transport. Planning principles and process; Planning norms and standards; planning frameworks for NMT infrastructure improvements; Analytical methods - NMT site analysis; NMT network analysis. MT Facilities - Facilities on Highways and Primary Arterials, Designs based on Roadway function, Safety and Intersections; Local Street Design with respect to NMT; Financing NMT Infrastructure. Planning for NMT - Integration of NMT into transport master plans, PLOS framework, Case studies on sustainable transport projects.

Unit V Emerging Trends in Transportation Planning 9

Big Data Analytics, conventional urban traffic planning and management methods vs big data; Machine Learning and the Internet of Things technologies in Transport Modelling and Planning.

Total: 45 Periods

Outcomes:

1. Understanding the process of four stage travel demand modelling.
2. Apprehension of sustainable transport planning and its integration with land use and urban morphology.

References:

1. Dios Ortuzar J. (2001), Modelling Transport, Wiley, New York.
2. Cordera, R., Ibeas, A., dell'Olio, L. and Alonso, B., Land Use-Transport Interaction Models, CRC Press, 2018.
3. Hutchinson B.G., Principle of Transportation Systems Planning, McGraw-Hill, 1974.
4. Yang, D., & Duan, Z. (2022, September 19). Assessing Urban Transportation with Big Data Analysis. Springer Nature.
5. Papacostas, C. S., and Prevedouros, P. D., Transportation Engineering and Planning. 3rd Edition, Prentice - Hall of India Pvt. Ltd., 2015

MTP125 - Public Transport Planning	Subject Category	TC
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical's	0
	Total Periods per Week	3

Objective:

- To introduce various concepts of Public Transport and NMT, and how Public Transport and NMT can be integrated into the Transport Network.

Unit I Introduction to Public Transport Systems 9

Urban passenger transport system characteristics, public transport modes, genesis of public transport system, mass transit system, Para transit system, technological features, Demand for public transport, public transport demand and supply indicators, public transport supply and demand characteristics in cities of various sizes and socio economic setting. Public transport based city forms and structure, Transit Oriented Development (TOD); Impact of city density, size, activity concentration.

Unit II Public Transport Network Planning and Operations 9

Form, type and density of bus network and principles; Types of bus priority measures, merits and limitations, case studies; bus service planning: Network design, route design, frequency and headway determination, scheduling and time table, pedestrian –public transport interface, application of ITS services including Advanced Public Transportation Systems (APTS).

Unit III Public Transport Infrastructure 9

Design of Bus stops/shelters, Depots, Terminals, multimodal interchanges; Bus stops –types and characteristics, planning guidelines; pedestrian-public transport interface, Bus Terminals – types, assessment of facilities and land areas for terminals; interchange- concepts, function and planning guidelines; bus depot -concepts, function, activity and land requirements, planning guidelines.

Unit IV Public Transport Performance and Economic Aspects 9

Physical and financial performance indicators for public transport, performance characteristics of various public transport modes including para-transit modes, life cycle cost assessment, Public transport fare types and pricing criteria, costs, services; price elasticity of demand; subsidy issues; regulation, privatization impacts and integration issues on public transport performance; public transport financing; Alternate sources of financing, Accounting and Economic Profitability of Public Transport.

Unit V Feeder Systems 9

First and last mile connectivity to mass transit systems, cycling, walking and para transit system; Types, function and role of para transit, planning principles, operation and maintenance of para transit systems; Institutional aspects and performance assessment.

Total: 45 Periods

Outcomes:

1. Knowledge of planning and design imperatives for public transport related infrastructure.

2. Sustainable strategies for enhancing public transport accessibility through last mile connectivity with NMT.

References:

1. Chakraborty and Das (2009), *Principles of Transportation Engineering*, PHI Learning, India.
2. Nash, C.A. (2007), *The Economics of Public Transport*, Longman, London.
3. Vuchic, V.R. (1981), *Urban Public Transportation Systems and Technology*, Prentice-Hall, Inc., USA.
4. White, P. R. (2003). *Public Transport: Its Planning, Management and Operation. (n.p.): Taylor & Francis.*
5. Dell'Olivo, L., Ibeas, A., de Ona, J., de Ona, R. (2017). *Public Transportation Quality of Service: Factors, Models, and Applications. Netherlands: Elsevier Science*

MTIP1210 - Sociology and Transport Planning (Elective)	Subject Category	OE
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical's	0
	Total Periods per Week	3

Objective:

- To understand an overview of the various aspects related to the importance of sociological factor particularly the human and psychological dimensions of transport.

Unit I Sociological Principles 9

Urban and rural Society; Social structure and physical pattern of rural and urban communities; Social Mobility, migration, and commutation; Urban and sub urban living and social mobility.

