

Proposed Course Modification – Department of Urban Planning

1. Background of the Revision

The Master in Urban Planning curriculum of the Department of Urban Planning, School of Planning and Architecture, New Delhi, is proposed to be revised in response to significant changes in professional planning practice, technology, urban governance, data-driven decision-making and emerging areas of specialization.

The last major revision of the curriculum was undertaken in 2015. Since then, urban planning practice has undergone considerable transformation, particularly with the increasing application of GIS, urban data analytics, Artificial Intelligence, smart infrastructure, transit-oriented development, participatory planning, climate-resilient development, land economics and real-estate analytics.

The present revision therefore seeks to modernize the programme while retaining its established strengths in planning theory, policy, infrastructure and studio-based education. The proposed revision does not increase the overall semester-wise academic load; rather, it restructures, updates, renames and expands existing subjects and introduces contemporary electives and specialization pathways.

2. Reasons for Undertaking the Revision

The revision has been undertaken in response to the changing requirements of the urban planning profession and the need to improve the employability and international competitiveness of graduates.

Feedback received through interaction with students, alumni, professionals, employers and placement-related engagements has indicated an increasing requirement for planners who possess competencies beyond conventional planning practice, particularly in:

- GIS, GeoAI and urban data analytics;
- Artificial Intelligence and machine learning applications in planning;
- smart infrastructure and urban service analytics;
- transit-oriented development and future mobility;
- land economics, real estate and development finance;
- climate resilience and blue-green infrastructure;
- community engagement and participatory planning;
- professional practice, entrepreneurship and planning startups.

Accordingly, the proposed curriculum incorporates AI, GeoAI, urban data science, flexible electives, specialized degree pathways, community planning, applied laboratories, stronger industry engagement and global exposure while retaining the core planning foundation of the programme.

The proposed modernization is expected to increase placement potential by developing future-ready skills, technological expertise and specialization opportunities.

3. Recommendation within the Department

The proposal for revision of the Master in Urban Planning curriculum was discussed within the Department of Urban Planning in the Departmental Faculty Meeting held on 01/02/2026 and 22/04/2026.

During the discussion, the Department Faculty reviewed:

- modifications to existing core and theory subjects;
- revision of the GIS/Quantitative Methods component into the Urban Data Science, GIS and AI Methods Lab;
- introduction of the Community-Based Participatory Planning Studio;
- flexible Planning and Design Studios;
- enlargement of the departmental elective basket;
- proposed specialization pathways in Artificial Intelligence and Land Economics and Real Estate;
- proposed AI + Cities Lab; and
- proposed policy governing ethical use of Artificial Intelligence in academic work.

The Department Faculty considered the proposed changes relevant to contemporary planning education and professional practice and recommended/approved the proposal for further consideration by the competent academic bodies of the Institute.

The revised curriculum retains the overall semester-wise credit and contact-hour structure and introduces modernization primarily through restructuring and updating existing course content.

Departmental Faculty Meeting date: 01/02/2026 and 22/04/2026.

4. Recommendation of the Advisory Committee

The proposed curriculum revision was placed before the Departmental Advisory Committee/Academic Advisory Committee in its meeting held on 04/05/2026 and 01/06/2026.

The Committee reviewed the proposed curriculum with particular reference to:

- contemporary professional requirements;
- employability;
- technological transformation of planning practice;
- AI and urban data science;
- land economics and real estate;
- participatory planning;
- flexibility in studio and elective choices;
- research opportunities;
- industry orientation; and
- NEP 2020 requirements.

The Advisory Committee recommended the proposed revision for consideration by the appropriate statutory bodies of SPA Delhi.

The minutes of the Advisory Committee meeting dated 04/05/2026 and 01/06/2026 are enclosed as Annexure.

5. Recommendation of Other Stakeholders

The curriculum revision has been informed by interactions with multiple stakeholders and by a review of contemporary academic and professional requirements.

The proposal has been discussed/validated through the following, wherever documentary evidence is available:

- feedback from students and alumni;
- interaction with employers and professionals during placements, internships, juries and professional engagements;
- discussions with practising planners, government officials and consultants;
- faculty and HOD-level discussions; and
- comparative review of leading international planning programmes.

A structured international curriculum comparison was undertaken with programmes at Harvard, MIT, University of Tokyo, Kyoto University and Chiba University. The comparison highlighted the importance of flexibility, technology and analytics, AI/data science, industry linkages, laboratory-based research, sustainability and community-based participatory planning.

The revised curriculum further institutionalizes stakeholder engagement by introducing a Community-Based Participatory Planning Studio involving residents, local institutions, neighbourhood groups, workshops, focus group discussions, participatory mapping, surveys and community validation.

6. Impact of the Proposed Syllabus

a. Impact on Learning Outcomes

The revision is expected to significantly improve student learning outcomes by shifting the programme towards a combination of conceptual knowledge, professional application, analytical capability, digital skills, field engagement and research competence.

Students will develop competencies in:

- evidence-based planning and spatial reasoning;
- GIS, remote sensing, urban data science and GeoAI;
- AI and machine-learning applications in planning;
- community engagement and participatory methods;
- planning legislation and professional practice;
- infrastructure and smart urban systems;
- land economics, development finance and real estate;
- climate resilience and sustainable planning;
- professional communication and decision-making; and
- ethical and responsible use of data and Artificial Intelligence.

Several revised courses explicitly use Course Outcomes mapped to Programme Outcomes, including domain knowledge, critical thinking, research and inquiry, communication, ethical reasoning, multidisciplinary integration and professional practice.

b. Impact on Job Prospects and Placements

The proposed syllabus is expected to improve placement prospects by preparing students for both conventional and emerging employment sectors.

Graduates will be better prepared for opportunities in:

- Central, State and local government planning agencies;
- development authorities and urban local bodies;
- planning and infrastructure consultancy firms;
- GIS and geospatial companies;
- AI, urban analytics and technology companies;
- transport and mobility planning organizations;
- real-estate consulting and advisory companies;
- land and property analytics;
- development finance and infrastructure finance;
- environmental and climate-resilience organizations;
- research institutions;
- international development organizations; and
- planning-related startups and entrepreneurship.

The report specifically identifies future-ready skills, improved capability for government employment, community engagement, entrepreneurship, specialized degree pathways and international competitiveness as major employability benefits.

c. Impact on Research

The revised syllabus will significantly strengthen research by introducing students to empirical, spatial, computational, policy and design-based research approaches.

The proposed thesis framework enables students to pursue:

1. Urban Planning research;
2. Land Economics research; and
3. AI/Data-Enabled research.

The proposed AI + Cities Lab will provide an interdisciplinary platform for research in geospatial intelligence, smart mobility, environmental monitoring, climate resilience, digital twins, urban analytics, computer vision, machine learning and related areas.

7. NEP 2020 Compliance

The proposed revision is aligned with the broad principles of NEP 2020, particularly flexibility, multidisciplinary education, outcome-based learning, employability, technology integration, research orientation and experiential learning.

1. Outcome-Based Education: Subjects will have explicitly stated Course Outcomes (COs), with appropriate mapping to Programme Outcomes (POs).

2. Flexibility and Choice: The revised curriculum enlarges the departmental elective basket and provides specialization pathways in Artificial Intelligence/GeoAI and Land Economics/Real Estate while continuing the common Urban Planning core.

3. Multidisciplinary and Interdisciplinary Learning: Courses integrate planning with data science, AI, economics, finance, environment, mobility, governance and community development, with cross-listing where appropriate.

4. Skill-Based and Employability-Oriented Education: Studio work, GIS/AI labs, professional assignments, case studies, planning documentation, fieldwork and practical exercises develop directly applicable professional competencies.

5. Experiential Learning: The Community-Based Participatory Planning Studio includes field visits, resident interaction, stakeholder consultation, participatory mapping, focus-group discussions, workshops and community validation.

6. Integration of Technology: Urban Data Science, GIS, GeoAI, machine learning, digital twins, dashboards, remote sensing and AI-enabled planning are integrated into the curriculum.

7. Research Orientation: Research seminars and thesis options support empirical, design, policy and computational planning research.

8. Entrepreneurship and Innovation: Planning Legislation and Professional Practice is expanded to incorporate startups, PropTech, GovTech, civic-tech, climate-tech and entrepreneurial practice.

9. Continuous and Transparent Assessment: A number of proposed subjects adopt the institutional 50% continuous internal assessment and 50% end-semester assessment structure, supported by verifiable academic deliverables.

10. Ethical and Responsible Technology Use: The proposed AI Policy establishes provisions for responsible and transparent use of AI while safeguarding originality, academic integrity, critical thinking and professional competence.

8. Competencies within the Department to Follow Through the Proposed Revisions

The Department presently possesses substantial academic competency to implement the revised curriculum in the core areas of urban planning, city and metropolitan planning, sustainability, infrastructure, GIS, planning legislation, participatory planning and related professional subjects.

The current full-time faculty will form the academic core for implementation. However, highly specialized components may be strengthened through:

- visiting and adjunct faculty;
- guest faculty from industry and government;
- practising planners and consultants;
- collaboration with other departments of SPA Delhi;
- collaboration with IITs and specialized AI/data-science institutions;

The AI + Cities Lab proposal provides for participation of regular faculty, a senior faculty member as Lab Director, research associates, collaboration with other SPA departments, and external national, international, government and industry partners. The Department has the core capability to implement the proposed revision with present skill.

Minutes of Meeting

Department of Urban Planning, School of Planning and Architecture, New Delhi

Topic: Academic Advisory Committee Meeting, Dates: 04/05/2026 & 01/06/2026

Attendees: 1) Prof. Dr. Prafulla Parlewar, HOD (UP), Chairman, 2) Prof. Dr. Meenakshi Dhote, Dean (Academics), Member, 3) Prof. Dr. Mona Iyer, Expert Member, 4) Dr. Shabd Bansal, Expert Member, 5) Prof. Dr. Mahua Mukherjee, Expert Member, 6) M. Palaniappan, Member, 7) Dr. Chandrani B. Neogi, Member, 8) Dr. Nilanjana D. Sur, Member, 9) Dr. Sakkeri Ramya, Member, 10) Shri Karan Barpete, Member, 11) Shri Palthya Srinivas Naik, Member

Chairman Dr. Prafulla Parlewar warmly welcomed everyone to the meeting, and the following are the points of discussion:

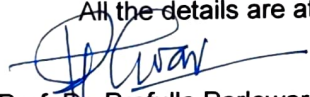
1) The present theory and studio courses have been modified, as detailed in the attached report. All members agreed to the modifications in the present theory and studio courses, as detailed in the attached report.

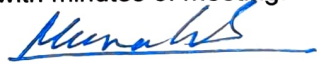
2) The department proposes two specialization track courses: a) a Master's in Urban Planning (Land Economics and Real Estate) and b) a Master's in Urban Planning (Artificial Intelligence).

3) A proposal for "AI+Cities Lab" within department of urban planning is approved by the members.

4) Members accept the AI policy for academic studios, theory subjects, reports, presentations, and sheet submissions.

All the details are attached in annexures along with minutes of meeting.


Prof. Dr. Prafulla Parlewar,
HOD (UP), Chairman

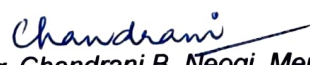

Prof. Dr. Meenakshi Dhote,
Dean (Academics), Member

(Online Consent)
Prof. Dr. Mona Iyer, Expert Member

(Online Consent)
Dr. Shabd Bansal, Expert Member

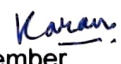
(Online Consent)
Prof. Dr. Mahua Mukherjee, Expert Member

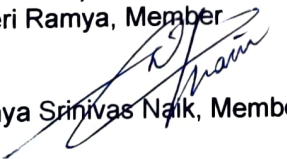

M. Palaniappan, Member


Dr. Chandrani B. Neogi, Member


Dr. Nilanjana D. Sur, Member

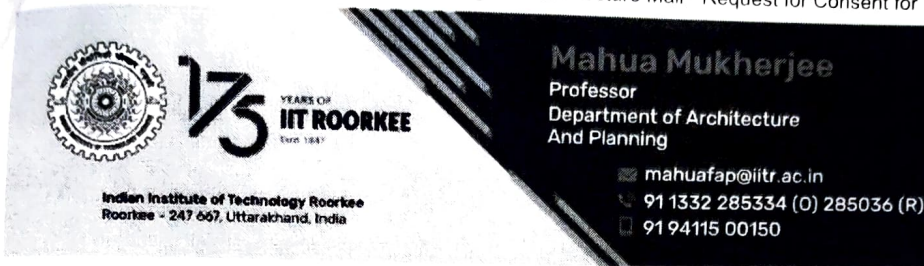
(Online Consent)
Dr. Sakkeri Ramya, Member


Shri Karan Barpete, Member


Shri Palthya Srinivas Naik, Member

26, 11:07 AM

School of Planning and Architecture Mail - Request for Consent for MOM for Academic Advisory Meetings



From: "HOD Department of Urban Planning" <hodup@spa.ac.in>
To: shabdbansal54@gmail.com, "mahuaafap" <mahuaafap@iitr.ac.in>, "mona iyer" <mona.iyer@cept.ac.in>
Cc: "Dean Academics" <deanacademics@spa.ac.in>
Sent: Monday, July 6, 2026 11:48:06 AM
Subject: Request for Consent for MOM for Academic Advisory Meetings

[Quoted text hidden]

Mona Iyer <monaiyer@cept.ac.in>

Sun, Jul 12, 2026 at 8:25 AM

To: HOD Department of Urban Planning <hodup@spa.ac.in>

Cc: shabdbansal54@gmail.com, mahuaafap@iitr.ac.in, mona.iyer@cept.ac.in, Dean Academics <deanacademics@spa.ac.in>

Dear Dr. Prafulla

Kindly take this email as online consent for the minutes of the academic advisory meeting.

Regards
Mona

[Quoted text hidden]

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HOD Department of Urban Planning <hodup@spa.ac.in>

Request for Consent for MOM for Academic Advisory Meetings

4 messages

HOD Department of Urban Planning <hodup@spa.ac.in>

Mon, Jul 6, 2026 at 11:48 AM

To: shabdbansal54@gmail.com, mahuaafap@iitr.ac.in, mona.iyer@cept.ac.in

Cc: Dean Academics <deanacademics@spa.ac.in>

Dear All,

Please give your consent for the MOM for academic advisory meetings.

Thank you. Regards,

Dr. Prafulla Parlewar
HOD (UP)**2 attachments** **Minutes of Meeting 1.0.pdf**
107K **URBAN PLG REPORT 6-7-26.pdf**
3466K**Dr. Shabd Prakash Bansal** <shabdbansal54@gmail.com>
To: HOD Department of Urban Planning <hodup@spa.ac.in>

Mon, Jul 6, 2026 at 12:23 PM

Please go ahead. I here with convey my consent for Academic Advisory Committee Meetings.

Warm Regards.

Dr Shabd Prakash Bansal

9810980287(m)

[Quoted text hidden]

Mahua Mukherjee <mahuaafap@iitr.ac.in>

Mon, Jul 6, 2026 at 5:00 PM

To: HOD Department of Urban Planning <hodup@spa.ac.in>

Cc: shabdbansal54@gmail.com, mona iyer <mona.iyer@cept.ac.in>, Dean Academics <deanacademics@spa.ac.in>

Dear Praful

Kindly consider this letter as my consent on the MoM attached.

Best

Mahua

Mahua Mukherjee, PhD., Fulbright Fellow

Head & Professor, Department of Architecture & Planning

Joint Faculty and Ex-Head, Centre of Excellence in Disaster Mitigation and Management

IIT Roorkee, INDIA

SAADRI Secretary-General

UNDRR -APSTAAG Board Member

Ph. 01332-285334 (O), 285036 (R)

Cell: 09411500150

Email: mahuaafap@iitr.ac.in, mahua1965@gmail.com

Web: <https://www.iitr.ac.in/~AR/mahuaafap><https://www.iitr.ac.in/centers/COEDMM/pages>



HOD Department of Urban Planning <hodup@spa.ac.in>

Consent for MOM for Academic Advisory Meetings

2 messages

HOD Department of Urban Planning <hodup@spa.ac.in>
To: Sakkeri Ramya <sakkeri.ramya@spa.ac.in>

Mon, Jul 6, 2026 at 2:05 PM

Dear Ramya,

Please give your consent to MOM for the academic advisory committee meeting.

Dr. Prafulla Parlewar
HOD (UP)

2 attachments

 **URBAN PLG REPORT 6-7-26.pdf**
3466K

 **Minutes of Meeting Final 6-7-2026.pdf**
87K

Mon, Jul 6, 2026 at 3:11 PM

Sakkeri Ramya <sakkeri.ramya@spa.ac.in>
To: HOD Department of Urban Planning <hodup@spa.ac.in>
Cc: "Dr. Prafulla Parlewar" <prafulla.parlewar@spa.ac.in>

Dear Sir,
I hereby give my consent to the Minutes of the Meeting (MoM) for the Academic Advisory Committee meeting.
Thank you.

Regards,

Dr. Sakkeri Ramya

Ph.D. (IIT Roorkee), MCP (IIT Kharagpur)

Assistant Professor

Department of Urban Planning

School of Planning and Architecture, Indraprastha Estate, Delhi-110002, INDIA.

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DETAIL REPORT - DEPARTMENT OF URBAN PLANNING

Proposed Modernization of Existing Course Curriculum, New Degree Pathways, New Lab Proposal, and AI Policy

1. Introduction

The Department of Urban Planning intends to revise its courses to align with current demands of the urban planning profession and to provide an internationally competitive curriculum. The modifications aim to enhance student employability while ensuring course alignment with the National Education Policy and evolving professional requirements. The department plans to implement improvements and initiatives to enhance urban planning teaching, research, and professional outreach. The existing syllabus will be revised to enhance the worldwide competitiveness of the Urban Planning program. Following a comparative analysis of analogous programs in the USA and Japan, the course framework need revision to integrate global best practices and emerging fields in urban planning (Table 1.0).

1.1. Enhancement of Existing Course Curriculum

The main features of the proposed course are a combination of AI data science, community planning, and adaptable studio exercises. The course will equip students for the current and future demands of urban planning professionals in the following major areas:

1.1.1. Modification in theory subjects

The primary modifications are implemented in theoretical subjects to meet the current demands of the profession. The subsequent theoretical subjects have been revised in accordance with current demands: a) UP2.01 City and Metropolitan Planning, b) UP2.02 Infrastructure Planning, c) UP2.03 Sustainable Planning and Development d) UP2.06 Quantitative Methods and GIS Applications, and e) UP4.01 Planning Legislation and Professional Practice (refer to Tables 2.0, 3.0, and 4.0).

1.1.2. Flexible Studio exercises

The studio has been adapted according to the current planning framework, aligning with students to the latest governmental initiatives and regulations. The present studio curriculum comprises a) UP2.06 Quantitative Methods and GIS Applications and b) a standard studio in the second and third semesters. The studio on GIS application has been revised to UP2.06 Urban Data Science, GIS, and AI Methods Lab. The studio curriculum for the second semester is designed to allow for the exploration of Master Plans, Zonal Plans, and Local Area Plans, as well as Strategic Plans, Infrastructure Plans, and various other planning initiatives.

1.1.3. New Studio on Community-Based Participatory Planning

A new studio focused on community-based participation, consisting of 2 hours each week, is proposed, finishing in a jury examination.

1.1.4. New Bundle of Departmental Electives

The department offers a bundle of electives focused on artificial intelligence, land economics and real estate, GIS and spatial planning, transportation and transit-oriented development, housing and infrastructure, urban heritage and local area planning, and disaster management.

1.2. Provision of New Specialization Degree Pathways

The department aims to offer flexibility for students to attain an new degree in specialized fields. The proposed new degree tracks include:

- a) Masters in Urban Planning (Land Economics and Real Estate), and
- b) Masters in Urban Planning (Artificial Intelligence).

1.3. Proposed “AI + Cities Lab”

The departmental programs will be expanded to include Artificial Intelligence and Data Science. The department has commenced institutional electives pertaining to GeoAI. The department plans to initiate a new degree pathway programme in the Master’s in Urban Planning (Artificial Intelligence). A specialized AI Cities Lab is proposed. The laboratory will serve as a key hub for the School, offering practical assistance for AI-centric courses and fostering research in Artificial Intelligence inside the institution.

1.4. AI Policy for Academic Work

With the emergence of generative AI and other AI platforms, malpractice in the use of AI for making sheets and literature has become a concern. The department intends to promote correct and ethical use of AI by students. AI policy for academic studios, theory subjects, reports, presentations and sheet submissions should be formulated to prevent misuse of AI and to guide responsible academic practice.

1.5. Cities Dataverse

The department produces substantial data for various cities through studio work and thesis projects. The department intends to develop an online data bank where such data can be shared openly across planning professionals and researchers. The funding for this is can be through School funds or through alumni funds.

2. Rationale

The key rationale for revising the course curriculum is as follows:

- 2.1. To enhance the worldwide competitiveness of the Urban Planning program.
- 2.2. To synchronize the program with the National Education Policy (NEP).
- 2.3. To synchronize the program with national mandates and policies.
- 2.4. To synchronize the course with forthcoming trends in technology, artificial intelligence, public policy, and land economics.

3. Comparison of Courses

The comparison shows that SPA Delhi has a strong conventional planning foundation, but international programmes provide useful directions for modernization. Harvard demonstrates the value of flexibility, design-policy integration, and leadership-oriented studio learning. MIT demonstrates the importance of technology, analytics, AI/data science, and strong industry linkages. The University of Tokyo shows the role of engineering planning and research-based coursework. Kyoto University highlights sustainability-led and lab-based urban and regional planning. Chiba University demonstrates the value of applied technical fieldwork and community-based participatory planning system.

Table 1.0: Comparative study of Course Curriculum in USA, Japan and SPA, Delhi

Criteria	SPA Delhi (India)	Harvard MUP (USA)	MIT DUSP (USA)	University of Tokyo (Japan)	Kyoto University (Japan)	Chiba University (Japan)
Program Name	M. Plan (Urban Planning)	MUP	MCP	MEng/ Urban Planning	Urban & Regional Planning	Urban Environment Systems
Duration	2 Years	2 Years	2 Years	2 Years	2 Years	2 Years
Structure	Fixed + electives	Flexible + studios	Flexible + tracks	Research + coursework	Research + lab	Technical + applied
Core Focus	Planning, policy, infrastructure	Design + policy + systems	Tech + analytics + policy	Engineering planning	Sustainability	Community Participation + policy
Year 1 Focus	Core + studio	Core + methods + studio	Core + quantitative + studio	Coursework + lab	Coursework + lab	Coursework + technical
Year 2 Focus	Thesis + electives	Advanced studio + thesis	Specialization + thesis	Research thesis	Lab thesis	Project/thesis
Electives Flexibility	Limited	Very high	Very high	Moderate	Moderate	Moderate
AI/Data Science	Emerging	Growing	Strong	Limited	Limited	Moderate
Interdisciplinary Exposure	Moderate	Very high	Very high	Moderate	Moderate	Moderate
Industry Linkages	Moderate	Strong	Very strong	Strong	Strong	Moderate
Pedagogy Style	Theory + studio	Studio + discussion	Research + lab	Lab + research	Lab-based	Technical Field Work
Key Strength	Planning foundation	Design & planning leadership	Tech-driven planning	Engineering planning	Sustainability	Community-Based Participatory System

This comparison supports the need to revise the SPA Delhi syllabus by adding stronger AI, GeoAI, urban data science, flexible electives, new degree pathways, community planning, applied laboratories, industry engagement, and global exposure. At the same time, the revision should retain SPA Delhi's existing strength in planning theory, policy, infrastructure, and studio-based learning.

4. Proposed existing and proposed Course Curriculum

The proposed revision of the Master in Urban Planning syllabus from Semester II onwards aims to modernize the curriculum while maintaining the existing credit and workload structure. Across Semesters II, III, and IV, the total hours and credits remain unchanged, showing that the revision is achieved through renaming, merging, updating, and expanding course content rather than increasing academic load. A major focus of the revised syllabus is the integration of contemporary planning themes such as smart infrastructure, sensors, service analytics, community-based participatory planning, GeoAI, urban data science, applied artificial intelligence, compact cities, TOD, future mobility, circular economy, blue-green infrastructure, public space planning, informal housing, and DCR/LAP implementation.

The revision also introduces greater flexibility through new electives and specialization streams in Artificial Intelligence and Land Economics and Real Estate. Semester II strengthens foundations in urban analytics by replacing the quantitative methods and GIS lab with an Urban Data Science, GIS and AI Methods Lab. Semester III expands studio and thesis preparation through flexible frameworks, allowing students to pursue urban planning, land economics, or AI/data-enabled research. Semester IV further supports specialization by permitting thesis work in empirical, design, policy, and computational planning research, while also adding planning legislation, professional practice, and startups to encourage innovation and entrepreneurship. Overall, the revised syllabus makes the programme more responsive to emerging urban challenges, technological transformation, market needs, and interdisciplinary research directions without increasing the semester-wise credit burden.

The Semester II Planning and Design Studio is proposed as a professional comprehensive planning studio, where students will work on master plans, TOD master plans, GIS-based master plans, compact city master plans, zonal plans, local area plans, or other relevant planning exercises. It also introduces contemporary approaches such as transit-oriented development, station influence zone analysis, mixed-use planning, walkability, value capture, GIS-based spatial decision-making, compact growth, 15-minute city principles, urban regeneration, and plot- or block-level local area planning.

The Semester III Planning and Design Studio is framed as flexible studio, allowing students to engage with strategic plans, action plans, zonal plans, local area plans, land management plans, brownfield redevelopment, slum redevelopment, urban regeneration, heritage conservation, tourism planning, city economic region plans, metropolitan planning, infrastructure planning, DPR preparation, municipal finance, climate resilience, and AI-enabled urban planning. It also integrates emerging tools such as GIS, remote sensing, machine learning, generative AI, urban simulation, and dashboards for decision support in areas such as TOD potential, compactness scoring, infrastructure gaps, flood vulnerability, heat-risk mapping, walkability, and accessibility.

Below is the nature of change and rationale for existing course curriculum:

Table 1.0: Semester II Comparison (Existing vs Proposed)

Module	Existing Syllabus	Hrs	Proposed Revised Syllabus	Hrs	Nature of Change / Rationale
Core	UP2.01 City and Metropolitan Planning	2 hr	UP2.01 City and Metropolitan Planning	2 hr	Added module on city economic regions
Core	UP2.02 Infrastructure Planning	2 hr	UP2.02 Urban Infrastructure Systems and Smart Services	2 hr	Retains infrastructure planning; adds smart infrastructure, sensors, service analytics
Core	UP2.03 Sustainable Planning and Development	2 hr	UP2.03 Sustainable Planning and Development	2 hr	Course modified
Core	UP2.04 Project Planning and Management	2 hr	UP2.04 Project Planning and Management	2 hr	No change
Studio	UP2.05 Design Studio	10 hr	UP2.05 Design Studio	10 hr	Studio exercise detailed (Annexure)
Studio	UP2.06 Quantitative Methods and GIS Applications	2 hr	UP2.06 Urban Data Science, GIS and AI Methods Lab	2 hr	New AI/data methods lab aligned with urban analytics directions
Department Elective	UP2.07 Urban Information System and Spatial Analysis UP2.08 Land Use and Transport Planning	2 + 2 hr	UP2.07 Urban Information System and Spatial Analysis UP2.08 GeoSpatial Artificial Intelligence (GeoAI) (Elective for New Degree Course) UP2.09 Land Economics and Real Estate (Elective for New Degree Course) UP2.10 Land Use and Transport Planning UP2.11 Blue-Green Infrastructure and Nature-Based Solutions UP2.12 Public Space Planning and Placemaking UP2.13 Informal Housing and Infrastructure UP2.14 DCR & LAP Implementation	2 + 2 hr	New Electives and flexibility to choose for new degree course in following: Master in Urban Planning (Land Economics and Real Estate) Master in Urban Planning (Artificial Intelligence)
TOTAL	Existing total hours / credits	22 hr	Proposed total hours / credits	22 hr 22 cr	No increase in total semester load;

Module	Existing Syllabus	Hrs	Proposed Revised Syllabus	Hrs	Nature of Change / Rationale
		22 cr			changes are achieved by renaming, merging, and updating content.

Table 2: Semester III Comparison (Existing vs Proposed)

Module	Existing Syllabus	Hrs	Proposed Revised Syllabus	Hrs	Nature of Change / Rationale
Core	UP3.01 Urban Development Management and Governance	2 hr	UP3.01 Community Planning and Participation	2 hr	Departmental elective converted as a regular course and regular course as departmental elective
Core	UP3.02 Development Finance	2 hr	UP3.02 Community-Based Participatory Planning Studio	2 hr	New studio in coordination with studio exercise
Core	UP3.03 Urban Risk and Disaster Management	2 hr	UP3.03 Urban Risk Reduction and Planning for Resilience	2 hr	Modified
Studio	UP3.04 Design Studio	10 hr	UP3.04 Design Studio: Flexible Framework	10 hr	Studio revised multi options
Studio	UP3.05 Thesis Research Seminar	2 hr	UP3.05 Thesis Research Seminar 1) Urban Planning 2) Land Economics 3) AI/Data-Enabled Research	2 hr	Flexibility to students to take seminar topics in three streams
Department Elective	UP3.06 Community Planning and Participation UP3.07 Urban Design and Heritage	2 + 2 hr	UP3.06 Urban Risk and Disaster Management UP3.07 Urban Design and Heritage UP3.08 Applied Artificial Intelligence (Elective for New Degree Course) UP3.09 Advance Land Economics (Elective for New Degree Course) UP3.10 Compact Cities and TOD UP3.11 Future Mobility and Autonomous Transport System	2 + 2 hr	New Electives and flexibility to choose for new degree course in following: Master in Urban Planning (Land Economics and Real Estate) Master in Urban Planning (Artificial Intelligence)

Module	Existing Syllabus	Hrs	Proposed Revised Syllabus	Hrs	Nature of Change / Rationale
			UP3.12 Circular Economy and Urban Metabolism UP3.13 Development Policies UP3.14 Urban System Dynamics UP2.15 Sustainable Planning and Development		
Institute Elective	UP3.08 Inclusive Cities	2 hr	UP3.13 Inclusive Cities UP3.14 GeoSpatial Artificial Intelligence (GeoAI)	2 hr	New Elective Approved
TOTAL	Existing total hours / credits	22 hr 22 cr	Proposed total hours / credits	22 hr 22 cr	No increase in total semester load; changes are achieved by renaming, merging, and updating content.

Table Semester IV Comparison

Module	Existing Syllabus	Hrs	Proposed Revised Syllabus	Hrs	Nature of Change / Rationale
Core	UP4.01 Planning Legislation and Professional Practice	2 hr	UP4.01 Planning Legislation, Professional Practice and Startups	2 hr	Adds startups as additional module to encourage Startup Ecosystem
Core	UP4.02 Urban Development Policies	2 hr	UP4.02 Development Finance and Policies	2 hr	Participatory planning methods and its field work introduction to students
Core	--	--	UP4.03 Urban Development Management and Governance	2 hr	3 rd Sem shifted to 4 th Sem and course modified
Studio	UP4.03 Thesis	10 hr	UP4.03 Thesis: 1) Urban Planning 2) Land Economics 3) AI/Data-Enabled Research	8 hr	2 hrs reduced and thesis permits empirical, design, policy, and computational planning research

Module	Existing Syllabus	Hrs	Proposed Revised Syllabus	Hrs	Nature of Change / Rationale
Institute Elective	UP4.04 Climate Resilient Urban Development	2 hr	UP4.04 Climate Resilient Urban Development	2 hr	No change
TOTAL	Existing total hours / credits	16 hr 16 cr	Proposed total hours / credits	16 hr 16 cr	No increase in total semester load; changes are achieved by renaming, merging, and updating content.

