Master of Planning (Town & Country Planning)

Semester- III

PLANNING STUDIO-3			
Course Code	**2MTCP301**	CIE Marks	50
Teaching Hours/Week (L:S:SDA)	12hrs (4:8:2)	Viva Marks	50
Total Hours of Pedagogy	156	Total Marks	100
Credits	9		

Course Learning objectives:

- Equip students with the ability to conduct independent and rigorous scientific research in the field of Town & Country Planning with a focus on Smart City Management.
- Enable students to formulate and test hypotheses or research questions, drawing conclusions that are supported by robust data analysis
- To undergo professional training in any Government departments or Private firms/organizations involved in Infrastructure/ Smart City Projects/ Town Planning / Transport Planning and policies/ Urban Design/ Infrastructure development projects to get an on-site experience of handling services pertaining to Urban Planning discipline
- To utilize the forum to discuss key issues in City Planning, engage with different stakeholders
- Apply analytical skills developed in the coursework over the two semesters into practice.

PROFESSIONAL TRAINING / INTERNSHIP

Content:

- A Candidate shall undergo Professional Training for 6 weeks immediately after the completion of 2nd-semester examinations and before the commencement of 3rd-semester course work.
- The training shall be undertaken in any Government departments (Town Planning/ Governance/ Traffic Police Command (or similar)/ Urban Local Bodies/ Planning and Development Authorities/firms/organizations involved in Infrastructure/ Smart City Projects/ Town Planning / Transport Planning and policies/ Urban Design/ Infrastructure development projects. The training certificate shall be signed by an authorized signatory of the Government department/ Firm/ Company or Agency.
- Each student has to maintain a weekly log in the prescribed format by the department. And shall submit the same to the department during the Internal Assessments.
- Every candidate shall compile and submit a report of their Professional Training, which is signed by the authorized signatory at the Interning Organisation. Professional Training report shall consist of the certificate, project details (including work/survey maps/drawings/study etc., done by the student), Critical Self-Evaluation of the training and Manager feedback at the interning organisation and enclosing the weekly log maintained.

DISSERTATION PHASE-1

Objective:

- To conduct independent scientific research on the topic of Town & Country Planning, with an orientation towards Smart City Management.
- Each student is required to undertake a Dissertation project on a subject related to any topic broadly connected to the Urban or Regional Planning, in consultation with the allotted guide. The students are required to select a topic of their choice in consultation with the Dissertation Coordinator/Special Officer/Head of the Department and carry out the research based on primary and secondary data analysis / interpretation followed by identification of issues and potentials culminating in policies, plans and proposals or in proving the formulated hypothesis or research questions.
- The Dissertation Coordinator/Special Officer/Head of the Department shall identify the potential topics and assign the Guides/co-Guides to each student for aiding their research. The students are to maintain regular meetings with the Guides (in person/Online) to update on their progress and imbibe the Guide's suggestions into their research. The students have to mandatorily maintain the Guide meeting log in the prescribed format by the department.
- Students are expected to draw inference and in-depth knowledge on their chosen topics from at least 10 Scopus indexed journal publications/case studies for their literature review.
- Students are to draw upon the learning from the Research Methodologies & IPR course from I Semester to prepare their research methodology/research proposal.
- Project identification, Research proposal, literature review, Research Methodology and Case studies shall be the basis of marking in the viva-voce during the semester examination. There shall be at least 2 reviews during the semester to present the data gathered and confirm with the guides/ reviewers the adequacy of preparatory work leading to Dissertation Stage-2 in IV Semester.

Teaching-Learning Process	***Blended learning***: Power point presentation and webinars. ***Collaborative and Cooperative learning:*** Students should work as a group and present the compilation of work starting with introduction, Creating Master Plan report and Land Use Map.

REGIONAL PLANNING STUDIO (CLASS ASSIGNMENT) (8 WEEKS)

Preparation of District Development Plan

- The students (divided into two or more teams) are required to undertake a Regional Planning exercise
- by choosing any one of the Regions like Resource Region/River Valley Region/Command Area/ District or Metropolitan Region.
- The Planning exercise includes base map preparation, resource inventory, land utilisation pattern, ecology, drivers of economy of the region, sectoral analysis, special programs, implementation of various Govt. Schemes,
- The evaluation to be made for a future timeline (of 20 years) taking into account the sustainable growth of the region.
- Students will work out goals, formulate strategies and broad proposals for the comprehensive development of the Region. The presentation is through graphical representation, Spatial analysis and Report.
- The students are expected to apply the planning techniques and statistical tools to draw conclusions.
- The report prepared shall be in the prescribes format, including the group's detailed analysis, data, conclusion, policy recommendations etc.

