

Semester I Proposed Curriculum – M.Tech. Urban Infrastructure – IITRAM

Course	Code	Teaching Scheme & Credits
Optimization Methods	MA5001	2-0-0-2
Transportation System Management	CE5001	3-0-2-4
Municipal Waste Management	CE5002	3-0-2-4
Ground Improvement Techniques	CE5003	3-0-0-3
Elective I [#]		3-0-0-3
<p># - Students have to opt Elective I from the following two subjects:</p> <ol style="list-style-type: none">1) CE5004 Disaster Management2) CE5005 Urban System Planning		

Course No.	CE5001
Course Title	Transportation System Management
Credits	L T P Cr 3 0 2 4
Prerequisites	---
Instructor(s)	Dr. Jiten Shah
<p>Course Contents:</p> <p>Development of Transportation Systems in India, Growth of Transport; Trends in Traffic; Disparities in transportation system; Functions, Problems & factors in transportation system management; National Transport Policy; Traffic regulation & transportation system management (TSM) - Speed, vehicle, parking, enforcement regulations, Mixed traffic regulation, Management techniques– Transportation System Management Process – TSM planning & Strategies: short term and long term-problems, strategic categories and action elements, travel behaviour impact and response time; Public transportation and parking management- park and ride, carpooling, exclusive lanes, shared ride, short term reserved parking, increased parking rates, time duration limits, expanded off-street parking, Non-Motorized Transport- pedestrian only streets; Demand Management: Staggered work hours, flexible work hours, high peak period tolls, shuttle services, circulation services, extended routes; Traffic Operations Improvement- On-street parking ban, freeway ramp control & closure, one-way streets, reversible lanes, traffic calming, reroute turning traffic; Airport Planning- Airfield Configuration - Runway Orientation, Elements of Airport Master Plan: - FAA - ICAO Guidelines; Planning and Airport Systems Management under different States. Principles of engineering economics- Overview, Supply and demand models, Elasticity applications.</p> <p>Practicals:</p> <ol style="list-style-type: none"> 1. Traffic data collection on congested/problematic corridor for TSM action (Public transportation/Vehicular traffic-Intersection, Mid-block/Parking Management) 2. Analysis of data and suggestion of suitable TSM techniques, preparation of alternatives. 3. Impacts assessment for a given TSM alternatives- By Soft computing Technique/ actual implementation. 4. Presentation for the possible alternative TSM action and open discussion. 	
<p>References Books:</p> <ol style="list-style-type: none"> 1. Khisty C J, Lall B. Kent; <i>Transportation Engineering-An Introduction</i>, Prentice-Hall, NJ, 2005. 2. Chakroborty P., Das N., <i>Principles of Transportation Engineering</i>, PHI, New Delhi, 2003 3. Papacostas C.S. and Prevedouros, P.D., <i>Transportation Engineering & Planning</i>, PHI, New Delhi, 2002 4. Vukan R. Vuchic, <i>Urban Public Transportation System & Technology</i>, Prentice Hall, Inc. 5. David A. Hensher, Ann M. Brewer., <i>Transport: An Economics and Management Perspective</i>, Oxford University Press 6. Ortuzar J. D., Willumsen L.G., <i>Modeling Transport</i>, John Wiley & Sons, 1994 7. IRC: SP: 30-1993., <i>Manual on Economic Evaluation of Highway Projects in India</i>. 8. Sarkar P K., Maitri V., <i>Economics in Highway and Transportation Planning</i>, Standard Publisher, New Delhi, 2010. 9. Norman J. Ashford, Saleh Mumayiz, Paul h. Wright; <i>Airport Engineering Planning, Design, and Development of 21st century Airports</i>, John Wiley & Sons, Inc., 2011 	
Any other Remarks:	

