

**UNIVERSITY OF MUMBAI**  
**No. UG/12 of 2014**

**CIRCULAR:-**

The Principals of the affiliated Colleges in Commerce and the Heads of recognized Institutions concerned are hereby informed that the recommendation made by the Faculty of Commerce at its meeting held on 28<sup>th</sup> February, 2014 has been accepted by the Academic Council at its meeting held 4<sup>th</sup> March, 2014 **vide** item No. 4.110 and subsequently approved by the Management Council at its meeting held on 4<sup>th</sup> April, 2014 **vide** item No.8 and that in accordance therewith, in exercise of the powers conferred upon the Management Council under Section 54 (1) of the Maharashtra Universities Act, 1994 and the Ordinances 6102 and 6103 and the syllabus as per the Credit Based Semester and Grading System for the Three Years integrated B.Com (Transport Management) degree programme is introduced, which is available on the University's web site ([www.mu.ac.in](http://www.mu.ac.in)) and that the same has been brought into force with effect from the academic year 2014-15.

MUMBAI – 400 032  
1<sup>st</sup> July, 2014

Sd/-  
Director, B.C.U.D.

To,

The Principals of the affiliated Colleges Commerce and the Heads of Recognized Institutions concerned.

**A.C/4.110/04.03.2014**  
**M.C/8/04.04.2014**

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No. UG/12-A of 2014

MUMBAI-400 032

1<sup>st</sup> July, 2014

Copy forwarded with Compliments for information to:-

- 1) The Dean, faculty of Commerce,
- 2) The Professor-cum-Director, Institute of Distance & Open Learning (IDOL)
- 3) The Director, Board of College and University Development,
- 4) The Co-Ordinator, University Computerization Centre,
- 5) The Controller of Examinations.

Sd/-  
Director, B.C.U.D.

**AC 4-3-2014**  
**Item No. – 4.110**

# **UNIVERSITY OF MUMBAI**



**Syllabus**

**Program: B.Com**

**Course: Transport Management**

(As per Credit Based Semester and Grading System with  
effect from the academic year 2014–2015)

# Transport Management

## Module I

### Introduction to Transport Management and System

Transport Functions and Systems : Accessibility/Connectivity, Mobility

Role of Transport : Economic Role, Social Role, Political Role and Cultural values, Environment

Development of Transport Network - Means of Transport - Walking - Palanquin - Bullock Cart and Horse Carriage - Bicycle - Hand-pulled rickshaw - Cycle Rickshaw - Urban Public Transport - Bus Rapid Transit System (BRTS) - Taxi - Auto Rickshaw - Suburban Railway - Urban Mass Rapid Transit - Monorail - Motorcycle and Scooter - Automobile - Utility Vehicles.

## Module II

### Transport Co-ordination

Transport policy and Economic Planning in India - National & International-Functions - Components of Transport - Way, Terminal- Unit of carriage - motive power etc.

Road Development in India -Administration and financing of roads in India and rural transport in India -Motor transport in India -rates and fares in road transport - Road Transport and Indian rural economy - Public Utility - Character of Transport Units and their special pricing and management problems.

## Module III

### Transport Planning and Analysis

Transport Planning and Its Scope - Components of Comprehensive Planning - Urban Transport System Planning - Land Use Forecast - Travel Forecast - Systems Approach to Transportation Planning - Levels of Urban Transport Planning - Modal Split Analysis - Choice of Travel Mode - Basic Approaches for Modal Split Analysis

## Module IV

### Administration and Control

State regulation - Services performed by local cartage carriers - Contracts and rates - Household goods carriers : Radial and nonradial operations. Cooperative arrangements - Agents - Pooling agreements - booking - Operations - Warehousing - Regulation - Rates - Development of tank truck operations - Equipment - Operations - Automobile Haulers : Nature of operating authority. Heavy Haulers.

Multi model transportation - Taxation of commercial motor transport, regulation of road transport in india. Administration and financing of road construction, extension maintenance. Current problems of surface transport.