Teaching-Learning Process	***Direct method****: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts* ***Blended learning:*** *Power point presentation to elaborate more on key topics.*

Studio –

Students have to complete the Studio Assignments handed by the Studio Coordinator/Faculty in

accordance with course work. Faculty and Students (in a Faculty-Student ratio of not more than 1:10) are to be involved in small groups to interact together to enhance learning and application skills. Students should interact with Planning and Civic agencies of medium and large-sized towns/cities to understand their functioning and problems or foresee what can be undertaken for study in the form of research/ case studies/projects, and for creative and innovative methods to solve the identified problem.

• Students must work on different software/s(tools)to simulate, analyse, and authenticate the output to interpret and conclude.

• Students must familiarize themselves with codes of standards to narrow the gap between academia and the industry.

• Students shall prepare reports for the exercise(s) for which they will be assessed in the SEE Viva Voce. All activities should enhance student's abilities for employment and /or self-employment opportunities, management skills, Statistical analysis, fiscal expertise, etc. These exercises are intended to give students – • Confidence in working along with Planning and civic agencies.

• Work on different software/s (tools) to Simulate, analyse, and authenticate the output to interpret and conclude.

• Understand the various stakeholders – both public and private.

• Involve in case studies and field visits/fieldwork. Accustom with the use of various Acts and legal provisions in preparation of Master Plans/Regional Development Plans/Appreciation reports, etc.,

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Examination (SEE) i.e., Viva voce is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in Viva is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Viva-voce) taken together.

Continuous Internal Evaluation:

CIE marks shall be awarded by a committee comprising of Principal/Dean/ Special Officer/ PG Course Coordinator/ HOD/ Guide of the department. The CIE marks awarded for Planning Studio, shall be based on tests/assignments based on Professional Training / Internship, Diserrtation Phase 1, Exercise-3 (Regional planning), Periodic progress of Exercise-3 (Regional planning studio) of the student throughout the semester, presentation skills in seminars, and submission of the report.

Semester End Examination (Viva voce):

1. The student needs to submit his/her report done for Regional planning studio, including the data collection for the Viva examination, at least one day prior to the Viva examination to the PG course coordinator/HOD/Special officer.
2. The Viva-voce will be evaluated by one external examiner appointed by the University along with one internal examiner appointed by the Department.
3. The viva-voce marks awarded for Planning Studio, shall be based on the evaluation of report submission, presentation skill and performance in Question-and-Answer session in the ratio 30:10:10.

The viva-voce marks list generated is to be signed by both internal and external examiners and submitted to VTU in the sealed cover through the principal of the institution.

Suggested Learning Resources:

Books

1. Souparno Bannerjee et. al., 2021, Waste-wise Cities, NITI Aayog & Centre for Science and Environment.
2. Virendra Proag, 2021, Infrastructure Planning and Management: An Integrated Approach, Springer publications.
3. Alvin Goodman, Makrand Hastak, 2006, Infrastructure Planning Handbook: Planning, Engineering & Economics, McGraw Hill Publications
4. Charles K Coe, 2009, Handbook of Urban Services, Routledge

Karen Chappie, 2015, Planning Sustainable Cities and Regions: Towards more equitable development, Routledge

Web links and Video Lectures (e-Resources):

- https://youtu.be/fbuxkvcjlqk?si=XRj8OJIl8LIexrTl
- https://youtu.be/oFz_WLKwXLE?si=XpJQb_1k5bYOtXVx
- https://youtu.be/Up9186-dddI?si=-ulhlUakyLMSPeRW

Skill Development Activities Suggested:

- Guest Lecture from expert.
- Case Studies :
- Site Visits to Govt Agencies, Offices for understanding the roles and collecting information pertaining to the studio activities.