Unit II Social Aspects of Transport Sector 9

Traffic as a social system; People, occupation and travel; Evolution and change in population mobility pattern; Mental and physical health and local and distance travel; Psychological impact of physical disruption; Social quality of urban roads, streets and public places; Barrier for mobility, Travel and mobility problems of diverse people: child, youth, women, elderly and differently able; Gender and Mobility, Equity and inclusiveness, Environment quality of urban streets and pedestrian safety; Sociology of car traffic in towns and cities; Stress, noise and pollution control; Evaluation of social impact of transport,

Unit III Contemporary Living Pattern of Mobility 9

Historic and contextualized travel practices; Travel in technological culture; ICT based mobility innovations; Social features of smart transportation and smart mobility.

Unit IV Managing Transport and Society 9

Rise and decline of public transport; Restructuring traffic facilities; Use of social research; Ideology and policy perspective of urban transportation; User friendly design of places for safe mobility and travel for all; Efficient transport plan; Participatory Planning Approaches, Management and control of the environmental impacts of transport systems in communities and cities.

Unit V Planning for Mobility of transport disadvantaged 9

Transport disadvantaged groups, mobility needs of transport disadvantaged groups; planning principles and approaches of disadvantaged, differently-abled groups; Concept of accessibility; Best Practices.

Total: 45 Periods

Outcomes:

- Understanding travel behaviour across different social groups and planning approaches for universal accessibility.

References:

- Boer Enne de (Ed.)(2011), Transport Sociology - Social Aspects of Transport Planning, Pergamon Press, Oxford.
- Government of India (2006), National Urban Transportation Policy, Ministry of Urban Development, New Delhi.
- Peters F.P.(2006), Time, Innovation and Mobilities: Travel in Technological Cultures, Taylor & Francis, UK

MTP1211 – Road Safety and Environment (Elective)	Subject Category	OE
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical's	0
	Total Periods per Week	3

Objective:

- To advance critical abilities to understand and solve real-world environmental impacts and effects stemming from transport network and infrastructure on the environment and propose ways in which the long-term development of transport can be made environmentally sustainable.

Unit I Road Transport and Environment 9

Elements of environment affecting the mobility of people and goods; Impacts of transport on environment –an introduction; Transportation and energy consumption; Vehicle emissions and trends; Effects of Vehicle Emissions; Transport dependent GHG emissions; Alternative fuels.

Unit II Transport and Road Safety 9

Road safety scenario, Collection and recording of accident data; Pillars for road safety systems approach; Star Rating of Road Network; Black Spot, Grey Spot Identification; Haddon matrix; Safety of vulnerable road users (VRU); Characteristics and environment of VRU's- Regulatory, Physical, Social; Safety in road design; Engineering and Non-Engineering measures; Accident Investigation, Analysis & Prevention; Countermeasures at Hazardous Locations.

Unit III Road Safety Audit 9

Introduction to Road Safety Audit (RSA) Approach & Methodology; Road Safety Audit at different stages of the project -Design Stage, Construction Stage, Pre-Opening Stage, Existing Stage; Road Safety Action Plan.

Unit IV Vehicular Pollution Modelling 9

Assessment of traffic related pollution- air and noise; Emission Inventory Techniques; Dispersion modelling approaches; Source Apportionment approaches; Basic definition of noise and measurements of Noise Level L₁₀, L₅₀, L₉₀, L_{EQ}; Relationship between traffic flow and traffic noise; landuse planning and environmental noise.

Unit V Traffic and Environmental Impact Assessment for transport projects 9

Basic introduction to EIA; scoping and baseline studies; Impact of traffic on public health - accessibilities, active modes and health promotion; Impact of new road infrastructure; Road building materials and impacts; Manufacture and disposal of vehicles; Impact Prediction and Evaluation - NATA assessment methods, Analysis of Potential Environmental Impact and Mitigation Measures, Traffic Impact Assessment, Financial and Economic feasibility for transport projects.

Total: 45 Periods

Outcomes:

- Understanding criticality of road safety and appreciate the needs of VRU's in developing safe environment.
- Understanding the impact of traffic on environment in terms of air and noise pollution and strategies for preparing environmentally sustainable transport plan.



References:

1. ASCI (2010), Environmental Impact Assessment Guidance Manual for Highways, Ministry of Environment and Forest, India.
2. Tiwari, G., & Mohan, D. (Eds.). (2016). Transport Planning and Traffic Safety: Making Cities, Roads, and Vehicles Safer (1st ed.). CRC Press. Taylor & Francis Group
3. Tiwary, A., & Williams, I. (2018). Air Pollution: Measurement, Modelling and Mitigation, Fourth Edition (4th ed.). CRC Press. Taylor & Francis Group
4. The Royal Society of Chemistry (2004), Transport and the Environment: Issues in Environmental Science and Technology, United Kingdom
5. IRC 104: Guidelines for Environmental Impact Assessment of Highway Projects, Ministry of Road Transport and Highways

MTP1212 – Smart Mobility (Elective)	Subject Category	PE
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical's	-
	Total Periods per Week	3

Objective:

- To provide a comprehensive overview of the intelligent transport systems (ITS) and traffic control systems for providing versatile and smart mobility solutions to cater future travel demand.

Unit I Smart Mobility 9

Concepts and components of smart mobility, role of ITS in smart mobility and smart cities; PPPs as a tool to implement smart mobility projects; smart mobility solutions for differently abled; Integration of smart and green mobility.