## References :

- (1) R.R.Khan, **Transport Management**, Transport Himalaya Publishing House, 1980
- (2) R.L. Sabharwal, Rail and Road Transport in the Punjab (India), (Punjab University, Chandigarh, 1952).
- (3) BICHITRANANDA, SINHA, GEO-ECONOMIC PLANNING OF ORISSA, (UNIVERSITY OF CALCUTTA, 1959).
- (4) UMESH PARSAD, RIVER TRANSPORT IN U.P., (BANARAS HINDU UNIVERSITY, 1956).
- (5) PRASAD, UMESH; "RIVER TRANSPORT IN U.P.'. BANARAS HINDU UNIVERSITY VARANASI, 1956.
- (6) PRAKASH CHANDRA; "RURAL TRANSPORT AND ECONOMIC DEVELOPMENT IN RAJASTHAN". UNIVERSITY OF RAJASTHAN, JAIPUR.
- (7) KRISHNA CHANDRA SHARMA; "RURAL TRANSPORT IN INDIA WITH SPECIAL REFERENCE TO UTTER PRADESH", AGRA UNIVERSITY, AGRA.
- (8) AGNIHOTRI, SHASHI PRAKASH; "THE ROLE OF ROAD TRANSPORT IN OUR DEVELOPING ECONOMY'. UNIVERSITY OF RAJASTHAN, AGRA, 1963.
- (9) SAXENA R.C; "TRANSPORT DEVELOPMENT IN NEW MADHYA PRADESH", AGRA UNIVERSITY, AGRA, 1960.
- (10) R.R. Khan, Research in Transport; School of Management Studies', Mumbai, 2013.

# **AIR TRANSPORT**

## **Module I**

History of aviation, Growth of air transportation in India, Civil Aviation Department: its establishment and administrative structure, Types of airline operations, Types of aircraft and performance, Route networks, Hubs, Airport functions, International aviation, Principal organizations supporting aviation management, Chicago convention on international aviation, Sovereignty of air space, Air transit agreements, Open skies concept, Airline marketing: Overview of practices in sales, advertising, public relations and marketing efforts, Airline marketing share analysis, Branding and corporate identity, Passenger operations: Ticketing systems, Seat inventory management, Provision and maintenance of facilities, Public announcement system, Baggage claim, Passenger relations, Regulation of passenger movements, Disruptive situations.

## **Module II**

Cargo operations: Ground handling practices, Documentation procedures, Responsibilities in various operations relating to transshipment of air cargo, security practices, Containerization, Logistics of air freight, Regulations and laws pertaining to air cargo operations, Handling of hazardous cargo and liability practices, Basics of safety and risk management, Safety performance Monitoring and auditing, Financial management and accounting: Costing and pricing, Setting of airport fees, rates and charges, Tariff formulation and competitive practices, Impact of aviation on environment, aircraft noise and abatement procedures, aircraft emissions.

## **Module III**

General: Airport site selection, Size of airport, Obstructions, Zoning laws, Layout and capacity, airport architecture, Environmental considerations, Runway design, Runway orientation, Basic running length, Geometric design, balanced field concept, Airport capacity, Runway intersections, Taxiway design, Layout of taxiway, Geometric standards, loading aprons, holding aprons, Bypass or turnaround taxiway, Visual aids for pilots, Airport lighting, Visibility factors, Access to airport: Security and airfield operations.

## **Module IV**

Planning and design of terminal area, Terminal building, Passenger flow, Parking of vehicles, Size of apron, Hangars, Protection from jet blast, Typical airport layouts, Air traffic control: Flight rules, Air traffic control networks and aids, Automation of air traffic aids, Passenger safety and segregation: Fire safety, Risk management, Safety analysis, Safety performance monitoring and auditing, Terminal operations: Passenger service expectations, check-in and transfer time, walking distances and route finding, use of buses and air bridges, Optimal use of apron space, Holding lounge arrangements, Performance indicators: Passenger throughput, Arrivals and departures of passengers and cargo, Movement of aircraft, Runway capacity, Aircraft age, flight hours, cycles, design service goal, utilization factor, Available seat kilometres, Revenue passenger seat kilometres, Available tonne kilometres, Revenue tonne kilometres, Load factor

### **References:**

1. Fundamentals of Air Transport Management by Sengultuvan P.S., 2006
2. Airline Handbook by Air Transport Association (A.T.I.)
3. Annual Reports, Ministry of Civil Aviation, G.O.I.
4. Airport Operations, Norman Ashford
5. Airport Planning and Management, Alexander T. Wells
6. Managing Transport Operations, Edmund G. Gubbins
7. Transport Manager's and Operator's Handbook, Lowe
8. Management of Transportation, Edward D. Bardi
9. Dictionary of Transport and Logistics, David Lowe

