



IPS Academy, Institute of Engineering & Science

(A UGC Autonomous Institute, Affiliated to RGPV, Bhopal)

Scheme & Syllabus

Civil Engineering Department

(U.G.NBA Accredited up to June 2023)

Bachelor of Technology (B.Tech.)

Honors in Transportation Planning

(To be offered to students of Civil Engineering Department)

S.No.	Semester	Subject Code	Subject Name	Contact Hours per week			Total Credits
				L	T	P	
1	V	HOCE-TP-501	Airport Planning and Design	3	2	-	4
2	VI	HOCE-TP-601	Transportation Economics and Finance	3	2	-	4
3	VII	HOCE-TP-701	Intelligent Transportation Systems	3	2	-	4
4	VIII	HOCE-TP-801	Advanced Traffic Engineering	3	-	2	4
Total				12	6	4	16
Total Academic Engagement and Credits				22			16

HOCE-TP-501 Airport planning and design

Course Objective:

To make the students conversant with the types of pavements and their design. To make them learn the importance of orientation of runways, Air traffic control devices and airport drainage.

Course Contents: (40 hrs.)

Module 1: (08 hrs).

Introduction: Growth of air transport, airport organization and associations, Classifications of airports airfield components, airport traffic zones and approach areas.

Aircraft Characteristics Related to Airport Design: Components, size turning radius, speed, airport characteristics

Module 2: (08 hrs)

Airport planning, surveys and Design : Airport Site Selection, Runway length and width, sight distances, longitudinal and transverse grades, runway intersections, taxiways, clearances, aprons, numbering, holding apron, noise control , Problems

Module 3: (08 hrs)

Planning and Design of the Terminal area: Operational concepts, space relationships and area requirements, vehicular traffic and parking at airports.

Capacity and Delay: Factors affecting capacity, Determination of runway capacity related to delay, gate capacity, taxiway capacity

Module 4: (08 hrs)

Airport Grading and Drainage: Grading of airport area, hydrology, design of drainage systems, construction methods, layout of surface drainage and subsurface drainage system, Problems.

Module 5: (08 hrs)

Air Traffic Control and Aids: Runways and taxiways markings, day and night landing aids, airport lighting, ILS and other associated aids.

Course Outcomes:

CO1 Analyse the various components of an airport and aircraft characteristics affecting the design of airports.

CO2 Design the runway and taxiway geometrics based on the likely aircrafts using the airport.

CO3 Plan the requirements of terminal area and suggest an optimum layout for the terminal area based on passenger and baggage volume.

CO4 Provide a suitable method of grading and leveling work involved in the area along with drainage provisions for surface and subsurface water flows.

CO5 Understand the various air traffic control aids required for safe landing and take-off of aircrafts at the airport.

List of Text / Reference Books

1. "Planning and Design of Airports" - Robert Horenjeff, 2nd edition, McGraw Hill Book Co.
2. "Airport engineering"- g. Glushkov, v.babkov, mir publishers, moscow.
3. "airport planning and design"- khanna, arora and jain, nem chand and bros., roorkee
4. Harry.r.cedergern. "drainage of airfield pavements"- john wiley and sons.
5. Virender Kumar and Satish Chandra, "Airport Planning and Design"- Galotia Publication press.

HOCE-TP-601 Transportation Economics and Finance

Course Objective:

To know Economic evaluation of transportation projects, ownership financing of transport, economic function of transportation, road user and transportation cost, finance and taxation

Course Contents: (40 hrs.)

Module 1: (10 hrs).

Economic evaluation of transport plans Need for economic evaluation, cost and benefits of transport projects, time horizon in economic assessment, basic principles of economic evaluation, interest rate, method of economic evaluation, benefit cost ratio method, first year rate of return, net present value method, internal rate of return method, and comparison of various methods of economic evaluation.

Module 2: (08 hrs)

Vehicle operating costs Introduction, road user cost study in India , components of VOC, factors affecting VOC, fuel consumption relationship, spare parts consumption, maintenance and repairs, labour cost, tyre life, lubricants, utilization, and fixed costs.

Module 3: (06 hrs)

Value of travel time savings Introduction, classes of transport users enjoying travel time savings, methodology for monetary evaluation of passengers' travel time, review of work in India on passengers' travel time

Module 4: (10 hrs)

Accident costs Introduction, relevance of accident costing for a developing country, review of alternative methodologies for accident costing, Indian studies.

Traffic congestion, traffic restraints and road pricing Congestion as a factor in road traffic, traffic restraint, road pricing

Module 5:**(06 hrs)**

Highway finance Basic principles, distribution of highway cost, sources of revenue, highway financing in India.

Course Outcomes:

CO1 Providing a solid introduction to transportation demand and cost analysis.

CO2 Evaluate economic aspects of transportation project

CO3 Estimate vehicle operating costs

CO4 Evaluate travel time saving

CO5 Interpret road pricing factors.