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

Sl. No.	Description	Blooms Level
CO1	• Conduct in-depth literature reviews of peer reviewed journals. • Prepare professional reports, including work, survey maps, drawings, and studies conducted during the internship.	L4
CO2	Design comprehensive research methodologies integrating primary and secondary data sources.	L6
CO3	• Formulate evidence-based policies and proposals based on research findings. • Formulate practical solutions and policies for urban planning challenges based on internship experience.	L5
CO4	Apply planning techniques and statistical tools to evaluate and propose comprehensive regional development strategies.	L6
CO5	Create district development plans through regional planning exercises, incorporating sustainable growth strategies	L5

Program Outcome of M. Plan (TCP) program:

Sl. No.	Description	POs
1	Acquire outstanding fundamental knowledge in the field of Urban Planning.	PO1
2	Encompass the ability to work in collaboration with interdisciplinary teams and stakeholders.	PO2
3	Demonstrate creativity in the problem-solving process through professional quality graphic presentations, use of GIS software, and Policy decisions.	PO3
4	Acquire outstanding knowledge & software skills for redesigning, monitoring, and improving Cities and Regions' functioning.	PO4
5	Understanding the diverse needs of values and systems of society and providing Smart, Sustainable, and data-centric solutions.	PO5
6	Demonstrate design and policy solutions that integrate contextual, social, economic, cultural, ethical, and environmental concerns.	PO6
7	Ability to undertake independent/option-based research and exploration of advanced and emerging topics.	PO7
8	Appraise professional standards and ethical responsibilities as a team member/stakeholder.	PO8
9	Acquire outstanding knowledge and understanding of the current trends in Urban Planning.	PO9

Mapping of COs and POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	✓			✓	✓		✓		✓
CO2	✓			✓	✓		✓		✓
CO3	✓		✓	✓		✓	✓		✓
CO4	✓			✓		✓	✓		✓

✓ -High Impact

CITY AND METROPOLITAN PLANNING			
Course Code	**2MTCP302**	CIE Marks	50
Teaching Hours/Week (L:S:SDA)	3 hrs (3:0:0)	SEE Marks	50
Total Hours of Pedagogy	30	Total Marks	100
Credits	3	Exam Hours	03

Course Learning objectives:

By taking this course Students will be able to:

- To understand the problems and concepts of urbanization in various metropolitan cities as well as area of influence of metropolis with understanding of global metropolis as well as Indian cities.

Module-1

Theories of Development and Urban Structure-1

Growth of cities; cities as engine of growth; Urban sprawl; Land value, economic attributes of activity location; Economic forces in urban development; Structure of City Regions, Area of influence; Impact of technology on urban forms; Transportation and urban form; Location characteristics and impact of urban settlements.; Theories of urban structure and land use Centre place theory, urban realm model; New urbanism; Territorial Development Theory: Growth pole theory, urban bias critique, secondary cities and urban diffusion;

Teaching-Learning Process	***Direct method**: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts* ***Blended learning:** Power point presentation to elaborate more on key topics.*

Module-2

Theories of Development and Urban Structure-2

System approach to planning; Threshold analysis, retail location and industrial location analysis; Transport system analysis; Desakota model; Emerging Rural Urban Relationship models globalisation and extended metropolitan region; Networked model; Peri- urban Interface (PUI) case studies.

Teaching-Learning Process	***Direct method**: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts* ***Blended learning:** Power point presentation to elaborate more on key topics.*

Module-3

Planning Norms and Standards

Land use standards for residential, industrial, commercial, institutional, transport, ecological spaces, recreational areas etc.; Space standards based on population for facility areas, utilities and networks, performance standards; URDFPI, RADFPI, Hill Area Development Guidelines, standards and other model guidelines by State and Central development Ministries (Central) and States; Building Bye-Laws, FSI and Formed based norms and standards.