# **COMMUNICATION AND PRESENTATION SKILLS**

## **Module – 1**

### **Introduction to Communication**

- ❖ Concept of Communication
- ❖ Definition of Communication
- ❖ Process of Communication
- ❖ Importance of Communication
- ❖ Importance of Communication in Personal / Corporate areas

### **The 3 Different Forms of Communication**

- ❖ Written Verbal Non – Verbal
- ❖ Nature definition advantages and disadvantages

### **Formal Dimension of Corporate Communication**

- ❖ Hierarchical structure
- ❖ Upwards Downwards and Horizontal Communication
- ❖ Advantages and disadvantages

### **Informal Dimension of Communication**

- ❖ Nature and Importance
- ❖ Grapevine – strengths and weakness
- ❖ Types and effective use of grapevine

## **Module – 2**

### **Listening Skills**

- ❖ Nature and definition of Listening
- ❖ Process of Listening
- ❖ Difference between hearing and listening
- ❖ Barriers – How to resource throw

- ❖ Guidelines for effective Listening

### **Interviews**

- ❖ Introduction and Definition
- ❖ How does a Candidate prepare for an Interview
- ❖ How does an Interviewer prepare for an Interview

### **Barriers to Communication**

- ❖ What are Barriers
- ❖ Different types of Barriers
- ❖ How to remove the Barriers

### **Module – 3**

#### **Report Writing**

- ❖ What is Report
- ❖ How is a Report Written well
- ❖ Different types of Reports
- ❖ Examples of several Report

#### **Presentation**

- ❖ Definition , Nature and Importance
- ❖ Structure
- ❖ How to prepare a good presentation
- ❖ How to deliver a good presentation
- ❖ Fax, email, video – conferencing

### **Module – 4**

#### **Commercial Correspondence**

- ❖ Basic of letter writing
- ❖ Parts and layouts
- ❖ Functions of Business Letters

- ❖ Various types of letters like Inquiry , order, Complaint, Sales, Collection & letters like Congratulations & Condolences

### **Reference Books:**

1. Alien, R.K.(1970) Organisational Management through Communication.
2. Ashley,A(1992) A Handbook Of Commercial Correspondence, Oxford University Press.
3. Bangh, LSue, Fryar,Maridell and Thomas David A. (1998) How to Write First Class Business Correspondence, N.T.C. Publishing Group USA.
4. Bhargava and Bhargava(1971) Company Notices, Meetings and Regulations.
5. BoveeCourtland,L and Thrill, John V(1989) Business Communication, Today McGraw Hill, New York, Taxman Publication.
6. Eyre, E.C. (1985) Effective Communication Made Simple, Rupa and Co.Calcutta.
7. Fisher Dalmar, (1999), Communication in Organisation, Jaico Pub House, Mumbai, Delhi.
8. Lesikar, Raymond V and Petit, John D.(1994) Business Communication: Theory and Application , Richard D. Irwin Inc. Illinois.
9. Ludlow,Ron.(1995) The Essence of Effective Communication, Prentice , New Delhi.
10. McQuail, Denis (1975), Communication, Longman.
11. Merrihue, William (1960) Managing by Communication, McGraw Hill, New York.
12. Murphy, Herta and Hilde Brandt, Herbert W (1984) Effective Business Communication, McGraw Hill, New York.
13. Parson, C.J. and Hughes (1970) Written Communication for Business Students, Great Britain.
14. Phillip, Louis V. (1975) Organisational Communication- The Effective Management, Columbus Grid Inc.
15. Shurter, Robert L. (1971) Written Communication in Business, McGraw Hill, Tokyo.



## Semester II

### 2.6 FINANCIAL ACCOUNTING

#### Module I

##### Introduction to Accounting

Definition/ Meaning/ Objectives/ Needs/ Functions/ Scope/ Development of accounting/ Users of accounting/ Disclosures/ Accounting Principles/ Accounting Concepts/ Accounting Convention/ Accounting Standards

Accounting Procedure- Journal/ Subsidiary Books/ Ledger/ Opening Entry/ Trial Balance

#### Module II

##### Inventory Valuation

Meaning/ Cost for Inventory Valuation/ Inventory System: Periodic Inventory and Perpetual inventory System/ Methods of Stock Valuation as per AS-2: FIFO and Weighted Average Method/ Computation of Valuation of Inventory.