Course No.	CE5002
Course Title	Municipal Waste Management
Credits	L T P Cr 3 0 2 4
Prerequisites	Environmental Engineering
Instructor:	Dr. Jaidevi Jeyaraman
<p>Course contents:</p> <p>Introduction Sources and types of solid wastes– factors affecting generation of solid wastes, waste quantity and composition; methods of sampling and characterization; Effects of improper disposal of solid wastes – public health effects. Effects on Environment.</p> <p>On-Site Storage & Processing On-site storage methods– on-site segregation of solid wastes – public health & economic aspects of storage – options under Indian conditions – Critical Evaluation of Options.</p> <p>Waste Collection and Transport: Collection of mixed waste or of source separated waste, collection logistics, Methods of Collection – types of vehicles – Manpower requirement – collection routes; transfer stations – selection of location, operation & maintenance; options under Indian conditions.</p> <p>Treatment/disposal Technologies: Processing techniques and Equipment; Resource recovery from solid wastes – composting, incineration, mechanical-biological treatment, Pyrolysis - options under Indian conditions.</p> <p>Dumping of solid waste; sanitary landfills – site selection, design and operation of sanitary landfills – Leachate collection & treatment</p>	
References Books:	
<ol style="list-style-type: none"> 1. Ramachandra T.V., “Management of Municipal Solid Waste” TERI Press, 2006 2. George Tchobanoglous et.al., “Integrated Solid Waste Management”, McGraw-Hill Publishers, 1993. 3. B.Bilitewski, G.HardHe, K.Marek, A.Weissbach, and H.Boeddicker, “Waste Management”, Springer, 1994. 	
Any other Remarks: This course includes a project on municipal solid waste management	

Course No.	CE5003
Course Title	Ground Improvement Techniques
Credits	L T P Cr 3 0 0 3
Prerequisites	Soil Mechanics, Foundation Engineering
Instructor:	Dr. Trudeep N. Dave
<p>Course contents: Introduction, Mechanical Modification: Soil Densification, Compacted soil, Compaction control tests and Compaction requirements, Hydraulic Modification: Dewatering systems, Preloading and use of vertical drains, Electro kinetic dewatering and stabilization, Physical and Chemical Modification: Admixtures, Grouting, Thermal Modification</p>	
<p>References Books:</p> <ol style="list-style-type: none"> 1. Engineering Principles of Ground Modification by Manfred R. Hausmann, Published by McGraw-Hill College. 2. Soft ground improvement in low land and other environment by D. T. Bergado, L. R. Anderson, N. Muira and A. S. Balasubramaniam, Published by ASCE Press. 3. Ground Control and Improvement by P. P Xanthakos, L. W. Abramson and D. A. Bruce, Published by John Wiley and Sons. 4. Ground Improvement by M. P. Mosely and K. Kirsch, Published by Spon Press. 5. Soil Improvement and Ground Modification Methods by P. G. Nicholson by Elsevier. 6. Recent technical literature on the related topics. 	
<p>Any other Remarks:</p>	

Course No.	CE5004
Course Title	Disaster Management
Credits	: L T P C 3 0 0 3
Prerequisites	None
Instructor:	Dr. Vikas Pratap Singh

Course contents:

1. **Introduction to Disasters**

Understanding the Concepts and Definitions of Disaster, Hazard, Vulnerability, Risk, Capacity – Disaster and Development, and Disaster Management.

2. **Fundamental of Disasters**

a) Types, Trends, Causes, Consequences and Control: Geological Disasters, Hydro-Meteorological Disasters, Biological Disasters, Technological Disasters, and Man-made Disasters.

b) Global Disaster Trends – Emerging Risks of Disasters – Climate Change and Urban Disasters.

3. **Disaster Management Cycle and Framework**

Disaster Management Cycle – Paradigm Shift in Disaster Management, Pre-Disaster – Risk Assessment and Analysis, Risk Mapping, Zonation and Microzonation, Prevention and Mitigation of Disasters, Early Warning System; Preparedness, Capacity Development; Awareness.

During Disaster – Evacuation – Disaster Communication – Search and Rescue – Emergency Operation Centre – Incident Command System – Relief and Rehabilitation.

Post-disaster – Damage and Needs Assessment, Restoration of Critical Infrastructure – Early Recovery – Reconstruction and Redevelopment; IDNDR, Yokohama Strategy, Hyogo Framework of Action.

4. **Disaster Management in India**

Disaster Profile of India – Mega Disasters of India and Lessons Learnt, Disaster Management Act 2005 – Institutional and Financial Mechanism, National Policy on Disaster Management, National Guidelines and Plans on Disaster Management; Role of Government (local, state and national), Non-Government and Inter-Governmental Agencies.