Teaching-Learning Process	***Direct method**: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts* ***Blended learning:** Power point presentation to elaborate more on key topics.*

Module-4

Plan Preparation Approaches and Techniques

Approaches for preparation of Urban development plans, Master Plans, Structure plans and Strategy Plan; Public Participation and Plan Implementation; Zonal and Local Area Plan; Techniques of urban renewal and redevelopment; Special area planning: definition, types, attributes, requirements, planning process; Inner areas, peri-urban areas issues and planning approaches; Smart City: Concepts, Elements, Features, planning approach and strategies, policy efforts in India; Inclusive planning.	
Teaching-Learning Process	***Direct method**: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts* ***Blended learning:** Power point presentation to elaborate more on key topics.*

Module-5

Best Practices in City and Metropolitan Planning

Best practices of city and metropolitan planning in India and abroad, inter-disciplinary policy issues and public action s for guiding city and metropolitan development

Teaching-Learning Process	***Direct method**: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts* ***Blended learning:** Power point presentation to elaborate more on key topics.*

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

The Internal Marking shall be done for 100 which will be scaled down to 50, the faculty in charge of the particular course can decide on any change in the structure of the internal examination which is to be conducted on 5th, 10th, and 15th weeks of the academic calendar preferably. The Internals shall be from a choice of written examinations/ Assignments/ Presentations allotted to students.

Semester End Examination:

- The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
- The question paper will have ten full questions carrying equal marks.
- Each full question is for 20 marks.
- There will be two full questions (with a maximum of four sub-questions) from each module.
- Some subjects can choose to have a compulsory question under any one module.
- Each full question will have a sub-question covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module

Suggested Learning Resources:

Books

1. Aggarwalla Astha. (2011). Agglomeration Economies and Productivity Growth in India. Indian Institute of Management, Ahmadabad.
2. BMRDA (2016). Bangalore Metropolitan Region Revised Structure plan 2031. BMRDA, Bangalore.
3. Board N. C.R. P. Regional Plan 2021. National Capital Region. Government of India, New Delhi.
4. Clark G. and T. Moonen (2014). Mumbai: India's Global City. Brookings Inst Pr., Massachusetts.

5. Glasson J. (1974). An Introduction to Regional Planning. Taylor and Francis ltd., London. 6. HMDA. (2013). Metropolitan Development Plan – 2031 for Hyderabad Metropolitan Development Region. HMDA, Hyderabad. 7. Jaidit Brar S. G. A. M. C. M. S. R. M. S. (2014). India's Economic Geography in 2025: States, Clusters and Cities. McKinsey and Company, Delhi. 8. KMDA. (2000). Perspective Planning for metropolitan Development, Kolkata. KMDA, Kolkata.

Web links and Video Lectures (e-Resources):

NPTEL courses -
https://onlinecourses.nptel.ac.in/noc21_hs96/preview
https://onlinecourses.nptel.ac.in/noc22_hs108/preview

Skill Development Activities Suggested

- Guest Lectures
- Case Studies

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

Sl. No.	Description	Blooms Level
CO1	To appreciate urbanization and terminologies regarding urban areas.	L4
CO2	To appreciate the legislative structure for metropolitan planning and development	L6
CO3	To analyse the nature, form and planning of metropolitan cities and regions in India.	L5
CO4	to have a global perspective regarding planning and development strategies of metropolis	L6
CO5	To understand best practices of city and metropolitan planning in India and abroad	L5

Program Outcome of M. Plan (TCP) program:

Sl. No.	Description	POs
1	Acquire outstanding fundamental knowledge in the field of Urban Planning.	PO1
2	Encompass the ability to work in collaboration with interdisciplinary teams and stakeholders.	PO2
3	Demonstrate creativity in the problem-solving process through professional quality graphic presentations, use of GIS software, and Policy decisions.	PO3
4	Acquire outstanding knowledge & software skills for redesigning, monitoring, and improving Cities and Regions' functioning.	PO4
5	Understanding the diverse needs of values and systems of society and providing Smart, Sustainable, and data-centric solutions.	PO5
6	Demonstrate design and policy solutions that integrate contextual, social, economic, cultural, ethical, and environmental concerns.	PO6
7	Ability to undertake independent/option-based research and exploration of advanced and emerging topics.	PO7
8	Appraise professional standards and ethical responsibilities as a team member/stakeholder.	PO8
9	Acquire outstanding knowledge and understanding of the current trends in Urban Planning.	PO9

Mapping of COs and POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	✔					✔			✔
CO2	✔	✔	✔	✔	✔	✔			✔
CO3	✔					✔			✔
CO4	✔			✔	✔	✔			✔
CO5	✔					✔			✔

✔ -High Impact

DISASTER AND SETTLEMENTS			
Course Code	**2MTCP303**	CIE Marks	50
Teaching Hours/Week (L:S:SDA)	3 hrs (3:0:0)	SEE Marks	50
Total Hours of Pedagogy	30	Total Marks	100
Credits	3	Exam Hours	03

Course Learning objectives:

By taking this course Students will be able to:

- Understand the different types of disasters, causes and effects.
- Elucidate the consequences of both natural and man-made disasters.
- Evaluate the different techniques of Disaster Management and the role of different stakeholders (both individuals and agencies) in disaster mitigation.