#### Module III

##### Consignment Accounts

Accounting for consignment transaction/ Valuation of stock/ Invoicing of goods at higher price.

#### Module IV

##### Fire Insurance Claims

Computation of loss of stock by fire/ Ascertainment of Claim as per the insurance policy (Excluding loss of profit and consequential loss).

#### References:

1. Introduction to Accountancy by T. S. Grewal, S. Chand and Company (P) Ltd., New Delhi
2. Financial Accounting by P.C. Tulsian, Pearson Publications, New Delhi

3. Compendium of Statement and Standard of Accounting, ICAI
4. Accounting Principles by R.N. Anthony and J.S. Reece, Richard Irwin, Inc
5. Financial Accounting by M. Mukherjee and M. Hanif, Tata McGraw Hill Education Pvt. Ltd., New Delhi
6. Financial Accounting by V. Rajasekaran, Pearson Publications, New Delhi.
7. Financial accounting by M. Mukharjee and M. hanif, tata McGraw Hill Education Pvt. Ltd., New Delhi.
8. Company Accounting Standards by ShrinivasanAnand, Taxman, New Delhi.

## **Semester II**

### **2.1 LOGISTICS AND SUPPLY CHAIN MANAGEMENT**

#### **Module I**

##### **Introduction to Logistics & Supply Chain Management**

Logistic- basic concept/ Definitions/ Scope/ Functions/ Logistics for business excellence/ Logistic Management- objective, logistic solutions/ Logistic Costing/ Logistical Network Analysis.

Supply Chain Management- Basic Concept/ Definitions/ Scope/ Comparison between logistics and Supply Chain Management/ Global Supply Chain scenario and importance/ Conventional Supply Chain/ Participants/ Channels agencies/ Relationship Management/ Concept of extended enterprises/ Bull-Whip effect.

#### **Module II**

##### **Transportation & Warehousing**

Transport- Definition/ Principles/ Role/ Functions/ Scope/ Mode of Transport/ Intermodal Transport/ Ownership Transport/ Routing Vehicles

Warehousing- Definition/ Principles/ Role/ Functions/ Scope/ Purpose of warehouse/ Types of warehouse/ Warehousing Strategy/ Planning and Distribution/ Warehouse layout Design.

#### **Module III**

##### **Packaging and Material Handling**

Packaging- Definition/ Principles/ Role/ Functions/ Importance/ Packaging perspective/ Packaging for Material Handling Efficiency/ Packaging Material.

Material Handling- Definition/ Principles/ Role/ Functions/ Importance/Basic handling consideration/ Mechanized System/ System Design/ Methods.

#### **Module IV**

## **Inventory Management and Strategy**

Inventory Functionality and Principles/ Types/ Characteristic/ Planning/ Inventory Carrying Cost/ Inventory Management Policies and Practices/ Inventory Control/ Collaborative Inventory Planning/ Product/Market Classification.

### **References:**

9. Donald J. Bowersox & David J. Closs, **Logistical Management-The Integrated Supply Chain Process**, Tata McGraw-Hill Publishing Company Ltd., 2007.
  10. Donald J. Bowersox, David J. Closs & M. Bixby Cooper, **Supply Chain Logistics Management**, Tata McGraw-Hill Publishing Company Ltd., 2003.
  11. Donald Waters, **Logistics- An Introduction to Supply Chain Management**, Palgrave Macmillan, 2008.
  12. V.V. Sople, **Logistical Management**, Pearson, 2012.
  13. Vijay Kumar, **Logistical Management**, Print Media Publications, 2007.
  14. Anurag Saxena, **Logistics and Supply Chain Management**, Jaico Publishing House, 2009.
  15. Bhattacharya S. K., **Logistics Management: Definitions, Dimensions and Functional Applications**, Wheeler Publishing, 2000.
  16. B.S. Sahay, **Supply Chain Management**, Macmillan India Ltd.
- Lambert, Douglas M., **Fundamentals of Logistics management**, McGraw-Hill

# **Rail Transport**

## **Module – 1**

### **Introduction to Indian Railways**

Background of Indian Railways Railway Transportation in India Today and its Significance, Railway Organisation

## **Module – 2**

### **Mobility of Indian Railways to Passengers**

- ❖ Types of Travel
- ❖ Convenience and Comfort
- ❖ Variations over time and space.
- ❖ Railway Tourism