5. **Role of Science and Technology in Disaster Management**

Geo-informatics in Disaster Management (RS, GIS, GPS and RS), Disaster Communication System (Early Warning and Its Dissemination), Land Use Planning and Development Regulations, Disaster Safe Designs and Constructions, Structural and Non-Structural Mitigation of Disasters, S&T Institutions for Disaster Management in India.

6. **Disaster Case Studies**

Various Case Studies on Disaster and Development, Disaster Prevention and Control, Risk Analysis and Management.

References Books:

1. Alexander, D., Natural Disasters, Kluwer Academic London, 1999.
2. Asthana, N.C., Asthana P., Disaster Management, Aavishkar Publishers, 2014.
3. Carter, N., Disaster Management: A Disaster Manager's Handbook, Asian Development Bank, Manila Philippines, 1991.
4. Collins, A.E., Disaster and Development, Routledge, 2009.
5. Coppola, D.P., Introduction to International Disaster Management, 2nd Edition, Elsevier Science, 2015.
6. Goyal, S.L., Encyclopedia of Disaster Management (Vols. 1-3), Deep & Deep, New Delhi, 2006.
7. Gupta, A.K., Nair, S.S., Environmental Knowledge for Disaster Risk Management, NIDM, New

Delhi, 2011.

8. Ibrahimbegovic, A., Zlatar, M., Damage Assessment and Reconstruction after War or Natural Disaster, Springer, 2009.
9. Menshikov, V.A., Perminov, A.N., Urlichich, Y.M., Global Aerospace Monitoring and Disaster Management, 2012.
10. Modh, S., Introduction to Disaster Management, Macmillian Publishers India, 2010.
11. National Institute of Disaster Management (NIDM) and National Disaster Management Authority (NDMA) publications.
12. Srivastava, H.N., Gupta, G.D., Management of Natural Disasters in Developing Countries, Daya Publishers, Delhi, 2006.

Evaluation Scheme:

- Mid-Semester Examination: 30 marks
- End-Semester Examination: 40 marks
- Quiz / Test: $5 \times 2 = 10$ marks
- Case Studies Presentations: $5 \times 2 = 10$ marks
- Fire Safety Audit: 10 marks

Any other Remarks:

Course No	CE5005
Course Title	Urban System Planning
Credits	L T P Cr 3 0 0 3
Prerequisites	None
Instructor(s)	Dr. Yogesh U. Shah
<p>Course Contents:</p> <p>Urbanization: Concepts and challenges, Indian and Global scenario, history of urbanization in India, urban class groups. Urban Land Use Planning: Objectives of Land Use Planning, Types of land uses, Land use patterns/urban forms, urban structure, land use models. Urban Transportation Planning: Planning Objectives; Planning Process; Transportation surveys; Four stage Travel Demand Modelling: Trip Generation, Trip Distribution, Modal Split and Route Assignment Analysis; Urban mass transit systems. Urban Housing Planning: Regulations and building bye-laws, principles of planning, housing schemes. Urban Infrastructure Planning: Urban service delivery; standards and norms for services like water supply, sanitation/sewerage, solid waste collection, drainage; investments for urban infrastructure, Infrastructure planning process. Urban Environmental Planning: Environmental Impact Assessment guidelines, Role and functions of various environmental organizations like CPCB, GPCB, MoEF; Integrating environmental considerations into urban planning, Environmental standards in India. Urban Governance: Indian system of urban government, Taxation system for urban services.</p>	
<p>References Books/Manuals:</p> <ol style="list-style-type: none"> 1. Infrastructure Planning Engineering and Economics, Alvin Goodman and MakarandHastak. (2015, McGraw Hill). 2. Modelling Transport (4 Edition), Juan de Dios Ortuzar and Luis G. Willumsen (2011, Wiley). 3. Urban Public Transportation –Systems and Technology, Vukan R. Vuchic (2007 Wiley). 4. Transportation Engineering: An Introduction (3rd Edition), C. JotinKhisty and B. Kent Lall 5. Urban Development in India, B Bhattacharya. (2006, Jain Book Depot). 6. Manual on norms and standards for environment clearance of large construction projects, Ministry of Environment and Forests, Government of India. 7. Urban Development Plans Formulation and Implementation (UDPFI), Report by Ministry of Urban Development, Government of India. 	
Any other Remarks:	