Module-1

Introduction Natural disasters

Concepts, processes, and perceptions of Disasters – natural– causes and consequences. Disaster and the natural environment: Floods and flash floods-urban floods- causes and consequences-flood controls. Land Slides, mudflow, forest fires, wildlife fires, and winter storms Cyclones-cyclone preparedness and Risk

Management landslides, soil erosion, earthquakes, tremor, tsunami, cloud bursts, etc. Using technology to monitor and predict Disaster Damage to people and property due to disaster. Case studies from across the world. Disaster Recovery.	
Teaching-Learning Process	***Direct method**: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts* ***Blended learning:** Power point presentation to elaborate more on key topics.*
Module-2	
Disaster Management Disaster preparedness, prevention, displacement and development; Government structure and disaster mitigation, Health Issues-Evacuation behaviour-current measures- vulnerability assessment- Evacuation planning in all types of natural disasters. Emergency management-alerts and warning-Role of Communications in Alerts and warnings. Role of NDRF	
Teaching-Learning Process	***Direct method**: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts* ***Blended learning:** Power point presentation to elaborate more on key topics*
Module-3	
Planning and Resource Management Human response to the disaster – short term and long-term effects; Integrating disaster mitigation in the spatial planning process: micro zoning, building bye-laws, norms, and standards, density variations, provisions of infrastructure for disaster mitigation; vulnerability index and mapping; Disaster insurance at various levels: village, district, and town/city level. Geo-informatics-use of Remote Sensing in Disaster Management. Role and preparedness of Local Governments and NGOs in mitigating Urban Disasters.	
Teaching-Learning Process	***Direct method**: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts* ***Blended learning:** Power point presentation to elaborate more on key topics.*
Module-4	
Man-Made Disaster and Management Man-made disasters-Chemical spills, Terrorism and Urban Violence. Action plans to minimize the risks. Special Regulations. Identification of Special Areas for Development-Flood Prone Areas; Drought Prone Areas, Desert Land, and Saline Lands-Planning Appraisal and Planning Strategies	
Teaching-Learning Process	**Teaching-Learning Process**
Module-5	
Disaster Education Community awareness and participation at various levels; Role of ULBs, NGOs/CBOs and communities in disaster education; Relevance of disaster management with relevant to development and environment; Use of technology and media for spreading disaster awareness.	

Teaching-Learning Process	***Direct method**: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts* ***Blended learning:** Power point presentation to elaborate more on key topics.*

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

The Internal Marking shall be done for 100 which will be scaled down to 50, the faculty in charge of the particular course can decide on any change in the structure of the internal examination which is to be conducted on 5th, 10th, and 15th weeks of the academic calendar preferably. The Internals shall be from a choice of written examinations/ Assignments/ Presentations allotted to students.

Semester End Examination:

- The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
- The question paper will have ten full questions carrying equal marks.
- Each full question is for 20 marks.
- There will be two full questions (with a maximum of four sub-questions) from each module.
- Some subjects can choose to have a compulsory question under any one module.
- Each full question will have a sub-question covering all the topics under a module.

The students will have to answer five full questions, selecting one full question from each module

Suggested Learning Resources:

Books

1. Subir Ghosh, *Natural Disaster Management: New Technologies and Opportunities*
2. S.C. Sharma, 2022, *Disaster Management*
3. *Ilan Kelman, 2020, Arctic humanitarianism for post-disaster settlement and shelter*, Disaster Prevention and Management: An International Journal , Emerald

Web links and Video Lectures (e-Resources):

https://onlinecourses.swayam2.ac.in/cec20_ge35/preview

Skill Development Activities Suggested

- Case studies
- Guest Lectures

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

Sl. No.	Description	Blooms Level
CO1	Analyse natural and man-made disasters using global case studies	L4
CO2	Assess strategies for disaster preparedness, prevention, and evacuation across various natural disasters	L5