Unit II Intelligent Transport System 9

Definition, concepts, types of Intelligent Transport System (ITS); ITS technology, software, equipment, Traffic management, emergency and incident management, public transport system, terminal and depot management system, parking infrastructure management, commercial vehicle management, highway surveillance, case studies.

Unit III Application of ITS in Transport Systems 9

Advanced Traveller Information Systems (ATIS), including functionality, business models, field trip to Smart Route Systems; Advanced Transportation Management Systems (ATMS), including network operations, incident detection, congestion pricing, tolling, HOT lanes, example deployments; Fleet-oriented ITS services, including Advanced Public Transportation Systems (APTS), Commercial Vehicle Operations (CVO), Intermodal Freight, including International Operations and Supply Chains ITS and Technology, including automated highway systems (AHS); sensors, electronic toll collection (ETC); dedicated short range communication, and standards

Unit IV Performance, Implementation and Evaluation of ITS 9

Costing of ITS, ITS benefits assessment, economic and financial analysis of ITS. Implementation; case studies, Critical ITS Issues, including (as time permits) ITS and security; safety; human factors; privacy; sustainability; funding (as contrasted with conventional infrastructure); technology deployment/R &D/policy; other institutional issues.

Unit V Case studies on smart mobility 9

Application of ITS in-demand management, transport supply provision, shared mobility.

Total: 45 Periods

Outcomes:

- Knowledge on different ITS tools for managing transport demand and enhancing performance of transport system.
- Capability to perform financial and economic evaluation of different ITS related projects.

References:

- Button, K. J., Hensher, D. A. (2001), Handbook of Transport Systems and Traffic Control, Elsevier Science, United Kingdom.
- Sarkar, P., Jain, A.K. (2017), Intelligent Transport Systems, PHI Learning Private Limited, New Delhi
- Mashrur A. Chowdhury, and Adel Sadek, Fundamentals of Intelligent Transportation Systems Planning, Artech House, Inc., 2003.
- Ghosh, S., Lee, T.S. Intelligent Transportation Systems: New Principles and Architectures, CRC Press, 2000.

Educational and awareness campaigns (Role of information dissemination and public education in changing travel behavior), Incentive-based approaches (Financial incentives, rewards, and penalties to influence travel choices), Regulatory and policy measures, Quantitative and qualitative evaluation methods

Unit V Designing Behaviour Change Interventions

9

Applying theories to various transport system design interventions such as NMT Infrastructure design (Pedestrian, and bicycle facilities design), Public Transport system design (Route designing, scheduling, fare policies and incentives etc), Traffic System Management, Steps in designing a behavior change intervention

Total: 45 Periods

References:

1. Gärling, Tommy & Fujii, S.. (2009). Travel behavior modification: Theories, methods, and programs. *The Expanding Sphere of Travel Behaviour Research*. 97-128.
2. Sundling, C. Travel Behavior Change in Older Travelers: Understanding Critical Reactions to Incidents Encountered in Public Transport. *Int. J. Environ. Res. Public Health* **2015**, *12*, 14741-14763. <https://doi.org/10.3390/ijerph121114741>
3. Guell C, Panter J, Jones NR, Ogilvie D. Towards a differentiated understanding of active travel behaviour: using social theory to explore everyday commuting. *Soc Sci Med*. 2012 Jul;**75**(1):233-9
4. Moses Mwale, Rose Luke, Noleen Pisa, Factors that affect travel behaviour in developing cities: A methodological review, *Transportation Research Interdisciplinary Perspectives*, Volume 16, 2022, 100683, ISSN 2590-1982,

Third Semester

MTP211 - Transport Infrastructure Planning Studio	Subject Category	SC
	Number of Credits	15
	Lecture Periods per Week	3
	Tutorials per week	-
	Studio/Lab/Workshop/Practical's	12
	Total Periods per Week	15

Objectives:

- To strengthen the capabilities of student in conducting feasibility studies using statistics and operation research of transport infrastructure of interurban/regions/special areas.
- To plan, design and institutionalize the transport infrastructure projects with concepts and strategies.

Unit I Application of Micro simulation

Various analytical quantitative techniques and methods for transport infrastructure; recent advancements in transport models; application of statistical and transport planning software, data requisition and survey methods; Structure and approach to feasibility studies. Micro-simulation using dedicated software packages

Unit II Detailed Project Report study on transport infrastructure planning, design and management for a case study

The objective of this studio exercise is to train the students for conducting a detailed project level study related to transport infrastructure planning, design and management aspects for a case study. This exercise will involve relevant field data collection besides secondary data collection. The data collected would be analysed to assess the existing characteristics and identify various problems and issues. Based on the scope of the study, alternate improvement, impact assessment, planning design and management strategies would be formulated and evaluated by taking into account costs and benefits; proposals and CBA.

Total: 225 Periods

Outcomes:

1. Knowledge of macro and microscopic traffic system modelling by preparing DPR of transport projects.
2. Capability of carrying out financial and economic feasibility of transportation projects.