5. New Community-Based Participatory Planning Studio

The Community-Based Participatory Studio is introduced in Semester IV is a fieldwork-oriented and participatory studio course designed to train students in community-based planning through direct engagement with residents, stakeholders, local institutions, and neighbourhood groups. The studio emphasizes community interaction, stakeholder consultation, participatory workshops, focus group discussions, participatory mapping, field visits, and community validation before preparing planning proposals. Students learn to identify local issues through field observation and community knowledge, prepare stakeholder matrices and needs assessments, translate community feedback into spatial planning proposals, and present the final outcomes through studio sheets, reports, documentation, and jury discussion. The course also introduces participatory tools such as transect walks, social mapping, resource mapping, focus groups, charrettes, visioning, public hearings, surveys, and workshops to strengthen inclusive and people-centred planning practice.

6. Departmental Electives

The proposed departmental electives provide greater flexibility within the Master in Urban Planning programme while keeping the overall credit and contact-hour structure unchanged. The elective basket allows students to specialise in emerging and practice-oriented areas such as GeoAI, applied artificial intelligence, land economics, real estate, transport and TOD, blue-green infrastructure, public space planning, informal housing, disaster management, urban design, heritage, future mobility, and circular economy. It is organised around two major new degree pathways—Artificial Intelligence, and Land Economics and Real Estate—along with regular departmental electives, helping students build both traditional planning competencies and new digital, spatial, economic, environmental, and governance skills required for contemporary urban planning practice.

7. Specialization Degree Pathways

The specialty Degree Pathways will initially be available to students through specialized electives. Subsequently, engaging in a research seminar and thesis within the same discipline (refer Figure 1.0).

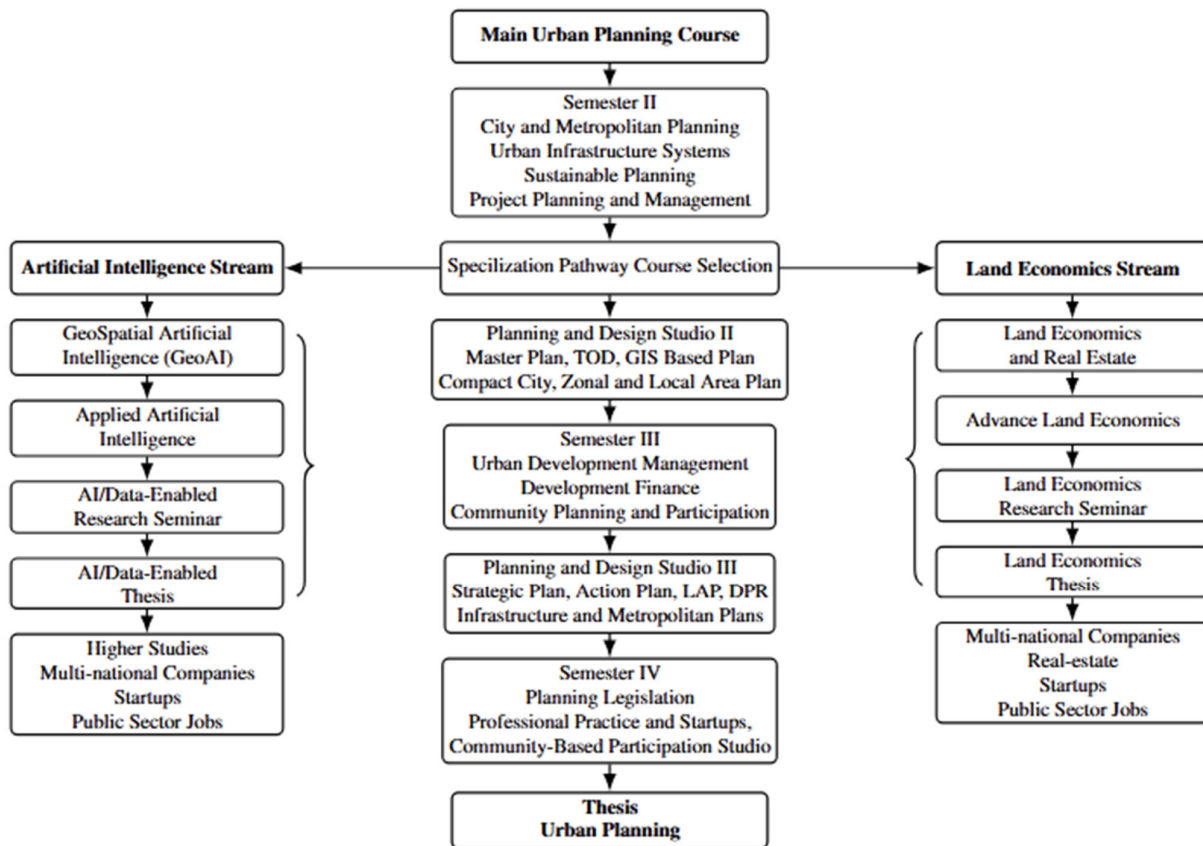


Figure 1.0: Main Urban Planning Course and Specialized Pathways

8. Employability

The proposed course intends to develop employability of the urban planning students in following points:

- 8.1.1. Future Ready Urban Planning Skills:** The suggested courses equip students with skills that are vital for the next 10 to 15 years. The proposed course is aligned with future technologies, urban development, and urban policies.
- 8.1.2. Better skills for government jobs:** The training of students in national programs, policies, planning processes, and professional exposure will enhance their performance in public sector employment.
- 8.1.3. Community engagement and field work skills:** The course alignment promotes strong abilities for community engagement through relevant fieldwork. This is the most crucial talent for current government policies regarding creative redevelopment, transit-oriented development, and the implementation of master plans.

- 8.1.4. Entrepreneurship and startups:** The proposed course aims to enhance entrepreneurship among students and stimulate the existing startup ecosystem of the School inside the curriculum. This will enable students to initiate innovative enterprises upon course completion.
- 8.1.5. Specialized Degree Pathways:** The specialized degree programs in artificial intelligence and land economics enhance employability. Currently, there is a persistent demand for research in artificial intelligence across numerous countries. Furthermore, land economics and real estate enable students to work with international corporations.
- 8.1.6. International Competitiveness:** The proposed course enhances student's worldwide competitiveness by developing their research skills and global knowledge in urban planning and the implementation of cities that meet global standards.

9. Tangible Outcomes

- 9.1.1. Revised and Globally Competitive Curriculum:** The suggested globally competitive curriculum prepares students for advanced research objectives and the development of internationally competitive cities.
- 9.1.2. New Specialized Degree Pathways:** The new specialized pathways enhance the competitiveness of students, institutions, and at both national and international levels.
- 9.1.3. AI + Cities Lab Establishment:** The laboratory will enable not only the department but the entire institute to assume leadership in AI research.
- 9.1.4. AI Policy for Academic Integrity:** The AI policy aims to prevent illegal use of AI throughout the whole academic program. Therefore, upholding the academic integrity of the School at highest level.
- 9.1.5. Higher Placement Potential:** The course modernization will improve placement potential through a development of future-ready skills, specialized degrees, and technological expertise.
- 9.1.6. Institutional Leadership:** The School will foster strong leadership across institutions in India for the urban planning program, featuring a contemporary curriculum and advanced skills for students.

10. Proposed “AI + Cities Lab”

The proposed Artificial Intelligence for Cities Lab (AI + Cities Lab) is envisioned as an interdisciplinary research and capacity-building centre at SPA Delhi, focused on applying AI methods to urban planning, geospatial intelligence, smart mobility, environmental monitoring, climate resilience, digital twins, and immersive urban design. The lab will use applied AI, computer vision, natural language processing, machine learning, urban analytics, and geospatial tools to address complex urban challenges. It will bring together SPA departments,

national AI and data science institutions, industry partners, and international collaborators to strengthen research, teaching, consultancy, and evidence-based urban governance.

The lab will contribute to SPA Delhi by modernizing pedagogy, developing future-ready planners, supporting interdisciplinary research, and positioning the institution as a national leader in AI-enabled planning and architecture. Its activities will include certified courses, workshops, mentoring, sponsored research, consultancy, open-source urban AI models, curated datasets, dashboards, policy briefs, technical reports, and academic publications. The proposal also outlines infrastructure, budget, collaboration strategy, self-financing mechanisms, and a phased implementation plan covering setup, pilot research, training programmes, external outreach, consultancy, and publication of initial outputs.

11. Proposed “AI Policy”

The proposed AI Policy for the Department of Urban Planning establishes a clear academic framework to regulate the use of AI, generative AI, and AI-assisted tools in studios, theory subjects, reports, presentations, sheets, and doctoral work. Its main purpose is to protect academic integrity, originality, design authorship, critical thinking, and professional competence while allowing limited and transparent AI use only where explicitly permitted by faculty. The policy prohibits unauthorized AI-generated content in assignments, juries, thesis work, doctoral research, references, presentations, drawings, analysis, and submissions, and requires students to submit either an AI Use Declaration or a No-AI Declaration as applicable. It also provides rules for evidence review, due process, penalties for violations, and the formation of an AI Review Committee to handle serious misconduct and update the policy regularly.

12. Conclusions

The department of urban planning aims to provide a globally competitive program to provide students with state-of-the-art education in urban planning. The education is enhanced by the integration of AI, data science, smart technologies, participatory planning systems, and land economics. The primary benefit of this course upgrade will be increased employability, specialization, and skill development. The proposed increase maintains the existing course credits and retains all previous subjects in the curriculum. In the future, the department intends to augment the enrolment by an additional 10 students. India's demand for highly competent urban planners will create opportunities for more students applying to SPA Delhi. In the future, the department intends to expand the specialized courses in the Master in Urban Planning (Land Economics and Real Estate) and Master in Urban Planning (Artificial Intelligence) as full master's degree programs.

Submitted to Senate for approval.

Annexure

a) Annexure A: Modified and New Courses

- 1.0 Modified Course – UP4.01 Planning Legislation, Professional Practice and Startup
- 2.0 Modified Course – UP2.02 Urban Infrastructure Systems and Smart Services
- 3.0 Modified Course – UP2.06 Urban Data Science, GIS and AI Methods Lab
- 4.0 Modified Course – UP3.02 Development Finance
- 5.0 Modified Course – UP 3.03 Urban Risk Reduction and Planning for Resilience
- 6.0 Modified Course – UP 2.01 City and Metropolitan Planning
- 7.0 Modified Elective Course – UP2.10 Land Use and Transport Planning
- 8.0 New Elective Course – UP 3.14 Urban System Dynamics
- 9.0 New Studio Course – UP3.02 Community-Based Participatory Planning Studio

b) Annexure B: New Pathway Electives Course

- 10.0 New Elective Pathway Course – UP 2.08 GeoSpatial Artificial Intelligence
- 11.0 New Elective Pathway Course – UP 3.08 Applied Artificial Intelligence
- 12.0 New Elective Pathway Course – UP2.09 Land Economics and Real Estate
- 13.0 New Elective Pathway Course – UP3.09 Advanced Land Economics and Real Estate

c) Annexure C: Departmental Elective Bundle

d) Annexure D: Modified Studio Course

e) Annexure E: Proposed “AI + Cities Lab”

d) Annexure F: AI Policy

a) Annexure A: Modified and New Courses

UP4.01: Planning Legislation, Professional Practice and Startups

a. Vision and Mission Statement of the Department/Course

Vision

To develop globally competent, socially responsible and future-ready urban planners capable of addressing complex urban challenges through integrated planning knowledge, technological innovation, sustainability, inclusiveness and evidence-based decision-making.

Mission

To provide high-quality urban planning education through integration of planning theory, studio practice, field engagement, advanced spatial and digital technologies, interdisciplinary learning and research; to prepare students for professional leadership in government, industry, academia and society; and to advance sustainable, inclusive, participatory and technologically enabled urban development.

b. Subject Objectives

The subject objectives are subordinate to and supportive of the Programme Vision and Mission. On completion of this subject, students should be able to:

- Build legal literacy for urban and regional planning practice across comparative jurisdictions and understand the legal hierarchy governing planning decisions.
- Understand the statutory basis of plan preparation, land-use control, development permission, environmental assessment, public participation and urban governance.
- Interpret Indian planning legislation, statutory procedures, institutional mandates and implementation instruments in a professional planning context.
- Connect professional ethics, consultancy practice, project implementation and legal accountability with contemporary planning practice.
- Develop the ability to interpret laws, prepare professional planning and legal documents, manage risk and formulate legally compliant planning projects.
- Identify and evaluate entrepreneurial opportunities in PropTech, GovTech, civic-tech, climate-tech, geospatial analytics, digital twins, planning compliance and decision-support systems.
- Apply evidence-based, inclusive and ethically responsible approaches to statutory planning, professional practice and urban innovation.

c. Alignment with Other Subjects and Overall Objectives of the Course

This subject is positioned as a bridge between planning theory/studio learning and statutory, institutional, professional and entrepreneurial practice. The alignment below should be read together with the approved semester-wise curriculum and Programme Outcomes.

Curricular Linkage	Nature of Alignment	Contribution of UP4.01
Preceding subjects	Builds on foundational planning theory, urban governance, planning techniques, land-use planning and basic understanding of planning institutions.	Adds the statutory and professional framework needed to translate planning concepts into legally valid plans, permissions, projects and implementation actions.
Parallel/Core subjects	Complements core subjects dealing with urban development, infrastructure, governance, land, housing, transport, environment and implementation.	Provides the legal basis, institutional roles, statutory safeguards, participation requirements, professional accountability and implementation instruments relevant to those subjects.
Studio exercises	Directly supports studio work involving plan preparation, development controls, implementation mechanisms and stakeholder engagement.	Enables students to identify applicable laws, statutory procedures, approval processes, public consultation requirements, implementation instruments and compliance risks in studio proposals.
Departmental electives	Provides a legal/professional foundation for electives in smart cities, GIS/GeoAI, housing, transport, environment, real estate, urban management and emerging technologies.	Helps students understand how specialized technical proposals operate within statutory, procurement, data, IP, privacy and professional frameworks.
Research seminar	Supports literature review, policy/legal analysis, case-law interpretation, institutional research and evidence-based argumentation.	Develops the ability to read statutes, rules, policy documents and case material and to prepare structured analytical notes.
Thesis	Strengthens the legal, institutional, ethical and	Supports identification of statutory context, governance structure,

Curricular Linkage	Nature of Alignment	Contribution of UP4.01
	implementation dimensions of thesis research and proposals.	compliance requirements, stakeholder processes, implementation pathways and professional risks.
Programme Outcomes	Contributes to planning knowledge, analytical skills, professional practice, digital capability, stakeholder engagement, research, communication and ethics.	Mapped explicitly through the CO-PO matrix in Section d.

Vertical and Horizontal Integration

Vertical integration is achieved by moving from foundational planning knowledge to statutory interpretation, professional documentation, implementation and thesis-level application. Horizontal integration is achieved by linking legal processes with governance, environmental safeguards, participation, studio proposals, consultancy practice, data/AI responsibility and entrepreneurial innovation. Duplication should be minimized by using this subject primarily for legal interpretation, statutory process, professional accountability and implementation rather than repeating technical methods taught elsewhere.

d. Subject Details

Course Code	UP4.01
Course Title	Planning Legislation, Professional Practice and Startups
Semester	IV (inferred from course code; confirm as per approved scheme)
Status	Proposed: Core; confirm as per approved scheme
Number of Credits	Proposed: 3 credits; confirm as per approved scheme
Contact Hours	Proposed: 45 hours (3 hours/week equivalent); confirm as per approved scheme
Prerequisites	Foundational knowledge of planning theory, urban governance, planning techniques and studio methods; no formal prerequisite stated in source file.

Course Overview

The course develops legal literacy and professional competence for urban and regional planning through a comparative understanding of planning legislation in the USA, Europe, Japan and India, with particular emphasis on Indian statutory processes and institutions. It integrates public participation, professional ethics, legal accountability, consultancy and project formulation with emerging entrepreneurial opportunities in planning-related PropTech, GovTech, civic-tech, climate-tech and geospatial/digital services. The course emphasizes interpretation of laws, preparation of professional documents, risk-aware project implementation and development of legally and ethically responsible planning innovations.

Course Objectives

1. COBJ1: Build legal literacy for urban and regional planning practice across comparative jurisdictions and understand the legal hierarchy governing planning decisions.
2. COBJ2: Understand the statutory basis of plan preparation, land-use control, development permission, environmental assessment, public participation and urban governance.
3. COBJ3: Interpret Indian planning legislation, statutory procedures, institutional mandates and implementation instruments in a professional planning context.
4. COBJ4: Connect professional ethics, consultancy practice, project implementation and legal accountability with contemporary planning practice.
5. COBJ5: Develop the ability to interpret laws, prepare professional planning and legal documents, manage risk and formulate legally compliant planning projects.
6. COBJ6: Identify and evaluate entrepreneurial opportunities in PropTech, GovTech, civic-tech, climate-tech, geospatial analytics, digital twins, planning compliance and decision-support systems.

Course Outcomes (COs)

CO	Measurable Course Outcome
CO1	Explain and compare the legal basis, institutional hierarchy and development-control frameworks of planning systems in the USA, Europe, Japan and India.
CO2	Interpret Indian statutory processes for preparation, approval, implementation, monitoring and revision of plans, including development permission, environmental safeguards and public participation.
CO3	Analyse the roles, functions, capacities and accountability mechanisms of planning and development organizations in India and selected international contexts.

CO	Measurable Course Outcome
CO4	Evaluate professional ethics, legal liability, participation processes, contract safeguards, data privacy and responsible use of AI in planning practice.
CO5	Prepare professional planning outputs such as terms of reference, bid/contract safeguards, legal or compliance notes, statutory notices, consultation reports and implementation documentation.
CO6	Formulate and communicate a legally aware and ethically responsible planning-startup concept addressing a statutory, governance, participation, implementation or urban-data problem.

Module-wise Content and Proposed Hours

Module 1: Comparative Planning Legislation - USA, Europe, Japan and India [8 hours]

- Comparative legal systems for planning: federal, state/provincial, prefectural, municipal and regional roles; legal hierarchy, delegated legislation, rules, by-laws, regulations and statutory plans.
- USA: zoning enabling laws and local zoning ordinances; comprehensive plans; subdivision regulations; police power, due process, takings, inclusionary zoning, historic preservation, NEPA/State Environmental Policy Acts, public hearings and judicial review.
- Europe: EU-level directives and national planning systems; SEA, EIA, Habitats and Water Framework interfaces; examples from UK/England, Germany and the Netherlands for planned systems, development control and public consultation.
- Japan: City Planning Act, Building Standards Act, land readjustment, urban redevelopment, urbanization promotion/control areas, district plans, transit-oriented development, disaster-risk and compact-city planning instruments.
- India: constitutional basis, 73rd and 74th Constitutional Amendments, State Town and Country Planning Acts, Development Authority Acts, municipal laws, master/development plans, town planning schemes, land acquisition, RERA, EIA, heritage and environment-related laws.
- Comparative exercise: matrix comparing plan hierarchy, development permission, land acquisition/readjustment, participation, environmental safeguards, appeals and enforcement mechanisms across the four regions.

Module 2: Indian Planning Legislation, Governance and Statutory Process [8 hours]

- Evolution of planning legislation in India; constitutional provisions relating to land, local government, environment and planning; role of Union, State, metropolitan, regional and local institutions.

- Town and Country Planning Acts, Improvement Trust Acts, Urban Development Authority Acts, Municipal Corporation/Municipal Council Acts, Metropolitan Planning Committee and District Planning Committee provisions.
- Procedures for preparation, notification, publication, public objections, approval, implementation, monitoring and revision of regional plans, master plans, development plans, local area plans and town planning schemes.
- Land assembly and implementation instruments: land pooling, land readjustment, transferable development rights, impact fees, betterment levy, development charges and public-private partnerships.
- Statutory process and safeguards: public participation, environmental permissions, heritage conservation, social impact, rehabilitation and resettlement, dispute resolution, appeals and judicial remedies.

Module 3: Planning and Development Organizations [6 hours]

- International scenario of development agencies in the USA, Japan, Europe, UAE and other countries.
- Town and Country Planning Organization, State Town and Country Planning Departments, Urban Development Departments, Development Authorities, City Improvement Trusts, Metropolitan Planning Committees, District Planning Committees and Municipal Corporations.
- Objectives, functions and duties; organizational structure, staffing patterns, technical capacity, statutory obligations, data systems, budgeting and project financing.
- Implementation issues in Indian and international practice: institutional overlaps, capacity gaps, accountability, transparency, open data, procurement and monitoring.

Module 4: Public Participation, Professional Ethics and Legal Accountability [7 hours]

- Role of interdisciplinary groups, community-based organizations, civil society, private sector, elected representatives and citizen forums in statutory and non-statutory planning.
- Methods of participation: notices, hearings, workshops, participatory mapping, online consultation, grievance redressal, social audits and inclusion of vulnerable groups.
- Professional institutes and bodies in planning; roles and responsibilities of planning consultants, planners in public agencies and planners in private practice.
- Professional ethics, conflict of interest, duties towards clients, fellow professionals and the public; code of conduct, confidentiality, transparency and evidence-based advice.
- Legal accountability: negligence, liability, indemnity, arbitration, contract safeguards, intellectual property, data privacy and responsible use of AI in planning practice.

Module 5: Professional Practice, Consultancy and Project Formulation [8 hours]

- Scope of services for planning projects: inception, baseline studies, stakeholder engagement, analysis, concept options, statutory drafting, implementation strategy and monitoring framework; professional project case studies.
- Consultancy agreements, terms of reference, bid documents, tenders, contracts, deliverables, timelines, professional fees, negotiation and variation management.
- Project context, rationale and objectives; work plan, budget, assumptions, risks, sustainability, stakeholder involvement, reporting, review, monitoring and evaluation.
- Implementation arrangements: project governance, procurement, contract management, quality assurance, documentation, dissemination and mainstreaming of project learning.
- Professional documentation: legal notes, board/council agenda notes, planning briefs, statutory notices, public consultation reports, compliance matrices and implementation MoUs.

Module 6: Planning Startups, Urban Innovation and Entrepreneurial Practice [8 hours]

- Introduction to startup opportunities in urban planning: PropTech, GovTech, civic-tech, climate-tech, geospatial analytics, urban digital twins, mobility platforms, housing analytics, compliance automation and planning decision-support systems.
- Problem discovery and validation in cities: identifying pain points of local bodies, development authorities, communities, consultants, real-estate stakeholders and infrastructure agencies.
- Startup business models: B2G, B2B, SaaS, consulting-plus-product, data-as-a-service, API-based services, impact ventures and public-private innovation pilots.
- Legal and professional compliance for startups: company formation, contracts, procurement eligibility, data protection, open-data licences, IP ownership, AI governance, liability and ethical safeguards.
- Funding and ecosystem: incubators, accelerators, research commercialization, grant proposals, CSR, multilateral projects, venture funding, public innovation challenges and pilot-to-scale pathways.
- Capstone exercise: concept note and pitch deck for a planning startup that solves a statutory planning, public participation, project implementation or urban-data problem.

Total proposed contact hours: 45 hours. The module-hour allocation is proposed for curriculum formatting because the source course file did not specify hours.

Assessment Structure

The source course file specifies the following internal assessment pattern (50 marks). The remaining end-semester/external assessment, if applicable, should follow the approved institutional regulations.

Assessment Component	Marks	Primary COs	Indicative Evidence
Comparative legislation matrix	15	CO1	Comparative legal-system matrix and analytical note
Indian statutory process assignment / case note	10	CO2, CO3	Case-based statutory process analysis
Professional practice documentation exercise	10	CO4, CO5	ToR / statutory notice / compliance matrix / contract safeguard / implementation note
Startup concept note and pitch presentation	10	CO4, CO6	Problem validation, legal-compliance logic, business model and pitch
Class participation, quizzes and statute-reading discussions	5	CO1-CO4	Short quizzes, seminar participation and jurisdiction/statute notes
Total Internal Assessment	50		

CO-PO Mapping

Following is the Programme Outcome (PO) as per National Education Policy (NEP):

PO	Descriptor	Programme Outcome Statement
PO1	Planning Knowledge	Apply integrated knowledge of urban and regional planning theory, institutions, law and practice.
PO2	Analysis and Critical Evaluation	Analyse complex urban issues using evidence, policy, legal and institutional reasoning.
PO3	Planning Methods and Professional Outputs	Apply planning methods and prepare implementable professional planning outputs.
PO4	Digital and Analytical Capability	Use appropriate spatial, digital, data and AI-enabled methods responsibly.
PO5	Sustainability and Inclusion	Integrate sustainability, equity, inclusiveness and resilience into planning decisions.

PO	Descriptor				Programme Outcome Statement				
PO6	Stakeholder Engagement and Governance				Engage effectively with communities, institutions and stakeholders in participatory governance.				
PO7	Research and Lifelong Learning				Undertake independent inquiry, interpret authoritative sources and update knowledge continuously.				
PO8	Communication				Communicate planning analysis, professional documents and proposals effectively.				
PO9	Professional Ethics and Responsibility				Demonstrate professional integrity, legal awareness, accountability and ethical responsibility.				
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3	3	1	-	1	1	2	2	1
CO2	3	3	3	-	2	2	2	2	2
CO3	3	3	2	1	1	3	2	2	2
CO4	2	3	2	2	2	3	2	2	3
CO5	2	2	3	1	1	2	1	3	3
CO6	2	3	3	3	2	2	2	3	3

Mapping scale: 3 = Strong contribution; 2 = Moderate contribution; 1 = Low contribution; - = No direct contribution.

e. Pedagogy

Pedagogy shall combine legal interpretation, professional application, participatory learning and project-based exercises. The following methods are recommended:

- Lectures for legal concepts, institutional frameworks and professional practice foundations.
- Case-law and statute-reading seminars with short jurisdiction notes.
- Seminars and discussions on comparative legal systems and transferable lessons for India.
- Case-study analysis of statutory planning, development control, environmental assessment, participation and project implementation.
- Comparative legislation matrix and classroom debate.
- Studio-linked exercises that identify legal provisions, statutory steps and implementation instruments relevant to live planning problems.

- Hands-on drafting of statutory notices, consultancy ToR, bid evaluation checklist, compliance matrix, consultation documentation and implementation notes.
- GIS/data/AI-oriented discussions and practical demonstrations on digital planning tools, data privacy, AI governance and responsible use of technology.
- Participatory workshops, stakeholder-role simulations and public-hearing simulations.
- Professional simulations covering consultancy procurement, contract negotiation, project governance and risk management.
- Guest lectures by planning consultants, government planners, legal experts, development-agency professionals and startup founders.
- Group assignments and presentations with peer critique.
- Research-paper/case-note exercises using statutes, rules, policies, government reports and peer-reviewed literature.
- Project-based capstone involving a planning-startup concept note and pitch presentation.

f. Learning Outcomes

The measurable learning outcomes are expressed through the Course Outcomes (CO1-CO6). By the end of the subject, the student will be able to:

- CO1: Explain and compare the legal basis, institutional hierarchy and development-control frameworks of planning systems in the USA, Europe, Japan and India.
- CO2: Interpret Indian statutory processes for preparation, approval, implementation, monitoring and revision of plans, including development permission, environmental safeguards and public participation.
- CO3: Analyse the roles, functions, capacities and accountability mechanisms of planning and development organizations in India and selected international contexts.
- CO4: Evaluate professional ethics, legal liability, participation processes, contract safeguards, data privacy and responsible use of AI in planning practice.
- CO5: Prepare professional planning outputs such as terms of reference, bid/contract safeguards, legal or compliance notes, statutory notices, consultation reports and implementation documentation.
- CO6: Formulate and communicate a legally aware and ethically responsible planning-startup concept addressing a statutory, governance, participation, implementation or urban-data problem.

Learning Outcome Domains

Learning Domain	Outcome	Demonstration in UP4.01
Understand and explain		Legal basis, planning systems, statutory hierarchy, institutional roles and professional responsibilities.
Analyse and critically evaluate		Comparative planning legislation, statutory processes, institutional capacity, ethical issues, legal risks and implementation choices.
Apply planning methods and tools		Use statutory-process analysis, compliance matrices, case methods and appropriate digital/data approaches.
Prepare professional planning outputs		Draft basic ToR, statutory notices, compliance notes, consultation reports, contract safeguards and implementation documentation.
Use appropriate digital and analytical methods		Assess opportunities and responsibilities related to geospatial analytics, digital twins, compliance automation, data services and AI-enabled planning.
Engage with communities and stakeholders		Understand and simulate hearings, consultations, participatory mapping, grievance redressal and inclusive engagement.
Undertake independent research		Read and interpret statutes, rules, notifications, policies, case material, institutional reports and academic literature.
Communicate effectively		Prepare comparative matrices, case notes, professional documents, concept notes and oral pitches.
Demonstrate professional and ethical responsibility		Recognize conflict of interest, confidentiality, transparency, liability, data privacy, responsible AI and duties to the public.

g. References

Core Statutory and Government Sources

- Government of India. Constitution of India, including the 73rd and 74th Constitutional Amendments and relevant provisions relating to local government, land, environment and planning.
- Government of India. India Code - official repository for Central Acts and statutory texts relevant to land, acquisition, real estate, environment and urban development.

- Ministry of Housing and Urban Affairs (MoHUA), Government of India. Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines and related planning guidance.
- Town and Country Planning Organisation (TCPO), Government of India. Manuals, planning standards and technical reports, as applicable.
- National Institute of Urban Affairs (NIUA). Reports and knowledge resources on urban governance, planning, digital cities and urban innovation.
- Relevant State Town and Country Planning Acts, Development Authority Acts, Municipal Acts, rules, development-control regulations and notified plans applicable to case-study jurisdictions.
- Real Estate (Regulation and Development) Act, 2016 (RERA), with applicable rules and amendments.
- Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013, with applicable rules/amendments.
- Environment (Protection) Act, 1986 and applicable EIA notifications, environmental rules and statutory guidance.
- Relevant heritage, disaster-management, data-governance, procurement, contract and intellectual-property laws/guidelines as applicable to course cases.

International and Comparative Sources

- United States Environmental Protection Agency (US EPA). National Environmental Policy Act (NEPA) overview and current implementation guidance.
- European Commission. Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA) guidance and relevant directives.
- European Commission and relevant national planning authorities. Current guidance on planned systems, development control, environmental safeguards and public consultation.
- Japanese Law Translation / Government of Japan. City Planning Act and Building Standards Act, together with current amendments and official translations.
- Relevant official planning legislation, zoning, land-readjustment, urban-redevelopment, compact-city, transit-oriented-development and disaster-risk guidance for selected comparative jurisdictions.

Professional, Academic and Digital Resources

- Professional planning institutes and councils: current codes of conduct, professional-practice guidance, consultancy/procurement guidance and ethics standards.
- Peer-reviewed journals in planning law, urban governance, land-use planning, planning practice, urban management, public participation, digital planning and urban innovation.

- Authoritative case-law databases and official court/judicial repositories for selected planning and land-development cases.
- Government and multilateral datasets relevant to land, environment, urban governance, real estate, infrastructure and public participation.
- Authoritative resources on PropTech, GovTech, civic-tech, climate-tech, geospatial services, responsible AI, data protection, open-data licensing and digital public infrastructure.

Indicative Source Links from the Existing Course File

- US EPA - NEPA: <https://www.epa.gov/nepa>
- European Commission - Environmental Assessments: https://environment.ec.europa.eu/law-and-governance/environmental-assessments_en
- Japanese Law Translation: <https://www.japaneselawtranslation.go.jp/>
- Ministry of Housing and Urban Affairs, Government of India: <https://mohua.gov.in/>
- India Code: <https://www.indiacode.nic.in/>

Recommended Review and Updating Protocol

At the beginning of each academic session, the course coordinator should verify the currency of Acts, rules, notifications, court decisions, planning regulations, professional codes, procurement requirements, data-protection provisions and AI-governance guidance used in lectures and assignments. Case-study materials should be updated to reflect recent statutory and professional practice where relevant.