CO3	Incorporate disaster mitigation into spatial planning through zoning, infrastructure provisions, and vulnerability mapping	L5
CO4	Formulate action plans to mitigate risks from chemical spills, terrorism, and urban violence	L5
CO5	Foster community awareness and participation in disaster education through NGOs/CBOs, leveraging technology and media for outreach	L4

Program Outcome of M. Plan (TCP) program:

Sl. No.	Description	POs
1	Acquire outstanding fundamental knowledge in the field of Urban Planning.	PO1
2	Encompass the ability to work in collaboration with interdisciplinary teams and stakeholders.	PO2
3	Demonstrate creativity in the problem-solving process through professional quality graphic presentations, use of GIS software, and Policy decisions.	PO3
4	Acquire outstanding knowledge & software skills for redesigning, monitoring, and improving Cities and Regions' functioning.	PO4
5	Understanding the diverse needs of values and systems of society and providing Smart, Sustainable, and data-centric solutions.	PO5
6	Demonstrate design and policy solutions that integrate contextual, social, economic, cultural, ethical, and environmental concerns.	PO6
7	Ability to undertake independent/option-based research and exploration of advanced and emerging topics.	PO7
8	Appraise professional standards and ethical responsibilities as a team member/stakeholder.	PO8
9	Acquire outstanding knowledge and understanding of the current trends in Urban Planning.	PO9

Mapping of COs and POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	✓				✓	✓			✓
CO2	✓				✓	✓			✓
CO3	✓		✓	✓	✓	✓			✓
CO4	✓	✓	✓	✓	✓	✓			✓
CO5	✓	✓	✓	✓	✓	✓			✓

✓ -High Impact

ADVANCED SOLID WASTE MANAGEMENT			
Course Code	**2MTCP304**	CIE Marks	50
Teaching Hours/Week (L:S:SDA)	3 hrs (3:0:0)	SEE Marks	50
Total Hours of Pedagogy	30	Total Marks	100
Credits	3	Exam Hours	03

Course Learning objectives:

- By taking this course Students will be able to inculcate by understanding:
- To make students understand the description of solid waste; different types: waste flows in society: amounts and composition of waste.
- Problems due to waste generation and strategies to minimize these problems; Consumption and waste, waste hierarchy (waste prevention, recirculation etc), product development, problem solving with a system analysis approach.
- Legal and economical means of control for waste management (Sweden and EU suggestions). Waste treatment and handling: thermal and biological methods, landfill, handling of hazardous waste.

Module-1
Municipal Solid Waste Management:

Legal and Organizational foundation: Definition of solid waste – waste generation– major legislation, monitoring responsibilities, sources and types of solid waste – sampling and characterization – Determination of composition of MSW – storage and handling of solid waste – Future changes in waste composition.	
Teaching-Learning Process	***Direct method**: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts* ***Blended learning:** Power point presentation to elaborate more on key topics.*
Module-2	
Collection and Transport of Solid Waste: Waste collection systems, analysis of collection systems – alternative techniques for collection systems. Need for transfer operation, transport means and methods, transfer station types and design requirements.	
Teaching-Learning Process	***Direct method**: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts* ***Blended learning:** Power point presentation to elaborate more on key topics.*
Module-3	
Process of Solid Waste and Energy recovery: Unit operations for separation and processing, Materials Recovery facilities, Waste transformation through combustion and aerobic composting, anaerobic methods for materials recovery and treatment – Energy recovery – Incinerators	
Teaching-Learning Process	***Direct method**: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts* ***Blended learning:** Power point presentation to elaborate more on key topics.*
Module-4	
Disposal of Solid wastes Land farming, deep well injections. Landfills: Design and operation including: site selection, Geo-environmental investigations , engineered sites, liners and covers, leachate control and treatment, gas recovery and control, including utilization of recovered gas (energy), and landfill monitoring and reclamation, , Requirements and technical solution, designated waste landfill remediation – Integrated waste management facilities. TCLP tests and leachate studies. Economics of the on-site v/s off site waste management options. Natural attenuation process and its mechanisms.	
Teaching-Learning Process	***Direct method**: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts* ***Blended learning:** Power point presentation to elaborate more on key topics.*
Module-5	
Household Hazardous Waste Management: Design practices of solid wastes. Definition and identification of hazardous wastes-sources and characteristics hazardous wastes in Municipal Waste – Hazardous waste regulations – minimization of Hazardous Waste-compatibility, handling and storage of hazardous waste collection and transport. Regulatory requirements for identification, characterization and disposal of hazardous, non-hazardous and domestic wastes.	