List of Text / Reference Books

1. Principles of Transportation engineering by Chakroborty & Das, Prentice Hall, India. 2
2. Highway Engg by S.K Khanna & CEG Justo, Nem Chand Bros., Roorkee
3. Principles and practices of Highway engg by L.R Kadyali, Khanna Publishers, Delhi.Edition
4. Principles of Transportation and Highway engg by G.V Rao, Tata Mc graw- Hill Publishing Co.Ltd. N.Delhi
5. Harral Clell G., A Manual for the Economic Appraisal of Transport Projects, World Bank Report, Washington D.C

HOCE-TP-701 Intelligent Transportation Systems

Course Objective:

To familiarize the students with latest techniques of transportation systems, to learn the techniques of existing toll system using ITS

Course Contents: (42 hrs.)

Module 1: (06 hrs)

Introduction to ITS, including where ITS fits; roles and responsibilities Advanced Traveller Information Systems (ATIS), including functionality; business models; field trip to Smart Route Systems

Module 2: (06 hrs)

Advanced Transportation Management Systems (ATMS), including network operations; incident detection; congestion pricing, tolling, HOT lanes, example deployments

Module 3: (10 hrs)

Fleet-oriented ITS services, including Advanced Public Transportation Systems (APTS); BRT; Commercial Vehicle Operations (CVO); Intermodal Freight , including International Operations and Supply Chains ITS and Technology, including automated highway systems (AHS); sensors, electronic toll collection (ETC); dedicated short range communication ,and standards

Module 4: (10 hrs)

Regionally-scaled ITS deployment, including regional architecture; organizational and institutional issues; standards; developed vs. developing countries; ITS and strategic regional transportation planning; Integrating infrastructure and operations planning

Module 5: (10hrs)

Critical ITS Issues, including (as time permits) ITS and security; safety; human factors; privacy; sustainability; funding (as contrasted with conventional infrastructure); technology deployment/R &D/policy; other institutional issues Conclusion, including regional ITS planning

and architecture presentation; the future of ITS; International ITS Programs Case Studies: applications in bus transport, metro and highways; Emerging Issues.

Course Outcomes:

CO1: Understand ITS & ATIS

CO2: Explain about Advanced Transportation Management System

CO3: Know about APTS, CVO, new technology and ETC

CO4: Details about regional architecture, integration of infrastructure and operational planning

CO5: Summarizes about ITS issues in terms of various factors and emerging issues

List of Text / Reference Books

1. Ghosh, S., Lee, T.S. Intelligent Transportation Systems: New Principles and Architectures, CRC Press, 2000.
2. Mashrur A. Chowdhury, and Adel Sadek, Fundamentals of Intelligent Transportation Systems Planning, Artech House, Inc., 2003.
3. R.P Roess, E.S. Prassas, W.R. McShane. Traffic Engineering, Pearson Educational International, Third Edition, 2004.

HOCE-TP-801 Advanced Traffic Engineering

Course Objective:

To know the traffic flow characteristics, To study various traffic surveys, To understand the Traffic Signal timing design and Traffic Flow theories.

Course Contents: (42 hrs.)

Module 1: (08 hrs).

Introduction to Traffic Engineering Properties of Traffic Engineering Elements, Road Vehicle performance

Traffic Studies Volume studies, Speed studies, Origin and destination studies and parking studies

Module 2: (08 hrs)

Traffic Control devices Various Traffic Control devices, Principles of Intersection Design, Design of signalized and unsignalized intersections, Signal Coordination , Traffic Regulations and Statistical methods

Module 3: (06 hrs)

Traffic Safety and Level-of-service Accidents, Lighting, Capacity and Level-of-service analysis

Module 4: (12 hrs)

Uninterrupted traffic Flow Theory Fundamentals of Traffic flow theory, Uninterrupted Traffic flow including Macroscopic and Microscopic Traffic flow models

Interrupted traffic Flow Theory Fundamentals of Interrupted Traffic Flow, Shockwave Analysis, Car following theory, Queuing Theory, Vehicle arrival: Gap and Gap acceptance Simulation of Traffic Systems

Module 5: (08 hrs)

Interrupted traffic Flow Theory Fundamentals of Interrupted Traffic Flow, Shockwave Analysis, Car following theory, Queuing Theory, Vehicle arrival: Gap and Gap acceptance Simulation of Traffic Systems

List of Experiments

- 1 Traffic volume studies
- 2 Speed studies
- 3 O & D studies
- 4 Signalised and non-signalised intersection studies
- 5 Parking surveys
- 6 Design service volume and capacity studies
- 7 Introduction to various Softwares

Course Outcomes:

CO1 Use the Traffic survey analysis for management of traffic and for designing new road infrastructure,

CO2 Ability to design various types of intersections,

CO3 Implementation of Traffic Control devices and traffic regulations,

CO4 Applications of Traffic flow theories in solving congestion problems

CO5 Use of simulation techniques

List of Text / Reference Books

1. Kadiyali, L. R., Traffic Engineering and Transport Planning, Khanna Publishers
2. O'Flaherty C A, "Transport Planning and Traffic Engineering", Butterworth Heinemann, Elsevier, Burlington, MA 2006
3. Mannering Fred L., Kilarski Walter P. and Washburn Scott S., Principles of Traffic Engineering and Traffic Analysis, Third Edition, Wiley 2007
4. Roess, R. P., Prassas, E. S., and McShane, W. R., Traffic Engineering, 4th Edition, Prentice Hall 2010
5. Chakroborty Partha and Animesh Das, Principles of Transportation Engineering, Prentice hall