Annexure: Consolidated Course Design Summary

Module	Hours	Key Learning Focus	Primary COs	Primary Assessment Link
1. Comparative Planning Legislation	8	Comparative legal systems; USA, Europe, Japan, India	CO1	Comparative legislation matrix
2. Indian Planning Legislation & Statutory Process	8	Indian legal framework, plan process, land/implementation instruments, safeguards	CO2	Statutory process assignment/case note
3. Planning & Development Organizations	6	Institutions, mandates, capacity, finance, accountability	CO3	Case note / quizzes / discussions

Module	Hours	Key Learning Focus	Primary COs	Primary Assessment Link
4. Participation, Ethics & Legal Accountability	7	Participation, professional roles, ethics, liability, privacy, responsible AI	CO4	Professional documentation / discussions
5. Professional Practice, Consultancy & Project Formulation	8	ToR, bids, contracts, project governance, documentation	CO5	Professional practice documentation exercise
6. Planning Startups & Urban Innovation	8	Urban innovation, business models, legal compliance, funding, pitch	CO6	Startup concept note and pitch
Total	45			

References

1. Government of India. Constitution of India, including the 73rd and 74th Constitutional Amendments and relevant provisions relating to local government, land, environment and planning.
2. Government of India. India Code - official repository for Central Acts and statutory texts relevant to land, acquisition, real estate, environment and urban development.
3. Ministry of Housing and Urban Affairs (MoHUA), Government of India. Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines and related planning guidance.
4. Town and Country Planning Organisation (TCPO), Government of India. Manuals, planning standards and technical reports, as applicable.
5. National Institute of Urban Affairs (NIUA). Reports and knowledge resources on urban governance, planning, digital cities and urban innovation.
6. Relevant State Town and Country Planning Acts, Development Authority Acts, Municipal Acts, rules, development-control regulations and notified plans applicable to case-study jurisdictions.
7. Real Estate (Regulation and Development) Act, 2016 (RERA), with applicable rules and amendments.
8. Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013, with applicable rules/amendments.
9. Environment (Protection) Act, 1986 and applicable EIA notifications, environmental rules and statutory guidance.

10. Relevant heritage, disaster-management, data-governance, procurement, contract and intellectual-property laws/guidelines as applicable to course cases.
11. United States Environmental Protection Agency (US EPA). National Environmental Policy Act (NEPA) overview and current implementation guidance.
12. European Commission. Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA) guidance and relevant directives.
13. European Commission and relevant national planning authorities. Current guidance on plan-led systems, development control, environmental safeguards and public consultation.
14. Japanese Law Translation / Government of Japan. City Planning Act and Building Standards Act, together with current amendments and official translations.
15. Relevant official planning legislation, zoning, land-readjustment, urban-redevelopment, compact-city, transit-oriented-development and disaster-risk guidance for selected comparative jurisdictions.
16. Professional planning institutes and councils: current codes of conduct, professional-practice guidance, consultancy/procurement guidance and ethics standards.
17. Peer-reviewed journals in planning law, urban governance, land-use planning, planning practice, urban management, public participation, digital planning and urban innovation.
18. Authoritative case-law databases and official court/judicial repositories for selected planning and land-development cases.
19. Government and multilateral datasets relevant to land, environment, urban governance, real estate, infrastructure and public participation.
20. Authoritative resources on PropTech, GovTech, civic-tech, climate-tech, geospatial services, responsible AI, data protection, open-data licensing and digital public infrastructure.
21. US EPA - NEPA: <https://www.epa.gov/nepa>
22. European Commission - Environmental Assessments: https://environment.ec.europa.eu/law-and-governance/environmental-assessments_en
23. Japanese Law Translation: <https://www.japaneselawtranslation.go.jp/>
24. Ministry of Housing and Urban Affairs, Government of India: <https://mohua.gov.in/>
25. India Code: <https://www.indiacode.nic.in/>

UP 2.02 Urban Infrastructure Systems and Smart Services

a. Vision and Mission Statement of the Department / Course

Proposed Vision of the Department

To advance sustainable, inclusive, resilient and technologically responsive urban development through excellence in planning education, research, innovation and professional practice.

Proposed Mission of the Department

- Develop competent urban planning professionals equipped with interdisciplinary, analytical and technological capabilities.
- Promote sustainable, inclusive and climate-responsive approaches to urban and regional development.
- Integrate contemporary planning tools, geospatial technologies, data analytics and smart urban systems into planning education.
- Encourage research, innovation and evidence-based decision-making for addressing emerging urban challenges.
- Strengthen interaction among academia, government, industry, communities and professional institutions.
- Develop socially responsible planners capable of contributing to equitable and sustainable urban development.

Vision of the Subject

To develop a comprehensive understanding of urban infrastructure systems and emerging smart services so that students can plan, assess and integrate efficient, sustainable, resilient and technology-enabled infrastructure within cities.

Mission of the Subject

The subject provides students with conceptual, analytical and practical understanding of conventional and emerging urban infrastructure systems, including water, sanitation, solid waste, mobility, energy, ICT, smart technologies, environmental infrastructure and resilience.

b. Subject Objectives

The objectives of Urban Infrastructure Systems and Smart Services, subordinate to the overall Vision of the Department, are to:

1. Develop an understanding of the concept, evolution, components and institutional framework of urban infrastructure systems.
2. Familiarize students with infrastructure planning standards, benchmarks, financing mechanisms and public-private partnership approaches.
3. Develop knowledge of urban water supply, sewerage, drainage and solid waste management systems.

4. Introduce principles and contemporary approaches related to urban transport, public transit, non-motorized transport and smart mobility.
5. Develop an understanding of smart-city technologies, IoT, GIS, remote sensing, digital twins and urban data analytics.
6. Familiarize students with urban energy, telecommunications, digital infrastructure and fire protection services.
7. Develop an understanding of climate-responsive, sustainable and resilient infrastructure planning.
8. Enable students to relate infrastructure planning with land use, urban form, environmental management and sustainable development.
9. Build the ability to evaluate conventional and technology-enabled infrastructure solutions from planning, environmental and service-delivery perspectives.
10. Encourage integrated and evidence-based approaches to urban infrastructure planning and management.

c. Alignment with Other Subjects and Overall Objectives of the Course

The subject forms an important component of the Urban Planning curriculum by connecting physical planning, land-use planning, transportation, environmental planning, housing, urban governance, municipal finance, geospatial technologies and smart-city planning.

The subject complements other courses in the programme by:

- Linking land-use planning and development planning with infrastructure demand, capacity and service provision.
- Supporting urban transport planning through the study of public transport, NMT, ITS, TOD and smart mobility.
- Complementing environmental planning through water management, waste management, green infrastructure, climate resilience and Environmental Impact Assessment.
- Supporting urban governance and municipal finance through institutional frameworks, infrastructure financing and PPP models.
- Connecting with GIS, remote sensing and spatial analysis through applications in infrastructure mapping, monitoring and decision-making.
- Supporting smart-city and digital planning approaches through IoT, urban data analytics, digital twins and ICT networks.
- Reinforcing concepts of sustainable development, climate resilience and disaster-risk reduction within urban planning.

The subject therefore contributes to the overall programme objective of developing planners capable of understanding and integrating physical, environmental, technological, financial and institutional dimensions of contemporary urban development.

d. Subject Details

Subject Code	UP 2.02
Subject Title	Urban Infrastructure Systems and Smart Services

Nature of Subject	Core / Professional Planning Subject
Primary Focus	Planning, management and integration of urban infrastructure systems and smart urban services.

The subject examines conventional urban infrastructure together with contemporary digital and smart-service systems. It covers infrastructure planning principles, service standards, institutional and financial mechanisms, water and sanitation, waste management, transportation, smart mobility, ICT, energy, urban technologies, sustainability and climate resilience.

Module 1: Introduction to Urban Infrastructure Systems

Topics

- Concept and evolution of urban infrastructure
- Components of urban infrastructure systems
- Urbanization trends and infrastructure challenges
- Relationship between land use and infrastructure
- Infrastructure planning standards and benchmarks
- Institutional framework for urban services
- Urban infrastructure financing mechanisms
- Public-private partnerships (PPP) in urban development

Module 2: Water Supply, Sewerage and Solid Waste Management

Topics

- Urban water supply systems and distribution networks
- Water demand estimation and service standards
- Sewerage systems and wastewater treatment
- Stormwater drainage systems
- Urban flooding and climate resilience
- Solid waste management principles
- Waste segregation, recycling and circular economy
- Smart monitoring systems for water and waste management

Module 3: Urban Transport Systems and Smart Mobility

Topics

- Urban transport planning principles
- Public transport systems: Metro, BRTS, buses and paratransit
- Non-Motorized Transport (NMT) infrastructure
- Traffic management systems
- Intelligent Transport Systems (ITS)
- Transit-oriented development (TOD)
- Smart parking and Mobility-as-a-Service (MaaS)

- Sustainable and low-carbon transportation

Module 4: Smart City Technologies and Other Infrastructure

Topics

- Concept and framework of smart cities
- Internet of Things (IoT) in urban management
- GIS and remote sensing applications
- Urban data analytics and digital twins
- ICT infrastructure and urban communication networks
- Smart energy systems and smart grids
- Transmission, Distribution and Supply network
- Sustainable Energy Planning
- Telecommunications - Infrastructure and Network Systems
- Digital Infrastructure
- Fire Fighting Services - Planning for Fire Protection Services and Space Standards

Module 5: Urban Environment, Sustainability and Resilience

Topics

- Urban environmental management
- Climate change and resilient infrastructure
- Green infrastructure and blue-green networks
- Urban heat island effect
- Renewable energy integration in cities
- Disaster risk reduction and emergency management
- Sustainable Development Goals (SDGs) and urban infrastructure
- Environmental Impact Assessment (EIA) for infrastructure projects

e. Pedagogy

The subject shall be delivered through an integrated combination of lectures, discussions, case studies and application-oriented exercises. The pedagogy may include:

- Classroom lectures for theoretical and conceptual understanding.
- Case studies of infrastructure planning and service-delivery systems in Indian and international cities.
- Analysis of infrastructure standards, benchmarks, policies and guidelines.
- Mapping and spatial analysis of infrastructure systems using GIS and related digital tools.
- Demonstrations of smart-city technologies, IoT applications, urban dashboards and digital infrastructure systems.
- Infrastructure demand and service-level assessment exercises.
- Group discussions and presentations on contemporary infrastructure challenges.
- Field visits to selected infrastructure facilities, utilities, transport systems or smart-city projects, wherever feasible.

- Problem-based learning using real urban infrastructure issues.
- Comparative assessment of conventional and smart infrastructure solutions.
- Integration of sustainability, resilience and climate considerations in infrastructure planning exercises.

Emphasis shall be placed on connecting theoretical understanding with contemporary planning practice and real-world urban infrastructure problems.

f. Learning Outcomes

LO1. Explain the concepts, components, evolution and institutional structure of urban infrastructure systems.

LO2. Identify relationships among urbanization, land use, infrastructure demand and service provision.

LO3. Apply relevant infrastructure planning standards, benchmarks and service-level concepts in urban planning.

LO4. Analyse urban water supply, sewerage, stormwater drainage and solid waste management systems from a planning perspective.

LO5. Evaluate urban transport infrastructure, public transport, NMT, ITS, TOD and smart-mobility approaches.

LO6. Explain the application of IoT, GIS, remote sensing, urban data analytics, digital twins and ICT systems in urban infrastructure management.

LO7. Assess energy, telecommunications, digital and fire-protection infrastructure requirements within urban areas.

LO8. Integrate environmental sustainability, climate resilience, renewable energy, disaster-risk reduction and green infrastructure considerations into urban infrastructure planning.

LO9. Examine institutional, financial and PPP mechanisms associated with urban infrastructure development and service delivery.

LO10. Develop integrated and evidence-based infrastructure planning proposals responsive to contemporary urban challenges and sustainable-development objectives.

g. References

11. Government of India, Ministry of Housing and Urban Affairs. Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines.
12. Ministry of Housing and Urban Affairs, Government of India. Service Level Benchmarks for Urban Services.
13. Central Public Health and Environmental Engineering Organisation (CPHEEO). Manual on Water Supply and Treatment.

14. Central Public Health and Environmental Engineering Organisation (CPHEEO). Manual on Sewerage and Sewage Treatment Systems.
15. Central Public Health and Environmental Engineering Organisation (CPHEEO). Manual on Municipal Solid Waste Management.
16. Ministry of Housing and Urban Affairs, Government of India. Smart Cities Mission - Mission Guidelines and related publications.
17. Ministry of Housing and Urban Affairs, Government of India. National Urban Transport Policy and related urban mobility guidelines.
18. National Disaster Management Authority. Relevant guidelines on urban flooding, disaster management and resilient infrastructure.
19. Bureau of Indian Standards. Relevant Indian Standards and National Building Code provisions concerning urban infrastructure and fire safety.
20. United Nations. Sustainable Development Goals, particularly Goal 6, Goal 7, Goal 9, Goal 11 and Goal 13.
21. UN-Habitat. Publications and reports on sustainable urban infrastructure, smart cities, urban resilience and inclusive urban development.
22. World Bank. Publications on urban infrastructure, municipal services, infrastructure financing and public-private partnerships.
23. Asian Development Bank. Publications relating to sustainable urban infrastructure and smart urban development.
24. Relevant national, state and local government policies, development plans, infrastructure standards and contemporary case studies may also be referred to during the course.

Course Title: Urban Data Science, GIS and AI LAB

Teaching Inputs

Total Lectures: 16

Time Duration: 2 hours / lecture

Total Hours / semester: 32 hours

Credits: 2 (Studio) (Replacing present GIS subject)

Programme placement: M.Plan Urban Planning, 2nd Semester (introductory elective); cross-listed across all M.Plan specialisations and as an SPA-wide open elective for B.Plan VIII, SPA Architecture, and SPA Landscape. Designed to be accessible to students with no prior background in statistics or programming. NEP-compliant format with declared Course Outcomes, PO mapping, and 50/50 assessment.

Course Overview

This introductory elective addresses a foundational skill that planners need but typically acquire only by chance: the ability to think spatially in a rigorous, statistical, and empirical way. Planners are trained to reason about cities visually and intuitively through studio work, but rarely trained to interrogate their own spatial intuitions with data and evidence. This course makes that move. Without requiring prior programming skills or advanced mathematics, it teaches students to operationalise urban concepts as measurable variables; to read and interpret spatial data and descriptive statistics; to grasp the logic of statistical inference, correlation, and causation; to read published empirical research on Indian cities critically; and to use evidence honestly and ethically in planning recommendations. The course is positioned as a bridge for students who later plan to take the proposed Quantitative Methods and GIS Applications course, and as a complete introduction in itself for students who will not.

Course Outcomes (COs)

Each Course Outcome is mapped to one or more Programme Outcomes (POs), listed at the foot of this document, consistent with the NEP-2020 Outcome-Based Education framework.

- CO1 — Shift from intuitive to evidence-based spatial reasoning when analysing Indian urban problems. [PO1, PO2]
- CO2 — Operationalise urban concepts as measurable variables and identify the principal Indian data sources for spatial analysis. [PO1, PO3]
- CO3 — Read, interpret, and critique published empirical research on urban questions, including spatially-aware research. [PO2, PO3]
- CO4 — Apply the logic of statistical inference, sampling, hypothesis testing, correlation vs. causation, and uncertainty, conceptually, to evaluate planning claims. [PO1, PO2]

- CO5 — Use empirical evidence honestly and ethically in planning recommendations; communicate uncertainty to non-technical audiences. [PO4, PO5]

Positioning in the Current Curriculum

This proposal is framed as a curriculum reform, not as a parallel addition. It is anchored explicitly against the existing M.Plan Urban Planning syllabus at SPA Delhi:

- Currently, the M.Plan UP curriculum has no introductory course on empirical spatial reasoning. CA2 covers basic micro and macro economics conceptually, but not empirical methods. C2.1 and other core courses use empirical findings without ever teaching students how to read, interpret, or critique those findings.
- This course functions as the accessible entry point to the proposed Quantitative Methods and GIS Applications course (3 cr): students who take this elective first will be substantially better prepared to engage with that more demanding course.
- Differentiates from Quantitative Methods and GIS Applications by remaining conceptual and accessible — no programming required, no heavy mathematical apparatus, focused on reading, critique, and study design rather than producing analyses.
- Adopts the NEP-compliant format: Course Outcomes (COs), CO-to-PO mapping, Topics + Activities, and the institutional 50/50 assessment scheme articulated through verifiable deliverables.
- Consistent with the SPA Delhi M.Plan curricular norm, the course is taught entirely in lecture-and-seminar format.

Course Structure and Modules

Module 1: Foundations of Evidence-Based Spatial Thinking

Duration: 14 hours

Combines: Why Spatial Thinking Needs Evidence; Measuring Cities; Describing Spatial Patterns.

Purpose: To help students move from intuitive spatial judgement to evidence-informed reasoning. The module explains why planners need empirical evidence, how urban concepts can be measured, and how spatial patterns can be described and interpreted critically.

Key Topics

- The planner as spatial thinker: what visual, intuitive, and studio-trained reasoning can reveal.
- The intuition trap: how spatial intuition may mislead in real planning decisions, with Indian examples.
- Meaning of empirical evidence in planning practice: evidence, opinion, anecdote, and stylised fact.

- Intuition versus evidence in Indian planning history, including slum eviction assumptions, transit ridership predictions, and master-plan land allocations.
- Operationalising urban concepts such as livability, density, informality, accessibility, and publicness into measurable variables.
- Indian data sources for urban spatial analysis, including Census of India, NSSO, PLFS, MoSPI, ULB-level data, RBI Residex, NHB Residex, MoHUA dashboards, and ISRO Bhuvan.
- Validity, reliability, measurement error, and the geography of missing or misrepresented data.
- Privacy, ethics, and responsible data use in Indian planning research.
- Descriptive spatial statistics: distributions, central tendency, dispersion, and spatial variation.
- Critical reading of choropleth maps, dot-density maps, and heat maps.
- Spatial autocorrelation, the Modifiable Areal Unit Problem (MAUP), aggregation effects, and ecological fallacy.

Learning Activities

- Class discussion of Indian planning decisions where intuition performed well and where it failed.
- Short response paper of 600 words assessing the evidentiary basis of one planning belief held by the student.
- Reading and discussion of a short methodological essay on evidence in planning.
- Operationalisation exercise in which students select one urban concept and propose five measurable variables.
- Data audit of one Indian dataset, written as an 800-word note on strengths, biases, and gaps.
- Map critique exercise using three published Indian planning maps.
- Conceptual exercise using the same data with three different boundary aggregations to discuss how conclusions may change.

Expected Learning Outcomes

- Distinguish evidence-based spatial reasoning from opinion, anecdote, and visual intuition alone.
- Translate abstract urban concepts into measurable indicators while recognising limitations.
- Evaluate the quality, bias, and gaps of Indian urban datasets.
- Interpret descriptive spatial patterns critically without overclaiming from maps or aggregated data.

Module 2: Inference, Empirical Relationships, and Planning Practice

Duration: 18 hours

Combines: Inference and Uncertainty; Empirical Relationships and Spatial Patterns; Empirical Reasoning in Planning Practice.

Purpose: To help students understand what data can and cannot prove, how empirical relationships are interpreted, and how evidence should be translated into ethical and responsible planning recommendations.

Key Topics

- Sample versus population in urban research; representative and opportunistic samples.
- Conceptual logic of statistical inference, including hypothesis tests, p-values, confidence intervals, and their limitations.
- Correlation versus causation in spatial contexts and the third-variable problem.
- Common inferential pitfalls in planning research, including multiple comparisons, p-hacking, publication bias, and false precision.
- Reading and critiquing inferential claims in published Indian urban research.
- Regression as a way of studying empirical relationships: outcomes, predictors, controls, and interpretation of tables in plain language.
- Why ordinary regression may mislead when applied to spatial data, especially under spatial autocorrelation.
- Spatial regression in plain language: what spatial-econometric papers attempt to do and why.
- Difference-in-differences and natural experiments in Indian planning research.
- Empirical case studies on Indian cities, including housing prices and transit access, air quality and exposure, informal settlements and amenities, and master-plan effects on sprawl.
- From analysis to recommendation: how evidence enters planning decisions in practice.
- Communicating empirical findings to non-technical audiences through policy briefs, public consultations, media, and court submissions.
- Ethics of empirical claims in planning: bias, equity, harm, and duty of care.
- Limits of measurement and questions that data cannot answer.
- Building a long-term spatial-empirical reasoning habit for professional practice.

Learning Activities

- Critical reading of a published Indian urban paper that overstates causal claims, followed by a 1,000-word methodological critique.
- In-class debate on whether a given empirical inference is justified.
- Short rewriting exercise to revise the recommendation section of a published study so that uncertainty is communicated honestly.
- Reading group using three published Indian regression papers, focusing on the inferences each paper draws.

- Conceptual study-design exercise to test a planning claim of interest.
- Class debate on whether empirical regression studies of Indian master plans support or contradict their stated objectives.
- Term paper proposal of approximately 3,000 words on an Indian urban question, covering research question, design, data, analytical approach, threats to validity, and ethical considerations.
- Final synthesis seminar with peer feedback on term paper proposals.
- Reflective memo of 500 words on how the course changes the student's approach to spatial planning evidence.

GEOGRAPHIC INFORMATION SYSTEM

MODULE 1 — Spatial Data Creation, Visualization & Urban Mapping

Session 1 — GIS Environment & Spatial Data Fundamentals

Practical Components

- ArcCatalog / ArcGIS Pro interface
- Creating geodatabases and layer files
- Coordinate systems and projections
- Raster vs vector data
- Georeferencing scanned toposheets/master plans
- KML/KMZ ↔ SHP conversion

Urban Planning Application

- Preparing ward/base maps
- Municipal GIS database creation
- Integrating Google Earth planning data

Session 2 — Digitization, Attribute Data & Thematic Mapping

Practical Components

- Digitization of:
 - Roads
 - Land use
 - Open spaces
 - Utilities
- Creating shapefiles
- Excel table joins
- Symbolology:
 - Choropleth
 - Graduated colors
 - Proportional symbols
 - Charts

Urban Planning Application

- Existing land use surveys
- Socio-economic mapping
- Infrastructure mapping

Session 3 — Spatial Queries & Geoprocessing

Practical Components

- Selection by Attribute
- Selection by Location
- Buffer
- Clip
- Intersect
- Union
- Merge
- Erase

Planning Case Exercises

- Schools within industrial buffer
- Open space accessibility
- Transit influence zones

MODULE 2 — Remote Sensing & Spatial Planning Analytics

Session 4 — Raster Analysis & Terrain Modelling

Practical Components

- DEM concepts
- Contour generation
- Slope
- Aspect
- Hillshade
- Extract by Mask
- Reclassification

Planning Application

- Hill town planning
- Infrastructure suitability
- Hazard-sensitive zoning

Session 5 — Watershed & Environmental Planning Analysis

Practical Components

- Hydrological tools
- Flow direction
- Stream network extraction
- Watershed delineation
- Catchment analysis

Planning Application

- Urban flooding
- Stormwater planning
- Blue-green infrastructure planning

Session 6 — Land Use/Land Cover & Change Detection

Practical Components

- LULC classification
- Model Builder workflow
- Landsat data introduction
- Change detection techniques
- Accuracy basics

Planning Application

- Urban sprawl analysis
- Environmental monitoring
- Development plan revision studies

Session 7 — Land Surface Temperature & Urban Climate Analytics

Practical Components

- Thermal band concepts
- LST derivation workflow
- Raster calculator
- Heat island mapping
- Overlay with land use/open spaces

Planning Application

- Heat resilience planning
- Climate-sensitive urban design
- Thermal comfort planning

MODULE 3 — Smart Cities, 3D GIS & Digital Twin Technologies

Session 8 — Drone Mapping & LiDAR for Urban Planning

Practical Components

- Drone survey workflow
- Orthomosaic generation concepts
- Point clouds
- LiDAR basics
- DSM vs DTM
- Extracting building heights

Planning Application

- Informal settlement mapping
- Corridor planning
- Infrastructure inventory
- Urban morphology analysis

Session 9 — 3D GIS, CityEngine & Urban Modelling

Practical Components

- Introduction to procedural modelling
- CityEngine basics
- GML/City GML concepts
- 3D urban form generation
- Rule-based street/block modelling
- Basic digital twin concept

Planning Application

- TOD visualization
- Urban design simulations
- Skyline and density studies
- Scenario planning

Assignment:

Students prepare:

- Existing land use
- Suitability analysis
- Heat vulnerability
- Watershed constraints
- 3D urban visualization

for a selected urban precinct.

MODULE 6

Session 1: Introduction to AI and ML for Planning

- Focus: Understanding how AI and ML can support planning decisions without replacing planning judgement.
- Key topics: AI vs ML; supervised and unsupervised learning; variables, features and labels; examples from transport, housing, land use and public space.
- Hands-on output: Students prepare a problem statement and list of measurable variables for one studio issue.

Session 2: KNIME and Python Workflow Basics

- Focus: Building transparent and reproducible urban data workflows.
- Key topics: KNIME interface; nodes; data import; joins; filters; missing values; Python scripting node; workflow documentation.
- Hands-on output: A working KNIME workflow that cleans and joins an urban dataset.

Session 3: Geospatial Analytics in KNIME

- Focus: Creating spatial indicators for planning analysis.
- Key topics: Geocoding; coordinates; spatial joins; buffers; accessibility measures; distance to services; neighbourhood-level indicators; Harvard-style geospatial case reading and discussion.
- Hands-on output: A spatial feature table for wards, stations, neighbourhoods or project sites.

Session 4: Visualization and Prediction

- Focus: Converting cleaned spatial data into visual evidence and simple prediction outputs.
- Key topics: Charts; map outputs; dashboards; train-test split; regression/classification; prediction maps; interpreting model error and bias.
- Hands-on output: Final studio lab output consisting of a visualization board and a simple prediction result.

Detailed Topics

A. Introduction to AI and Machine Learning

- What AI can and cannot do in planning practice.
- Machine learning as pattern recognition from data, not automatic truth.
- Planning examples: compact city scoring, transit ridership, land-use suitability, heat-risk mapping, public-space quality and housing market prediction.
- Basic model types: regression, classification, clustering and ranking.
- Responsible AI: bias, explainability, ethics, data gaps and public interest.

B. KNIME and Python for Urban Data Workflows

- Importing CSV, Excel, shapefile or GeoPackage-derived tables and API-based data outputs.
- Cleaning data: missing values, duplicates, inconsistent names, outliers and unit conversions.
- Combining data: joins, concatenation, grouping, aggregation and workflow annotation.
- Using Python in KNIME for custom functions, spatial calculations, feature engineering and model preparation.
- Building reusable, transparent and shareable workflows for studio submissions.

C. Geospatial Analytics in KNIME

- Preparing latitude-longitude data and checking coordinate reference issues.
- Creating indicators from locations: distance to transit, access to schools, parks and healthcare, service density and walkable catchments.
- Spatial joins and buffer-based analysis for neighbourhood, ward, corridor or station-area studies.
- Using Harvard-style geospatial case examples to connect spatial evidence, planning question, method and decision implication.
- Exporting outputs to GIS, spreadsheet and presentation-ready formats.

D. Visualization and Prediction for Studio Exercises

- Designing visual evidence: charts, ranked tables, comparative maps and before-after graphics.
- Exploratory visualization before modelling: distribution, correlation, spatial pattern and outlier checks.
- Building a simple prediction model: define outcome, select predictors, split data, train model and evaluate performance.
- Communicating predictions carefully: uncertainty, limitations, what the model misses and how planners should use the result.
- Preparing a final studio board that combines map, workflow diagram, prediction output and planning recommendation.

Suggested Lab Exercises for Studio

Lab 1: AI Problem Framing

- Convert a planning issue into variables, features and a measurable outcome.
- Main tool: Discussion and spreadsheet.
- Deliverable: One-page AI planning problem sheet.

Lab 2: KNIME Data Cleaning

- Import ward, station or neighbourhood data, clean fields and join datasets.
- Main tool: KNIME.
- Deliverable: Annotated KNIME workflow.

Lab 3: Python Feature Engineering

- Calculate ratios, accessibility scores, density indicators or normalized indices.
- Main tool: Python in KNIME or notebook.
- Deliverable: Feature table with documented formulas.

Lab 4: Geospatial Analysis

- Create buffer/catchment indicators and service-access measures.
- Main tool: KNIME and GIS table output.
- Deliverable: Spatial indicator table and map-ready file.

Lab 5: Visualization

- Prepare charts, rankings and thematic map layouts for studio interpretation.
- Main tool: KNIME views, Python or QGIS.
- Deliverable: Visual evidence sheet.

Lab 6: Prediction

- Train a simple model and interpret predicted values for planning recommendations.
- Main tool: KNIME ML nodes or Python.
- Deliverable: Prediction table, model summary and planning interpretation.

Assessment / Studio Evaluation

Final Studio Submission

- Workflow file: KNIME workflow and any Python script or notebook used.
- Data dictionary: List of variables, source, unit, scale and transformation.
- Visual output: Two to three maps or charts explaining the spatial planning issue.
- Prediction output: A simple model result with interpretation and limitations.
- Planning recommendation: A short evidence-based note explaining how the result supports a studio decision.

Internal Assessment (50%) — Verifiable Deliverables

- Empirical study proposal — term paper (25%) — 3,000-word proposal of an empirical study on an Indian urban question (question, design, data, methods, validity, ethics), submitted at the end of Module 6. Rubric assesses CO1, CO2, CO5.
- Methodological critique paper (15%) — 1,000-word critique of one published Indian empirical urban study, submitted under Module 4. Rubric assesses CO3, CO4.
- Data audit and map critique portfolio (5%) — combined deliverables from Module 2 (data audit) and Module 3 (map critique). Rubric assesses CO2.
- Class participation in seminar discussions and reflective memo (5%) — graded across the semester. Rubric assesses CO1, CO5.

External Assessment (50%) — End-Semester Examination

- End-semester examination (50%) — comprehensive written examination, essay format, three-hour duration; no calculation required. Assesses all Course Outcomes (CO1–CO5).

Indicative Readings

- Bhargava, R. and Vaishnav, M. (2023). "Reading Indian Urban Empirical Research." India Review.
- Bryman, A. (2016). Social Research Methods, 5th ed. Oxford University Press.
- Census of India (2011, 2021). House-listing and Housing Census tables; methodological notes.
- Cromley, E. K. and McLafferty, S. L. (2011). GIS and Public Health, 2nd ed. Guilford Press.

- de Smith, M. J., Goodchild, M. F., and Longley, P. A. (2018). *Geospatial Analysis: A Comprehensive Guide*. (open access).
- Fotheringham, A. S. and Wong, D. W. S. (1991). "The Modifiable Areal Unit Problem in Multivariate Statistical Analysis." *Environment and Planning A* 23.
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- Indian Statistical Institute. (2020). *Sampling and Survey Design — methodological notes*.
- Lock, R. H. et al. (2020). *Statistics: Unlocking the Power of Data*, 3rd ed. Wiley.
- Monmonier, M. (2018). *How to Lie with Maps*, 3rd ed. University of Chicago Press.
- Pearl, J. and Mackenzie, D. (2018). *The Book of Why*. Basic Books (selected chapters).
- Rajagopalan, S. and Sridhar, K. S. (2022). *India's Urban Future: Empirical Foundations*. Oxford University Press.
- Sridhar, K. S. and Wan, G. (eds.). (2014). *Urbanization in India: Challenges and Opportunities*. SAGE.
- Tufte, E. (2001). *The Visual Display of Quantitative Information*, 2nd ed. Graphics Press.
- Wasserstein, R. L. and Lazar, N. A. (2016). "The ASA Statement on p-Values." *The American Statistician* 70(2).

Programme Outcomes (POs) Referenced in CO Mapping

- PO1 — Domain knowledge: apply theory, frameworks, and Indian-context understanding to planning problems.
- PO2 — Critical thinking: analyse, critique, and reform planning interventions.
- PO3 — Research and inquiry: design, conduct, and communicate research.
- PO4 — Communication: write, present, and visualise planning content for diverse audiences.
- PO5 — Ethical reasoning: recognise equity, justice, and sustainability dimensions of planning.
- PO6 — Multidisciplinary integration: work across disciplinary boundaries.
- PO7 — Professional practice: engage with statutory, institutional, and procurement contexts.

UP4.02 Development Finance

a. Vision and Mission Statement of the Department / Course

Proposed Vision of the Department

To advance sustainable, inclusive, resilient and financially responsible urban development through excellence in planning education, research, innovation and professional practice.