References:

1. Blonk, W.A.G. (1979), Transport and Regional Development. Saxon House, Farnborough.
2. O'Flaherty, C.A. (2000), Transport Planning and Traffic Engineering, Dept. of Transport, USA.
3. Ortúzar, J. De and Willumsen, L. G. (2011), Modelling Transport, John Wiley and Sons, United Kingdom.
4. Verma A. (2010), Integrated Public Transportation System: Planning and Modelling. VdmPublishing House, Mauritius.
5. Vinod K. T. M. (2000), Micro Regional Transport Planning / Research. School of Planning and Architecture, Delhi

MPIS212 – Research Methods	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

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.

Course Structure and Detailed Syllabus for M.Plan (TP) with effect from A.Y 2024-25 onwards

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

MTP213 - Logistics and Freight Distribution	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

Objective:

- To provide a comprehensive overview of the main issues related to the increasingly important fields of freight transport, logistics and supply chain management (SCM) and all relevant aspects related to operations management.

Unit I Concepts of Freight, Logistics and Supply Chain 9

Introduction to freight transport, types of freight transport systems- Maritime, air, rail, road and intermodal freight transport; Introduction to logistics and distribution, integrated logistics and supply chain, customer service and logistics, channels of distribution, role of 3PL and 4PL; blockchain in logistics; reverse logistics; key issues and challenges for logistics. Planning framework for logistics, logistics processes, supply chain segmentation, logistics network planning, logistics management and organisation, manufacturing and materials management.

Unit II Inventory planning and management 9

Basic inventory planning and management, types, inventory costs; Performance Indicators; Inventory Control Methods; Replenishment models; Deterministic continuous review models: Economic order quantity (EOQ) model, Finite replenishment rate Inventory models; Multi-item EOQ model; Probabilistic inventory models.

Unit III Freight Demand Modelling 9

Global, Regional and Local Freight Generation; Forecasting of freight trip generation; Modelling Inter-regional freight demand with Input–Output, Gravity and Spatial Computable General Equilibrium (SCGE) Models; Behavioural analysis of freight mode choice decisions; Multi-class traffic assignment; Aggregate and Disaggregate Models; route planning and scheduling freight transport; Use of GPS and Bluetooth Data for Freight Analysis; International best practices of freight models.

Unit IV Terminal and Warehouse Management 9

Transportation Systems and Multimodal Transport; Need & Type of Terminals - Terminal Planning (Traffic Projection, Location, Layout), Terminal Activities; Design of freight terminals; Terminal Management & Operations; Telematics; Safety & Security aspects of Terminal; Principles of warehousing Flow, stock separation, unitisation, stock rotation; warehouse design; Storage and materials handling; Warehouse processes; warehouse management and information.

Unit V Freight distribution and management 9

Principles of freight distribution, management of freight traffic, facility location models, Cost and distribution economics, performance monitoring, benchmarking, information and communication technology in freight distribution, security and safety issues; logistics and environment.

Total: 45 Periods

Outcomes

1. Knowledge on concepts related to logistics, inventory and warehouse planning.
2. Application of operation and research techniques for freight routing and distribution.



References:

1. Rushton, A. et. al. (2010), The Handbook of logistics and Distribution Management, Kogan Page Limited, United Kingdom.
2. Waters, D. (2010), Logistics: An Introduction to Supply chain Management, Palgrave Macmillan, New York.
3. Tseng, Y. et. al. (2005), The Role of Transportation in Logistics Chain, Proceedings of the Eastern Asia Society for Transportation Studies, Vol. 5, pp. 1657 – 1672
4. Krajewski, L. J., Malhotra, M. K., & Ritzman, L. P. (2015). Operations Management. Pearson.
5. Ben-Akiva, M. E., Meersman, H., & Van De Voorde, E. (2013). Freight Transport Modelling. Emerald Group Publishing.

MTP214 - Transport Infrastructure Design	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

Objective:

- To introduce planning strategies, design considerations and standards for transportation infrastructure.

Unit I Road Infrastructure 9

Design of roundabouts; Design of grade separated intersection and interchange; design of tunnel roads; Design of bus stops and shelters, bus bays; Parking facilities (surface and multi – level) layout design; design of pedestrian facilities (subways, foot over bridges); cycle tracks; NMT facilities.

Unit II Rail Infrastructure 9

Rail alignment surveys; Permanent way- rails, sleepers, ballast, sleepers; Curvature of track types of curves, degree of curvature, super -elevation, transition curves; railway points, crossings and junctions; station yards; terminals- size, parking, circulation, platforms, passenger service and amenities area; metro rail alignment and stations design elements.

Unit III Airports 9

Airport location planning; Components of airport design; Air side development – runways, taxiways, aprons, air and ground navigation and traffic control aids; Land side development – passenger building, cargo facilities, internal airport circulation and parking; Design of ground access facilities and airport support facilities etc.; land side airport connectivity planning.

