

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Name of Department/Centre/School: Centre for Transportation Systems

Subject Code: TSC-501

Course Title: Transport Infrastructure Planning

L-T-P: 2-1-0

Credits: 3

Subject Area: PCC

Course Outlines: Fundamental terminologies and concepts of transportation studies, Introduction to Transportation and allied Infrastructures; Policy & Planning, Legislation and Governance; Role of Transportation in Economy and Climate Change; Transportation Planning Models; Performance Evaluation; Sustainable Transport Projects and Practices-Risk Management, Contracts. Infrastructure Implementation, capacity Building, Government Schemes and Programs

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Name of Department/Centre/School: Centre for Transportation Systems

Subject Code: TSC-503

Course Title: Transportation Systems Analytics

L-T-P: 2-1-0

Credits: 3

Subject Area: PCC

Course Outlines: Introduction to Transport Analytics; Data in Transportation, Descriptive Measures for Transport Data; Inferential Analytics; Predictive Analytics; Multivariate Transport Data Analysis; Machine Learning for Transport Data; Prescriptive Analytics.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Name of Department/Centre/School: Centre for Transportation Systems

Subject Code: TSC-505

Course Title: Intelligent Transportation System

L-T-P: 2-1-0

Credits: 3

Subject Area: PCC

Course Outlines: Introduction to ITS; ITS Standards and Architecture; Functional areas of ITS; ITS Organizational Issues; Traffic Stream Characteristics; Fundamental Traffic Flow Diagram and Relationships; Traffic Flow Modelling; Traffic Signal Design; Capacity and Level of Service; Traffic Data Collection and Sensors; Emerging Technologies in ITS – Automated Mobility; ITS Case Studies.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Name of Department/Centre/School: Centre for Transportation Systems

Subject Code: TSC-507

Course Title: Transportation and Health

L-T-P: 2-1-0

Credits: 3

Subject Area: PCC

Course Outlines: Introduction to factors contributing to environmental emissions and pollution, methods of evaluation, role of active modes of travel, environmental exposure & health impact, effect of vibration and noise generated by transportation, health and well-being in transport infrastructure planning.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Name of Department/Centre/School: Centre for Transportation Systems

Subject Code: TSC-509

Course Title: Transportation Planning and Management

L-T-P: 0-0-8

Credits: 4

Subject Area: PCC

Course Outlines: Transportation Surveys; Road Safety Audit; Accessibility Audit; Transport System Quick Assessment Studies; Formulation of City Mobility Plan (CMP), Low Carbon Mobility Plan or similar transportation planning/management plans using four-stage Transport Planning model; Transportation Management related exercises, including junction improvement, parking management; traffic management, walkability planning etc,

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF CENTRE: Centre for Transportation Systems

Subject Code: TSL-501 **Course Title:** Public Transport Operations and Management

L-T-P: 2-1-0

Credits: 3

Subject Area: PEC

Course Outlines: Introduction to Public Transport Systems; Public Transport Modes; Demand and Supply; Transit Network Design and Principles; Frequency Setting; Transit Network Timetabling; Mix-Fleet Scheduling; Real-Time Control including APTS; Inventory; Public Transport Financing; Fare Types and Pricing; Last Mile Connectivity to Public Transport; Case Studies.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF CENTRE: Centre for Transportation Systems

Subject Code: TSL-502 **Course Title:** Freight Transportation Planning and Management

L-T-P: 2-1-0

Credits: 3

Subject Area: PEC

Course Outlines: Freight transportation systems & their economical, environmental, and societal impact; demand analysis and forecasting; relationship between demand and supply; multimodal freight transportation systems; freight corridors and hubs; freight policy and regulation; freight logistics and supply chain management; Urban Freight - Last mile delivery; Case studies.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF CENTRE: Centre for Transportation Systems

Subject Code: TSL-503 **Course Title:** Advance Transportation Analytics

L-T-P: 2-1-0

Credits: 3

Subject Area: PEC

Course Outlines: Introduction to Advanced Transportation Analytics; Applications of AI and ML in Transportation; Optimization Techniques in Transportation; Transport Network Optimization; Case Studies and Industry Applications.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF CENTRE: Centre for Transportation Systems

Subject Code: TSL-504

Course Title: Management of Transportation Projects

L-T-P: 2-1-0

Credits: 3

Subject Area: PEC

Course Outlines: Introduction to Transport Projects; Network Techniques; Investment Appraisal; Project Financing; Role of PPP in Transport Projects; Strategies for Successful Transport Projects; Performance Evaluation, Case Studies.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF CENTRE: Centre for Transportation Systems

Subject Code: TSL-505

Course Title: Planning and Management of Non-motorized
Transport

L-T-P: 2-1-0

Credits: 3

Subject Area: PEC

Course Outlines: NMT and its significance; fundamentals of planning and operations of NMT, integration with multimodal transportations; Geometric Designs of NMT elements- junctions, FOB, Underpasses, cycle tracks, transfers, street vending, etc, Codes, norms and standards; Street space design for NMT, good practices, implications in City Health.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF CENTRE: Centre for Transportation Systems

Subject Code: TSL-506 **Course Title:** Geographical Information System (GIS) Applications
in Transportation Systems

L-T-P: 3-0-2

Credits: 4

Subject Area: PEC

Course Outlines: GIS in Transportation Systems; Components of GIS; Spatial Data Types; Transportation-Specific Data; Spatial Analysis in Transportation; GIS in Traffic Management; Public Transport Systems and GIS; GIS in Freight Transportation and Logistics; Future Trends in GIS and Transportation.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF CENTRE: Centre for Transportation Systems