Proposed Mission of the Department

- Develop competent urban planning professionals with interdisciplinary, analytical, financial and institutional understanding.
- Promote sustainable, inclusive and equitable approaches to urban and regional development.
- Strengthen the integration of planning, governance, public finance, infrastructure investment and contemporary financial instruments in planning education.
- Encourage research, innovation and evidence-based decision-making for addressing emerging urban development challenges.
- Strengthen interaction among academia, government, urban local bodies, financial institutions, industry and communities.
- Develop planners capable of communicating and evaluating development-finance choices within statutory, institutional and professional contexts.

Vision of the Subject

To develop planners who can understand, analyse and apply institutional, municipal, project, public-private, climate and capital-market finance mechanisms for equitable, sustainable and implementable urban development.

Mission of the Subject

The subject builds a contemporary understanding of development finance while retaining the institutional foundations of municipal finance, investment planning and Public-Private Partnerships. It equips students to engage with emerging instruments including climate and green finance, blended finance, bonds, InvITs, REITs, outcomes-linked finance and national infrastructure financing frameworks.

b. Subject Objectives

The objectives of Development Finance, subordinate to the overall Vision of the Department, are to:

1. Develop an understanding of the institutional architecture of development and municipal finance in India.
2. Enable students to analyse the financial roles of Urban Local Bodies, Development Authorities, Special Purpose Vehicles, Special Economic Zones and other urban institutions.
3. Build competence in municipal revenue analysis, property taxation, user charges, intergovernmental transfers and expenditure assessment.

4. Develop the ability to undertake investment planning and apply financial, economic and social project-appraisal techniques.
5. Familiarise students with project finance, tariff design, budgeting, procurement and performance-based financial management.
6. Develop a critical understanding of Public-Private Partnership models, concession structures, risk allocation and procurement mechanisms.
7. Introduce contemporary financial instruments including climate finance, green bonds, blended finance, InvITs, REITs, NIIF, GIFT City and multilateral finance.
8. Examine outcomes-linked and innovative finance including Social Impact Bonds, Development Impact Bonds, performance-based transfers and the National Infrastructure Pipeline / National Monetisation Pipeline.
9. Develop the ability to assess equity, sustainability, governance and distributional dimensions of urban finance.
10. Strengthen students' ability to communicate financing recommendations to planning, procurement, administrative and political decision-makers.

c. Alignment with Other Subjects and Overall Objectives of the Course

Development Finance is a core component of the M.Plan Urban Planning curriculum and provides the financial and institutional foundation required for translating planning proposals into implementable urban investments.

The subject aligns with and complements other subjects in the programme by:

- Supporting infrastructure planning and urban services courses through investment planning, project finance, tariff design and municipal finance.
- Complementing urban governance and institutional planning through Finance Commissions, ULB revenue systems, intergovernmental transfers and multi-level governance.
- Supporting urban economics and land-related subjects by distinguishing capital-market and institutional financing from land-based financing, while retaining a conceptual bridge to land-value capture.
- Strengthening project planning and appraisal through NPV, IRR, payback, economic appraisal and social cost-benefit analysis.
- Complementing public policy and implementation subjects through PPPs, procurement models, concession agreements, risk allocation and performance-based contracting.
- Supporting sustainability and climate-resilience subjects through climate finance, green bonds, adaptation finance, carbon markets and sustainability-linked instruments.
- Connecting with professional planning practice through municipal credit ratings, investment frameworks, financial institutions, infrastructure pipelines and decision-oriented communication.

The course contributes to the programme's broader objective of preparing planners who can integrate planning knowledge with financial feasibility, institutional capacity, equity, sustainability, professional practice and implementation.

d. Subject Details

Course Title	Development Finance
Total Lectures	24
Time Duration	2 hours / lecture
Total Hours / Semester	48 hours
Credits	3 (Core)
Programme Placement	M.Plan Urban Planning, 3rd Semester
Cross-listing	M.Plan Housing and Regional Planning
Assessment Pattern	50% Internal Continuous Assessment + 50% External End-Semester Examination

Course Overview

This course rebuilds the existing C3.2 Development Finance into a contemporary, NEP-compliant core. It retains the institutional and instrumental foundations of the existing course - Finance Commissions, municipal finance, investment planning, and the Public-Private Partnership architecture - and substantially expands them with the financial instruments and institutional innovations that have come to dominate Indian urban development since 2017: climate and green finance, blended finance, sovereign and municipal green bonds, the National Investment and Infrastructure Fund (NIIF), GIFT City as an International Financial Services Centre, Infrastructure and Real Estate Investment Trusts (InvITs and REITs), social impact bonds, and the National Infrastructure Pipeline / National Monetisation Pipeline. The land-based-financing material is relocated to the proposed Urban Land Economics, Housing Markets, and Real Estate course.

Course Outcomes (COs)

- CO1** - Explain the institutional architecture of Indian municipal finance (CFC, SFC, ULB revenue sources, property tax, user charges) and diagnose its principal failures. [PO1, PO7]
- CO2** - Design and appraise a structured investment-planning exercise for an Indian ULB or urban project, including financial, economic, and social cost-benefit analysis. [PO1, PO2, PO5]
- CO3** - Distinguish, compare, and critique alternative Public-Private Partnership models (BOT, DBFOT, HAM, EPC, performance-based) and evaluate their fit to Indian conditions. [PO1, PO2, PO7]
- CO4** - Identify and assess contemporary financial instruments - green bonds, blended finance, NIIF/GIFT City, InvITs/REITs, social impact bonds - and propose suitable applications. [PO1, PO2, PO6]
- CO5** - Engage critically with the equity, sustainability, and governance dimensions of urban finance, including climate finance flows and the National Monetisation Pipeline. [PO2, PO5, PO6]
- CO6** - Communicate financing recommendations clearly to non-financial planning audiences and to procurement and political decision-makers. [PO3, PO4]

Positioning in the Current Curriculum

- Replaces the existing C3.2 Development Finance entirely. Retains its institutional foundations (Finance Commissions, municipal finance, IPB, PPP) and updates the contemporary-instruments module substantially.
- Relocates the existing C3.2 Module 5 (Innovative Methods of Financing Urban Development - value capture instruments) to the proposed Urban Land Economics, Housing Markets, and Real Estate course.
- Adopts the NEP-compliant format: Course Outcomes (COs), CO-to-PO mapping, Topics + Activities, 50/50 assessment scheme.
- Pairs naturally with the proposed Urban Land Economics course (3rd Semester, also core) - students taking both obtain integrated coverage of land-based and capital-market financing of urban development.

Course Structure and Modules

Module 1: Indian and International Development Finance (6 hours)

Topics:

- Development finance - concepts, components, and approaches; the Indian institutional landscape. Models in India and abroad in detail.
- Improvement Trusts, Development Authorities, Special Purpose Vehicles, Special Economic Zones, and Urban Local Bodies - their financial roles.
- Credit rating of municipalities and urban institutions - methodology, India Ratings, CRISIL, ICRA; the Bengaluru and Pune ratings.
- Constitutional basis for urban finance - 74th Constitutional Amendment, 12th Schedule functions, and the funding-following-functions gap.
- Theoretical framing - financing as a constraint on Indian urbanism; the 'unbankable city' thesis.
- Linking finance to development outcomes - equity, sustainability, and basic services.

Activities:

- Lecture and seminar with foundational readings (one Indian, one international).
- Institutional mapping exercise - students map the finance flows of one Indian ULB of their choice and submit a 1,500-word note.
- Class discussion of one credit rating report of an Indian ULB.

Module 2: State, Central, and Municipal Finance (6 hours)

Topics:

- Central Finance Commission (CFC) and State Finance Commissions (SFC) - constitution, powers, devolution formulae; the 15th and 16th Finance Commission awards.
- Consolidated Fund, Contingency Fund, Centrally Sponsored Schemes - implications for urban transfers.
- Categorisation of municipal sources of revenue - own-source vs. transfer, capital vs. revenue, tax vs. non-tax.

- Property tax - assessment methods (Unit Area, Capital Value, Rateable Value), reform record across Indian cities.
- User charges, advertisement tax, professional tax, octroi legacy and GST compensation.
- Municipal expenditure analysis - establishment, O&M, capital; the maintenance gap.
- Municipal finance assessment frameworks - NIUA Index, World Bank MIA toolkit.

Activities:

- Property tax design exercise - students propose a property-tax reform for one chosen Indian ULB.
- Class debate - should octroi/local entry tax be reinstated for ULBs post-GST?
- Guest lecture from an SFC member or municipal commissioner.

Module 3: Investment Planning, Appraisal, and Project Finance (6 hours)

Topics:

- Investment planning - process, components, infrastructure-needs estimation; capital improvement plans.
- Project appraisal techniques - financial appraisal (NPV, IRR, payback, profitability index); economic appraisal; social cost-benefit analysis.
- Budgeting and financial management for urban projects.
- Project finance for infrastructure - risk allocation, ring-fenced cash flows, bankability.
- Tariff design and user-charge structuring - water, sanitation, transit.
- Procurement and standard works contracts in Indian urban practice.
- Performance-based budgeting and outcome-based monitoring.

Activities:

- Project-appraisal exercise (written) - students appraise a stylised urban infrastructure project on paper and submit a 2,000-word brief.
- Critical reading of one published SCBA of an Indian urban project.
- Tariff-design simulation - group exercise.

Module 4: Public-Private Partnerships and Procurement Models (6 hours)

Topics:

- PPP - concept, need, preconditions, principal-agent considerations in Indian conditions.
- PPP variants - BOT, BOO, BOOT, DBFOT, HAM (Hybrid Annuity Model), EPC; performance contracts and management contracts.
- PPP architecture - concession agreements, payment mechanisms, viability gap funding, swiss challenge.
- Risk allocation - design, construction, demand, regulatory, financial, force-majeure; common Indian renegotiations.
- Sector experiences - roads (NHAI), urban transit (DMRC), water (Nagpur, Khandwa), waste, urban renewal.
- Critiques - the privatisation question, contract incompleteness, regulator capture, fiscal contingent liability.

- Reform - the Kelkar Committee, dispute-resolution mechanisms, model concession agreements.

Activities:

- Concession-agreement reading - students read excerpts from a real PPP concession agreement and write a 1,500-word critical commentary.
- Negotiation simulation - concession renegotiation.
- Reading group - Kelkar Committee report.

Module 5: Climate, Green, and Blended Finance (6 hours)

Topics:

- The architecture of climate finance - UNFCCC, Green Climate Fund, Adaptation Fund, Loss & Damage Fund.
- Green bonds - sovereign green bonds (SGrB), municipal green bonds (Indore, Ghaziabad, Pune, Vadodara), GBP/CBI standards.
- Blended finance - combining concessional, philanthropic, and commercial capital.
- Adaptation finance and the adaptation-mitigation balance for Indian cities.
- Sustainability-linked loans and bonds; transition finance.
- Carbon markets and climate finance - CCTS, Article 6 of Paris Agreement.
- Climate disclosure and reporting - BRSR, ISSB, and the urban implications.

Activities:

- Green bond analysis - students analyse one Indian municipal or sovereign green bond issuance.
- Class debate - does blended finance crowd in or crowd out public investment?
- Guest lecture from NABARD, SBI Green, IFC.

Module 6: Capital Markets for Urban Infrastructure - Bonds, InvITs, and REITs (6 hours)

Topics:

- Pooled finance - PFDF and its uptake; municipal bond market structure.
- InvITs - structure, sponsor obligations, listed and unlisted InvITs.
- REITs - structure and Indian experience (Embassy, Mindspace, Brookfield India).
- Securitisation and structured finance for urban infrastructure.
- Sovereign wealth and the NIIF - Master Fund, Fund of Funds, Strategic Fund.
- GIFT City as an International Financial Services Centre.
- Multilateral institutions - World Bank, ADB, AIIB.

Activities:

- InvIT/REIT case study - students dissect the structure and performance of one listed Indian InvIT/REIT.
- Reading group - NIIF strategic fund annual report.
- Class discussion - should there be a sovereign-backed urban infrastructure REIT in India?

Module 7: Outcomes-Linked and Innovative Finance (6 hours)

Topics:

- Social Impact Bonds and Development Impact Bonds - Indian experiments.
- Pay-for-Performance contracts for urban services.
- Crowdfunding for civic projects.
- Diaspora bonds and remittance-linked finance.
- Land-value capture revisited - the bridge to the Urban Land Economics course (Module 6 of that course).
- Performance-based intergovernmental transfers.
- National Infrastructure Pipeline (NIP) and National Monetisation Pipeline (NMP) - architecture, instruments, controversy.

Activities:

- Design exercise - students design a social impact bond for an Indian municipal service.
- Class debate - is the National Monetisation Pipeline a finance innovation or a fiscal sleight-of-hand?
- Critical reading of one NIP / NMP critique paper.

Module 8: Governance, Equity, and the Future of Urban Finance (6 hours)

Topics:

- Multi-level governance of urban finance - central, state, ULB, parastatal.
- Equity and distributional incidence - who pays and who benefits from urban finance instruments.
- Gender, caste, and the financialisation question.
- The fiscal cost of climate change for Indian cities - adaptation finance gap.
- AI-enabled financial planning for ULBs - opportunities, risks.
- Future agenda - the next ten years of urban finance reform in India.
- Course synthesis and capstone preview.

Activities:

- Capstone term paper proposal - each student proposes an urban-finance term paper on an Indian ULB or programme.
- Final synthesis seminar - students present capstone outlines.
- Reflective memo (500 words).

e. Pedagogy

The pedagogy shall retain the course's existing emphasis on lectures, seminars, applied exercises, debates, case studies, simulations, guest lectures and critical reading, while integrating financial analysis with planning practice.

- Conceptual lectures on development finance, municipal finance, project finance, PPPs, climate finance and capital-market instruments.
- Seminar discussions based on foundational Indian and international readings.
- Institutional and municipal finance mapping exercises.
- Property-tax and tariff-design exercises.
- Financial and social project-appraisal exercises using NPV, IRR, payback and social cost-benefit analysis.

- Case-study analysis of municipal credit ratings, PPP concession agreements, green bonds, InvITs, REITs and national infrastructure-financing programmes.
- Negotiation and tariff-design simulations.
- Structured debates on contested finance and governance questions.
- Guest lectures from municipal, Finance Commission, banking, infrastructure and climate-finance practitioners.
- Capstone research and communication exercises focused on an Indian ULB, urban programme or financing instrument.

f. Learning Outcomes

On successful completion of the subject, students will be able to:

LO1. Explain the institutional and constitutional architecture of Indian development and municipal finance.

LO2. Analyse municipal revenues, expenditures, transfers, property taxation, user charges and financial performance.

LO3. Prepare and appraise urban investment proposals using financial, economic and social appraisal techniques.

LO4. Compare PPP and procurement models and assess concession structures, risk allocation and viability in Indian conditions.

LO5. Assess contemporary financial instruments including green bonds, blended finance, NIIF, GIFT City, InvITs, REITs and social impact instruments.

LO6. Evaluate climate-finance, capital-market and outcomes-linked financing options for urban infrastructure and services.

LO7. Critically examine the equity, sustainability, governance and distributional implications of urban-finance choices.

LO8. Interpret national infrastructure-financing frameworks including NIP and NMP in relation to urban development.

LO9. Integrate finance, planning, procurement, institutional capacity and implementation considerations in urban-development decision-making.

LO10. Communicate financing recommendations clearly to technical, non-financial, administrative and political audiences.

Assessment Methods

In line with the institutional SPA Delhi M.Plan assessment scheme, all assessment is split 50% internal continuous assessment (via verifiable deliverables, at the discretion of the Faculty Member) and 50% external end-semester examination. The weights of internal deliverables sum to 50%; each is mapped to specific Course Outcomes.

Internal Assessment (50%) - Verifiable Deliverables

- Capstone term paper (25%) - 5,000-word financing analysis of one Indian ULB, urban programme, or financial instrument. Rubric assesses CO1, CO4, CO5, CO6.

- Concession-agreement critique (10%) - 1,500-word commentary submitted under Module 4. Rubric assesses CO3, CO5.
- Green-bond / SIB design exercise (10%) - 1,500-word design submitted under Module 5 or 7. Rubric assesses CO4, CO6.
- Class participation in seminar discussions and reflective memo (5%) - graded across the semester. Rubric assesses CO2, CO5.

External Assessment (50%) - End-Semester Examination

- End-semester examination (50%) - comprehensive written examination, essay and short-answer format, three-hour duration. Assesses all Course Outcomes (CO1-CO6).

g. References

- Ahluwalia, I. J. and Mathur, O. P. (2014). Urban India and the Finance Commission. ICRIER.
- Bahl, R., Linn, J., and Wetzel, D. (2013). Financing Metropolitan Governments in Developing Countries. Lincoln Institute of Land Policy.
- Climate Bonds Initiative. (2024). Green Bond Market in India - annual report.
- Finance Commission of India. (2020). Report of the 15th Finance Commission for 2021-26.
- Government of India. (2020). National Infrastructure Pipeline - Volume I and II, NITI Aayog.
- Government of India. (2021). National Monetisation Pipeline.
- Kelkar, V. L. et al. (2015). Report of the Committee on Revisiting and Revitalising PPP Model of Infrastructure.
- Mathur, O. P. (2017). 'Municipal Finance Matters: India Municipal Finance Report.' NIPFP.
- MoHUA. (2022). Compendium on Municipal Bond Issuances in India.
- NIIF. (2024). National Investment and Infrastructure Fund - Annual Report.
- NIPFP. (2023). State of Municipal Finances in India.
- OECD. (2023). Climate Finance Provided and Mobilised by Developed Countries.
- RBI. (2023). Report on Municipal Finances.
- SEBI. (2023). Master Circular on InvITs; Master Circular on REITs.
- World Bank. (2022). India: Financing Cities of the Future.

UP 3.03 Urban Risk Reduction and Planning for Resilience

a. Vision and Mission Statement of the Department / Course

Proposed Vision of the Department

To advance safe, sustainable, inclusive and resilient urban development through excellence in planning education, research, innovation and professional practice.

Proposed Mission of the Department

- Develop competent urban planning professionals with interdisciplinary, analytical and risk-informed planning capabilities.
- Promote sustainable, inclusive and climate-resilient approaches to urban and regional development.
- Integrate disaster risk reduction, climate adaptation, geospatial analysis and evidence-based decision-making into planning education.
- Encourage research, innovation and solution-oriented approaches to emerging urban risks and vulnerabilities.
- Strengthen interaction among academia, government, communities, professional institutions and disaster-management agencies.
- Develop socially responsible planners capable of mainstreaming resilience, equity and safety into urban development processes.

Vision of the Subject

To develop planners capable of understanding urban disaster risks and integrating risk reduction, climate resilience, preparedness, recovery and indigenous knowledge into urban planning and development processes.

Mission of the Subject

The subject develops conceptual and applied understanding of disaster risk, urban vulnerability, risk assessment, climate-related hazards, disaster response and recovery, mitigation, preparedness and traditional knowledge, with emphasis on mainstreaming risk reduction into urban planning practice.

b. Subject Objectives

The objectives of Urban Risk Reduction and Planning for Resilience, subordinate to the overall Vision of the Department, are to:

1. Develop a conceptual understanding of the components of risk and their management.
2. Examine the legal, policy framework and institutional system for disaster risk management and discuss the interface with urban governance systems.
3. Discuss the international commitments and resolutions that generated a momentum of disaster management thoughts and actions.
4. Examine methods of risk assessment in the urban context and identify possible planning interventions.
5. Identify planning interventions in mitigation, recovery and reconstruction phases.
6. Discuss traditional construction techniques and practices for reducing risks.
7. Enable students to understand the complexity of hazards and risks in urban contexts and the intersectionality of disaster risk mitigation with urban planning.
8. Develop the ability to mainstream disaster risk reduction and resilience strategies into urban planning and development processes.

c. Alignment with Other Subjects and Overall Objectives of the Course

The subject is a core theory component of the M.Plan Urban Planning programme and supports the broader objective of preparing planners to create safe, sustainable, liveable and resilient urban settlements.

The subject aligns with other subjects and planning exercises through:

- Integration with Planning Studio through risk-informed infrastructure planning and resilience-oriented planning interventions.
- Linkages with urban infrastructure planning through resilient infrastructure, fire risk reduction, early warning systems and disaster-safe construction.
- Complementarity with environmental planning and climate-change subjects through urban flooding, heat islands, extreme weather events, adaptation and mitigation strategies.
- Linkages with GIS and spatial-analysis subjects through hazard mapping, exposure analysis, vulnerability mapping and land-suitability analysis.
- Integration with urban governance and policy through the Disaster Management Act, policy, institutional frameworks and planning instruments.
- Alignment with housing, settlement planning and construction-related subjects through resilient buildings, recovery, rehabilitation and Build Back Better principles.
- Incorporation of Indian Knowledge Systems through traditional and indigenous practices for coping with disasters and risk-sensitive settlement planning.

d. Subject Details

Course Code	UP 3.03
Course Title	Urban Risk Reduction and Planning for Resilience
Faculty Lead	Dr Chandrani Bandyopadhyay, Associate Professor, Department of Urban Planning, SPA Delhi
Total Lectures	16
Time Duration	2 hours / lecture
Total Hours / Semester	32 hours
Credits	2 (Core)
Programme Placement	M.Plan Urban Planning, Third Semester
Nature of Subject	Core theory subject for students specialising in Urban Planning
Evaluation	50% Internal + 50% External; Written examination

Course Overview

The aim of undertaking any city planning exercise rests on ensuring a safe, sustainable and liveable city. However, the inherent complexity of urban systems also gives rise to risks from natural and human-induced causes. Therefore, promoting a thorough understanding of disaster risks, their impacts and implications on urban development, as well as exploring pathways for integrating risk reduction in the planning process, is essential. Given its increasing importance in urban planning, this course is designed as a core course for Second Year Third Semester Urban Planning students.

Positioning in the Current Curriculum

This course is currently an integral part of the curriculum and retains its position as a core theory course. Already positioned as a 2-credit core subject for II Year III Semester students of M.Plan with specialisation in Urban Planning, it is proposed to retain the same position in the overall curriculum as a core theory course.

The course approach shifts from issue- and problem-centric to solution-centric and planner-relevant learning. It creates an understanding of the complexity of hazards and risks in urban contexts, risk assessment for cities and mainstreaming risk reduction in planning interventions. The course orients planners to understand concepts, explore the intersectionality of disaster risk mitigation with urban planning, and integrate risk reduction strategies into urban planning processes.

Course Structure & Modules

Module 1: Disaster Risk Reduction: Concepts & Overview (6 hours)

Topics:

- Conceptual Overview of Disaster Risks and Management: Definition, components, approaches, Typology, Interrelationships, Disaster Management Cycle, phases and activities.
- Disasters and Development: development implications of disasters, concept of resilience, elements and principles of resilient settlements.
- Global Frameworks and Commitments: UN Resolution for IDNDR, Yokohama Plan of Action, ISDR, Hyogo Framework for Action, Sendai Framework for DRR, achievements and constraints.
- Institutional Framework for Disaster Management in India: DM Act and Policy, intersectionality of DM Act, Rules and Guidelines with planning instruments.

Activities:

- Class activity of identifying a recent disaster event in India and identify the complex layers of hazard, vulnerability and risk.
- Critically analyse the response and recovery phases (Group work).

Module 2: Assessing Risks in an Urban Context (6 hours)

Topics:

- Risk Assessment: Rationale, methods of assessment, complex and cascading risks, urban risk assessment framework.
- Post-Disaster Needs Assessment: Immediate Damage Assessment, detailed damage assessment and prioritizing Needs, PDNA Framework.
- Assessment Bias: what is assessment bias? Types of bias, Minimizing bias, triangulation methods.
- Risk Assessment for City Planning: Hazard Mapping, Exposure Analysis, Vulnerability Mapping in cities. Land Suitability Analysis.

Activities:

- Class activity on identifying assessment bias.

Module 3: Climate Change and Disasters (6 hours)

Topics:

- Climate change induced disaster risks and impact in urban settlements.
- Climate change trends and scenarios and their implications in human settlements.
- Urban Flooding, Urban Heat islands and Extreme Weather Events.
- Adaptation and Mitigation Strategies: Heat Action Plans (HAP), Guidelines for Heat and Cold Waves.

Activities:

- Seminar presentation on climate trends and planning strategies for resilience.

Module 4: DM Cycle: Response, Recovery & Rehabilitation (4 hours)

Topics:

- Disaster Response System: Response and Relief Management, Incident Response System, National Disaster Response Force (NDRF).
- Recovery and Rehabilitation: Reconstruction Principles, Build Back Better, Resettlement and Rehabilitation, Livelihood Restoration.

Module 5: Mitigation and Preparedness: Mainstreaming DRR in Urban Development (6 hours)

Topics:

- Structural and Non-Structural Mitigation Framework for disaster risk reduction.
- Basic considerations for disaster-safe construction practices, earthquake, cyclone resilient buildings.
- Urban Fire risks: Causes, Impact, Implications, planning fire resilient neighbourhoods.
- Resilient Infrastructure planning for risk reduction.
- Mainstreaming Disaster Risk Reduction in Urban Planning and Development.
- Early Warning Systems: Last mile connectivity, risk informed communities, community-based disaster preparedness measures.

Activities:

- Aligned to Infrastructure Plan of the Third Semester Planning Studio.

Module 6: Leveraging Traditional & Indigenous Knowledge for DRR (4 hours)

Topics:

- Traditional knowledge and practices aimed for coping with disasters.
- Traditional building systems and planning for disaster risk reduction.
- Integrating traditional knowledge in urban planning processes.

e. Pedagogy

The teaching-learning pedagogy will comprise lecture-seminar sessions along with application-linked assignments. Critical analysis of best-practice case studies, including Indian Knowledge Systems (IKS) with respect to disaster management, will be included in the curriculum.

- Lecture-seminar sessions for conceptual and policy understanding.
- Application-linked assignments focused on urban risks and planning interventions.
- Critical analysis of recent disaster events and their hazard, vulnerability and risk dimensions.
- Group work on disaster response, recovery and rehabilitation.
- Exercises on assessment bias, risk assessment and urban hazard mapping.
- Seminar presentations on climate trends and planning strategies for resilience.
- Case-study analysis of best practices in disaster risk reduction and resilient urban planning.
- Integration with the Third Semester Planning Studio, particularly the Infrastructure Plan.
- Inclusion of Indian Knowledge Systems and traditional/indigenous practices relevant to disaster management and resilient construction.

f. Learning Outcomes

On successful completion of the subject, students will be able to:

LO1. Explain key concepts of disaster risk, hazard, vulnerability, exposure, resilience and disaster-management cycles.

LO2. Interpret international frameworks and the legal, policy and institutional architecture for disaster management in India.

LO3. Apply urban risk-assessment methods including hazard mapping, exposure analysis, vulnerability mapping and land-suitability analysis.

LO4. Identify complex and cascading risks and critically assess bias and uncertainty in risk assessment.

LO5. Evaluate climate-change-induced disaster risks including urban flooding, heat islands and extreme weather events.

LO6. Assess response, recovery, rehabilitation and Build Back Better approaches in urban contexts.

LO7. Recommend structural and non-structural mitigation, preparedness, early-warning and resilient-infrastructure measures.

LO8. Mainstream disaster risk reduction and resilience considerations into urban planning and development interventions.

LO9. Relate disaster-risk reduction strategies to infrastructure planning, neighbourhood planning and community preparedness.

LO10. Recognise and integrate relevant traditional and indigenous knowledge into risk-sensitive urban planning processes.

Assessment Methods

- External Evaluation (50%) - Written examination.
- Internal Assessment (50%) - assignments and class activities.

g. References

1. United Nations Office for Disaster Risk Reduction (2025). Global Assessment Report on Disaster Risk Reduction 2025: Resilience Pays: Financing and Investing for our Future. Geneva.
2. International Federation of Red Cross & Red Crescent Societies (2026). World Disaster Reports.
3. National Disaster Management Authority Guidelines.
4. Carter, W. Nick (2008). Disaster management: a disaster manager's handbook. Mandaluyong City, Philippines: Asian Development Bank.
5. Additional readings to be added as per module requirements.

UP 2.01 City and Metropolitan Planning

a. Vision and Mission Statement of the Department / Course

Proposed Vision of the Department

To advance sustainable, inclusive, resilient and evidence-based urban development through excellence in planning education, research, innovation and professional practice.

Proposed Mission of the Department

- Develop competent urban planning professionals with strong theoretical, analytical, spatial and professional capabilities.
- Promote sustainable, inclusive and context-responsive approaches to urban and metropolitan development.
- Integrate classical and contemporary planning theory, spatial analysis, technology and participatory approaches into planning education.
- Encourage research, innovation and evidence-based decision-making for addressing emerging urban challenges.
- Strengthen interaction among academia, government, professional institutions, communities and other urban stakeholders.
- Develop planners capable of preparing and evaluating plans at multiple scales and responding to changing urban dynamics.

Vision of the Subject

To provide a strong theoretical and analytical foundation for understanding city and metropolitan development and to enable students to connect urbanisation processes, planning theories, metropolitan dynamics, plan-making techniques and emerging urban forms with professional planning practice.

Mission of the Subject

The subject develops foundational knowledge of urbanisation, theories of urban development, metropolitan and city-region relationships, plan preparation approaches, urban form and redevelopment, and planning considerations for future cities. It provides the theoretical basis for Master Plan and local development plan studio exercises.

b. Subject Objectives

The objectives of City and Metropolitan Planning, subordinate to the overall Vision of the Department, are to:

1. Explain the patterns and trends of urbanisation and identify their future implications for urban development.
2. Explain classical and contemporary theories of planning and urban development and assess their relevance in different planning contexts.
3. Develop an understanding of urbanism, stages of urbanisation, location theories and spatial land-use theories.
4. Identify metropolitan regions, city economic regions, settlement networks and rural-urban relationships.

5. Understand levels, hierarchies and techniques of preparing plans for different settlement types and investigate the relationships among them.
6. Explain statutory and non-statutory planning instruments, legal frameworks, standards and public participation in plan preparation.
7. Develop an understanding of urban form, Transit Oriented Development, urban renewal, redevelopment and regeneration.
8. Explore emerging urban patterns and the implications of climate, mobility, communication and digital technologies for future cities.
9. Strengthen the ability to link theoretical learning with Master Plan and local development plan studio exercises.

c. Alignment with Other Subjects and Overall Objectives of the Course

City and Metropolitan Planning is a foundational theory subject of the M.Plan Urban Planning programme. It provides the conceptual and analytical basis required for subsequent planning studios and specialised subjects.

The subject aligns with and complements other subjects by:

- Providing the theoretical foundation for Master Plan, Zonal Development Plan and Local Area Plan preparation in planning studio.
- Supporting urban economics and development-finance subjects through concepts of city regions, agglomeration economies and metropolitan growth.
- Complementing land-use, transport and infrastructure subjects through spatial structure, urban form, Transit Oriented Development and growth patterns.
- Supporting housing, redevelopment and urban design subjects through urban renewal, regeneration, form-based codes and redevelopment approaches.
- Connecting with regional planning through metropolitan delineation, nodes, networks, territorial planning and rural-urban relationships.
- Supporting sustainable and resilient planning by examining future growth, climate implications, changing mobility and digital transformation.
- Strengthening professional planning practice through statutory and non-statutory plan-making approaches, standards, benchmarks and public participation.

d. Subject Details

Subject Code	UP 2.01
Subject Title	City and Metropolitan Planning
Faculty Lead	Dr Chandrani Bandyopadhyay, Associate Professor, Department of Urban Planning, SPA Delhi
Total Lectures	16
Time Duration	2 hours / lecture
Total Hours / Semester	32 hours
Credits	2 (Core)
Programme Placement	M.Plan Urban Planning, Second Semester

Subject Type	Core theory subject for students specialising in Urban Planning
Evaluation	Internal 50% + External 50%; Written external examination

Course Overview

City and metropolitan planning are the core of the urban planning discipline. This course is designed to provide foundational knowledge on the basic tenets and practices of city planning. Placed as a theory course, it provides the first in-depth exposure to the foundational theories and techniques for planning. The course provides the theoretical basis for the planning studio exercise on Master Plan and local development plans.