Unit IV Ports, Docks and Harbour 9

Harbours - Types, layout, components of harbour- entrance, approach channel, turning basin, sheltered basin, breakwaters, wharves and quays, dry docks, Jetties and piers; Appurtenances to Harbour- Aprons, Transit Sheds, Warehouses, Moorings; Ports- types, components, Seaport location planning and land side connectivity.

Unit V Multimodal Interchange 9

Types of modal interchange, facility requirements for interchanges, international case studies and best practices for modal interchanges; components of modal interchange design, space standards, movement control, parking; design standards, access control design, mobility assistance.

Total: 45 Periods

Outcomes

1. Knowledge on planning and design considerations for infrastructure related to all different transport modes.

References:

1. Blow, C. J. (2005), Transport terminals and modal interchanges: planning and design, Elsevier, United Kingdom.
2. Kadiyali L. R. (2016), Transportation Engineering, Khanna Publishers, New Delhi

MTP215 - Transport Economics	Subject Category	TC
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical's	0
	Total Periods per Week	3

Objective:

- To impart basic understanding of economics associated with transport and infrastructure.

Unit I Introduction to Transport Economics

9

Introduction: Basics of microeconomics such as demand and supply, and consumer surplus; Welfare Theory and Equilibrium Conditions, Goals and Objectives, Principles of Economic Analysis. Discounted Cash Flows: Analysis of User Costs and Benefits; Transport and the economy & transport and local economic development. Demand for transport; Factors influencing transport demand; Elasticity of demand, measures of elasticity; Supply and demand forecasting for transport.

Unit II Costing and Pricing of Transport services

9

Allocation of Resources within Transport Sectors, Fixed and variable cost; Joint and common cost; Cost allocation; User cost internal cost, external cost, economic cost; Principle of pricing, marginal cost pricing; Price determination; Operational objectives of pricing; Revenues and subsidies.

Unit III Transport System Selection, Evaluation and Cost Analysis

9

Framework of Evaluation, Transport Planning Evaluation at Urban and Regional levels, Other Evaluation Procedures – Financial and Economic Analysis, Achievement Matrices, Factor Profiles, Plan Ranking, Introduction to Mathematical Programming, Case Studies.

Unit IV Project Appraisal - Private Sector Participation

9

BOT, BOOT, BOLT Projects - Project Planning - Project System Management - Project Implementation - Funds Planning - Budgetary and Control - Tendering and Contract - Value Analysis, Information System - Impact assessment, Project Report Preparation.

Unit V Regulation and Financing Transport Infrastructure

9

Theory of regulation; Priorities in transport policies; Priorities in infrastructure policies; Regulatory reforms and coordination. Transport costing and financing sources, pricing principles, cost recovery pricing, deficits; Financial capital investment, , capital market/debt; Alternative Financing Mechanisms, Multilateral and Bilateral Financing mechanism, Financial Institutions, Private sector participation, land as a resource, public private partnership

Total: 45 Periods

Outcomes:

1. Knowledge of carrying out financial and economic evaluation of transportation projects.
2. Understanding the role of financial institutions in transport sector.

References:

1. Kenneth Button,, *Transport Economics*,, Edward Elgar Publishing Ltd, , 3rd Edition, 2010.
2. Cole, S. (2005). Applied transport economics: policy, management & decision making. Kogan Page Publishers.
3. Cowie, J. (2009). The economics of transport: a theoretical and applied perspective. Routledge. 2
4. Kockelman, K., Chen, T. D., Kam, K. A., & Nichols, B. G. (2013). *The economics of transportation systems: A Reference for Practitioners* (No. 0-6628-P1).
5. https://ctr.utexas.edu/wpcontent/uploads/pubs/0_6628_P1.pdf

MTP2110 - Port Planning (Elective)	Subject Category	PE
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical's	-
	Total Periods per Week	3

Objective:

- To provide the knowledge on types of ports, planning concerns of port areas, institutional arrangements for planning. The syllabus focuses on the preparation of spatial plans for port area plans with a special focus on port performance and commodity analysis.

Unit I Introduction

9

Evolution of ports, role of ports in the economy, importance of trade and shipping industry, major ports, minor ports, land lard ports, coastal shipping, container shipping, IC terminals in India, glossary of port planning, regulatory framework of ports in India.

Unit II Port Infrastructure

9

Port components; Ship size and cargo characteristics; Port Infrastructure for cargo handling and storage, marine access infrastructure, cargo specific berths and port facilities.

Unit III Port Master Planning

9

Principles of Port Planning, Port connectivity, Processing and non-processing zones, institutional arrangements, Commodity analysis and requirements, transit efficiency parameters. Land requirements for port operations.

Unit IV Port and its impact on hinterland

9

Evolution of port-city relationship, Any Port Model, port-city relationship; Traffic and Social impact assessment of port on hinterland; Captive and non-captive hinterlands assessment.

Unit V Case Studies

9

Greenfield port, major and minor ports, port planning best practices.

Total: 45 Periods

Outcome:

Knowledge on methodology for preparing Master Plan for Port areas focusing on commodity analysis and regional planning imperatives.

