

# Geo-informatics in Transportation Engineering - Web course

## COURSE OUTLINE

### Course Description:

This is an elective course at the ME/M Tech level.

The students should revise the basics of; geo-informatics, transportation planning, urban transportation modeling and planning process, and traffic engineering.

The course focuses primarily on the application of geo-informatics in transportation engineering.

### Course objectives:

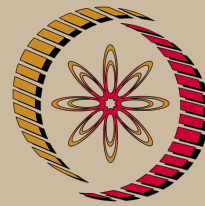
1. To learn the basic concepts of geo-informatics in brief that includes Geographical Information System (GIS), Remote Sensing (RS), and Global Positioning System (GPS).
2. To understand these basic concepts in context of transportation and transportation networks.
3. To learn the data needs and database development for doing transportation analysis in GIS environment.
4. To understand the concepts of transportation networks and algorithms and how they are incorporated into GIS.
5. To understand how GIS processes can be used for efficient transportation modeling and analysis.
6. To understand various applications of GIS in Transportation (GIS-T) including Intelligent Transport Systems (ITS) and learn from some case studies.

### Course Contents:

Concept of GIS and RS; land use and transportation data; database development; map generation and analysis; transportation network development and algorithms; transportation models and their applications in GIS; GIS-T applications; Intelligent Transport Systems (ITS); some case studies.

## COURSE DETAIL

Topic	No. of Hours
<b>Concept of GIS and RS:</b> <ul style="list-style-type: none"> <li>• What are GIS, RS, and GPS?.</li> <li>• How GIS and RS have developed over the period?.</li> <li>• GIS for transportation in perspective.</li> <li>• GIS, GPS and Transportation.</li> </ul>	05 hours



NP-TEL

# NPTEL

<http://nptel.iitm.ac.in>

## Civil Engineering

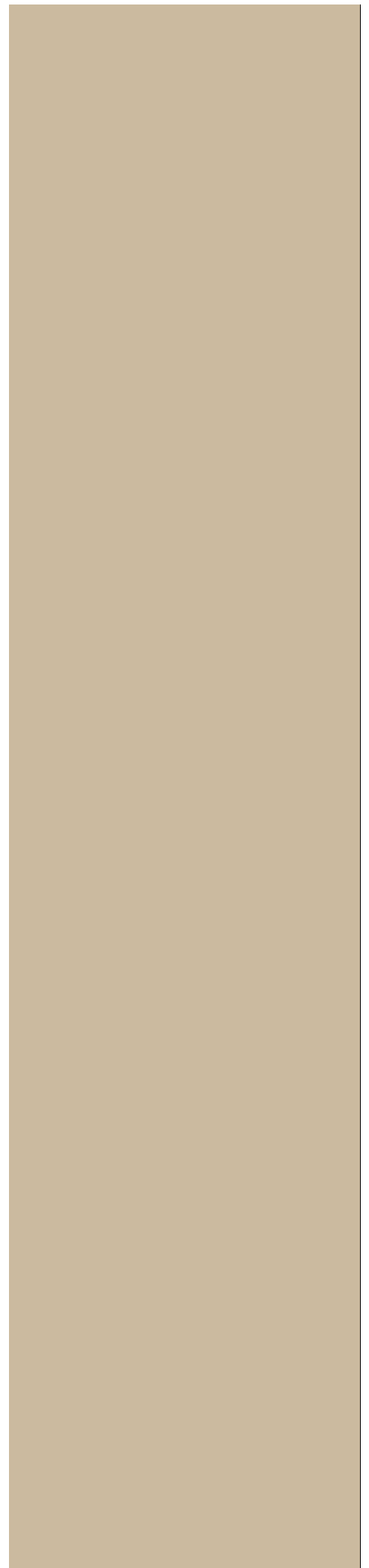
### Pre-requisites:

1. Urban Transportation Planning, Traffic Engineering.

### Coordinators:

**Dr. Ashish Verma**  
Department of Civil Engineering IISc  
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<b>Land use and Transportation Data:</b> <ul style="list-style-type: none"> <li>• Spatial and Non spatial data for land use and transportation.</li> <li>• Traffic Analysis Zone (TAZ) and screen lines.</li> <li>• Network and Routes.</li> </ul>	05 hours
<b>Data base Development:</b> <ul style="list-style-type: none"> <li>• Database domains and transactions.</li> <li>• RDBMS and Entity Relationship (ER) diagram.</li> <li>• Data base design.</li> </ul>	02 hours
<b>Map Generation and Analysis</b> <ul style="list-style-type: none"> <li>• Concept of map layers.</li> <li>• Land cover analysis.</li> <li>• Network creation and linear route building.</li> <li>• Map accuracy and location expression.</li> <li>• Generation of Themes and charts.</li> </ul>	05 hours
<b>Transportation Network Development and Algorithms:</b> <ul style="list-style-type: none"> <li>• Network development and management.</li> <li>• Network properties.</li> <li>• Shortest path algorithms.</li> <li>• Transit network and paths.</li> </ul>	10 hours
<b>Transportation Models and their Applications in GIS:</b> <ul style="list-style-type: none"> <li>• Transportation and land use Models.</li> <li>• Linear and Network Models.</li> </ul>	05 hours
<b>GIS-T applications:</b> <ul style="list-style-type: none"> <li>• Background and trends of GIS-T application.</li> <li>• GIS-T application areas.</li> </ul>	02 hours
<b>Intelligent Transport Systems (ITS):</b> <ul style="list-style-type: none"> <li>• Components of ITS.</li> <li>• Architecture and integration with GIS.</li> <li>• Analysis and visualizations of traffic data in GIS.</li> <li>• Integration of GPS and GIS.</li> </ul>	03 hours
<b>Case Studies:</b>	03 hours
<b>Total</b>	40 hours



## References:

1. Hensher D. A., Button K. J., Haynes K. E., and Stopher P. R. (Eds.), Handbook of Transport Geography and Spatial Systems, Elsevier, 2004.
2. Thill Jean-Claude, Geographical Information Systems in Transportation Research, Pergamon, 2000.
3. O'sullivan David, Geographic Information Analysis, John Wiley & Sons, 2003.
4. Longley P. A., Barnsley M. J., Donnay Jean-Paul, Remote Sensing and Urban Analysis, Taylor & Francis, 2001.
5. Caliper Corporation, Travel Demand Modelling with TransCAD, 1998.
6. Michael W., GIS - A Computing Perspective, CRC Press, 2004.