Positioning in the Current Curriculum

This course is currently an integral part of the curriculum and retains its position as the foundational theory course of urban planning. Already positioned as a 2-credit core subject for I Year II Semester students of M.Plan with specialisation in Urban Planning, it is proposed to retain the same position in the overall curriculum as a foundational theory course.

There is a felt need for modification and refinement of this course in view of the increasing complexity of urban settlements, spatial and demographic growth patterns and advancement of technology. The course is intended to expose learners to classical as well as modern approaches to city and metropolitan planning and encourage them to explore how theories have been propounded as a response to the changing urban landscape. The focus is on identifying the multi-dimensional dynamics that accompany urban growth.

Course Structure & Modules

Module 1: Urbanisation: Process, Pattern & Implications (4 hours)

Topics:

- Urbanisation in the modern and post-modern era - how cities have grown globally, salient aspects of urbanisation process, influence of global events on urbanisation pattern.
- Trends of urban growth: Rural-urban distribution and trend analysis, spatio-demographic evidence from Global North and South.
- Future growth implications - how do we envisage the future growth of cities with respect to the trends.

Activities:

- Class activity exploring the spatio-demographic growth of one metro city and identify the trend and pattern of growth.

Module 2: Theories of Urban Development: Approaches, Relevance in Today's Planning (6 hours)

Topics:

- Urbanism as a Way of Life: What makes a settlement 'urban?' Louis Wirth, Max Weber, characteristics of urban settlements, multi-disciplinary contribution to the idea of 'urban.'

- Stages of Urbanisation: Lampard Approach, Gibbs' Sequential Stage Model, Spatial Cycle Theory, Rostow's stages of Growth Model.
- Theories of Location & Spatial Landuse (Approach, Critique and Relevance) - Central Place (Christaller & Losch), Concentric Zone (Burgess), Sector (Hoyt), Multiple Nuclei (Harris & Ullman), Urban Realms (Vance), Core Frame Theory, Growth Pole Theories (Perroux, Boudeville), Urban Bias Critique.
- Threshold Analysis, Retail and Locational Analysis.

Activities:

- Study the map of a city and identify a spatial landuse theory that can be applied.

Module 3: Metropolitan Regions, City Economic Regions and Rural Urban Relationships (6 hours)

Topics:

- Defining and delineating metropolitan regions, settlements, nodes and networks, growth of metropolitan regions, regional functional linkages.
- Structure of City Regions, area of influence, scale, complexity and impact on national development.
- City Economic Regions - cities as economic growth engines, agglomeration economies, network model.
- Territorial planning principles, extended metropolitan region, territoriality of rural urban interaction, Desakota model.

Module 4: Plan Preparation Approaches and Techniques (6 hours)

Topics:

- Approaches for preparing Urban Development Plans: Levels and hierarchy of plans, statutory and non-statutory plans, Legal Framework.
- Components and Process of plan preparation - Master Plan, Zonal Development Plan, Local Area Plan.
- Standards and benchmarks for Planning, public participation for implementation.
- Special Area Planning - definition, approaches, types, approaches and process.

Activities:

- Aligned with studio exercise on Master Plan preparation.

Module 5: Urban Form and Function, Urban Renewal and Redevelopment (6 hours)

Topics:

- Form based Codes: Determinants and Elements of Urban Form, Indicators of Measurement.
- Transit Oriented Development.
- Urban Renewal and Redevelopment: Rationale, and Approach.
- Regeneration of Urban Cores - Principles, Practices and Best Practices.

Activities:

- Case study presentation on critical evaluation of urban redevelopment projects.

Module 6: Planning Considerations for Cities of the Future (4 hours)

Topics:

- Emerging Urban Patterns: What will the cities of the future look like?
- Exploring the implications of changing weather patterns, mobility and communication patterns, digital tools and integrating them into planning exercises.

Activities:

- Scenario building exercise on possible future impact of changes and planning implications (infrastructure allocation etc.).

e. Pedagogy

The teaching-learning pedagogy shall comprise lecture-seminar sessions along with application-linked assignments, consistent with the original course design.

- Conceptual lectures on urbanisation, planning theory, metropolitan systems, plan preparation and urban form.
- Seminar discussions on classical and contemporary approaches to city and metropolitan planning.
- Map-based exercises to identify spatial growth and applicable land-use theories.
- Spatio-demographic analysis of metropolitan growth patterns.
- Application-linked assignments connected to Master Plan preparation.
- Case-study presentations on urban redevelopment and regeneration projects.
- Scenario-building exercises addressing future growth, climate, mobility, communication and digital change.
- Critical discussion of the relevance and limitations of classical theories in contemporary Indian and international urban contexts.

f. Learning Outcomes

On successful completion of the subject, students will be able to:

LO1. Explain key patterns, processes and future implications of urbanisation.

LO2. Interpret major classical and contemporary theories of urban development and assess their relevance to present-day planning.

LO3. Analyse the spatial structure and functional relationships of cities, metropolitan regions and city economic regions.

LO4. Explain rural-urban relationships, territorial planning concepts and extended metropolitan development.

LO5. Identify the levels, hierarchy, components and processes involved in preparing urban development plans.

LO6. Apply planning standards, benchmarks and participation considerations in plan-preparation exercises.

LO7. Assess urban form, Transit Oriented Development, redevelopment, renewal and regeneration approaches.

LO8. Relate planning theory and techniques to Master Plan and local development plan studio work.

LO9. Evaluate emerging urban patterns and their implications for infrastructure, mobility, climate and digital planning.

LO10. Develop evidence-based and scenario-oriented interpretations of future city and metropolitan development.

Assessment Methods

- External Evaluation (50%) - Written examination.
- Internal assessment - assignments and class activities.

g. References

- Kumar, A., Vidyarthi, S. & Prakash, P. (2020). City Planning in India 1947-2017. Routledge India.
- Mitra, A. & Mehta, B. (2011). Cities as the engine of Growth: Evidence from India. Journal of Urban Planning and Development, 137(2), 171-183.
- Fulton, W. (1996). The New Urbanism. Cambridge: Lincoln Institute of Land Policy.
- McGee, T. G. & Greenberg, C. (1992). The emergence of extended metropolitan regions in ASEAN. Towards the year 2000. ASEAN Economic Bulletin, pp. 22-44.
- Healey, P. (2006). Making Strategic Spatial Plans. Routledge.
- Anderson, L. (2020). Guidelines for Preparing Urban Plans. Routledge.
- Chadwick, G. (2013). A Systems View of Planning: Towards a Theory of the Urban and Regional Planning Process. Elsevier.
- Mukhija, V., Das, A., Regus, A. & Tsay, S. S. (2015). The Tradeoffs of Inclusionary Zoning: What do we know and what do we need to know? Planning Practice and Research, 30(2), 222-235.

UP 2.03 Planning for Sustainable Development

a. Vision and Mission Statement of the Department / Course

Proposed Vision of the Department

To advance sustainable, inclusive, resilient and environmentally responsible urban development through excellence in planning education, research, innovation and professional practice.

Proposed Mission of the Department

- Develop competent urban planning professionals capable of integrating environmental, social and economic considerations in planning.
- Promote sustainable, inclusive, climate-responsive and resource-efficient approaches to urban and regional development.
- Integrate contemporary environmental knowledge, sustainability frameworks, spatial tools and evidence-based approaches into planning education.
- Encourage research, innovation and ethical decision-making for addressing emerging environmental and climate challenges.
- Strengthen interaction among academia, government, communities, professional institutions and environmental stakeholders.
- Develop planners capable of mainstreaming sustainability, climate adaptation and low-carbon development into planning interventions.

Vision of the Subject

To develop planners who can integrate sustainability principles, natural-resource management, climate action, nature-based solutions, low-carbon development and environmental justice into urban planning and development.

Mission of the Subject

The subject provides students with conceptual, policy, analytical and ethical foundations for sustainable urban planning. It develops an understanding of sustainability paradigms, natural resources, ecosystem services, climate change, adaptation, nature-based solutions, low-carbon development, net-zero cities, liveability and environmental justice.

b. Subject Objectives

The objectives of Planning for Sustainable Development, subordinate to the overall Vision of the Department, are to:

1. Explain the context, concept and evolution of the sustainable development paradigm.
2. Identify the principles and multi-dimensional components of sustainable development and examine their relationship with urban planning.
3. Discuss legal, policy and institutional tools relevant to sustainable planning in India and internationally.
4. Develop an understanding of natural-resource management and ecosystem services in urban settlements.
5. Trace changing climate patterns and examine their implications for cities and infrastructure.

6. Discuss climate adaptation, mitigation and nature-based solutions and their application in urban planning.
7. Develop an understanding of low-carbon development, circular economy, resource flows and net-zero cities.
8. Examine compact-city planning, liveability, walkability, connectivity and inclusion as dimensions of sustainable urban development.
9. Discuss environmental and social justice as important considerations in planning.
10. Strengthen the ability to integrate sustainability into Master Plan and other urban planning processes.

c. Alignment with Other Subjects and Overall Objectives of the Course

Planning for Sustainable Development is a core theory subject that provides the environmental and sustainability framework required across the M.Plan Urban Planning programme.

The subject aligns with and complements other subjects by:

- Supporting City and Metropolitan Planning through sustainable growth, compact-city concepts, liveability and future-oriented planning.
- Complementing Urban Infrastructure Systems through resource efficiency, water-energy systems, waste management, green-blue infrastructure and climate-responsive infrastructure planning.
- Supporting Urban Risk Reduction and Planning for Resilience through climate adaptation, extreme-weather considerations, Heat Action Plans and nature-based solutions.
- Strengthening planning studio work through sustainability-based Master Plan frameworks and integration of environmental considerations.
- Connecting with transport and mobility planning through low-carbon mobility, walkability and connectivity.
- Supporting environmental assessment and project planning through EIA, SIA, ecosystem services and resource-management approaches.
- Reinforcing ethical and inclusive planning through environmental justice, social justice and equitable access to urban resources.

d. Subject Details

Subject Code	UP 2.03
Subject Title	Planning for Sustainable Development
Faculty Lead	Dr Chandrani Bandyopadhyay, Associate Professor, Department of Urban Planning, SPA Delhi
Total Lectures	16
Time Duration	2 hours / lecture
Total Hours / Semester	32 hours
Credits	2 (Core)
Programme Placement	M.Plan Urban Planning, Second Semester
Subject Type	Core theory subject for students specialising in Urban Planning

Evaluation	Internal 50% + External 50%; Written external examination
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Course Overview

The futuristic nature of urban planning and development presupposes meeting the needs of the present without compromising the availability of resources for the future. For a planner, balancing urban development with environmental conservation, social equity and economic opportunities are crucial learnings. This course is designed to equip students with core competencies, skills and ethical frameworks to integrate sustainability concerns into planning interventions.

Positioning in the Current Curriculum

This course is currently an integral part of the curriculum and retains its position as a foundational theory course of urban planning. Already positioned as a 2-credit core subject for I Year II Semester students of M.Plan with specialisation in Urban Planning, it is proposed to retain the same position in the overall curriculum as a foundational theory course.

The course design is streamlined to merge some modules so that more relevant topics can be added. It is proposed that this course be refined in such a way that it allows the learner to explore the paradigm of sustainability in the context of urban habitat and planning.

Course Structure & Modules

Module 1: Sustainable Development: Concept and Principles (6 hours)

Topics:

- Sustainable Development - definition, approaches and components; multi-dimensional approach to sustainable development.
- Evolution of sustainable development paradigm: Club of Rome, Global Conferences and commitments (Our Common Future, Rio, Kyoto Protocol, Agenda 21, Global Environment Facility and Clean Development Mechanism, New Urban Agenda, Localizing Agenda 21).
- Planning Approach to Sustainability: Significance and relevance of sustainability in Urban Planning, pathways to sustainable planning, Eco-City Approach, Sustainable Development Goals (SDGs), Sustainable Cities Programme.
- Legal Approach in the Indian Context: Environmental Protection Act 1986, Climate change Protocols and Conventions, MoEFCC Guidelines.

Activities:

- Class activity on daily average water-energy usage habits and discuss the sustainability concerns.

Module 2: Natural Resource Management & Ecosystem Services (4 hours)

Topics:

- Natural Resources: Meaning, Concept and Classification, Approaches to Natural Resource Management.
- Managing Natural Resources in Cities: Land systems, Water Systems, Energy Systems.

- Ecosystem Services and Human Settlements: Definition and concept, Millenium Ecosystem Assessment, Assessment Tools.
- Planning considerations for Natural Resource Management and Ecosystem Services: CO2 sequestration, storm water management, EIA and SIA methods.

Activities:

- Class discussion on EIA and SIA implications on DPRs.

Module 3: Climate Change: Impact and Implications (6 hours)

Topics:

- Concepts and Definitions of Climate Change, The Changing Climate over the Ages, 'Code Red for Humanity' Trends of Emissions and Probability Scenarios.
- Impact and Implications of Climate Change: Food Security, Extreme Weather Events, Radiative Forcing, UHI, Climate Adaptation and Mitigation.
- Policy and International Commitments: Paris Agreement, COP Commitments, National Action Plan on Climate Change, NDC's.
- Planning Implications of Changing Climate: Cause and effect, resource demand for the future, infrastructure planning.

Module 4: Climate Adaptation and Nature based Solutions (6 hours)

Topics:

- Climate adaptation strategies, significance, adaptation fundamentals, Heat Action Plans for Cities, Climate Proofing, Urban Biodiversity corridors.
- Nature based solutions (NbS): green and blue infrastructure, regenerative planning, sponge city principles and good practices.
- Integrating NbS in city planning: cool roofs, bioswales, canopy.
- Triple Bottom Line, ESG Principles for urban administration, UN Global Connect.

Activities:

- Seminar presentation on NbS application in a city.

Module 5: Low Carbon Development and Net Zero Cities (4 hours)

Topics:

- Low Carbon Urban Development Strategies, phases of LCD, Low Carbon economy, low carbon society, low carbon urban development strategies, low carbon mobility systems, strategies for low carbon sustainable transport systems.
- Circular Economy and Resource Flows: Urban water systems, waste management, Circularity Principles.
- Net zero cities (Climate Neutral Cities): energy flow pattern, policy and regulations, energy efficient development.

Module 6: Environmental Management & Sustainable Cities (6 hours)

Topics:

- Compact City Planning for Sustainability: Concept, Indicators and Planning Strategies.

- Sustainable Lifestyle Assessment: Liveable Cities, Liveability Framework, Indicators of Liveability, Global Liveability Indicators, City Liveability Index, Ease of Living Index of India.
- Walkability, Connectivity and Inclusion: Walkability Influencers, Parameters for Walkability, Connectivity, Inclusion in Planning and Design.
- Environmental and Social Justice: Procedural and Distributive Justice.

Activities:

- Sustainability based Master Plan Framework - Group Work.

e. Pedagogy

The teaching-learning pedagogy shall comprise lecture-seminar sessions along with application-linked assignments, consistent with the original course design.

- Conceptual lectures on sustainable development, natural resources, ecosystem services, climate change and environmental planning.
- Seminar discussions on global and Indian sustainability frameworks and commitments.
- Application-linked exercises on household water-energy use and sustainability concerns.
- Case-based discussion on EIA and SIA implications for project planning and DPRs.
- Seminar presentations on nature-based solutions and their application in cities.
- Comparative discussion of climate adaptation, mitigation, low-carbon and net-zero strategies.
- Planning exercises integrating compact-city, liveability, walkability, connectivity and inclusion considerations.
- Group work on a sustainability-based Master Plan framework.

f. Learning Outcomes

On successful completion of the subject, students will be able to:

- LO1.** Explain the evolution, concepts, components and principles of sustainable development.
- LO2.** Relate sustainability principles and global commitments to urban planning practice.
- LO3.** Analyse natural-resource systems and ecosystem services in urban settlements.
- LO4.** Assess the impacts and planning implications of climate change in cities.
- LO5.** Explain key climate-policy commitments and their relevance to urban development.
- LO6.** Evaluate climate adaptation, mitigation and nature-based solutions for different urban contexts.
- LO7.** Apply concepts of low-carbon development, circular economy and net-zero cities to planning.
- LO8.** Assess compact-city, liveability, walkability, connectivity and inclusion frameworks from a sustainability perspective.
- LO9.** Recognise procedural and distributive dimensions of environmental and social justice in planning.
- LO10.** Integrate sustainability considerations into Master Plan and other urban-planning interventions.

Assessment Methods

- External Evaluation (50%) - Written examination.
- Internal assessment (50%) - divided among seminar presentations, assignments and class activities.

g. References

- Naess, P. (2001). Urban Planning and Sustainable Development. *European Planning Studies*, 9(4), 503-524.
- Purvis, B., Mao, Y. & Robinson, D. (2019). Three Pillars of Sustainability: In search of conceptual origins. *Sustainability Science*, 14(3), 681-695.
- Randolph, J. (2011). *Environmental Landuse Planning and Management*. Princeton University Press.
- Breheny, M. (1992). The Compact City: An Introduction. *Built Environment*, 18(4), 241.
- Grubler, A. & Fisk, D. (2012). *Energizing Sustainable Cities: Assessing Urban Energy*. Routledge.
- IPCC Reports (Multiple).

Course Title: Land Use and Transportation Planning

Proposed by – Karan Barpete, Assistant Professor, Department of Urban Planning, SPA Delhi.

Teaching Inputs

Total Lectures: 16

Time Duration: 2 hours / lecture

Total Hours / semester: 32 hours

Credits: 2 (Elective)

Programme placement: M.Plan Urban Planning, 2nd or 3rd Semester (elective; updated and NEP-compliant version of the existing Department Elective DE 2.2). Cross-listed with M.Plan Transport Planning, M.Plan Environmental Planning, and as an SPA-wide open elective.

Course Overview

This course is an updated, NEP-compliant version of the existing Department Elective DE 2.2 Land use and Transport Planning. It treats land use and transport as a single integrated planning question — rather than as two separable technical domains — and brings the contemporary mobility-transitions agenda into the elective: transit-oriented development, accessibility-based planning, mobility-as-a-service, electrification, micromobility, freight, and complete streets. The course focuses specifically on the policy integration of land use with transport — transport infrastructure as such (networks, capacity, design standards, freight) is addressed alongside other infrastructure sectors in the proposed Infrastructure Planning core course. The course remains deeply grounded in the Indian regulatory, behavioural, and political context.

Course Outcomes (COs)

Each Course Outcome is mapped to one or more Programme Outcomes (POs), listed at the foot of this document, consistent with the NEP-2020 Outcome-Based Education framework.

- CO1 — Articulate the theoretical and empirical basis of the land use–transport feedback cycle, and apply it to one Indian metropolitan region. [PO1, PO2]
- CO2 — Read and critique statutory development plans and Comprehensive Mobility Plans, with attention to the land-use–transport interface. [PO1, PO4, PO7]
- CO3 — Design a transit-oriented development (TOD) intervention or a complete-streets retrofit for a chosen Indian corridor. [PO1, PO5, PO7]
- CO4 — Engage critically with the mobility-transitions agenda — electrification, MaaS, micromobility, freight — and propose context-appropriate Indian responses. [PO2, PO5, PO6]
- CO5 — Communicate integrated land-use–transport analyses to non-specialist audiences and to multi-disciplinary teams. [PO4, PO6]

Positioning in the Current Curriculum

This proposal is framed as a curriculum reform, not as a parallel addition. It is anchored explicitly against the existing M.Plan Urban Planning syllabus at SPA Delhi:

- Updates and replaces the existing Department Elective DE 2.2 Land use and Transport Planning. Retains elective status (2 credits) rather than being promoted to core.
- Focuses on the policy integration of land use with transport — TOD, accessibility-based planning, modal hierarchy, mobility transitions, complete streets.
- Distinguishes itself from the proposed Infrastructure Planning core course: this course is about the planning question of integration, while transport-as-infrastructure (networks, capacity, design standards, freight) is addressed in the Infrastructure Planning core as one sector among others.
- Adopts the NEP-compliant format: Course Outcomes (COs), CO-to-PO mapping, Topics + Activities, 50/50 assessment scheme.
- Pairs with the proposed Urban Land Economics course (3rd Sem, core) and with the proposed Infrastructure Planning course (2nd Sem, core).

Course Structure and Modules

Module 1: Foundations of Land Use–Transport Integration (4 hours)

Topics:

- Why land use and transport belong together — the Wegener cycle and the “fundamental law of road congestion.”
- Marchetti's constant — travel-time budgets across cultures and centuries; Indian travel-time evidence.
- Accessibility vs. mobility — the conceptual distinction.
- Induced demand — how building roads creates traffic.
- Land-use–transport integration in Indian planning history — from MPD-1962 to MPD-2041; the CMP era under JNNURM.
- Why integration fails in practice — institutional silos, master plan vs. CMP disjuncture.

Activities:

- Reading and discussion of Wegener (1995) and Cervero (2002).
- Class debate — does building flyovers reduce or worsen congestion in Indian cities?
- Short response paper (800 words) — apply the Marchetti constant to commuting in one chosen Indian city.

Module 2: Land Use Theory and the Spatial City (4 hours)

Topics:

- Classical land-use theories — Burgess, Hoyt, Harris–Ullman; the move to bid-rent and Alonso–Muth–Mills.
- Polycentric and globally-networked city models.
- Density, mix, design — the “3Ds” of Cervero–Kockelman and their Indian application.
- Indian urban form — the colonial palimpsest, post-Independence master-plan grid, satellite-and-corridor expansion.
- Theories of metropolitan growth — growth pole, urban realm, Desakota.

- Peri-urban interface (PUI) and the rural-urban land-use continuum.

Activities:

- Map-reading exercise — students compare the land-use structure of one Indian metro across three master plans.
- Class discussion of one published bid-rent estimation paper for an Indian city.
- Concept-application exercise — identify the “3Ds” pattern of one Delhi/Mumbai/Bengaluru neighbourhood.

Module 3: Transport Demand, Networks, and the Modal Hierarchy (6 hours)

Topics:

- Transport demand modelling — the four-step model conceptually.
- Activity-based modelling and the move beyond four-step.
- Modal hierarchy — pedestrian, cycle, public transit, shared mobility, private vehicle.
- Mode-share analysis for Indian cities — Census, NSSO, household-travel-survey evidence.
- Parking as policy — pricing, supply, and modal effects.
- Congestion pricing — international experience and the Indian feasibility question.
- Public transit planning — bus systems, BRT, urban rail and metros, suburban rail, IPT; National Common Mobility Card; informal-transit literature.

Activities:

- Reading and critique of one published travel-demand model report for an Indian city (e.g., RITES CMP).
- Conceptual exercise — students apply the four-step framework to a stylised corridor.
- Class debate — should congestion pricing be introduced in one chosen Indian city?

Module 4: Plan-Making for Integrated Land Use and Transport (4 hours)

Topics:

- Statutory plan-making in India — the UDPFI Guidelines, T&CP Acts, the master plan tradition.
- Structure plans, strategy plans, and zonal plans.
- The Comprehensive Mobility Plan (CMP) — origins under JNNURM, current MoHUA template.
- Detailed Project Reports (DPRs) for transport and land-use projects.
- Public participation in plan-making — statutory provisions vs. actual practice.
- Reading and writing master plans for land-use–transport integration.
- Comparative experience — MPD-2041, Mumbai DP 2034, Bengaluru RMP, Hyderabad Metropolitan Plan.

Activities:

- Plan-reading exercise — students compare the land-use–transport integration sections of two Indian master plans and submit a 1,500-word annotated comparison.
- Drafting exercise — students draft one section of a master plan's transport chapter.
- Class discussion of one CMP and one DPR.

Module 5: TOD, Accessibility-Based Planning, and Mobility Transitions (8 hours)

Topics:

- Transit-oriented development (TOD) — principles, typology, global record.
- TOD in India — DMRC's TOD policy, Hyderabad ORR, Bengaluru Metro Phase 2, Ahmedabad BRTS corridors.
- Accessibility-based planning — from mobility to access; the literature (Levinson, Sen, Banerjee-Guha).
- Accessibility metrics — isochrones, betweenness, amenity-weighted accessibility; tools and Indian applications.
- Land value capture around transit — joint development, station-area FAR, accessibility-based pricing.
- TOD pitfalls — displacement, gentrification, transit-induced inequality.
- Electrification of transport — FAME-II, state EV policies, charging as land use, fleet electrification (DTC, BMTC, KSRTC).
- Mobility-as-a-Service (MaaS), platform mobility, micromobility (Yulu, Vogo); aggregator rules.
- Freight and urban logistics — last-mile e-commerce, warehousing, dark stores; National Logistics Policy 2022; PM Gati Shakti.

Activities:

- TOD design exercise — students prepare a 2,500-word TOD plan for a chosen Indian metro station or BRT stop.
- Reading group — one international TOD case and one Indian case.
- Class debate — should Indian cities subsidise electric private vehicles, or prioritise electric public transit?

Module 6: Streets as Public Space and Complete Streets (6 hours)

Topics:

- Streets as the largest public space of the city — the politics of street allocation.
- Complete Streets — principles, design standards, MoHUA Urban Streets Design Guidelines.
- Pedestrianisation and tactical urbanism — Indian cases (Janpath, Hauz Khas Village, Pondicherry Promenade, Mumbai Open Streets).
- Non-motorised transport (NMT) cells — Pune, Chennai, Coimbatore, Pimpri-Chinchwad experiences.
- Vending and the street — Street Vendors Act 2014, Town Vending Committees.
- Public space programming — events, markets, cultural use of streets.
- Course synthesis: integrating Modules 1–5 in a single corridor design proposition.

Activities:

- Capstone term paper — 3,000-word integrated land-use–transport plan for a 2 km Indian urban corridor of student's choice.
- Final synthesis seminar — students present capstones and receive peer feedback.

- Reflective memo (500 words) on integrating land-use and transport thinking.

Assessment Methods

In line with the institutional SPA Delhi M.Plan assessment scheme, all assessment is split 50% internal continuous assessment (via verifiable deliverables, at the discretion of the Faculty Member) and 50% external end-semester examination. The weights of internal deliverables sum to 50%; each is mapped to specific Course Outcomes.

Internal Assessment (50%) — Verifiable Deliverables

- Capstone integrated corridor plan (25%) — 3,000-word land-use–transport plan for a 2 km Indian urban corridor. Rubric assesses CO1, CO3, CO5.
- TOD design exercise (15%) — 2,500-word TOD plan under Module 5. Rubric assesses CO1, CO3.
- Plan-reading annotated comparison (5%) — 1,500 words under Module 4. Rubric assesses CO2.
- Class participation, reading-group engagement, and reflective memo (5%) — graded across the semester. Rubric assesses CO4, CO5.

External Assessment (50%) — End-Semester Examination

- End-semester examination (50%) — comprehensive written examination, essay format, three-hour duration. Assesses all Course Outcomes (CO1–CO5).

Indicative Readings

- Banerjee-Guha, S. (ed.). (2010). *Accumulation by Dispossession: Transformative Cities in the New Global Order*. SAGE.
- Cervero, R. (2002). “Built Environments and Mode Choice — Toward a Normative Framework.” *Transportation Research D* 7(4).
- Cervero, R. and Kockelman, K. (1997). “Travel Demand and the 3Ds.” *Transportation Research D* 2(3).
- Government of India. (2014). *Street Vendors Act*.
- Government of India. (2022). *National Logistics Policy*.
- Hidalgo, D. and Carrigan, A. (2010). *Modernizing Public Transportation*. EMBARQ-WRI.
- ITDP India. (2024). *Complete Streets Framework Guidelines*.
- Levinson, D. and Krizek, K. (2017). *The End of Traffic and the Future of Access*. Network Design Lab.
- Mathur, S., Ahluwalia, I. J. (2023). *Urban Mobility in India*. ICRIER.
- MoHUA. (2014). *National Urban Transport Policy (revised); CMP Guidelines*.
- MoHUA. (2017, 2023). *Urban Streets Design Guidelines*.
- MoUD. (2017). *National TOD Policy*.
- Pucher, J. and Buehler, R. (eds.). (2012). *City Cycling*. MIT Press.

- Tiwari, G. (2014). Planning and Designing Transport Systems to Ensure Safe Travel for Women. ITF.
- Wegener, M. and Fürst, F. (1999). "Land-Use Transport Interaction — State of the Art." DSS Working Paper.

Programme Outcomes (POs) Referenced in CO Mapping

- PO1 — Domain knowledge: apply theory, frameworks, and Indian-context understanding to planning problems.
- PO2 — Critical thinking: analyse, critique, and reform planning interventions.
- PO3 — Research and inquiry: design, conduct, and communicate research.
- PO4 — Communication: write, present, and visualise planning content for diverse audiences.
- PO5 — Ethical reasoning: recognise equity, justice, and sustainability dimensions of planning.
- PO6 — Multidisciplinary integration: work across disciplinary boundaries.
- PO7 — Professional practice: engage with statutory, institutional, and procurement contexts.

UP3.14 Urban System Dynamics: Modelling and Simulation

a. Vision and Mission Statement of the Department / Course

Proposed Vision of the Department

To advance sustainable, inclusive, resilient and evidence-based urban development through excellence in planning education, research, innovation and professional practice.

Proposed Mission of the Department

- Develop competent urban planning professionals with strong analytical, systems-thinking, quantitative and technological capabilities.
- Promote integrated understanding of physical, social, environmental, ecological, infrastructure, economic and institutional dimensions of urban systems.
- Integrate quantitative methods, modelling, simulation and scenario analysis into planning education and decision-making.
- Encourage research, innovation and evidence-based approaches for understanding rapidly changing urban environments.
- Strengthen the ability of planners to evaluate alternative development strategies and their implications for sustainable urban futures.
- Develop planners capable of using appropriate analytical and simulation tools to support governance, planning strategies and policy formulation.

Vision of the Subject

To develop an understanding of urban areas as dynamic and interconnected systems and to equip students with analytical, modelling and simulation approaches for anticipating change and creating better urban futures.

Mission of the Subject

The subject introduces quantitative analytical methods, systems thinking, urban models, system dynamics techniques and hands-on modelling exercises so that students can quantify interactions among urban subsystems, test alternative strategies and evaluate future scenarios.

b. Subject Objectives

The objectives of Urban System Dynamics: Modelling and Simulation, subordinate to the overall Vision of the Department, are to:

1. Understand the dynamics and processes of change within urban systems for creating better urban futures.
2. Develop the ability to respond analytically to challenges posed by rapidly changing urban environments.
3. Introduce quantitative, statistical and spatial analytical techniques relevant to planning.

4. Develop systems-thinking capabilities for understanding the characteristics, functions and interrelationships of urban systems.
5. Introduce urban modelling approaches, including static and dynamic, aggregated and disaggregated, cellular automata and agent-based models.
6. Develop competence in system dynamics modelling using causal loop diagrams, stock-flow diagrams and scenario analysis.
7. Enable students to quantify interactions between drivers and subsystems of urban systems.
8. Enable students to test and compare alternative development strategies and anticipate their impacts on possible futures.
9. Develop basic hands-on capability in modelling and simulation software such as Vensim / Stella and analytical tools such as SPSS / R / Matlab / ArcGIS.
10. Develop the ability to evaluate model results using indicators of efficiency, equity and environmental impact while recognising uncertainty and data limitations.

c. Alignment with Other Subjects and Overall Objectives of the Course

The subject supports the wider Urban Planning curriculum by providing analytical and systems-based methods for understanding change, evaluating policy alternatives and strengthening evidence-based planning.