## **Module – 3**

### **Mobility of Indian Railways to Goods & Supplies**

- ❖ Node & Links
- ❖ Supply Chain
- ❖ Commodity Transport across India and other countries

## **Module – 4**

### **Railways Operation Managements**

- ❖ Costing & Pricing of Railway Transport Services
- ❖ HRM in Indian Railways
- ❖ Financial / Aspects and Revenue Generation

**Reference Books:**

- 1) Railways Yearbook 2013-14, SumanChopra(Ed.), Jain Publishing House.
- 2) Indian Railways – Towards a Safer Tomorrow, S.C. Halder, Jain Publishing House.
- 3) Indian Railway Commercial Management & Rules, K.P. Sharma, Jain Publishing House.
- 4) Railway Administration and Management, J.M. Ovasdi, Jain Publishing House.
- 5) Railway Construction in India (in 3 Vols.), Indian Council of Historical Research, Jain Publishing House.
- 6) Railway Safety – Checks and Inspections, IndraGhosh (Chief Safety Officer, North Central Railways), Jain Publishing House.
- 7) Indian railway Safety – Ultimate Goal to Prevent Railway Accidents, AryaBhushan& M.M. Agrawal, Jain Publishing House.
- 8) Exploring Indian Railways, Bill Aitken,
- 9) Rail Transport, Dr.Ms. M.B. Madlani and Prof. JitendraAherkar, Rishab Publishing House.
- 10) Managing Indian Railways – The Future Ahead, V.K. Agrawal (Former Chairman Railway Board), Jain Publishing House.
- 11) Railway Engineering, B.L. Gupta and Amit Gupta, Jain Publishing House.
- 12) Material Management (Indian Railways), K.P. Sharma and SanjivMalhotra.
- 13) Railways in Modern India – Themes in Indian History, Ian J. Kerr.
- 14) Railways, Bridges and Tunnels, V.N. Vazirani and S.P. Chandola, Jain Publishing House.
- 15) Tourism and Transport Management – Practice and procedures, Ratandeep Singh, Jain Publishing House.

- 16) Railway Financial Rules (Including Accounts and Traffic Costing), S.K. Ghosh(Assistant Accounts Officer, Kolkata Metro), Jain Publishing House.
- 17) Indian Railways Establishment Code 9Vol. 1) (with Correction Slips Upto No. 105, dt.16/12/07), Ministry of Railways, Govt. Of India

# Roads and Road Transport

## Module I

### Road Transport System in India

Road Network - Historical growth of road network - Nagpur Plan - Development in Planned Economy  
Classifications of Roads in India : National Highways, Freeways Highways, International Highways, State Highways, District Roads, Village Roads, Border Roads - Advantage of Road Transport -  
Problems of Road Transport  
National Highway network - National Highway Development Plan - NHDP Phase I - NHDP Phase II - NHDP Phase III - NHDP Phase IV - NHDP Phase V - NHDP Phase VI - NHDP Phase VII - Status of Development of Golden Quadrilateral

## Module II

### Road Transport in India

Passenger Road Transport System (PRTS) in India - Operational Framework of passenger Road Transport System in India - (a) State Road Transport Corporations; (b) Departmental undertaking; (c) Municipal undertaking; (d) Government Companies  
Problems of PRTS in India - Legal constraints - Heavy burden of tax - Issue of Industrial relation.  
Nationalisation of Road Transport Industry - Privatisation - Change of outlook - Social welfare.  
Regulatory Mechanism

## Module III

### Passenger Transport

Urban Transport : means of transport - Mass Transport System - Passenger Bus Service - Intermediate Public Transport (IPT) - Motorbikes - Auto Rickshas - Cycle Rickshas - Personal Modes - Urban Transport Problems -  
Rural Transport - Means of rural transport - Importance of rural transport  
Freight Transport : Road Goods Transport Industries (RGTI) / Trucking Industries - Competition and Regulation in the Road Goods Transport Industry - Freight Rates, Operator Costs and Industry Profitability - Structure of the highway freight industry - Freight rates and industry profitability - Quality of service  
The vehicle fleet - Costs of truck delays and facilitation payments - Trucking safety

## Module IV

### Recent Developments in Roads and Road Transport

National Urban Renewal Mission (NURM) - National Highways, Strategic roads, Roads of Economic and Inter-State importance, Road development in sensitive border areas and tribal roads. Review and Monitoring of National Highway Development Project comprising Golden Quadrilateral and North-South, East-West corridor projects. Examination of proposals from various States in the North- Eastern region for providing assistance through Non-lapsable Central Pool of Resources. Examining proposals received for the consideration of High Powered Committee on BOT projects. Examining proposals relating to National Highway Development Project for consideration of National Highways Authority of India Board. FDI, Build-Operate-Transfer (BOT) - NABARD - Rural Infrastructure Development Fund (RIDF).