References:

- Daamen, T. Marcel V.G. (2006), Development challenges in the evolving port city interface, defining complex development problems in European main seaport-city interface: Rotterdam and Hamburg, International Association of Cities & Ports (Conference Paper).
- Ministry of Shipping (2016), Sagarmala, National Perspective Plan of Indian Ports, Government of India, New Delhi.
- Pedquera .M.A., Ruiz J.R. (1996), Sustainable Development strategies for cities and ports, United Nations (Monograph).
- Takel, R. E. (1983), Planning land use in port areas: getting the most out of port infrastructure, United Nations (Monograph).
- Thoresen, Carl A. (2003), Port designer's handbook: recommendations and guidelines, Thomas Telford, London

MTP2111 - Transport Infrastructure for Tourism Sector (Elective)	Subject Category	OE
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical's	-
	Total Periods per Week	3

Objective:

- Understanding of tourism planning process, provision and production of infrastructure services in destination, departure, transit and arrival place.

Unit I Tourism Concepts, Theory, and practice 9

Introduction to Tourism – Concepts, theories, approaches and methods of tourism studies – Recreation, Leisure, travel and tourism - Types of tourism – Tourism regions – Tourism scenario - Tourist circuits – Tourism as Industry.

Unit II Determinants of Tourism Demand 9

People and travel habits – Tourist flow and tourism traffic analysis – Access to tourism: Gender, Age, Elders and differently able people - Environment responsive tourism – Tourism and environment sensitive areas- Tourism impact on environment – Disaster, pollution and tourism - Climate change.

Unit III Tourist Transport Modes 9

Rural and urban tourism – Modes of Travel - Hotel and hospitality services - Transportation networks and destinations – local public transport system - Walk ways, cycle tracks, para-transit modes and NMT, water ways, rope ways.

Unit IV Planning transport infrastructure for Tourism 9

Infrastructure planning for sustainable tourism: The social practices approach - The role of transport infrastructure in international tourism development: A gravity model approach - Tourism and international trade - Planning transport for special events - Tourism infrastructure: inequality and externality issues – Tourism Infrastructure support services – Travel safety and security – Walkways and informal sector; Transport Infrastructure in tourist precincts.

Unit V Transport Policies and Tourism Governance 9

Government and local community in creation of tourism infrastructure – Tourism policies and legislations - Tourism development and happiness: Residents' perspective - Collaborative tourism planning - Digital destinations - Destination branding: The role of consumer affinity.

Total: 45 Periods

Outcomes: Knowledge on tourism planning process and methodology for assessing transport infrastructure demand for tourism sector.

References:

1. Govt. of India, (2015), Tourism Policy of India, Ministry of Tourism, New Delhi
2. Jamal T and Robinson M, (2005), Introduction to Tourist Transport, Sage Publications, United Kingdom.
3. Khadaroo J, (2007), Transport infrastructure and Tourism development, Annals of Tourism Research, Vol.34. No 4 pp1021-2032.
4. Majumder, R, (2008) Infrastructure and Development in India, Rawat Publications, New Delhi.
5. Roday.S, Biwal.A. &Joshi.V, (2009), Tourism Operations and Management, Oxford University Press, London

MTP2112 - Transport Infrastructure Finance (Elective)	Subject Category	PE
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical's	-
	Total Periods per Week	3

Objective:

- To impart concepts related to transport infrastructure, mechanism and role of alternative financing mechanism and its relevance with the institutional framework.

Unit I Transport Infrastructure 9

Characteristics of transport infrastructure, Growth trends, Investment need and budgetary support, existing financing pattern, financial recurrent expenditure.

Unit II Transport Costing and Recovery 9

Transport costing, pricing principles, cost recovery pricing, deficits; financial capital investment, municipal development funds, capital market/debt.

Unit III Alternative Financing Mechanisms 9

Multilateral and Bilateral Financing mechanism, Financial Institutions, Private sector participation, land as a resource, public private partnership, and annuity based approach risk management.

Unit IV Institutional and Regulatory Framework 9

Risk management, financing institute, fund providers, role and function, documentation and agreement, institutional and regulatory framework implementation.

Unit V Case studies 9

Highways and urban roads, Mass transport systems, Passenger terminals (rail, bus, air), interchanges, Depots, Parking complexes, Logistics hubs etc.

Total: 45 Periods

Outcomes

- Understanding the role of alternative financing mechanism along with the institutional framework.

References:

- A.Richard, Richard Hemming and H.Barry (2013),The International Handbook of Public Financial Management Center for aid and public expenditure,Hamburg, Germany.
- Allen .F, Yago.G (2013),Financing the Future, Market-Based Innovations for Growth, Pearson Publications, Indianapolis, Indiana.
- Athena Roumboutsos, Hans Voordijk, AristeidisPantelias (2018), Funding and Financing Transport Infrastructure, Rutledge Publications, New York, USA.
- Karl F Seidman (2012), Economic Development Finance, Sage publications, California, USA.
- Rondinelli. A (1990), Financing the decentralization of urban services in developing countries: Administrative requirements for fiscal improvements, Springer-Verlag publications, New York, USA

MTP2113 - Regional Transport Planning (Elective)	Subject Category	PE
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical's	-
	Total Periods per Week	3

Objective:

- To introduce regional elements in the domain of transport planning and equip students towards enhancing regional connectivity.