It aligns with and complements other subjects by:

- Supporting city and metropolitan planning through analysis of urban growth, change and system interrelationships.
- Complementing planning studio work by providing methods for scenario building, model-based evaluation and testing of alternative development strategies.
- Supporting infrastructure, environmental and sustainability subjects through systems analysis of interacting physical, ecological, economic and service networks.
- Strengthening quantitative and spatial-analysis capabilities through descriptive, inferential and spatial statistics, probability and sampling.
- Connecting with GIS and digital planning through the use of analytical and modelling tools such as ArcGIS, R, Matlab, Vensim and Stella.
- Supporting policy and governance subjects by helping students evaluate the consequences of interventions under alternative conditions and future scenarios.
- Developing an integrated understanding of efficiency, equity, environmental impact, uncertainty and data limitations in planning decisions.

d. Subject Details

Subject Title	Urban System Dynamics: Modelling and Simulation
Primary Objective	Understanding the dynamics/change for creating better urban futures

Nature of Subject	Analytical / modelling and simulation oriented planning subject
Key Analytical Tools Mentioned	SPSS / R / Matlab / ArcGIS
Key Modelling Tools Mentioned	Vensim / Stella
Core Focus	Urban systems thinking, quantitative methods, modelling, system dynamics, simulation and scenario forecasting
Credits / Contact Hours	Not specified in the provided source syllabus

Background

All urban areas are in a constant state of change. Some, like Delhi, struggle to cope with the consequences of urban growth such as lack of affordable housing, inequalities in amenities and services, pollution, evolving demographic patterns through migration and gentrification, and competition for limited available land. Other cities must manage decline and low demand. Planning for sustainable cities involves balancing relationships among the various components of the city such as Physical, Social, Environmental, Ecology, Infrastructure, Economic and Institutional systems. It is therefore important for planners and policy makers to understand and respond to rapidly changing environments. Appropriate policy tools can help formulate governance structures, planning strategies and financing mechanisms required for successful design and implementation of local policies and plans.

Questions this Course Will Address

- Q01: How we respond to the challenges posed by the rapidly changing urban environment?
- Q02: How to optimise the performance of a system using operation research techniques?
- Q03: How to quantify interactions between drivers and sub-systems of urban system?
- Q04: How to anticipate impact of alternate development strategies on futures?
- Q05: How to develop models and simulations for urban systems using suitable software/s (Vensim/ Stella)?

Core Content

C01: Introductory Analytical Methods

Theory and practical application of elementary quantitative techniques in planning emphasizing descriptive, inferential and spatial statistical analysis, probability, and sampling. Introduction to tools like SPSS / R / Matlab/ ArcGIS.

C02: Systems thinking in planning

System theory: System thinking, characteristics, classification of system and functions of urban system; History of urban simulation; Works of G.F. Chadwick, W. Jay Forrester, John.D. Sterman, Michael batty. Introduction to tools like Vensim/ Stella.

C03: Urban models and simulations

Concept of modelling, static and dynamic models, aggregated vs disaggregated models, Conventional and New generation models like cellular automata, agent-based models, Land use and Urban Development models and simulations.

C04: System Dynamics Technique

Definition; Defining the Problem and its conceptualization, Causal Loop Diagrams, Typology of Variables, Stock Flow Diagrams. Data analysis and application of statistical techniques for model Input. Steps of system dynamics modelling, Model preparation, Model Validation, Analysis of system under alternative conditions and scenario forecasting, analysis of model results.

C05: Case example: (Hands on!)

Indicators, Evaluation, discussion of evaluation of model results using indicators of efficiency, equity, and environmental impact. Alternative visualizations and user-interfaces for indicators. Model Specification, Estimation, Calibration and Validation. Managing uncertainty and data limitations: Uncertainty in urban systems and its impact on models, scenarios and solution findings Methods to manage uncertainty and data limitations.

e. Pedagogy

The pedagogy should combine conceptual understanding with practical analytical and modelling exercises, while retaining the hands-on orientation of the source syllabus.

- Lectures on quantitative methods, systems theory, urban modelling and system dynamics.
- Hands-on analytical exercises using descriptive, inferential and spatial statistical techniques.
- Software demonstrations and guided exercises using SPSS / R / Matlab / ArcGIS and Vensim / Stella, as available.
- Development of causal loop diagrams and stock-flow diagrams for selected urban problems.
- Problem conceptualisation and model-building exercises based on urban planning issues.
- Scenario simulation to compare alternative development strategies and future conditions.
- Model specification, estimation, calibration and validation exercises.
- Evaluation of model results using efficiency, equity and environmental indicators.
- Class discussion on uncertainty, data limitations and the interpretation of simulation results.
- Hands-on case examples connecting modelling outcomes to planning and policy decisions.

f. Learning Outcomes

On successful completion of the subject, students will be able to:

LO1. Explain the interconnected and dynamic nature of urban systems and the need for systems thinking in planning.

LO2. Apply elementary quantitative, statistical and spatial analytical methods to urban planning problems.

LO3. Describe the characteristics, classifications and functions of systems and relate them to urban systems.

LO4. Differentiate among major types of urban models, including static/dynamic, aggregated/disaggregated, cellular automata and agent-based models.

LO5. Conceptualise an urban problem using causal relationships, variable typologies and stock-flow structures.

LO6. Prepare, calibrate and validate a basic system dynamics model using suitable software.

LO7. Analyse urban systems under alternative conditions and develop scenario forecasts.

LO8. Interpret model outputs using indicators of efficiency, equity and environmental impact.

LO9. Recognise and manage uncertainty and data limitations in urban modelling and simulation.

LO10. Use modelling and simulation results to support planning strategies, policy evaluation and future-oriented decision-making.

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Course Title: Community-Based Participatory Planning Studio

Semester: IV

Course Title: Studio-based / Participatory Planning / Fieldwork-oriented

Hours per Week: 2 Hrs

Evaluation: Studio Jury with viva voce, sheets, workshop documentation and community-based proposals

Course Brief

Community Planning Studio is a participatory studio course designed to train students in community-based planning to allow student of knowledge of participatory planning in planning process through direct engagement with local residents, stakeholders, institutions and neighborhood groups. The course emphasis on community interaction, participatory workshops and stakeholder engagement, ensuring that students involve the community before formulating planning proposals.

Students will conduct field visits, household interactions, stakeholder consultations, focus group discussions, participatory mapping exercises and community workshops. The studio concludes with a jury presentation where students demonstrate how community planning process was translated into planning strategies, local area improvements and practical interventions.

Course Objectives

- Understand the importance of community participation in urban and local area planning.
- Develop skills in community interaction, communication, facilitation and documentation.
- Conduct participatory workshops with residents, local institutions and stakeholders.
- Identify planning issues through direct community engagement and field observation.
- Prepare community profiles using both technical data and local knowledge.
- Translate community feedback into spatial planning proposals and improvement strategies.
- Present community-based planning outcomes through studio sheets, reports and jury discussion.

Learning Outcomes

- Design and conduct community interaction exercises and stakeholder consultations.
- Facilitate participatory workshops, focus group discussions and group-based mapping exercises.
- Apply tools such as transect walks, social mapping, resource mapping, mobility mapping and stakeholder mapping.
- Record, interpret and prioritize community perceptions, needs and aspirations.

- Integrate community feedback into planning concepts and local-level proposals.
- Prepare studio sheets, workshop reports, community validation summaries and final presentations.
- Defend community-based proposals during internal reviews and final jury.

Weekly Structure

The course will be 2 hours per week. Each session may combine short input lectures, guided studio work, field documentation review, community interaction planning and jury-style discussion.

Week	Topic / Activity	Community Engagement Component	Studio Output
1	Introduction to community planning studio	Understanding community-based planning	Studio brief and study framework
2	Methods of community interaction	Role-play on community communication	Interaction checklist
3	Study area selection and stakeholder identification	Stakeholder listing and mapping	Stakeholder matrix
4	Field visit planning	Preparing questions for residents and groups	Fieldwork plan
5	Community interaction I	Household / resident interaction	Community notes
6	Community interaction II	Interaction with local leaders, shopkeepers, workers, women, youth and elderly	Stakeholder feedback record
7	Participatory mapping workshop	Social mapping / resource mapping with community	Participatory maps
8	Mid-term review / internal jury	Presentation of community findings	Existing situation analysis
9	Focus group discussion	Community needs and priority identification	Needs assessment
10	Community workshop I	Problem identification and issue ranking	Problem matrix
11	Proposal formulation	Translating community inputs into concepts	Draft planning proposal
12	Community workshop II	Feedback on draft proposals	Revised proposal framework
13	Refinement of proposals	Incorporating community feedback	Final proposal sheets
14	Final presentation preparation	Community validation summary	Final studio report
15	Final jury	Presentation of community-based planning process and proposals	Final jury submission

Participatory Planning and Workshop Tools

The studio focuses to teach any of the following techniques which will be part of a strategic problem in a city. Some of the tools for participatory planning are listed below:

Technique / Tool	Usefulness in Community Planning Studio
Appreciative Inquiry Summit	Builds on community strengths and positive local experiences to develop a shared vision for improvement.
Beneficiary Assessment	Captures views of direct users or beneficiaries of services, projects and neighborhood interventions.
Charrette	Intensive design workshop that helps students, experts and community members co-create alternatives quickly.
City Walk / Transect Walk	Helps students observe street life, mobility, safety, services, public spaces and everyday urban conditions with residents.
Computer-Aided Negotiation	Uses digital tools, maps or scenarios to support discussion between stakeholders with different priorities.
Consensus Building	Encourages dialogue and agreement among residents, agencies and other stakeholders on priority issues and actions.
Consensus Conference	Allows informed community representatives to discuss a planning issue and present a collective position.
Gulliver Mapping	Allows community members to express thought on a large map
Focus Groups	Useful for understanding group-specific needs such as women, elderly persons, youth, vendors or commuters.
Future Search	Brings diverse stakeholders together to examine past trends, present issues and preferred future directions.
Groupware	Supports collaborative documentation, mapping, voting and idea sharing through digital platforms.

Multi-Attribute Utility Analysis	Helps compare planning alternatives using multiple criteria such as cost, equity, accessibility, environment and feasibility.
Open House	Allows residents to visit information stations, interact with experts and leave comments at their convenience.
Participatory Appraisal	Uses participatory maps, seasonal calendars, ranking and local knowledge to understand community assets and problems.
Participatory Technology Assessment	Engages users in assessing the social, environmental and practical implications of new technologies or infrastructure.
Polls and Surveys	Generates comparable data on perceptions, priorities, service gaps and satisfaction levels across many respondents.
SARAR	Uses participatory learning principles to build self-esteem, associative strength, resourcefulness, action planning and responsibility.
Visioning	Helps the community articulate desired futures and shared aspirations for local area improvement.
Public Hearing	Provides a transparent platform where anyone can make comments and have them formally recorded.
Public Comment / Town Meeting	Allows open comments in a less formal public setting and helps identify broad concerns.
Briefing with Question and Answer	Provides information to the public and allows clarification through structured questions.
Panels	Allows informed viewpoints from experts, officials and community representatives to be discussed in one session.
Large Group / Small Group Format	Combines common information sharing with smaller group discussion, task completion and higher participation.
Workshop	Targets a specific product or task, such as identifying alternatives, ranking priorities or preparing action plans.
Coffee Klatch / Informal Meeting	Creates a friendly setting for in-depth discussion, especially with residents who may avoid formal meetings.

Symposium	Provides information and conflicting viewpoints in a setting where people can reflect on issues.
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Expected Studio Outputs

1. Community interaction plan
2. Stakeholder matrix
3. Field visit notes
4. Interview summaries
5. Focus group discussion records
6. Workshop photographs and documentation
7. Participatory maps
8. Community needs assessment
9. Problem ranking matrix
10. Community feedback report
11. Existing situation analysis
12. Proposal development process
13. Final planning proposal
14. Community validation summary
15. Final jury presentation sheets

b) Annexure B: New Pathway Electives Course

GeoSpatial Artificial Intelligence (GeoAI) – Course Brief

Duration: One Semester (15 weeks) | Faculty: Prof. Dr. Prafulla Parlewar | Total Marks: 100

Course focus: GeoAI integrates GIS, remote sensing, machine learning, deep learning and spatial analytics to solve applied geospatial problems. The course develops both theoretical understanding and hands-on skills using QGIS/ArcGIS, Python, and KNIME.

Module 1: Introduction to GeoAI – Data Types and Sources (Weeks 1–2)

Covers GeoAI definitions, need and scope; GIScience fundamentals; raster and vector data models; coordinate systems, projections and transformations; spectral signatures and remote sensing basics; open data sources such as NASA, ESA and OpenStreetMap; spatial/temporal data cleaning and preprocessing; introductory GeoPandas, Shapely and Pyproj; QGIS visualization and KNIME-based data analysis. Practical work includes QGIS operations, layer import/cleaning, CRS transformation and Python notebook setup.

Module 2: AI in Spatial Analysis (Weeks 3–5)

Introduces supervised and unsupervised learning for geospatial datasets, including classification, regression, clustering and dimensionality reduction. Topics include Random Forest, SVM, XGBoost, linear and ensemble regression, K-means, DBSCAN, hierarchical clustering, PCA and t-SNE. Students learn ML pipelines, feature extraction, spatial autocorrelation issues, and accuracy assessment using confusion matrix, Kappa coefficient and ROC-AUC. Practical work uses scikit-learn for classification, clustering and urban density pattern analysis.

Module 3: Deep Learning for Remote Sensing (Weeks 6–8)

Focuses on image classification, object recognition and segmentation using deep learning. Topics include CNN architecture, convolution, pooling, batch normalization, activation functions, transfer learning with pretrained models such as ResNet and VGG, hybrid geospatial models, hyperspectral image analysis, LULC classification, and segmentation architectures such as UNet, SegNet and DeepLabV3+. Practical work includes building CNN models in Python/Keras, UNet segmentation and patch extraction/tiling for large satellite images.

Module 4: Object Detection & Change Detection in Remote Sensing (Weeks 9–10)

Explores object detection and temporal change analysis in satellite imagery. Topics include YOLO, RetinaNet and Faster R-CNN; building, road and vehicle extraction; disaster damage assessment; pixel-based change detection such as image differencing and NDVI differencing; feature-based change detection including Siamese networks; and time-series satellite analysis workflows. Practical work includes YOLO training, NDVI-based change detection and Google Earth Engine workflows for flood/drought monitoring.

Module 5: GeoAI Applications, Case Studies & Industry Use (Weeks 11–12)

Applies GeoAI methods to urban regeneration and gentrification, smart mobility and traffic prediction, micro-mobility, precision agriculture, public health GIS, climate risk mapping, flood prediction, disaster impact analysis, cultural heritage detection and automated topographic mapping. Students review real-world datasets, present case studies and develop project design concepts linking GeoAI methods with planning, environment and industry applications.

Module 6: Advanced GeoAI, Big Data & Spatio-Temporal Analytics (Weeks 13–14)

Covers large-scale and real-time geospatial analytics, including massive geospatial datasets, Spatial Hadoop, GeoSpark, RasterFrames, spatio-temporal patterns in mobility/environment/weather data, GPS streams, IoT sensor feeds, wildfire/flood prediction, pollution control, climate and sustainability analytics, urban design, heritage rehabilitation,

infrastructure planning and built-environment applications. Practical work includes GEE time-series analysis, heatmaps, hotspot analysis and air-quality forecasting with ML.

Week 15: Final Project Submission & Viva

Each student demonstrates a complete GeoAI pipeline: dataset selection, preprocessing, model development, evaluation, map production and final paper/viva. The final project should address a real-world spatial problem using one or more AI techniques studied in the course.

Learning outcome: By the end of the course, students will be able to build ML/DL models for spatial data, apply GeoAI to land-cover mapping, object detection and environmental/urban challenges, and use modern GeoAI tools for sustainable development and planning.

Applied Artificial Intelligence

Advanced Elective for New Degree Course | 6 Modules | 15 Weeks

Course Positioning: This advanced elective moves beyond introductory AI literacy toward professional AI problem-solving. It trains students to frame complex domain problems, build production-grade machine learning and deep learning workflows, use large language models and AI agents responsibly, deploy models through APIs and dashboards, and evaluate AI systems for impact, risk, fairness, scalability and governance.

Course Type: Elective | **Duration:** One semester, 15 weeks | **Suggested Credits:** 3-4 | **Total Marks:** 100 | **Mode:** Lectures, coding studios, professional labs, case clinics, deployment sprint and capstone viva

Course Objectives

- Formulate professional AI problems from messy, real-world organizational, spatial, business, environmental, infrastructure and public-sector contexts.
- Design full AI pipelines from data acquisition, governance and feature engineering to model selection, evaluation, deployment and monitoring.
- Apply advanced ML, deep learning, NLP, computer vision, multimodal AI, LLMs and AI agents for decision-support and automation.
- Translate model outputs into actionable decisions using explainability, uncertainty assessment, dashboards, APIs and stakeholder-ready reporting.
- Assess ethical, legal, safety, privacy, bias, sustainability and accountability issues in professional AI systems.

Module 1: AI Problem Framing, Data Strategy and AI Systems Thinking

Weeks 1-2. This module establishes AI as a professional decision and automation system, not only a modeling technique. Students learn to convert ambiguous institutional, business, planning, infrastructure, health, climate or governance problems into AI-ready problem statements.

Advanced Coverage

AI maturity in organizations; professional AI use cases and failure modes; AI opportunity assessment; problem framing; data availability and feasibility; decision workflows; key performance indicators; data governance; data contracts; data quality scoring; responsible data collection; privacy by design; AI system architecture; human-in-the-loop design; cost, risk and value estimation.

Professional Studio Output

- Prepare a professional AI problem brief with stakeholders, data sources, decision points, risks, metrics and expected value.

Module 2: Advanced Machine Learning for Decision Intelligence

Weeks 3-5. This module develops advanced modeling capacity for tabular, spatial, temporal and operational datasets used in professional decision systems.

Advanced Coverage

Feature stores and feature engineering; leakage control; advanced regression and classification; ensemble learning; gradient boosting; XGBoost/LightGBM/CatBoost; anomaly detection; imbalanced learning; causal inference foundations; uplift modeling; demand forecasting; time-series modeling; uncertainty estimation; model calibration; explainable AI using SHAP/LIME; model benchmarking and error analysis.

Professional Studio Output

- Build an end-to-end ML pipeline for a professional dataset, compare multiple models, interpret results, and prepare an executive decision note.

Module 3: Deep Learning, Computer Vision and Multimodal AI

Weeks 6-8. This module focuses on high-dimensional professional problems involving imagery, video, sensor streams and multimodal data.

Advanced Coverage

Neural network design; CNNs and vision transformers; transfer learning; object detection; semantic and instance segmentation; anomaly detection in images; multimodal representation learning; image-text models; satellite, medical, industrial and surveillance imagery workflows; synthetic data; data augmentation; model compression; GPU/Colab workflows; performance trade-offs in professional deployment.

Professional Studio Output

- Develop a computer vision or multimodal prototype for detection, classification or segmentation and present error cases with improvement strategy.

Module 4: Natural Language Processing, Generative AI, LLMs and AI Agents

Weeks 9-10. This module prepares students to use language models as professional knowledge, automation and decision-support systems.

Advanced Coverage

Advanced NLP pipeline; embeddings; transformers; semantic search; retrieval-augmented generation; prompt engineering; structured prompting; evaluation of LLM outputs; hallucination control; tool use; AI agents; workflow automation; document intelligence; chatbots; report generation; policy and legal document analysis; knowledge graphs; domain adaptation; privacy-safe use of generative AI.

Professional Studio Output

- Build a domain-specific RAG or AI-agent workflow that answers professional queries using verified documents, citations and evaluation checks.

Module 5: AI Deployment, MLOps, Governance and Professional Integration

Weeks 11-12. This module converts models into reliable services. It introduces the operational and governance layer required in professional environments.

Advanced Coverage

Model packaging; APIs; dashboards; cloud and edge deployment; Docker basics; model registries; CI/CD concepts; monitoring data drift and model drift; feedback loops; A/B testing; security; audit trails; AI governance frameworks; compliance; documentation; model cards; risk registers; service-level expectations; procurement and vendor evaluation for AI systems.

Professional Studio Output

- Deploy a small AI service or dashboard and submit model documentation including risk assessment, monitoring plan and governance checklist.

Module 6: Professional AI Problem Labs and Capstone Studio

Weeks 13-15. The final module is a professional studio in which students solve a complex applied problem using the complete AI lifecycle. The capstone must demonstrate technical rigor, professional relevance and implementation awareness.

Advanced Coverage

Problem lab themes: smart city operations, infrastructure asset monitoring, climate risk and disaster early warning, urban mobility demand, public health intelligence, education analytics, real-estate and land-use analytics, energy forecasting, agricultural intelligence, finance and fraud detection, logistics optimization, citizen-service automation and organizational knowledge management. Capstone requirements: data pipeline, model, evaluation, explainability, dashboard/API or prototype, governance review, final report and viva.

Professional Studio Output

- Submit a professional AI capstone with source code/workflow, model evaluation, deployment mock-up, ethics and risk note, stakeholder presentation and viva.

15-Week Delivery Plan

Week	Focus
1	AI as professional decision infrastructure; problem discovery and value mapping
2	Data strategy, governance, feasibility, KPI design and system architecture
3	Advanced data preparation, feature engineering, leakage control and validation design
4	Ensemble models, gradient boosting, imbalanced data and anomaly detection

5	Time-series, uncertainty, explainability, benchmarking and professional reporting
6	Deep learning foundations, transfer learning and GPU workflow
7	Computer vision: detection, segmentation, image analytics and error analysis
8	Multimodal AI, synthetic data, model compression and deployment constraints
9	NLP, embeddings, semantic search and document intelligence
10	Generative AI, RAG, LLM agents, hallucination control and evaluation
11	APIs, dashboards, MLOps, monitoring and model documentation
12	AI governance, risk, security, procurement and responsible deployment
13	Capstone studio: problem framing, data pipeline and baseline model review
14	Capstone studio: advanced model, explainability, prototype and stakeholder testing
15	Final professional presentation, report submission and viva

Assessment Scheme (100 Marks)

- **Advanced Practical Labs - 30 marks:** ML pipeline, CV/multimodal task, NLP/RAG workflow, deployment or dashboard lab.
- **Mid-Term Professional Problem Analysis - 20 marks:** Case-based exam requiring problem framing, method choice, metrics, risks and implementation plan.
- **Seminar / Case Clinic - 10 marks:** Critical review of a current AI solution in a professional domain, including limitations and governance issues.
- **Final Professional AI Capstone - 35 marks:** End-to-end project with data pipeline, model, evaluation, explainability, prototype, governance note and viva.
- **Participation and Studio Reviews - 5 marks:** Peer review, code walkthroughs, design critiques and professional engagement.

Indicative Professional Problem Bank

- AI decision-support system for infrastructure condition assessment and maintenance prioritization.
- Urban service demand forecasting using mobility, demographic and service-delivery data.
- Disaster impact detection from satellite or drone imagery using computer vision.
- RAG-based policy intelligence assistant for government or institutional document analysis.
- Customer churn, fraud, credit risk or operational anomaly detection for business analytics.

- Public health surveillance dashboard combining time-series, spatial and text data.
- Climate risk early-warning model using environmental, remote sensing and sensor datasets.
- AI-powered grievance classification, routing and response recommendation system.
- Energy demand forecasting and optimization for campus, building or city-scale systems.
- Agriculture intelligence system for crop health, yield or pest-risk monitoring.

Learning Outcomes

- Develop professional-grade AI problem statements, data strategies and implementation roadmaps.
- Build and evaluate advanced ML, DL, NLP, LLM and multimodal AI workflows.
- Deploy AI prototypes through APIs, dashboards or agentic workflows with monitoring logic.
- Interpret and communicate AI outputs for decision-makers using explainability and uncertainty assessment.
- Prepare ethical, governable and auditable AI solutions suitable for professional contexts.

Tools and Platforms

Python, Jupyter/Google Colab, Pandas, NumPy, scikit-learn, XGBoost/LightGBM, TensorFlow/Keras, PyTorch, OpenCV, Hugging Face Transformers, LangChain/LlamaIndex concepts, vector databases, SHAP, FastAPI/Flask, Streamlit/Dash, Docker basics, Git/GitHub, KNIME, cloud notebooks and selected responsible generative AI platforms.

Course Title: Land Economics and Real Estate

Teaching Inputs

Total Lectures: 24

Time Duration: 2 hours / lecture

Total Hours / semester: 48 hours

Credits: 3 (Core)

Programme placement: M.Plan Urban Planning, 3rd Semester (core); cross-listed with M.Plan Housing, Regional Planning, and Environmental Planning. NEP-compliant format with declared Course Outcomes, PO mapping, and 50/50 assessment scheme.

Course Overview

This course addresses one of the most persistent gaps in Indian planning education: rigorous, integrated engagement with how urban land, housing, and real estate markets actually function — and how planning instruments succeed or fail in shaping them. The course brings economic theory (rent, bid-rent, hedonic pricing, supply elasticity) into direct conversation with the institutional realities of Indian urbanism — dual formal-informal markets, the master plan tradition, RERA, PMAY, LARR, the slum policy regime, and the National Monetisation Pipeline. It draws on quantitative reasoning at a level that permits critical reading of empirical research, and on the political-economy critique of “world-class” urbanism. Students will leave the course able to read a development plan, evaluate an affordable-housing scheme, structure a value-capture instrument, and engage with contemporary debates on financialisation, climate risk, and the digital transformation of land and housing.

Course Outcomes (COs)

Each Course Outcome is mapped to one or more Programme Outcomes (POs), listed at the foot of this document, consistent with the NEP-2020 Outcome-Based Education framework.

- CO1 — Apply economic theory (rent, bid-rent, hedonic pricing, supply elasticity) to Indian urban land and housing problems, with awareness of theoretical limits. [PO1, PO2]
- CO2 — Read, critique, and draft sections of statutory development plans, TDR regulations, and housing-scheme documents with technical fluency. [PO1, PO4, PO7]
- CO3 — Interpret quantitative evidence on land and housing markets (hedonic, repeat-sales, spatial econometrics) at a level that permits critical engagement with research without producing the analyses oneself. [PO1, PO2, PO3]
- CO4 — Design or evaluate housing schemes, value-capture instruments, and land-policy interventions in Indian municipal practice. [PO1, PO5, PO7]

- CO5 — Engage critically with the political economy of land and housing — informality, displacement, financialisation, climate vulnerability — in Indian conditions. [PO2, PO5]
- CO6 — Communicate complex land-economics and housing analyses to non-specialist audiences (policy briefs, court submissions, public consultations). [PO4, PO6]

Positioning in the Current Curriculum

This proposal is framed as a curriculum reform, not as a parallel addition. It is anchored explicitly against the existing M.Plan Urban Planning syllabus at SPA Delhi:

- Replaces and substantially expands the single buried module on land economics in C3.1 Urban Development Management and Governance (Module 2). Allows C3.1 to refocus on governance, institutions, and redevelopment.
- Relocates the existing C3.2 Module 5 (Innovative Methods of Financing Urban Development — land-based financing and value-capture instruments) into Module 6 of this course, where it forms a coherent body of knowledge with the rest of land economics.
- Consolidates housing-market content currently dispersed across CA2 (sociology of slums), C2.1 (special-area planning, slum improvement), and C4.2 (NUH&H Policy) into Modules 3, 4, and 5 of this course.
- Adopts the NEP-compliant format: Course Outcomes (COs), CO-to-PO mapping, Topics + Activities, and the institutional 50/50 assessment scheme articulated through verifiable deliverables.
- The course is taught entirely in lecture-and-seminar format, consistent with the SPA Delhi M.Plan curricular norm of theory-only courses.

Course Structure and Modules

Module 1: Foundations of Urban Land Economics (6 hours)

Topics:

- Theories of land rent: Ricardian differential rent, von Thünen, Alonso–Muth–Mills monocentric model, polycentric extensions.
- Bid-rent curves and the spatial sorting of households and firms.
- Land as a factor of production vs. land as a financial asset; speculation and the differential mobility of land.
- Externalities, public goods, and agglomeration economies as the rationale for land use planning.
- The Indian land question: colonial settlement systems (zamindari, ryotwari, mahalwari); ULCRA and its repeal; dual formal–informal markets.
- Property rights and tenure regimes: fee simple, leasehold (DDA, GMADA), occupancy, customary tenure; the Forest Rights Act and PESA.

- Political economy of urban land: Goldman on speculative urbanism, Roy on world-class urbanism, Bhan on displacement, Benjamin on occupancy urbanism.

Activities:

- Lecture and seminar discussion of foundational readings (one Indian + one international per session).
- Short response paper (800 words): critique the monocentric model in light of one Indian metropolitan region.
- Class debate on “land as commodity” vs. “land as commons” positions in Indian urban thought.

Module 2: Land Markets, Land Use Regulation, and Planning Instruments (8 hours)

Topics:

- Zoning, FAR/FSI, ground coverage, setbacks, height controls; the difference between Indian DCR/UDPF norms and Euclidean zoning.
- Master plans and statutory development plans: MPD-2041, Mumbai DP 2034, Bengaluru RMP, Hyderabad Metropolitan Plan.
- Transferable Development Rights (TDR), accommodation reservation, premium FSI, fungible compensatory area; the Mumbai TDR market.
- Land readjustment and land pooling: Gujarat Town Planning Schemes, Andhra Pradesh Land Pooling for Amaravati, Magarpatta.
- Land acquisition: LARR Act 2013 and predecessor regime, state-level dilutions, consent and SIA provisions.
- Environmental overlays and regulatory takings: NGT, eco-sensitive zone notifications, CRZ, Aravalli Notification, regulatory takings doctrine.
- Informal regulation: production and regularisation of unauthorised colonies, PM-UDAY, Karnataka Akrama-Sakrama, selective enforcement.

Activities:

- Comparative reading of MPD-2041 land-use schedule vs. Mumbai DCPR — students submit a 1,500-word annotated comparison.
- Class debate: Is land pooling a more equitable substitute for compulsory acquisition?
- Seminar discussion: read one judgment of the Supreme Court on regulatory takings and one judgment on slum eviction; compare their reasoning.

Module 3: Housing Demand, Supply, and Affordability (6 hours)

Topics:

- Housing as a bundle of attributes: structural, locational, and neighbourhood characteristics; the hedonic conception.

- Demand drivers: household formation, income elasticity, life-cycle, migration; reading Census 2011/2021 housing data, NSSO/PLFS.
- Housing supply elasticity: land availability, regulatory friction, financing, construction productivity, labour markets.
- Affordability metrics: PIR, RIR, residual income approach, housing cost burden; the EWS/LIG/MIG categorisation.
- Public housing in India: from JNNURM/BSUP and Rajiv Awas Yojana through PMAY-U (ISSR, AHP, BLC, CLSS) and ARHC.
- Rental markets: Rent Control Acts, Model Tenancy Act 2021; institutional rental, co-living, student housing, senior housing.
- Housing finance: banks, HFCs, NHB, mortgage products; financialisation debate; LTV/LTI risk; informal-income borrowers.

Activities:

- Affordability calculation exercise (no coding) across NCR / MMR / Bengaluru using NHB Residex, CRISIL, and PLFS data.
- Scheme evaluation: students compare PMAY-U ISSR vs. BLC outcomes in two cities using public dashboards — 1,500-word paper.
- Guest lecture from MoHUA / NHB / a HFC underwriter.

Module 4: Real Estate Markets and Finance (6 hours)

Topics:

- Market segmentation: residential, commercial, retail, warehousing/logistics, hospitality, industrial; Grade A / B office stock.
- Real estate cycles, bubbles, and crashes: 2008 GFC, NCR overhang post-2013, IL&FS / DHFL / Unitech / Jaypee, IBC resolution.
- Developer economics: land acquisition, debt, customer advances, sales velocity, cash flow; the leverage cycle.
- REITs and InvITs: Embassy, Mindspace, Brookfield India; institutionalisation of office and retail.
- Regulation of consumer real estate: RERA Act 2016, state RERAs, regulatory gaps (resale, plots, small developers).
- PPP models: DBFOT, JVs with land authorities, slum redevelopment, PMAY-AHP partnerships.
- Valuation under uncertainty: comparable sales, income capitalisation, residual method, automated valuation models; the Companies Act registered-valuer regime.

Activities:

- Reading and analysis of one quarterly report from a listed Indian REIT — 800-word note.

- Case study: pick one stressed real estate IBC case, write a 1,500-word note on the cause and resolution.
- Guest lecture from a state RERA officer or a PE real estate analyst.