Subject Code: TSL-507 **Course Title:** Active Mobility and Health

L-T-P: 2-1-0

Credits: 3

Subject Area: PEC

Course Outlines: Active mobility, health and wellbeing; Measures, Metrics and Standards; Health benefits of active mobility; Environmental exposure, wellbeing and mental health; Factors affecting transport mode choice; Impediments to active mobility; Thermal stress and Exertion; Planning and design for active mobility; Economic and health impact assessment; Case Studies.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF CENTRE: Centre for Transportation Systems

Subject Code: TSL-508 **Course Title:** Design of Inclusive Urban Transport

L-T-P: 2-1-0

Credits: 3

Subject Area: PEC

Course Outlines: Inclusion and diversity in Public Transport; Characteristics of Urban Mobility; Principles of Urban Transport Design; Design Standards; Urban Transport Challenges; NMT; Urban Transport Planning; Access Audit; Case studies; Gender & Transport; Children & Elderly Mobility; Differently abled; Accessibility vs mobility.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF CENTRE: Centre for Transportation Systems

Subject Code: TSL-509

Course Title: Sustainable Urban Mobility

L-T-P: 2-1-0

Credits: 3

Subject Area: PEC

Course Outlines: Sustainability- General Concepts, present challenges and Sustainability and Transportation Linkages; Strategies for Sustainable Transportation: Transport Externalities; Active Mobility; Public Transport; Multi-Modal Freight Transport; Sustainable Fuel Sources; Electric Mobility, Water based Transport; Case Studies.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF CENTRE: Centre for Transportation Systems

Subject Code: TSL-510 **Course Title:** Ropeway Infrastructure Planning and Design

L-T-P: 2-1-0

Credits: 3

Subject Area: PEC

Course Outlines: Ropeway Systems and their Applications in Urban Mobility, Tourism, and Cargo Transport; Ropeway Infrastructure Planning; Alignment and Route Planning; Design Stations and Terminals; Design Standards and Regulations; Safety and Risk Management; Environmental, Economical and Social Sustainability; Case studies.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF CENTRE: Centre for Transportation Systems

Subject Code: TSL-511

Course Title: Multimodal Transportation

L-T-P: 2-1-0

Credits: 3

Subject Area: PEC

Course Outlines: Definition of Multimodality, Stakeholders, Multimodal policies, Institutional coordination, Operational coordination, Fee charging and revenue coordination, Data and information coordination, Coordination approaches, Centralised authority and roles, Multimodal corridor planning and design, Multimodal Terminal and Hub planning, Assessing multimodality - Tools and Practice, Case studies.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF CENTRE: Centre for Transportation Systems

Subject Code: TSL-512

Course Title: Inland Navigation and Water Transport

L-T-P: 2-1-0

Credits: 3

Subject Area: PEC

Course Outlines: Inland Navigation Waterways; Canalization and Navigation Canals; River Modelling; Locks; Dredging; Transport on Inland Waterways; Economics of Water Transport Systems; Inland Ports and Terminals; Multimodal-Integration; Shallow water shipping, hydrodynamics & ship maneuvering; Terminal operations; Water and land side coordination; Berth allocation.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF CENTRE: Centre for Transportation Systems

Subject Code: TSL-513

Course Title: Advance Transport Planning

L-T-P: 2-1-0

Credits: 3

Subject Area: PEC

Course Outlines: Travel demand modelling; Trip Generation; Trip Distribution; Mode Choice; Route Assignment; Activity based modelling; Land use and Transportation; Urban Goods Movement; Case studies.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF CENTRE: Centre for Transportation Systems

Subject Code: TSL-514

Course Title: Airport Planning and Design

L-T-P: 2-1-0

Credits: 3

Subject Area: PEC

Course Outlines: Design of airport terminal buildings; Space planning; Airport location planning; Airstrip pavement design; Passenger flow; Standards and best practices; Level of Service in terminal design; Capacity and demand analysis; Building services; HVAC system; Lighting system; Performance and service quality assessment; Sustainable Design.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF CENTRE: Centre for Transportation Systems

Subject Code: TSL-515

Course Title: Road Traffic Safety

L-T-P: 3-0-2

Credits: 4

Subject Area: PEC

Course Outlines: Road Safety & Transportation Planning; Road Accident Analysis; Human Factors in Road Safety; Vehicle Safety and Technology; Road Infrastructure and Safety; Traffic Management for Safety; Legal and Regulatory Frameworks for Road Safety; Road Safety for Vulnerable Populations; Road Safety Policy and Strategy Development.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF CENTRE: Centre for Transportation Systems

Subject Code: TSL-516

Course Title: Transport Economics

L-T-P: 2-1-0

Credits: 3

Subject Area: PEC

Course Outlines: Principles of Transport Economics; Interaction between transport supply, demand, and pricing; Role of government interventions in transportation; Economic, social, and environmental impacts of transport policies; Globalization and international trade in transport services; Competition, regulation & multimodal integration; Financial and Economic analysis of a project & IRR; Case studies.

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF CENTRE: Centre for Transportation Systems

Subject Code: TSL-517 **Course Title:** EV Charging Infrastructure

L-T-P: 2-1-0

Credits: 3

Subject Area: PEC

Course Outlines: EV technology and charging systems; Demand for EV charging infrastructure; Planning and siting EV charging stations; Financial Viability and Business Models; Policy, Regulations, and Standards; Charging Infrastructure Management and Maintenance; Technological Innovations in EV Charging; Environmental and Social Impact; Case studies.