## References :

- (1) R.R.Khan, Transport Management, Transport Himalaya Publishing House, 1980
- (2) SAXENA R.C; "TRANSPORT DEVELOPMENT IN NEW MADHYA PRADESH", AGRA UNIVERSITY, AGRA, 1960.
- (3) R.R. Khan, Research in Transport; School of Management Studies', Mumbai, 2013.
- (4) Philip Locklin - Economics of Transportation.
- (5) Fenelon K.G. - Economics of Road Transport.
- (6) Road Goods Transport Industry in India-A study of its structure and organization, 1994, Central Institute of Road Transport, Pune, India.
- (7) The India Infrastructure Report, Rakesh Mohan Committee Report, 1996.
- (8) Infrastructure for Development, World Development Report, 1994.
- (9) Sudarsanam Padam - Transport Matters, Central Institute of Road Transport, Pune, India.



# **SHIPPING & WATER TRANSPORT**

## **Module I**

### **Introduction of Shipping**

Modes of transportation and their advantages and disadvantages, Ships – different types and sizes with their important features and their suitability to different cargoes, Foreign going, Coastal, inland vessels, etc.

Basic shipping terminology including abbreviations, General particulars of ships.

Bills of Lading – functions, conditions, contents, types and general information

## **Module II**

### **General Structure of Shipping Industry**

Liner and tramp services, Liner shipping – essential features, break bulk, modes of unitization, , container sizes and types, container terminology, freighting, CYs, CFSs and ICDs, marketing of liner shipping, documents. Tramp shipping – types of charters – time, trip-time, voyage, consecutive voyages, bareboat etc.

Agents – ship, port and liner agents and their roles in shipping, Freight forwarders, Freight brokers, ship brokers and other intermediaries in shipping.

## **Module III**

### **Cargo Documentation**

Manifest, Mate's Receipt, Tally sheets, Notice of Readiness, Statement of Facts, etc.

Custom house work – Inward and outward entry of ships documentation

Customs Bill of Entry and Shipping Bill

## **Module IV**

### **Multimodalism**

Concept of multimodal transport, Introduction to convergence of different modes of transport, combined bill of lading, Multimodal Transport Document, Risk and liabilities of Multimodal carrier

## Reference Books

1. Research in Transport by R.R. Khan, Institute of Business Management, 2013.
2. Shipping practice with a consideration of relevant Laws by Steven Edward F, Sterling Publisher, 1999.
3. Ships and Shipping by M. Palmer, 1971
4. Merchant Ships and Shipping by R. Munro Smith, Hutchinson, 1968
5. Commercial Geography by S.D. Paranjpe, Mannan publication, 1990
6. Geography of sea transport by A.D. cooper, 1972
7. Indian Transport Towards the New Millennium: Performance, Analysis, and Policy by R. Ramanathan, Concept Publishing Co., 2004
8. Inland Water Transport in India by Rameshwar Prasad Misra, Prasaranga, University of Mysore for Institute of Development Studies, 1972
9. Bill of Lading by captain D.E. Driver, Navaneet publication, 1995
10. Dictionary of Shipping Terms by Peter R. Brodie, Informa Law from Routledge, 2007

# **Traffic Management**

## **Unit 1: Traffic System Components**

Introduction, Road User and Vehicle Characteristics, Roadways and their geometric characteristics, Traffic Stream Characteristics, Volume Studies and Characteristics, Speed, Travel Time, and Delay Studies, Road Parking Studies and Programs.