Unit I Overview of Regional Planning 9

Approach to regional planning, types of regions and their characteristics, delineation of region for transport planning; backwardness and regional disparity in development; role of connectivity and regional transport in development and backwardness.

Unit II Regional Transport Systems 9

Regional transport system, types, characteristics, regional transport supply, regional traffic and travel pattern, emerging issues.

Unit III Regional Travel Demand 9

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

Unit IV Regional Network Analysis 9

Regional network system, rural road network planning, graph theory applications- connectivity and accessibility measures.

Unit V Regional Transport Policy 9

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

Total: 45 Periods

Outcomes

- Understanding the regional context of transport planning and enhancing regional connectivity and accessibility using concepts of transport modelling and graph theory.

References:

- Blonk, W.A.G. (1979), Transport and Regional Development. Saxon House, Farnborough.
- Verma A. (2010), Integrated Public Transportation System: Planning and Modelling. Vdm Publishing House, Mauritius.
- Vinod K. T. M. (2000), Micro Regional Transport Planning / Research. School of Planning and Architecture, Delhi

MTP224 –Logistics Inventory Management	Subject Category	PE
	Number of Credits	3
	Lecture Periods per Week	2
	Tutorial Periods per Week	1
	Studio/Lab/Workshop/Practical's	-
	Total Periods per Week	3

Objective:

1. Comprehend the importance of inventory management and gain a broad understanding of how inventory management fits into the broader function of logistics.
2. Develop the ability to independently construct new models and analytical tools for different problems by synthesizing and adapting the concepts, models, and analytical methods covered in the course.

Unit I Introduction to Inventory Management and Planning 9

Definition of inventory, importance in supply chain management, Objectives of inventory management, Inventory classification: ABC analysis, XYZ analysis, FSN analysis, VED analysis. Inventory cost analysis: holding costs, ordering costs, stockout costs. Forecasting demand: quantitative and qualitative methods, time series analysis, causal methods.

Unit II Inventory Models and Optimization Techniques 9

Deterministic models: EOQ model, EPQ (Economic Production Quantity) model. Stochastic models: Continuous review models (ROP – Reorder Point, s – Order-up-to level), periodic review models. Multi-echelon inventory systems: Distribution inventory, transportation inventory, pipeline inventory. Inventory optimization algorithms: dynamic programming, simulation optimization, genetic algorithms, heuristic methods. Inventory control in uncertain environments: stochastic demand, lead time variability, supply chain disruptions.

Unit III Inventory Performance Measures 9

Key performance indicators (KPIs) for inventory management: inventory turnover ratio, stockout rate, fill rate, cycle time, carrying cost, Days Inventory Outstanding (DIO), Backorder Rate, Excess and Obsolete Inventory, Supplier Performance

Unit IV Inventory Control and Management Software Systems 9

Just-in-Time (JIT) inventory management: principles, benefits, implementation challenges. Vendor Managed Inventory (VMI) systems; RFID and barcode technologies for inventory tracking and control. Overview of inventory management software systems as SAP, Fishbowl, WMS (Warehouse Management System), DEAR: features, functionalities, implementation considerations. Case studies on inventory management software in different industries.

Unit V Current Trends and Challenges in Inventory Management 9

Sustainable inventory practices: green logistics, reverse logistics, circular economy principles. Inventory management in omni-channel retailing and e-commerce. Integration of artificial intelligence (AI) and machine learning (ML) in inventory forecasting and optimization.

Total: 45 Periods

Outcomes:

1. Understand inventory management principles, methodologies, and optimization strategies for successful inventory planning, analysis, and control.
2. Gain practical skills in inventory planning, control systems, performance assessment, and supply chain integration to make educated decisions and drive continuous improvement in real-world businesses.



References:

1. Silver, E.A., Pyke, D.F., & Thomas, D.J. (2016). Inventory and Production Management in Supply Chains (4th ed.). CRC Press. <https://doi.org/10.1201/9781315374406>
2. Chopra, Sunil, and Peter Meindl. "Strategy, planning, and operation." *Supply Chain Management* 15, no. 5 (2001): 71-85.
3. Piasecki J. (2009): Inventory Management. A focus on forecasting, Lot sizing, Safety Stock and ordering Systems, 133.
4. Council of Supply Chain Management Professionals and Matthew, M. / Terry L. (2014): The definitive Guide to inventory management, Pearson Education LTD, 129-152.
5. Krajewski, L. J., Malhotra, M. K., & Ritzman, L. P. (2015). Operations Management. Pearson.



Fourth Semester

MTP221 - Transport Planning Thesis	Subject Category	SC
	Number of Credits	24
	Lecture Periods per Week	-
	Tutorials per week	-
	Studio/Lab/Workshop/Practical's	24
	Total Periods per Week	24

Objectives:

- To conduct independent scientific research on a topic of Transportation & Infrastructure Planning.