Module 5: Informality, Tenure, and Urban Land Conflicts (6 hours)

Topics:

- Theorising informality: de Soto and the titling thesis; Ananya Roy on informality as a mode of governance; Vyjayanthi Rao on speculative urbanism.
- Typology of informal settlements: notified slums, non-notified slums, JJ clusters, unauthorised colonies, urban villages, regularised colonies, resettlement colonies.
- Tenure security: fee simple, occupancy certificates, NoCs; PM-UDAY; SVAMITVA; the de jure / de facto gap.
- Slum policy paradigms: in-situ upgrading, in-situ redevelopment, resettlement; SRA, Delhi resettlement colonies, Ahmedabad Slum Networking, Indore BSUP, Dharavi.
- Eviction and the right to the city: 1976 Emergency demolitions, post-2010 court-ordered evictions, Land Conflict Watch and HLRN data.
- Gender, caste, and religion in access to urban land: women's tenure under personal law, caste-based segregation, Muslim ghettoisation.
- Climate displacement: Chennai 2015, Mumbai coastal vulnerability, Joshimath, planned-relocation discussions.

Activities:

- Comparative case study: 2,000-word policy note comparing SRA Mumbai vs. an in-situ upgrading site of the student's choice.
- Reading group: one chapter each from Bhan (2016), Roy (2003), and Benjamin (2008) — in-class discussion.
- Guest lecture from HLRN, SPARC, or a community-based settlement organisation.

Module 6: Land-Based Financing and Value Capture (6 hours)

Topics:

- Municipal finance crisis in India: limited tax base, dependence on transfers, weak property tax compliance; HPEC and 15th Finance Commission estimates.
- Toolkit of land-based financing: betterment levies, development charges, impact fees, premium FSI, TDR sale.
- TIF, special assessment districts, BIDs; HMDA, CIDCO, and AMRUT experiments.
- TOD and accessibility-based value capture: DMRC joint development, Hyderabad ORR, Bengaluru Metro Phase 2; Hong Kong MTR R+P, Tokyo.

- Land monetisation: National Monetisation Pipeline; Indian Railways, Defence, and PSU surplus land.
- International value-capture experiments: Bogotá Plusvalía, São Paulo CEPACs, China land-leasing, Brazil Outorga Onerosa, Korea readjustment.
- Property tax reform and digital cadastres: DILRMP, SVAMITVA, Bengaluru Self-Assessment Scheme, GIS-based assessment.

Activities:

- Design exercise (written, no coding): students structure a value-capture instrument (TDR, premium FSI, or impact fee) for a chosen Indian metro corridor and submit a 2,000-word brief.
- Negotiation simulation: betterment levy stakeholder negotiation between municipality, owners, and developers — in-class role-play.
- Guest lecture from NIUA, ICRIER, or a state finance commission member.

Module 7: Reading Quantitative Evidence on Land and Housing (6 hours)

Topics:

- How a hedonic price model works — conceptual exposition, interpreting implicit prices, common pitfalls; reading published Indian hedonic studies.
- Repeat-sales indices: the Case-Shiller logic, RBI Residex, NHB Residex, Knight Frank India indices.
- Discrete choice models for residential and tenure choice — the conceptual idea, reading published applications.
- Spatial econometrics in plain language — spatial autocorrelation, spillovers.
- Online property data — listing-vs-transaction bias, deduplication; how to evaluate a study based on scraped data.
- Affordability and policy-counterfactual studies — how to read FSI-deregulation, subsidy-incidence, and rent-control studies critically.
- Network and accessibility analysis as it appears in land-economics research.

Activities:

- Critical reading exercise: each student is assigned one quantitative paper on Indian land or housing and writes a 1,500-word methodological critique.
- In-class “replication walkthrough” — instructor demonstrates a hedonic regression on a small public dataset for conceptual understanding only.
- Group seminar: students debate the merits and risks of policy reforms based on quantitative evidence (e.g., FSI deregulation in Mumbai).

Module 8: The Future of Urban Land and Housing (4 hours)

Topics:

- Climate risk and property markets: flood, heat, sea-level rise; NDMA risk maps; reinsurance-driven repricing of coastal markets.

- PropTech, fractional ownership, and algorithmic real estate — Strata, hBits, PropertyShare; international comparators.
- Co-living, build-to-rent, and rental institutionalisation.
- Land for the energy transition: solar/wind land demand, EV charging, battery storage, last-mile logistics; conflict with grazing/forest land.
- Land commons, community land trusts, cooperative ownership.
- Regulating short-term rentals and platform property.
- Pedagogical reflection: what should the next generation of Indian planners know about land and housing?

Activities:

- Reading and discussion of two recent (post-2023) papers per topic.
- Final synthesis seminar — students present their term paper outlines and receive peer feedback.

Assessment Methods

In line with the institutional SPA Delhi M.Plan assessment scheme, all assessment is split 50% internal continuous assessment (via verifiable deliverables, at the discretion of the Faculty Member) and 50% external end-semester examination. The weights of internal deliverables sum to 50%; each is mapped to specific Course Outcomes.

Internal Assessment (50%) — Verifiable Deliverables

- City-specific term paper (25%) — 5,000 words; students select an Indian city and produce an analytical paper on its land and housing market, evaluating one planning intervention (TDR, PMAY-U project, RERA, slum policy, or value capture). Rubric assesses CO1, CO2, CO4, CO6.
- Methodological critique paper (10%) — 1,500-word critique of one published quantitative paper, submitted under Module 7. Rubric assesses CO3.
- MPD-2041 vs. Mumbai DCPR annotated comparison (10%) — 1,500 words, submitted under Module 2. Rubric assesses CO2.
- Class participation in seminar discussions, reading-group engagement, and reflective memo (5%) — graded across the semester. Rubric assesses CO5.

External Assessment (50%) — End-Semester Examination

- End-semester examination (50%) — comprehensive written examination, essay and short-answer format, three-hour duration. Assesses all Course Outcomes (CO1–CO6) with weighted distribution across modules.

Indicative Readings

- Alonso, W. (1964). *Location and Land Use*. Harvard University Press.
- Bhan, G. (2016). *In the Public's Interest: Evictions, Citizenship, and Inequality in Contemporary Delhi*. University of Georgia Press.

- Benjamin, S. (2008). "Occupancy Urbanism: Radicalizing Politics and Economy beyond Policy and Programs." *IJURR* 32(3).
- DiPasquale, D. and Wheaton, W. C. (1996). *Urban Economics and Real Estate Markets*. Prentice Hall.
- Glaeser, E. and Gyourko, J. (2018). "The Economic Implications of Housing Supply." *Journal of Economic Perspectives* 32(1).
- Goldman, M. (2011). "Speculative Urbanism and the Making of the Next World City." *IJURR* 35(3).
- Government of India. (2013). *Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act*.
- Government of India. (2016). *The Real Estate (Regulation and Development) Act*.
- MoHUA. (2024). *PMAY-U Annual Report; Model Tenancy Act 2021 — Implementation Note*.
- NIUA. (2022). *Land Value Capture in India — Concepts, Tools, and Case Studies*.
- O'Sullivan, A. (2019). *Urban Economics*, 9th ed. McGraw-Hill.
- Roy, A. (2003). *City Requiem, Calcutta: Gender and the Politics of Poverty*. University of Minnesota Press.
- Roy, A. (2009). "Why India Cannot Plan Its Cities: Informality, Insurgence and the Idiom of Urbanization." *Planning Theory* 8(1).
- Sridhar, K. S. (2010). "Impact of Land Use Regulations: Evidence from India's Cities." *Urban Studies* 47(7).
- Verma, G. D. (2002). *Slumming India: A Chronicle of Slums and Their Saviours*. Penguin India.
- World Bank. (2021). *India: Urbanization beyond Municipal Boundaries — Nurturing Metropolitan Economies*.

Programme Outcomes (POs) Referenced in CO Mapping

- PO1 — Domain knowledge: apply theory, frameworks, and Indian-context understanding to planning problems.
- PO2 — Critical thinking: analyse, critique, and reform planning interventions.
- PO3 — Research and inquiry: design, conduct, and communicate research.
- PO4 — Communication: write, present, and visualise planning content for diverse audiences.
- PO5 — Ethical reasoning: recognise equity, justice, and sustainability dimensions of planning.
- PO6 — Multidisciplinary integration: work across disciplinary boundaries.

- PO7 — Professional practice: engage with statutory, institutional, and procurement contexts.

Advanced Land Economics and Real Estate

Semester Course Details | Advanced Elective / Professional Studio-Seminar

Designed as an advanced follow-on to the previous Land Economics, Housing Markets and Real Estate course. The earlier course covered foundations of land rent, Indian land regulation, housing demand-supply, real estate finance, informality, value capture, quantitative evidence, and future land-housing debates.

Course Type	Advanced elective for M.Plan / interdisciplinary postgraduate programmes
Duration	15 weeks 48 contact hours 3 credits
Pedagogy	Lecture-seminar + professional lab + case clinic + term project
Prerequisite	Prior coursework in urban land economics, housing markets, planning law, or real estate fundamentals
Core Orientation	Professional problem-solving: market diagnosis, land policy design, feasibility, valuation, risk, finance, negotiation and implementation
Assessment	50% internal professional deliverables + 50% end-semester examination / jury

Course Overview

Advanced Land Economics and Real Estate moves beyond introductory concepts into professional and policy-facing problems encountered by planners, development authorities, real estate analysts, lenders, consultants, public agencies and community organisations. The course trains students to connect land-market theory with valuation, real estate project feasibility, statutory planning instruments, land assembly, infrastructure finance, affordable housing delivery, climate risk, market data, negotiations and implementation constraints in Indian metropolitan regions.

The course is case-led. Each module requires students to work with a real site, corridor, redevelopment area, land parcel, housing scheme, metro influence zone, or stressed real estate project. The final output is a professional-quality Land and Real Estate Strategy Dossier suitable for presentation to a city agency, developer, housing board, lender, tribunal, public consultation, or investment committee.

Advanced Course Outcomes

- ACO1: Diagnose land and real estate market problems using theory, market evidence, statutory controls and stakeholder behaviour.

- ACO2: Prepare professional land-value, feasibility and affordability assessments using comparable sales, income, residual and policy-based approaches.
- ACO3: Structure land policy and planning instruments such as land pooling, TDR, premium FSI, inclusionary housing, impact fees and transit-oriented value capture.
- ACO4: Evaluate real estate projects from developer, municipality, lender, household and community perspectives, including cash-flow, risk, regulation and political-economy constraints.
- ACO5: Analyse informality, tenure conflict, displacement, climate risk and legal-institutional constraints in land and housing decisions.
- ACO6: Communicate professional recommendations through policy briefs, investment memos, negotiation notes, public consultation material and expert-style reports.

Course Modules: 6 Modules Across 15 Weeks

Module 1: Advanced Land Market Diagnostics and Spatial Political Economy (Weeks 1-2; 6 hours)

Professional focus: Understanding how land values, planning controls, infrastructure, speculation, informality and political decisions interact in a real urban market.

Advanced topics:

- Advanced bid-rent, polycentric urban structure, agglomeration and accessibility premiums.
- Land value gradients, rent gaps, speculative holding, vacant land and under-utilised public land.
- Formal, informal and quasi-formal land markets; permissions, enforcement, regularisation and discretionary planning.
- Reading city-scale land markets through development plans, cadastral records, transaction data, listing data, circle rates and infrastructure plans.
- Political economy of land: displacement, commons, elite capture, occupancy urbanism and public interest.

Studio / professional lab: Students select one Indian city/corridor and prepare a professional land-market diagnosis using planning documents, land-use maps, news archives, public data and market evidence.

Module deliverable: Land Market Diagnostic Note: 1,500 words + maps/figures identifying value drivers, regulatory constraints and major professional risks.

Module 2: Professional Valuation, Feasibility and Real Estate Financial Modelling (Weeks 3-5; 10 hours)

Professional focus: Preparing evidence-based valuation and project feasibility assessments for professional decision-making.

Advanced topics:

- Valuation methods: comparable sales, income capitalisation, discounted cash flow, residual land value and replacement cost.
- Development feasibility: FAR/FSI, saleable area, efficiency ratios, phasing, absorption, sales velocity, construction cost, finance cost and approvals risk.
- Project cash-flow, IRR, NPV, DSCR, leverage, escrow, RERA-linked cash management and stress testing.
- Housing affordability and viability gap: cross-subsidy, inclusionary housing, PMAY-linked affordability, rental yield and household capacity to pay.
- Automated valuation models, hedonic indicators, listing data bias, transaction opacity and professional ethics in valuation.

Studio / professional lab: Spreadsheet-based feasibility clinic using a mixed-use parcel or redevelopment site. Students test scenarios for FSI, pricing, affordable-housing requirement, construction cost and finance assumptions.

Module deliverable: Professional Feasibility Memo: valuation logic, assumptions, base case, sensitivity table and recommendation to investor/authority/lender.

Module 3: Land Assembly, Development Rights and Statutory Implementation (Weeks 6-7; 6 hours)

Professional focus: Designing implementable land assembly and development-right strategies within Indian legal and institutional realities.

Advanced topics:

- Land acquisition under LARR, consent, SIA, compensation, R&R and state-level variations.
- Land pooling and readjustment: Gujarat TP Schemes, Delhi land pooling, Amaravati and peri-urban growth corridors.
- TDR, accommodation reservation, premium FSI, fungible FSI, TOD zoning and development control negotiation.
- Regulatory takings, environmental overlays, CRZ, eco-sensitive zones, heritage controls and litigation risk.
- Development agreement drafting logic: parties, obligations, risk allocation, phasing, public facilities and dispute points.

Studio / professional lab: Case clinic where students compare two possible instruments for the same corridor: acquisition vs. pooling, or TDR vs. premium FSI, or inclusionary zoning vs. land monetisation.

Module deliverable: Instrument Design Brief: recommended instrument, legal basis, stakeholder incentives, risks and implementation sequence.

Module 4: Housing Markets, Affordable Housing Delivery and Informality Solutions (Weeks 8-10; 10 hours)

Professional focus: Solving professional housing problems where demand, affordability, tenure, finance, land cost and social justice intersect.

Advanced topics:

- Advanced housing-market segmentation: EWS/LIG/MIG, rental housing, co-living, student housing, senior housing and worker housing.
- Affordability models: price-to-income, rent-to-income, residual income, lifecycle costs, transport-housing cost burden and subsidy incidence.
- Affordable-housing delivery: PMAY-U, ARHC, PPP-AHP, in-situ slum redevelopment, rental housing and cross-subsidy models.
- Informality and tenure: slums, unauthorised colonies, urban villages, resettlement colonies, PM-UDAY, SVAMITVA and tenure security.
- Displacement, livelihood loss, gender/caste/religion in land access, public consultation and rights-based housing strategies.

Studio / professional lab: Students prepare a housing intervention strategy for a selected settlement, redevelopment site, or rental-housing problem, including stakeholders, finance, tenure and implementation pathway.

Module deliverable: Affordable Housing and Tenure Strategy: professional policy note with affordability calculations, delivery model and risk safeguards.

Module 5: Infrastructure Finance, Land Value Capture and Public Asset Monetisation (Weeks 11-12; 6 hours)

Professional focus: Structuring land-based financing instruments that can fund urban infrastructure while managing equity and market risks.

Advanced topics:

- Municipal finance gap, property tax reform, GIS-based assessment, user charges, creditworthiness and infrastructure funding constraints.
- Land value capture toolkit: betterment levy, impact fee, development charge, premium FSI, TDR sale, special assessment district and TIF.
- TOD and accessibility-based value capture around metro, BRT, ring road and station-area projects.
- Public land monetisation: railways, defence, PSUs, port trusts, development authorities and safeguards against one-time fiscal extraction.
- International lessons: Hong Kong MTR R+P, Tokyo rail real estate, Bogota Plusvalia, Sao Paulo CEPACs and China land leasing.

Studio / professional lab: Students design a value-capture strategy for a real or hypothetical transit corridor, estimating beneficiaries, collection mechanism, institutional arrangement and equity safeguards.

Module deliverable: Value Capture Term Sheet: instrument design, charging logic, implementation agency, legal risks and public communication note.

Module 6: Future Real Estate, Climate Risk, PropTech and Capstone Integration (Weeks 13-15; 10 hours)

Professional focus: Preparing students for emerging professional problems in climate-sensitive, data-rich and financially complex land and real estate markets.

Advanced topics:

- Climate risk and property markets: flood, heat, coastal risk, insurance, disclosure, stranded assets and managed retreat.
- PropTech, digital cadastres, blockchain land records, fractional ownership, algorithmic pricing, platform rentals and data governance.
- REITs, InvITs, private equity real estate, stressed assets, IBC, NCLT, RERA litigation and investment-committee reasoning.
- AI/GIS for land and real estate intelligence: spatial data, remote sensing, accessibility, market dashboards and risk scoring.
- Professional communication: investment memo, policy memo, expert note, public consultation material and negotiation brief.

Studio / professional lab: Capstone studio sessions, peer review, mock public hearing/investment committee and final viva.

Module deliverable: Final Land and Real Estate Strategy Dossier: complete professional report for a selected city/site/corridor/project.

Indicative Week-wise Plan

Week	Focus
Week 1	Advanced land-market theory, rent gaps, spatial value gradients
Week 2	Indian land institutions, informality, political economy and market diagnosis
Week 3	Professional valuation methods and market evidence
Week 4	Residual land value, feasibility modelling and scenario testing
Week 5	RERA, cash flow, debt, stress testing and valuation ethics
Week 6	Land acquisition, pooling, readjustment and implementation risks
Week 7	TDR, premium FSI, TOD controls, regulatory takings and legal risk
Week 8	Advanced housing demand, affordability and segmentation
Week 9	Affordable housing finance, rental housing and PPP delivery
Week 10	Informal settlements, tenure security, resettlement and rights-based strategies
Week 11	Municipal finance, property tax, impact fees and betterment levies
Week 12	TOD value capture, public land monetisation and international models
Week 13	Climate risk, PropTech, digital cadastres and data governance
Week 14	REITs, private equity, stressed assets, IBC/RERA cases and capstone clinic

Week 15

Final dossier presentation, mock professional jury and viva

Assessment Scheme

The assessment follows a professional-output model while retaining the 50/50 internal and external structure used in the previous course proposal.

Internal Assessment: 50%: Land Market Diagnostic Note 10%; Feasibility/Valuation Memo 15%; Instrument or Value Capture Brief 10%; Affordable Housing/Tenure Strategy 10%; seminar participation and peer review 5%.

External Assessment: 50%: End-semester professional examination/jury: case-based written analysis, policy-instrument design, valuation interpretation and viva on the final dossier.

Final Capstone Dossier: Integrated Land and Real Estate Strategy for a city/site/corridor/project: market diagnosis, valuation, feasibility, regulatory strategy, housing/equity implications, risk register, implementation roadmap and communication brief.

Professional Problems Addressed

- How should a municipality capture land value around a metro corridor without displacing low-income households?
- Is a redevelopment project financially viable under existing FAR, RERA, construction cost and absorption assumptions?
- Which is more implementable for peri-urban expansion: acquisition, pooling, readjustment, TDR or negotiated development?
- How should a city evaluate PMAY, in-situ redevelopment, rental housing or resettlement proposals beyond unit counts?
- How should public agencies monetise land while protecting long-term public value and social infrastructure needs?
- How do climate risk, litigation, informality and data opacity affect land valuation and real estate investment decisions?

Professional Tools and Data Sources

- Planning documents: master plans, DCR/UDPFI provisions, TOD policies, RERA orders, land pooling regulations and court judgments.
- Market and finance data: circle rates, registration statistics where available, NHB/RBI Residex, listed REIT reports, developer annual reports, CREDAI/Anarock/JLL/Knight Frank/CBRE market reports, bank/HFC lending norms.
- Spatial and public data: Census, PLFS, PMAY dashboards, municipal property tax data, DILRMP/SVAMITVA references, metro corridor plans, GIS layers and remote-sensing evidence.

- Analytical tools: Excel/Google Sheets for feasibility, GIS for spatial overlays, basic dashboarding, scenario analysis, sensitivity analysis and professional memo writing.

Indicative Advanced Readings and Cases

- Alonso, W. Location and Land Use; DiPasquale and Wheaton, Urban Economics and Real Estate Markets; O'Sullivan, Urban Economics.
- Glaeser and Gyourko on housing supply; Bertaud on cities as labour markets; Fischel on zoning and local public finance.
- Indian statutes and policies: LARR 2013, RERA 2016, Model Tenancy Act 2021, PMAY-U, MPD-2041, Mumbai DCPR, TOD and land pooling policies.
- Indian political economy: Bhan, Roy, Benjamin, Goldman; selected HLRN, Land Conflict Watch, NIUA and ICRIER reports.
- Professional cases: Mumbai TDR/SRA, Delhi land pooling, Gujarat TP schemes, Hyderabad ORR, DMRC property development, Embassy/Mindspace/Brookfield REITs, Jaypee/Unitech/IL&FS cases.

c) Annexure C: Departmental Elective Bundle

Proposed Departmental Electives

1. Overview of the Departmental Electives

The proposed departmental electives are designed to provide flexibility within the Master in Urban Planning programme while retaining the overall credit and contact-hour structure. The revised syllabus keeps the semester workload unchanged, but reorganises elective choices to allow students to specialise in emerging and practice-oriented areas such as GeoAI, applied artificial intelligence, land economics, real estate, mobility planning, local area planning, housing, infrastructure, disaster management, urban design, and heritage.

The electives are organised around two major Honors pathways and a broader set of regular departmental electives. The Honors pathways include Artificial Intelligence and GeoAI in Urban Planning, and Land Economics and Real Estate Planning. These pathways allow students to select a coherent sequence of electives across Semester II and Semester III, while still remaining anchored in the core urban planning curriculum and studio-based learning.

The revised elective structure strengthens the department's ability to respond to contemporary changes in urban planning practice. Cities are increasingly shaped by data platforms, smart infrastructure, real estate markets, transport systems, climate risk, and citizen participation. Therefore, the electives are categorised to support both traditional planning competencies and new digital, spatial, economic, and governance skills required by professional planners.

The proposed bundle can be used for course choice, timetable planning and Honors stream allocation. It is proposed that department may introduce any two electives with one mandatory honors elective per semester.

2. Semester-wise Departmental Electives

2.1 Semester II Departmental Electives

Course Code	Course Title	Departmental Elective Type
UP2.07	Urban Information System and Spatial Analysis	Regular Existing Elective
UP2.08	GeoSpatial Artificial Intelligence (GeoAI)	Honors Elective
UP2.09	Land Economics and Real Estate	Honors Elective
UP2.10	Land Use and Transport Planning	Regular Existing Elective
UP2.11	Blue-Green Infrastructure and Nature-Based Solutions	Regular Elective

Course Code	Course Title	Departmental Elective Type
UP2.12	Public Space Planning and Placemaking	Regular Elective
UP2.13	Informal Housing and Infrastructure	Regular Elective
UP2.14	DCR & LAP Implementation	Regular Elective

2.2 Semester III Departmental Electives

Course Code	Course Title	Elective Type
UP3.06	Urban Risk and Disaster Management	Regular Course Subject converted to Regular Elective
UP3.07	Urban Design and Heritage	Regular Existing Elective
UP3.08	Applied Artificial Intelligence	Honors Elective
UP3.09	Advanced Land Economics	Honors Elective
UP3.10	Compact Cities and TOD	Regular Elective
UP3.11	Future Mobility and Autonomous Transport Planning	Regular Elective
UP3.12	Circular Economy and Urban Metabolism	Regular Elective

3. Thematic Categorization of Elective Basket

Category	Courses Included
Artificial Intelligence	UP2.07 GeoSpatial Artificial Intelligence; UP3.08 Applied Artificial Intelligence
Land Economics and Real Estate	UP2.08 Land Economics and Real Estate; UP3.09 Advanced Land Economics
GIS and Spatial Planning	UP2.07 Urban Information System and Spatial Analysis
Transport and TOD	UP2.09 Land Use and Transport Planning; UP3.10 Compact Cities and TOD
Housing and Infrastructure	UP3.09 Informal Housing and Infrastructure UP3.11 Future Mobility and Autonomous Transport Planning UP3.12 Circular Economy and Urban Metabolism
Urban Design, Heritage and Local Area Planning	UP3.10 DCR & LAP Implementation; UP3.07 Urban Design and Heritage
Disaster Management	UP3.06 Urban Risk and Disaster Management

4. Brief Descriptions of Electives

Semester II Departmental Electives

UP2.07 Urban Information System and Spatial Analysis

This course introduces students to urban information systems as a foundation for evidence-based planning. It focuses on the collection, organisation, management, analysis, and visualisation of spatial and non-spatial urban data. Students learn how GIS, spatial databases, thematic mapping, and spatial analysis can support land-use planning, infrastructure planning, environmental assessment, and governance decision-making. The course is suitable for students who want to strengthen their analytical and mapping skills for professional planning practice.

UP2.08 GeoSpatial Artificial Intelligence (GeoAI)

This course introduces GeoAI as an emerging field that combines geospatial data, machine learning, remote sensing, GIS, and spatial analytics. It enables students to understand how AI can be used for land-use classification, urban growth modelling, accessibility analysis, infrastructure monitoring, risk mapping, and smart governance. The course is especially relevant for students pursuing the Artificial Intelligence Honors stream. It prepares students to work with data-driven and platform-based planning systems. This course is also part of institutional elective and share common course for department and institution of GeoAI.

UP2.09 Land Economics and Real Estate

This course provides a foundation in the economic principles that shape urban land markets and real estate development. It covers land value, rent, location theory, property markets, real estate development processes, valuation, land-use regulation, and the role of public policy in influencing land development. The course helps students understand how land becomes an economic resource in urban planning and how planning decisions affect land and property markets. It is suitable for students interested in land policy, real estate, urban redevelopment, and development finance.

UP2.10 Land Use and Transport Planning (Existing Elective)

This course examines the relationship between urban land use, transport systems, accessibility, and mobility behaviour. It introduces students to transport demand, network structure, public transport planning, pedestrian and non-motorised transport, parking, traffic management, and integrated land-use-transport strategies. The course emphasises how transport investments influence urban form and how compact, transit-oriented development can improve sustainability and accessibility. It is an important elective for students interested in mobility planning and urban structure.

UP2.11 Blue-Green Infrastructure and Nature-Based Solutions

This elective introduces students to planning approaches that integrate water systems, green spaces, biodiversity, and urban infrastructure. It focuses on strategies such as urban forests, wetlands, rain gardens, bioswales, green roofs, sponge city principles, and ecological corridors. Students learn how nature-based solutions can reduce flooding, heat stress, air pollution, and climate vulnerability while improving urban liveability. The course also develops skills in mapping, planning, and evaluating blue-green networks at neighbourhood, city, and regional scales.

UP2.12 Public Space Planning and Placemaking

This elective focuses on the planning, design, management, and activation of streets, parks, plazas, markets, waterfronts, and community spaces. It explores how public spaces contribute to social interaction, safety, inclusion, identity, health, and urban vitality. Students learn placemaking methods such as user surveys, behavioural mapping, tactical urbanism, participatory design, and public realm improvement strategies. The course emphasizes creating accessible, inclusive, climate-responsive, and culturally meaningful public spaces.

UP2.13 Informal Housing and Infrastructure

This course focuses on the housing and infrastructure challenges faced by informal settlements and low-income urban communities. It addresses issues of tenure, basic services, sanitation, water supply, social infrastructure, livelihood linkages, housing policy, and upgrading strategies. Students learn to assess infrastructure gaps and formulate inclusive planning interventions that respond to ground realities. The course is valuable for students interested in equity, poverty, housing policy, and inclusive urban development.

UP2.14 DCR and LAP Implementation

This course deals with the practical implementation of Development Control Regulations and Local Area Plans. It helps students understand how planning regulations are translated into built-form controls, development permissions, local planning frameworks, and implementation mechanisms. The course can include case-based learning on zoning, building regulations, street design, land pooling, redevelopment, and participatory local area planning. It is useful for students aiming to work with planning authorities, urban local bodies, and regulatory agencies.

Semester II Departmental Electives

UP3.06 Urban Risk and Disaster Management (Existing Subject)

This course introduces students to the concepts of urban risk, vulnerability, hazard assessment, disaster preparedness, mitigation, and resilience planning. It focuses on climate-related and non-climate-related urban risks such as floods, heat, earthquakes, fire, infrastructure failure, and public health emergencies. Students learn how planning

tools, GIS, risk mapping, institutional coordination, and community preparedness can reduce vulnerability. The course supports risk-sensitive urban planning and resilience-oriented governance.

UP3.07 Urban Design and Heritage (Existing Elective)

This course combines urban design principles with heritage conservation and place-sensitive planning. It introduces students to urban form, public realm, streetscape, built heritage, cultural landscapes, precinct planning, conservation policy, and design guidelines. The course helps students understand how heritage areas can be managed while accommodating contemporary urban needs. It is relevant for students interested in urban character, conservation planning, public space, and design-led planning interventions.

UP3.08 Applied Artificial Intelligence

This course focuses on practical applications of artificial intelligence in urban planning and governance. It may include machine learning, natural language processing, computer vision, predictive modelling, urban analytics, decision-support systems, and AI-enabled dashboards. Students learn how AI can support service delivery, mobility planning, land-use monitoring, citizen grievance analysis, compact city assessment, and smart governance. The course is a key component of the Artificial Intelligence Honors stream.

UP3.09 Advanced Land Economics

This course builds on the fundamentals of land economics and examines advanced issues in urban land markets, real estate finance, land value capture, development feasibility, redevelopment, public-private partnerships, and land-based financing. It enables students to analyse the economic implications of planning decisions and the financial mechanisms used in urban development. The course is particularly relevant for students pursuing the Land Economics and Real Estate Honors stream. It prepares students for work in development authorities, real estate advisory, valuation, infrastructure finance, and policy analysis.

UP3.10 Compact Cities and TOD

This course introduces compact city principles and transit-oriented development as strategies for sustainable urban growth. It focuses on density, mixed land use, walkability, public transport accessibility, station-area planning, last-mile connectivity, urban design, and land-use-transport integration. Students learn how compact and transit-oriented planning can reduce sprawl, improve accessibility, and support climate-sensitive urban development. The course is well suited for students interested in mobility, urban form, station-area planning, and sustainable city models.

UP3.11 Future Mobility and Autonomous Transport Planning

This elective examines emerging mobility systems such as electric vehicles, autonomous vehicles, shared mobility, micro-mobility, mobility-as-a-service, and intelligent transport systems. It helps students understand how new transport technologies may transform land use, street design, parking, transit systems, logistics, and urban form. The course also addresses policy, safety, equity, data governance, and infrastructure requirements for future mobility. Students learn to evaluate mobility futures and prepare adaptive transport strategies for sustainable and inclusive cities.

3.12 Circular Economy and Urban Metabolism

This elective introduces students to the concept of cities as systems of resource flows, energy use, water cycles, food systems, construction materials, and waste streams. It focuses on reducing waste, reusing resources, recycling materials, and designing closed-loop urban systems. Students learn about circular neighbourhoods, construction and demolition waste management, decentralized waste systems, resource-efficient infrastructure, and sustainable consumption patterns. The course develops the ability to assess urban metabolism and plan cities that are more resource-efficient, low-carbon, and environmentally sustainable.

d) Annexure D: Modified Studio Course

Proposed II and III Semester Studio Framework

A. Studio II: Planning and Design Studio

Suggested Themes: Master Plan, TOD Master Plan, GIS Based Master Plan (As per MOHUA guidelines), Compact City Master Plan, Zonal Plan, Local Area Plan and any other relevant Plan

Suggested Plan Typologies

Conventional Master Plan

- City or town-level land use planning.
- Population projection and land requirement assessment.
- Housing, transport, infrastructure, environment, economy and social facility planning.
- Development control regulations, phasing and implementation strategy.

Transit-Oriented Development Master Plan

- Metro, BRT, railway or bus corridor-based planning.
- Station influence zone analysis, preferably 500 m to 800 m radius.
- Density redistribution, mixed-use planning, walkability, parking management, feeder systems and value capture.
- TOD zoning, FAR incentives, public realm and last-mile connectivity.

GIS Based Master Plan

- Develop standardized digital base maps and land-use maps.
- Enable strategic, data-driven decision-making for urban growth management.
- Integrate spatial growth with physical and social infrastructure planning.