Teaching-Learning Process	***Direct method**: Lecture supported by conventional method of Blackboard and chalk to introduce the concepts* ***Blended learning:** Power point presentation to elaborate more on key topics.*

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

The Internal Marking shall be done for 100 which will be scaled down to 50, the faculty in charge of the particular course can decide on any change in the structure of the internal examination which is to be conducted on 5th, 10th, and 15th weeks of the academic calendar preferably. The Internals shall be from a choice of written examinations/ Assignments/ Presentations allotted to students.

Semester End Examination:

- The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
- The question paper will have ten full questions carrying equal marks.
- Each full question is for 20 marks.
- There will be two full questions (with a maximum of four sub-questions) from each module.
- Some subjects can choose to have a compulsory question under any one module.
- Each full question will have a sub-question covering all the topics under a module.

The students will have to answer five full questions, selecting one full question from each module

Suggested Learning Resources:

Books

1. Rada Elena Cristina 2016, *Solid Waste Management*, Taylor and Francis
2. Kumar Sunil, 2016, *Municipal Solid Waste Management in Developing Countries*, Taylor and Francis
3. Cherry PM, New Delhi CBS Publisher & Distributors, 2016, *Solid and hazardous Waste Management*.
4. Tchobanoglous George, Theisen Hilary, Vigil Samuel A *Integrated Solid Waste Management: Engineering Principles and Management Issues*, New Delhi McGraw Hill 2015
5. Cherry PM, *Solid and hazardous Waste Management*, New Delhi CBS Publisher & Distributors 2016

Web links and Video Lectures (e-Resources):

https://nptel.ac.in/courses/105103205
https://www.coursera.org/learn/solid-waste-management
https://www.edx.org/learn/waste-management/world-bank-group-solid-waste-management?index=product&objectID=course-ed3aa6cc-9a82-4a39-965d-

Skill Development Activities Suggested

- Case studies
- Guest Lectures

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

Sl. No.	Description	Blooms Level
CO1	Analyse the major legislation and organizational responsibilities in municipal solid waste management	L4
CO2	Evaluate different waste collection systems and techniques for efficiency and effectiveness.	L5
CO3	Design processes for solid waste and energy recovery, including materials recovery facilities and incinerators	L6
CO4	Develop comprehensive landfill management plans, covering site selection, design, operation, and monitoring	L6
CO5	Assess the regulations and practices for the identification, handling, and disposal of hazardous wastes in municipal solid waste management.	L5

Program Outcome of M. Plan (TCP) program:

Sl. No.	Description	POs
1	Acquire outstanding fundamental knowledge in the field of Urban Planning.	PO1
2	Encompass the ability to work in collaboration with interdisciplinary teams and stakeholders.	PO2
3	Demonstrate creativity in the problem-solving process through professional quality graphic presentations, use of GIS software, and Policy decisions.	PO3
4	Acquire outstanding knowledge & software skills for redesigning, monitoring, and improving Cities and Regions' functioning.	PO4
5	Understanding the diverse needs of values and systems of society and providing Smart, Sustainable, and data-centric solutions.	PO5
6	Demonstrate design and policy solutions that integrate contextual, social, economic, cultural, ethical, and environmental concerns.	PO6
7	Ability to undertake independent/option-based research and exploration of advanced and emerging topics.	PO7
8	Appraise professional standards and ethical responsibilities as a team member/stakeholder.	PO8
9	Acquire outstanding knowledge and understanding of the current trends in Urban Planning.	PO9

Mapping of COs and POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	✓				✓	✓			✓
CO2	✓			✓	✓	✓			✓
CO3	✓			✓	✓	✓			✓
CO4	✓	✓	✓	✓	✓	✓			✓
CO5	✓				✓	✓	✓		✓

✔ -High Impact