Each student of Planning (Transportation & Infrastructure Planning) course is required to undertake a terminal project on a subject related to Urban and Regional Transportation Development (Road, Rail, Port and Airport) concern preferably related to Travel behaviour, Land use and Accessibility, Travel demand forecasting modelling, Public transport system, Transportation Infrastructure Design and Management, transportation logistics Intelligent transport system, etc., as approved by the Department in the third semester in the course Advanced Research Methods.

The Thesis will provide an opportunity to the student to synthesize 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 students are required to select a topic of their choice in consultation with the faculty members and carry out the research based on primary and secondary data analysis / interpretation followed by identification of issues and potentials culminating in policies, plans and proposals or in proving the formulated hypothesis or research questions.

The Thesis shall be monitored continuously and periodically through internal marked review 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 extended abstract, which once approved by the department will be followed by the submission of a detailed report and maps/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 for each topic.

Total: 360 Periods

Outcomes:

1. 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.

MTP222 - Project Formulation and Appraisal	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

Objective:

- Introduce aspects of project planning, management, implementation, monitoring and appraisal.

Unit I Introduction to Project Planning 9

Concept of Project and Program, Prioritization of Projects and Programs, Nature and scale of Planning Projects, life cycle of a Project.

Unit II Project Formulation and Appraisal 9

Definition, Objectives, Importance of project formulation, Project appraisal and management; need of project appraisal, detailed project report, Feasibility studies; concepts of financial feasibility (Pay-back period, IRR, DCF, NPV, CBR), Methodology for project identification and formulation; financial cost-benefit analysis, social-cost benefit analysis

Unit III Project Management 9

Concept of project management, Stages of project form Network analysis; concept of CPM, PERT, resource levelling and allocation, time-cost trade off aspects; Bar charts, Milestones, Techno-economic analysis of projects.

Unit IV Project Implementation 9

Project implementation, stages of implementation, actors in project implementation; Project monitoring techniques, integrated reporting, Milestones, time and cost overrun and under runs, unit index technique.

Unit V Project Evaluation and Monitoring 9

Project evaluation: Life of a project; Stages, approach and steps, techniques of project evaluation: input analysis, UNIDO Approach methods; Case studies in Transportation and Infrastructure development projects.

Total: 45 Periods

Outcomes

1. Apprehension of project planning and management specific to transport sector.

References:

1. Awani, Alfred O. (1985), Project Management Techniques, Petrocelli Books, New York, USA.
2. Chandra, P. (1995), Projects: Planning, analysis, selection, implementation and review, Tata McGraw Hill publishing, New Delhi, India.
3. F.Lawrence Bennett (2003), Management of Construction: A Project Lifecycle Approach, Butterworth Heinemann, Portsmouth, USA.
4. Kerzner, H. R. (2013), Project Management: A Systems Approach to Planning, Scheduling, and Controlling, John Wiley & Sons, New York, USA.
5. Lester, A. (2007), Project Management, Planning and Control, Butterworth Heineman publishing house, Portsmouth, USA.

MTP223 - Transport Policy and Governance	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

Objective:

- To introduce the students to Transport Policy, Legislation and Institutional Framework.

Unit I Introduction to Transport Policy Making 9

Basic concepts of policy, strategy and tactics, fundamentals of transport policy, theoretical and historical perspectives; principles of transport policy making at local, national and international level.

Unit II Transport Sector Policies 9

National transport policies in sectors of road sector, Road transport, railways, civil aviation, ports and shipping; financial outlays in transport sector; National urban transport policy (NUTP); urban bus service provision policies, MRTS policies, NMT policies, Logistics and freight sector policies; PPP in transport sector; International and national case studies on best practices in urban, regional and national transport policies.

Unit III Transport Legislation and Acts 9

Road Transport Corporation (RTC) Act, Motor Vehicle Act, National Highway Act; Legislations in Railways, Civil Aviation, Ports sector, Logistics sector, Multimodal Transport Act etc.

Unit IV Institutional Frameworks in Transport Sector 9

Institutional set ups in Roads, Road transport, Railways, Civil Aviation, Ports and Shipping, Metro Rail Corporations, State Road Transport Undertakings .City Bus Undertakings; Urban Transport set up in Municipal Authorities, local bodies etc.; UMTA; Special Purpose Vehicles (SPV's), Role of NGO's etc.; innovative methods in institutional strengthening, institutional audit and capacity building.

Unit V Case Studies 9

A review of regulating policies and case studies on national, state and regional policies and governance implications of these policies.

Total: 45 Periods

Outcomes:

1. Apprehension of various transport policies and there relevance in transportation.
2. Understating the importance of legislation and governance for transport sector.

References:

1. Planning Commission National Transport Development Policy Committee (2014), India Transport Report: Moving India to 2032. Government of India.
2. MoUD (2006), National Urban Transport Policy. Government of India.\
3. O'Flaherty, C.A. (2000), Transport Planning and Traffic Engineering, Department of Transport, USA