## **Unit 2: Accident Studies and Road Safety**

Accident Reporting, Accident Recording, Causes of Accidents, Studies of High Accident Locations, Preventive Measures for Accidents, Safety Measures and Remedial Facilities, Intelligent Transportation Systems: applications in traffic management and control, Traffic Regulations in various Countries

## **Unit 3: Route Assignment Analysis and Highway Capacity**

Choice of Routes, Factors Affecting Route Choice, Methods of Route Assignment, Capacity Restraint Assignment Techniques, Highway capacity: Its importance in transportation studies – basic, possible and practical capacity – determination of theoretical maximum capacity - passenger car units – level of service – factors affecting level of service, Traffic Control for Freeways and Rural Highways.

## **Module 5: Traffic Signal Design**

Basic Principles of Intersection Signalization, Elements of Intersection Design, Analysis and applications of Signalized Intersections, Actuated Signal Control and Detection, Signal Coordination for Arterials and Networks.

## **Reference**

1. Introductory course on Transportation Engineering at UG level.
2. Roess, R.P., Prassas, E, and McShane, W.R., Traffic Engineering 3rd Edition, Pearson, 2004.
3. Kadiyali, L.R. Traffic Engineering and Transportation Planning, 6th Edition, Khanna Publishers, 2000.
4. Slinn, M., Guest, P. and Heimann, P. Traffic Engineering Design: Principles and Practice, 2nd Edition, Elsevier, 2005.

5. TRB, Highway Capacity Manual, 2000, Transportation Research Board, USA.
6. Slater, R.J. Highway Traffic Analysis and Design. Macmillan, 1990.
7. Relevant IRC Codes, and Literature on Traffic Flow theory.
8. Khadiyali L.R. Traffic Engineering and Transport planning, Khanna Tech Publishers
9. Khanna O.P and Jestu C.G; Highway Engineering, Nem Chand Publishers
10. Martin, Whol, Traffic system Analysis for Engineers  
Donald Drew, Traffic Flow Theory.

## **TRANSPORT LAWS**

### **Module I**

#### **The Road Transport**

Motor Vehicles Act, 1988

Road Traffic Act, 1988

### **Module II**

#### **The Railway Act, 1989**

Transportation of goods, passengers, safety, etc.

### **Module III**

#### **The Shipping Laws**

The Bills Of Lading Act 1856

The Indian Carriage of goods by Sea Act 1925

Merchant shipping Act 1958

### **Module IV**

#### **Multimodal Transport & Goods Act 1993**

#### Reference Books

1. Bare Act, The Merchant Shipping Act, 1958, Universal Law Publishing Co. Pvt Ltd., New Delhi, 2011
2. The Law relating to Merchant Shipping in India by B. C. Mitra, University Book Agency, 2000.
3. Bare Act, The Multimodal Transport and goods Act, 1993, Universal Law Publishing Co. Pvt. Ltd., New Delhi, 2011
4. Shipping practice with a consideration of relevant Laws by Steven Edward F, Sterling Publisher, 1999.
5. Bare Act, Indian Railway Act, 1989
6. Bare Act, Motor Vehicles Act, 1988
7. Bare Act, Road Traffic Act, 1988

# **TRANSPORT AND ENVIRONMENTAL IMPACTS**

## **Module I**

Analysis of complex nature of environment-transport interface, Air pollution, Noise pollution, marine pollution, Encroachment on green belt

Greenhouse gas emissions by transport vehicles and measures to mitigate the environmental effects and damage, Green logistics

Transport and urban pollution, Designing traffic systems to reduce pollution, Air quality management issues, Monitoring tools and Approaches to modelling,

Environmental data collection and analysis techniques, Environmental impact of specific transport schemes, Case studies

World Commission on Environment and Development Report, 1987 on transport industry as a culprit for environmental degradation

## **Module II**

Conflict between transport industry's self-interest and green objectives, Sustainability of policy to shift from fossil fuels to bio-fuels

Environmental considerations in project design, External and internal impacts, Stakeholder groups, Corporate environmental responsibility and ethics

Costs in terms of degradation of environment, Laws relating to environmental degradation accounting and problems in implementation

Environment and health, Valuation of externalities, Waste management, Meteorology

International Earth Summit, 1992 and Kyoto Protocol, 1997

## **Module III**

Environmental impact of roads: Noise and acoustical engineering, combustion by-products of gasoline and fossil fuels, Habitat destruction, Habitat fragmentation, Barriers to animal movement, Increased animal mortality due to traffic, Toxic effects on plants and animals, Poaching of flora and fauna, Curtailment of space for growth of forests, Problems of illegal logging