Compact City Master Plan

- Polycentric and compact growth strategy.
- 15-minute city principles, mixed land use, density optimization, accessibility and urban regeneration.

Zonal Development Plan

- Planning for a development zone, planning district, sub-city or growth area.
- Land use refinement from the city master plan.
- Road hierarchy, open space system, social infrastructure, utility planning and development regulations.
- Implementation through sector plans, schemes and projects.

Local Area Plan

- Neighbourhood, ward, station area, heritage precinct, commercial district, waterfront, market area, main street, complete street corridor, city core, form-based code or industrial area.
- Plot-level or block-level planning.
- Public realm improvement, traffic circulation, parking, vending, pedestrianization, open spaces, disaster risk and urban design controls.

B. Studio III: Planning and Design Studio

Suggested Themes: Strategic Plans, Action Plans, Zonal Plans, Local Area Plans, Land Management Plans, Brownfield Plans, Slum Redevelopment, Urban Regeneration, Heritage Conservation and Tourism Plans, Economic Development Plan/City Economic Region Plans, Metropolitan Plan, Infrastructure Planning, Detailed Project Reports, Urban Challenge Fund / Government Policy, Municipal Finance and AI-enabled Urban Planning and any other relevant plans.

Suggested Studio Options

Strategic Plans

- Strategic to align with land use, economy, infrastructure, climate, and governance.
- Long-term strategic vision document for city development.
- Identifies priority sectors, spatial growth directions, and investment areas.

Action Plans

- Short- to medium-term implementation plan for selected priorities.
- Converts broad policies into specific projects, responsibilities, timelines, and budgets.
- Can focus on traffic, sanitation, housing, local economy, environment, or public spaces.

Zonal Plans

- Detailed planning for a zone, sub-city, district, or planning division.
- Refines the master plan at a more operational scale.
- Covers land use, road hierarchy, social infrastructure, utilities, open spaces, and regulations.

Local Area Plans

- Micro-level plan for neighbourhoods, wards, station areas, markets, heritage precincts, or corridors.

- Focuses on plot/block-level improvement, public realm, walkability, parking, vending, and services.

Land Management Plans

- Plan for efficient use, assembly, pooling, readjustment, acquisition, or disposal of land.
- Supports infrastructure development, affordable housing, public facilities, and urban expansion.
- Includes land ownership, land value, tenure, development potential, and regulatory analysis.

Brownfield Plans

- Redevelopment plan for underused, contaminated, abandoned, or obsolete urban land.
- Commonly applied to old industrial areas, railway lands, waterfronts, warehouses, and vacant sites.
- Requires environmental assessment, land remediation, infrastructure upgrading, and reuse strategy.

Slum Redevelopment

- Planning for upgrading, rehabilitation, or redevelopment of informal settlements.
- Focuses on housing, tenure security, basic services, livelihood, community facilities, and social safeguards.
- May include in-situ redevelopment, relocation, rental housing, or incremental upgrading models.

Urban Regeneration

- Comprehensive revival of declining, inner-city, old, or underperforming urban areas.
- Integrates physical redevelopment, economic revitalization, heritage, mobility, housing, and public space.
- Useful for old city cores, CBDs, industrial areas, station districts, and waterfronts.

Heritage Conservation and Tourism Plans

- Plan for conserving built heritage, cultural landscapes, historic precincts, and traditional urban forms.
- Links conservation with tourism, local economy, public realm, mobility, and community participation.
- Includes heritage inventory, grading, adaptive reuse, visitor management, and interpretation strategy.

Economic Development Plan / City Economic Region Plans

- Plan to strengthen city or regional economy through industry, services, logistics, innovation, and jobs.

- Identifies economic clusters, labour markets, investment zones, infrastructure gaps, and growth corridors.
- Can cover metropolitan regions, city-regions, industrial corridors, or creative economy districts.

Metropolitan Plan

- Regional-scale plan for metropolitan area, urban agglomeration, or city-region.
- Coordinates multiple municipalities, transport systems, housing, economy, ecology, and infrastructure.
- Addresses urban expansion, regional mobility, peri-urban growth, resource management, and governance.

Urban Infrastructure Planning

- Water supply, sewerage, drainage, solid waste, mobility, energy, blue-green infrastructure and social infrastructure.
- Infrastructure demand estimation and service-level benchmarking.
- Network mapping and gap assessment.
- Climate resilience and sustainability integration.

Detailed Project Report

- Selection of a specific urban infrastructure or area improvement project.
- Technical and financial feasibility, site analysis, design proposal, cost estimation, financial analysis and implementation model.
- DPR may include roads, public spaces, drainage, markets, bus terminals, parking, lakefronts, station areas, slum upgrading or green infrastructure.
- Students should prepare drawings, quantities, cost estimates as per CPWD Cost Index, phasing, risk assessment and institutional framework.

Urban Challenge Fund / Latest Government Policy

- Projects may focus on Cities as Growth Hubs, Creative Redevelopment of Cities, and Water and Sanitation.
- Studio projects may be framed as bankable proposals with public finance, PPP, bonds, loans, land value capture and revenue models.
- Students may prepare policy-aligned proposals for municipal implementation and funding support.

AI-Enabled Urban Planning

- Use GIS, remote sensing, machine learning, generative AI, urban simulation and dashboard-based decision support.
- AI applications may include land suitability, TOD potential, compactness scoring, infrastructure gap prediction, urban growth simulation, walkability, accessibility, public space performance, flood vulnerability and heat-risk mapping.

- Students may produce an AI-supported planning dashboard or decision-support model.

Municipal Finance and Bankable Projects

- Preparation of financially viable urban infrastructure proposals.
- Cost recovery, revenue sources, user charges, municipal bonds, PPP structure and project prioritization.
- Integration of capital investment planning with local economic development.

Climate Resilience and Blue-Green Infrastructure

- Urban flood management, heat mitigation, green corridors, lake rejuvenation, stormwater planning, sponge city principles and nature-based solutions.
- Can be linked to DPR preparation and Urban Challenge Fund proposals

e) Annexure E: Proposed “AI + Cities Lab”

Proposal for the Establishment of an Artificial Intelligence for Cities (AI-Cities) Lab

1. Executive Summary

- **Title of Lab:** Artificial Intelligence for Cities Lab (AI-Cities)
- **Thematic Areas:**
 - Urban Analytics and Geospatial Intelligence
 - Smart Mobility and Transportation Planning
 - Urban Environmental Monitoring and Climate Resilience
 - Digital Twins and Immersive Urban Design
- **Lead Researcher:** Selected for 3 years (Extendable up to 2 more year) by Head of Department and One Sr. Faculty
- **Co-Researchers:** All regular faculty members
- **Collaborators:**
 - **Internal (SPA):** Departments of Urban Planning, Transport Planning, Architecture, Housing, Urban Design, Physical Planning, Environment Planning, Architectural Conservation, BEM
 - **National:** Robert Bosch Centre for DS and AI @ IITM, Centre for Machine Learning and Data Science @ IITB, Yardi School of Artificial Intelligence @ IIT Delhi, AI and ML Lab @ VNIT Nagpur, MNIT Bhopal (Center for AI), ESRI India.
 - **International:** Meijo University (Japan), Chiba University (Japan), Harvard Spatial Data Lab, Tokyo University (Japan)
- **Project Budget (Indicative):** Approximately Rs.20 Lakh

2. Overview

This proposal outlines the establishment of the "Artificial Intelligence for Cities Lab" (AI-Cities), envisioned as a premier interdisciplinary center at SPA, Delhi, for research and capacity building. The lab will serve as a premier center for interdisciplinary research, focusing on the application of a suite of core AI methodologies as its technical foundation, including Applied AI for practical problem-solving, Computer Vision for analyzing video feeds, Natural Language Processing (NLP) for understanding human language data, and ML Foundations to advance predictive algorithms. These powerful methodologies will be directly applied to solve complex challenges within the lab's primary thematic application areas: Urban Analytics, Smart Mobility, Environmental Monitoring, and Digital Twins etc.—acting as a collaborative nexus for various SPA departments and external national and international partners. The lab's activities are structured around two main pillars: capacity building, through specialized certified courses for students and professionals, and

applied research. Through these integrated activities, the lab will generate a diverse range of outputs, including peer-reviewed academic publications, open-source AI models and urban datasets, a cohort of future-ready professionals, and actionable policy briefs to support data-driven governance. The proposal further details the lab's infrastructure, a three-phased implementation timeline, and a long-term self-financing strategy combining grants and capacity building to ensure its sustainability.

3. Contribution to SPA, Delhi

The AI-Cities Lab aligns directly with SPA Delhi's vision of being a global leader in education and research on human habitats. It will:

- **Enhance Pedagogy:** Integrate cutting-edge computational skills into the curriculum, producing future-ready planners and architects equipped for data-driven decision-making.
- **Foster Interdisciplinary Research:** Serve as a nexus for collaboration between various departments within SPA, breaking down traditional silos and fostering holistic urban solutions.
- **Strengthen Institutional Profile:** Position SPA Delhi as a pioneer in applying AI to planning and architecture, distinct from generic AI labs in engineering institutions, thereby attracting high-quality students, faculty, and research grants.
- **Support Policy and Practice:** Generate actionable insights and tools that can directly support urban policy-making and practice at municipal, state, and national levels, reinforcing SPA's role as a key advisory institution.

4. Justification

The establishment of an AI for Cities Lab at SPA Delhi is a strategic imperative, driven by converging national priorities, technological advancements, and the evolving demands of urban management in India. The Urban Challenge & Limits of Traditional Planning: India is experiencing rapid and complex urbanization, with cities expected to house 40% of the population and contribute over 70% of the GDP by 2030. This growth presents enormous challenges, including inadequate infrastructure, traffic congestion, environmental degradation, and socio-economic disparities. Traditional planning methods, which rely on expert knowledge and periodic data collection, are increasingly insufficient to manage the complexity and dynamism of modern urban systems. Cities today are generating vast amounts of real-time data from a multitude of sources like IoT sensors, satellite imagery, traffic cameras, and social media, creating a data-rich environment that traditional tools cannot fully leverage.

Artificial Intelligence has emerged as a transformative technology capable of making sense of this vast urban data, offering advanced analytics, predictive modeling, and optimization capabilities. This aligns perfectly with the Government of India's vision. The IndiaAI Mission, with an

allocation of over ₹10,300 crores, is a testament to the national commitment to building a robust AI ecosystem. A key part of this mission is the creation of a high-performance common computing facility, making AI accessible to innovators and researchers. Furthermore, the government has established Centres of Excellence (CoE) for AI, including one specifically for Sustainable Cities, signaling a clear directive to apply AI for improving urban livability. The AI-Cities lab at SPA Delhi would be a direct response to this national call, positioning the institution as a key contributor to the Viksit Bharat 2047 vision.

While the potential of AI is immense, its application in urban planning in India is still nascent. A significant barrier is the acute skill gap; there is a lack of professionals trained in both urban planning and AI methodologies. India is projected to need 1 million AI professionals by 2026, and the AI-skilled workforce has already seen a 14-fold increase from 2016 to 2023. The AI-Cities lab is crucial for developing this specialized human capital. Moreover, while several IITs have established excellent AI research centers, they are primarily technology-focused. SPA Delhi offers the unique advantage of deep domain expertise in planning, architecture, and social sciences. An AI lab at SPA would ensure that technological solutions are not developed in a vacuum but are grounded in a nuanced understanding of urban socio-cultural dynamics, historical context, and stakeholder preferences, ensuring solutions are contextually responsive and equitable.

Proven Global and National Applications: The value of AI in urban planning is globally recognized. Cities like Singapore use AI for smart traffic management, Shanghai for optimizing urban layouts, and others for environmental management and emergency response. In India, AI has already been successfully deployed for crowd management at the Kumbh Mela and for improving agricultural yields, demonstrating its practical utility in complex, large-scale scenarios. The AI-Cities lab will build upon these successes, domesticating global best practices and innovating new solutions tailored to the unique challenges of Indian cities.

5. Objectives

- To establish a state-of-the-art computational infrastructure with high-performance computing (HPC) hardware and specialized software for advanced urban data analysis and modeling.
- To conduct pioneering research on developing and applying novel AI/ML models to critical urban domains, including transportation, housing, environmental quality, and urban design.
- To develop and deliver training programs and certified courses for students, faculty, and in-service professionals from government and industry to build capacity in urban data analytics.
- To foster a collaborative ecosystem by partnering with leading national and international academic institutions, government agencies, and technology firms to facilitate knowledge exchange and joint projects.

6. Value Proposition

- The lab addresses the critical disconnect between the vast amounts of urban data being generated and the ability of urban planners, architects, and policymakers to derive actionable, evidence-based insights from it.
 - **For Students:** Access to cutting-edge tools and skills, making them highly competitive in the job market for a projected 1 million AI roles by 2026.
 - **For SPA:** Solidifies its position as an innovative leader in architectural and planning education, directly contributing to national missions like the IndiaAI.
 - **For Government/Society:** Development of data-driven tools for more efficient urban resource allocation, improved traffic management, effective environmental monitoring, and inclusive policy-making.
- SPA Delhi provides the essential domain expertise that is often missing in pure technology institutions. The success of AI lies in its application, which requires a deep understanding of the problem context. By locating the lab at SPA, we ensure that the development of AI models is grounded in sound principles of urban planning and architecture, leading to solutions that are not just technically robust but also socially relevant, equitable, and sustainable.

7. Core Activities

A. Capacity Building

- **Certified Courses & Education Plan:**
 - Students of SPA, working professionals, and officials from urban local bodies.
 - Offer short-term (3-6 month) certified courses on "Geospatial AI," "Urban Simulation Modeling," and "Data-Driven Urban Policy." The curriculum will adapt modules from established AI/ML programs, focusing on urban case studies. This includes foundational modules in Python, Data Analytics, GIS, and advanced topics in Machine Learning and Deep Learning.
- **Mentoring Plan:**
 - PhD scholars and junior faculty at SPA.
 - Host monthly workshops and reading groups. Establish a mentorship program where lab-affiliated faculty guide scholars in integrating AI methods into their research.

B. Research

- Thematic Research areas –

1. **Applied AI** - This field focuses on applying artificial intelligence techniques to practical, real-world challenges. It involves developing and optimizing AI systems to solve problems, automate tasks, and improve decision-making across industries.
 2. **Computer Vision** - applies AI Machine Learning techniques to automatically analyze video feeds. It uses models to detect and track objects, recognize events, and extract actionable data. This technology is crucial for advances in public safety, smart cities, and operational efficiency, turning passive video into a source of intelligent, real-time insights.
 3. **Natural Language Processing (NLP)**: a core component of AI, revolves around teaching machines to comprehend and process human language. It involves creating algorithms and models that enable computers to read, understand context, analyze sentiment, and generate natural-sounding text. This field's progress has driven breakthroughs in machine translation, virtual assistants, spam filtering, and information extraction. By imparting machines with the ability to interpret written and spoken data, NLP research empowers technology to understand and interact with the world using human language.
 4. **ML Foundations**: revolves around advancing the fundamental algorithms and models that enable computers to learn from data. It involves developing and optimizing methods for pattern recognition, prediction, and adaptability, often through the study of algorithmic complexity. This field's progress drives enhanced accuracy and efficiency in applications like image recognition and language processing. By improving how AI learns, ML Foundations provides the essential tools for solving complex, real-world problems across all domains.
- Researchers and activities—
 - Faculty, PhD scholars, and Masters students.
 - Initiate sponsored and collaborative research projects in the lab's thematic areas.
 - Municipal corporations, development authorities, transport agencies, and private sector urban development firms.
 - Provide expert consultancy services for projects requiring advanced data analysis, such as traffic pattern analysis for a new metro line, site suitability analysis using ML, or citizen sentiment analysis from social media data for a new public space project.

8. Outputs from the Lab

- **Academic**: Peer-reviewed journal articles, conference publications, and books.

- **Software & Data:** Open-source AI models for urban applications, curated urban datasets, and interactive data visualization dashboards.
- **Human Resources:** A cohort of trained students, researchers, and professionals skilled in urban data science.
- **Policy & Society:** Policy briefs, technical reports, and white papers to inform urban governance.
- **Intellectual Property:** Patents for novel algorithms and urban technologies.

9. Collaboration and Partnerships

The lab will adopt a multi-tiered collaboration strategy:

- **SPA Department Level:** Joint studios and courses with the Departments of Transport Planning, Environmental Planning, Regional Planning, Housing, Conservation and Architecture to integrate data analytics into core planning and designing exercises.
- **National Level:**
 - **Academic:** Joint PhD supervision and research projects with top AI centers like RBCDSAI @ IIT Madras and ScAI @ IIT Delhi.
 - **Industry:** Technology partnerships with firms like ESRI India for geospatial software and data access.
 - **Government:** MoUs with the Ministry of Housing and Urban Affairs (MoHUA) and city-level Smart City SPVs for data sharing and pilot projects.
- **International Level:** Faculty and student exchange programs with Meijo University and Chiba University in Japan to learn from their work. Collaborative research with the Harvard Spatial Data Lab on projects of mutual interest.

10. Lab Infrastructure

Phase 1: Lab space – 1 Room inside Department of Urban Planning

Phase 2: Lab space – CASS Lab (as an integrated entity)

A. Hardware

2 Computers+ GPU+ Laptops (Rs. 2 lakh)

B. Software

- a. Python program based libraries (paid ones) – yearly subscription Rs. 50,000
- b. KNIME (free complete usable credits) – from Harvard Spatial data lab
- c. Google Developers – Rs. 20,000-25,000
- d. Cloud Python (monthly Rs. 5000)

C. Project Team Expertise and Roles

- **Lab Director** (1, Part-Time): A senior faculty member from SPA to provide overall strategic vision, manage collaborations, and oversee finances.
- **Research Associates** (2, Full-Time): Post-doctoral or post-graduate researchers to execute research projects, manage datasets, and assist in training programs.

11. Budget (Indicative – Rs.20 lakh)

12. Self-Finance/ Alternate Mechanism for the Lab

Initial funding for setting up and starting the function of the lab, the lab will try to employ alternate finance mechanisms like -

To ensure long-term sustainability beyond initial funding, the lab will pursue a multi-pronged financial strategy:

1. **Sponsored Research Grants:** Actively apply for funding from national (DST, SERB) and international agencies.
 - a. Fund for Improvement of S&T Infrastructure in Universities & Higher Educational Institutions (FIST) Program
 - b. National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS)
 - c. FutureSkills PRIME Programme
 - d. National Supercomputing Mission (NSM)
 - e. National Programme on Artificial Intelligence (NPAI)
 - f. Scheme for Trans-disciplinary Research for India's a Developing Economy (STRIDE)
 - g. 12th plan guidelines for providing grants to university/college teachers for minor research project
 - h. Science and Engineering Research Board (SERB) –
 - i. Core research Grant
 - ii. MATRICS
 - iii. Scheme for funding industry relevant R and D
2. **Subsidies:** key subsidies for setting up an AI lab,:

- a. Equipment Import Subsidies:
 - i. Customs duty exemption on imported research equipment via DST.
 - ii. Concessional 5% GST on research purchases via DSIR registration.
 - b. High-Performance Computing Access:
 - i. Subsidized or free access to national supercomputers under the NSM.
 - c. Software & Cloud Services Discounts:
 - i. Special academic pricing on software (NVIDIA, MATLAB).
 - ii. Free cloud credits from AWS, Google Cloud, and Azure for research.
 - d. Skill Development Funding:
 - i. Infrastructure subsidies through MeitY's FutureSkills PRIME Programme.
 - e. Industry Collaboration Incentives:
 - i. Tax deductions for corporate partners sponsoring research (Section 35).
3. **Budgets:** allocated specifically for AI that can be tapped into
4. **Finance through faculty contribution**– (per year how much faculties get under this that can be pooled in)
- a. CPDA (Cumulative Professional Development Allowance)
 - b. PDA (Professional Development Allowance)
5. **Industry and Private Sector Funding**
- a. Industry-Sponsored Labs
 - b. Corporate Social Responsibility (CSR) Grants
 - c. Private Foundations and Trusts
6. **Corporate and Industrial Consultancy:** Offer paid data analytics and model development services to private and public sector organizations on a project basis.
7. **Corporate Training Programs:** Conduct high-value, specialized training workshops and executive programs for professionals in the real estate, transport, and technology sectors.
8. **Industry Membership Program:** Create a tiered membership model where industry partners can pay an annual fee for benefits like access to research, student recruitment, and joint R&D projects.

13. Timelines (Activities with Key Milestones)

Phase	Duration	Key Activities & Milestones
Phase 1: Foundation & Setup	Months 1-3	1. Secure and physically set up the designated lab space. 2. Procure, install, and configure all hardware (Computers, GPUs) and activate primary software subscriptions.

		3. Appoint Lab Director & Lead Researcher; complete hiring for System Administrator & Research Associates. 4. Conduct an internal launch workshop with all collaborating SPA departments to identify initial joint projects. 5. Initiate administrative processes for DSIR registration (for tax concessions) and draft initial grant proposals (e.g., SERB).
Phase 2: Operationalization & Pilot Research	Months 4-8	1. Lab becomes fully operational for internal SPA users (faculty, PhD scholars). 2. Launch internal capacity-building: Start the monthly workshop/reading group series and establish the mentorship program. 3. Initiate the first set of internal pilot research projects and "Joint studios" with departments like Transport and Environmental Planning. 4. Develop and finalize the complete curriculum for the 3-6 month certified courses (e.g., "Geospatial AI," "Urban Simulation Modeling"). 5. Submit major grant proposals (FIST, NM-ICPS) and develop "Industry Membership Program" materials.
Phase 3: Expansion & External Outreach	Months 9-12	1. Launch and complete the first cohort of the certified training program for external professionals and government officials. 2. Secure and begin work on the first consultancy projects (e.g., traffic analysis, site suitability analysis) for external clients. 3. Formalize MoUs with key national collaborators (e.g., MoHUA, Smart City SPVs, or partner IITs). 4. Publish and disseminate first outputs: Policy Briefs, Technical Reports, and submission of first peer-reviewed journal articles. 5. Host an end-of-year stakeholder workshop to showcase lab capabilities and conduct the "First Year Review" to plan for Year 2.

d) Annexure F: AI Policy

AI Policy

FOR ACADEMIC STUDIOS, THEORY SUBJECTS, REPORTS, PRESENTATIONS,
AND SHEET SUBMISSIONS



DEPARTMENT OF
URBAN PLANNING

Effective date

1 Aug 2026

Next review date

1 Aug 2027

Version

Version 1 ▾

Summary

This AI policy establishes a framework for the Department of Urban Planning for managing student use of artificial intelligence (AI), generative AI, and AI-assisted tools in academic studios, theory subjects, reports, presentations, and sheet-based submissions. The objective is to protect academic integrity, originality, design authorship, critical thinking, and professional competence while allowing controlled and transparent AI literacy where explicitly approved by faculty.

- **Principle rule: AI use is prohibited in reviews, juries, assignments, and submissions unless the assignment brief explicitly permits it.**
- Where AI use is permitted, students must submit an AI Use Report / AI Declaration with process evidence at the end of the semester and with relevant submissions.
- Where AI use is not permitted, students must submit a No-AI Declaration.
- Unauthorized, undeclared, excessive, or misleading AI use will lead to mark deduction, zero marks for affected components, and/or referral under academic integrity procedures.
- AI detection tools may assist in review, but penalties should be based on multiple forms of evidence, not detector scores alone.

Scope

- All semester academic studio, GIS studio and any other studios as per the curriculum of the master's course in Urban Planning
- All theory subjects: assignments, essays, book reviews, literature reviews, policy analysis, tutorials, quizzes, open-book assignments, and take-home tests.
- All doctoral works, including publications, presentations, department research

committee (DRC), doctoral thesis, and doctoral defense.

- All report submissions: studio reports, project reports, research reports, thesis chapters, technical notes, survey reports, and analysis documents.
- All sheet submissions: concept sheets, analysis sheets, proposal sheets, final jury sheets, posters, maps, diagrams, drawings, 3D views, and animations.
- All presentations: PPTs, oral presentations, juries, viva voce, portfolio presentations, and exhibition materials.
- All forms of AI: ChatGPT, OpenAI, Google AI, Gemini, Claude, Copilot, Midjourney, DALL-E, Stable Diffusion, Canva AI, Grammarly AI, QuillBot, paraphrasing tools, code-generation tools, data-analysis assistants, AI-rendering tools, AI image upscalers, City Engine, Cityplain, Digital Blue Foam (DBF), OpenCities Planner, InfraWorks, DeepBlocks, and any similar system.

Definitions

AI tools: Any software that uses machine learning or generative models to create, transform, summarize, analyze, translate, code, visualize, or edit content.

Generative AI: AI that produces new text, images, drawings, tables, code, maps, diagrams, presentation content, design options, or audio/video.

AI-assisted works: Work where AI has influenced ideas, structure, wording, analysis, images, maps, drawings, diagrams, coding, presentations, or final output.

Unauthorized Use: Use of AI for purposes mentioned in this policy is prohibited by the Department of Urban Planning or use beyond permitted limits.

Undeclared Use: Use of AI without declaration, AI Report, prompt log, or required acknowledgement.

Disclosure: It refers to the mandatory declaration by the author(s) regarding the use of AI tools in any stage of manuscript preparation, editing, or presentation.

Originality: It means that the research reflects the author's own intellectual contribution and independent scholarly effort and is not plagiarized, fabricated, or derived from unacknowledged sources, including AI-generated or AI-replicated content.

Misconduct: It refers to the deceptive alteration, fabrication, or misrepresentation of data, text, images, or references through any means, including AI tools, with the intent of misleading readers.

Rules for AI Use in Studio

The purpose of the urban planning studio is to mold a professional into a leader with a high quality of integrity, with the capacity to handle any critical assignment individually, and develop professional leadership, and the expectation is to learn urban planning theories, critical analysis, critical thinking, problem synthesis, and creative thinking.

Studio Component	Rule
Study and Analysis	Rule 1.1: AI cannot replace field studies, case studies, literature studies, site surveys, base maps, interviews, or photographic documentation. AI cannot be used for literature studies, case studies, site analysis, master plan analysis, or any other similar tasks. AI-generated study and analysis is not acceptable.
Proposals	Rule 1.2: AI-generated strategies, policies, concepts, planning/design narratives, or options are prohibited unless the studio brief explicitly allows AI experimentation.
Drawings and Sheets	Rule 1.3: AI-generated or AI-redrawn plans, sections, elevations, rendered views, maps, diagrams, icons, or infographics are prohibited unless authorized.
Data Analysis	Rule 1.4: AI-assisted coding or statistical analysis may be permitted only with faculty approval and full disclosure of prompts, scripts, and verification.
Internal and External Jury	Rule 1.5: Students must explain all design decisions. Inability to explain submitted material may be treated as evidence of non-authorship.
Submission of Sheet	Rule 1.6: Students for master's and doctoral degrees will submit soft copies of the sheets, presentations, and reports to the department after every review, internal or external jury, and DRC with AI declaration and, if instructed, AI report from AI check software.

Rules for AI Use in Theory Subjects

The theory subjects should maintain integrity, and students are expected to learn the subjects for professional quality. Hence, students shall be honest in the use of AI in any assignment or work assigned by the subject teachers.

Theory Subject Component	Rule
Assignments	Rule 2.1: AI-generated paragraphs, paraphrased AI text, AI-written introductions/conclusions, and AI-produced literature reviews are not permitted unless authorized.
Presentations	Rule 2.2: AI-generated powerpoints, paragraphs, AI text, summaries, comparatives, images, figures, diagrams, and references are not permitted unless authorized.
References and Citations	Rule 2.3: AI-generated references are not acceptable. Students must verify all sources manually from original publications.
AI Codes for Quantitative Analysis	Rule 2.4: AI-generated codes for using the quantitative analysis are not permitted
Internal and External exams	Rule 2.5: AI use is prohibited unless the exam paper explicitly permits it.

AI Rules for Doctoral Research

Doctoral research is original research that contributes to the development of society. In the department of urban planning, research scholars are expected to undertake original contributions that are innovative or novel and result in high-quality publications.

Doctoral Research Component	Rule
Research Work	Rule 3.1: AI-generated research problems, objectives, hypotheses, or conceptual frameworks must not be presented as the scholar's original work
Research Publication	Rule 3.2: AI-generated data, methodology, framework, models, analysis, synthesis, conclusions, etc. are not permitted, and scholars must not submit these as original work.
Literature Review	Rule 3.3: AI-generated reviews, review summaries, comparative summaries, etc. are not permitted, and the scholar must check that original work is present in this component.
Data Analysis	Rule 3.4: AI-generated data, software codes, statistical assistance, interpretation, etc. are not permitted, and scholars must have original authorship on analysis and data.
Referencing and Citations	Rule 3.5: AI-generated references are not acceptable. Students must verify all sources manually from original publications.
Thesis Report Writing	Rule 3.6: AI-generated chapters, summaries, problem statements, hypotheses, methodologies, analyses, syntheses, conclusions, or any other similar works are not permitted unless authorized by the DRC Chairman or the supervisor.
Reviews, Exams, and PhD Viva Voce (Oral Exam)	Rule 3.7: AI use is prohibited in reviews, exams, and PhD viva voce (oral exam). All types of presentations, data, analysis, and proposals are not permitted unless permitted by the DRC Chairman.

Mark/Grade Penalty

The following penalty will be applied by the department of urban planning subject to the regulation of the School. The stricter penalty, whether from the School or the department of urban planning, shall prevail.

Violation	Recommended Penalty
Studio, TRS, Thesis & PhD Reviews/DRC: AI-generated sheets and presentations with clear identification of text and 3D-generated images for on more than one sheets	Zero marks for complete review or deduct 25-70% of the marks for total subject to discussion with the all members of review/DRC and HOD
Studio, TRS, Thesis Internal/External Jury & PhD Viva Voce: AI-generated sheet and presentations with clear identification of text and 3D-generated images for on more than one sheets	Zero marks for complete review or deduct 25-50% of the total marks subject to discussion with the all members of jury and HOD
All Submissions: Submissions substantially produced by use of AI; fabricated data/references; false declaration; repeated violation; refusal to provide process evidence	Zero marks for submissions and possible fail grade and referral to Dean (Academics) and Dean (Students Welfare)
PowerPoint Presentations (Type 1): AI-generated complete PowerPoint presentation in reviews, seminars, and thesis and doctoral research	Zero marks for presentation and possible fail grade and referral to Dean (Academics) and Dean (Students Welfare)
PowerPoint Presentations (Type 2): AI-generated works of 25%-50% are found on PowerPoint presentations in reviews, seminars, and thesis and doctoral research	Zero marks for complete review and an official warning or deduct 25-70% of the marks for total subject to discussion with the all members of review and HOD
AI permitted (fully or partially) in review, presentation, report by HOD and competent committee, and declaration submitted along with report, prompts, etc. as instructed (With permission from HOD)	No penalty/partial penalty. However subject to the assessment by the faculty member and HOD

Evidence, Review and Due Process

- In studio thesis and PhD research, faculty members, supervisors, contract faculty, and visiting faculty may review sheets, presentations, data, or any materials as necessary for identifying the use of AI.
- Students may be called for a hearing to explain the use of AI with detailed sources and file history.
- AI detectors' output may be used but should not be treated as conclusive proof of misconduct.
- Students must be given an opportunity to explain their reasons for committing a violation or misconduct.
- Students may appeal to the department review committee in situations approved by the HOD.

AI Review Committee

The department of urban planning will constitute an AI review committee for each academic year. The composition of the committee will comprise the head of the department (HOD) or nominees, one senior faculty member, and the subject coordinator. The review committee will function to look after only serious misconduct cases. The committee will also update the policy and maintain case records.

Mandatory Submission

In the studio thesis research seminar, thesis, and theory subjects, it is mandatory to submit the PDF copies of sheets and reports for each stage to concerned faculty, the studio coordinator, the thesis research seminar coordinators, the thesis coordinator, the PhD supervisor, DRC members, or HOD. Students or a group of students shall submit an AI check report if necessary. Any violation in the non-submission of sheets and reports will lead to a zero mark.