Road Ecology: Hydrology: Storm water run-off as a source of pollution, storm sewers, air and noise pollution, Plant life, Effects on wild life, Increased human encroachment,

Mitigating efforts: Measures to reduce traffic noise, habitat construction and planting of trees

Environmental impact of aviation: Increase in demand for air travel and related statistics of carbon emissions, acidification, photo-chemical air pollution, Impact in terms of noise and air quality, Greenhouse effect, Role of International Civil Aviation Organization (ICAO), Ban on noisy aircrafts, Enforcement of aircraft construction standards

Environmental impact of railways, Proceedings of International Conference on Railways and Environment, 2010

Maritime and inland waterway transport: Atmospheric emissions of sea-going ships, Regulations for polluting emissions from inland waterway vehicles, Role of Inland Waterways Authority of India

#### **Module IV**

Integration of environment and sustainable development into transport policy, Existing machinery for policy implementation in India

Strategies to minimize environmental impact of transport: Promotion of public transport, intermodal and combined transport in urban areas, Elimination of negative effects of transport growth through land-use measures, Infrastructure charging, Promoting research to reduce CO<sub>2</sub> emissions and noise, Variation of tolls based on vehicle emission classes and time of day

Recycling of waste products used in road building, Reuse of asphalt pavements, coal fly ash, asphalt shingles, shredded tyres, ground glass and steel mill slag

Creation of awareness among public, vehicle drivers and industry through indicators and vehicle standardization, Propagating awareness among school children through class tutorials and field visits

India's Environmental Performance Index, Provisions of Air (Prevention and Control of Pollution) Act, 1981, Eco-friendly measures by Indian Railways

### **REFERENCE BOOKS**

1. Energy, Transport and the Environment by Oliver Inderwildi and David King (Eds.)
2. Globalisation, Transport and Environment, O.E.C.D.
3. Handbook of Transport and Environment, by David A. Hensher and Kenneth J. Button
4. Central Pollution Control Board, Annual Reports
5. International Energy Agency (IEA) Reports on World Energy Outlook
6. United Nations Environment Programme (UNEP) Reports
7. Transport, the Environment and Sustainable Development, David Bannister, Kenneth John Button, Kenneth Button
8. Unsustainable Transport: City Transport in the New Century, David Bannister
9. Environmental Transport Processes, Bruce C. Logan
10. Air Transport and the Environment, Ben Daley
11. The Environmental Impact of Railways, T. G. Carpenter
12. Environmental Problems Caused by Railways, Charlie Higgins
13. Environmental External Costs of Transport, Rainer Friederich, Peter Bickel



# **TRANSPORT ECONOMICS**

## **Module I**

### **Introduction to Transport Economics**

Normative and positive economics/ Central v/s Market economics/ Public v/s Private ownership/ Demand and supply/ Concept of elasticity and price elasticity of demand/ Factors in the location of facilities/ Transport networks/ Modeling Techniques.

## **Module II**

### **Transport Costing**

Types of cost and their behavior- direct and indirect; fixed and variable/ Treatment of assets and capital depreciation- infrastructure/ Vehicle carrying unit and others/ Transport costs- infrastructure/ Terminal; track access and facility charges; and operating costs/ An approach to transport costing for single and multi-modal operation/ Identification of externalities/ Economic efficiency/ Market failure/ Environmental factors/ Valuation of externalities/ Responsibility charges.

## **Module III**

### **Pricing of Transport Service**

Principles of pricing/ Marginal cost pricing/ Second best situations/ Price discrimination and yield management/ Pricing with stochastic demand/ Problems of demand peaks/ subsidies/ Operational objectives and pricing/ Pricing and market conditions- monopoly v/s competition.

## **Module IV**

### **Investment Criteria**

Investment objectives/ Risk and return on investment/ Private and public sector analysis/ Sources of capital- internal and external, Alternative source of funding.

### **Reference Books:**

1. Infrastructure Development and Financing in India; by N.Mani, New Century Publications, 2012
2. Infrastructure Development in India, by RajashriMajumdar, Rawat Publications, ND, 2008.
3. Infrastructure Development in India, by K.VarndraJetli and Vishal Sheth, New Century Publication, 2007.
4. Infrastructure Development and the Indian economy, by L.N. Dash, Amazon in
5. Public and Private Partnership in Infrastructure in India, by R.N. Joshi, Visionbooksindia.com 2013.