



# MSc in Civil Eng. Road and Transport



DANESHPAJOOHAN PISHRO HIGHER EDUCATION INSTITUTE

- **COURSE CHART**
- **SYLLABUS**

# MSc. Civil Engineering – Road and Transport Full Course Chart

Road and Transport Courses						
Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Co-requisite
3032011	Pavement Analysis and Design	3	3	0	-----	-----
3032012	Pavement Technology and Materials	3	3	0	-----	-----
3032013	Advanced Geometric Design of Highways	3	3	0	-----	-----
3032014	Advanced Traffic Engineering	3	3	0	(one of these two courses has to be taken)	
3032015	Road Maintenance Management	3	3	0		
3032016	Seminar	2	2	0	-----	-----
3032018	Thesis	6	0	6	-----	-----
<b>Total Credits</b>		23	Note: students have to pass 20 credits from road and transport courses			

Elective Courses (not complete)						
Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Co-requisite
3032030	Advanced Soil Mechanics	3	3	0	-----	-----
3032031	Airport Designing and Engineering	3	3	0	-----	-----
3032032	Advanced Railway Engineering	3	3	0	-----	-----
3032033	Transportation Planning	3	3	0	-----	-----
<b>Total Credits</b>		-	Note: students have to pass 12 credits from elective courses.			

## Pavement Analysis and Design

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Co-requisite
3032011	Pavement Analysis and Design	3	3	0	-----	-----

- Review of distribution of stresses and strains in layered pavement systems
- Layered elastic analysis and layer modulus back-calculation
- Rutting and fatigue cracking performance criteria for flexible pavements
- Low temperature cracking in flexible pavements
- Traffic and load spectra
- Environmental effects on pavement performance
- Mechanistic-empirical pavement design procedures
- Overview of the theory of viscoelasticity
- HMA fracture mechanics and application to top-down, bottom-up, and low temperature cracking in pavements

## Pavement Technology and Materials

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Co-requisite
3032012	Pavement Technology and Materials	3	3	0	-----	-----

- Properties and characteristics of binders and aggregates
- Types, properties and design of asphalt mixes
- Assessment of traffic loading
- Structural design of asphalt pavements
- Manufacture, laying and compaction of asphalt
- Pavement performance
- Sustainability and recycling procedures
- Skid resistance and surface texture
- Thin surfacings and other surface treatments
- Quality management and certification for asphalt
- Road maintenance, assessment, design and practice
- Health and safety aspects of asphalt operations
- Latest developments in asphalt pavement technology

## Advanced Geometric Design of Highways

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Co-requisite
3032013	Advanced Geometric Design of Highways	3	3	0	-----	-----

This course serves as an introductory course in the fundamentals and concepts of highway geometric design for Civil Engineering graduate students. The course provides a broad overview of the latest policy on geometric design of highways and streets and exposes students to the tools and concepts needed to practice highway design in the field of civil engineering.

## Advanced Traffic Engineering

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Co-requisite
3032014	Advanced Traffic Engineering	3	3	0	-----	-----

- Parameters characterizing traffic flow (e.g. density, speed, flow)
- Data collection techniques for traffic parameters and delay studies
- Introduction to traffic flow theory (including description of speed-density, speed-flow, and flow density relations)
- Introductions to concept of capacity and level of service
- Theory of uninterrupted and interrupted traffic flow
- Delay analysis
- Capacity and level-of-service analysis for various facilities
- Design of traffic facilities (like expressways, channelization, unsignalized and signalized intersections, airport circulation, parking facilities, etc.)

## Road Maintenance Management

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Co-requisite
3032015	Road Maintenance Management	3	3	0	-----	-----

Monitoring Post-construction condition, timing preventive maintenance and rehabilitation treatments, and economic analysis of alternatives.

## Seminar

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Co-requisite
3032016	Seminar	2	2	0	----	-----

In this course students, with the help and supervision of their instructor, will choose a topic (usually the same as their thesis), and study and investigate all the previous and modern researches and facts about it. Subsequently they have to prepare and present their results and conclusions for the whole class, in the form of a seminar.

## Thesis

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Co-requisite
3032018	Thesis	6	0	6	----	-----

In this project students will choose and study a specific subject or problem and find its answer or solution, through practical analyzing, experiencing, and experimenting. Eventually, students will compile their theses and present them as their final project.

## Advanced Soil Mechanics

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Co-requisite
3032030	Advanced Soil Mechanics	3	3	0	-----	-----

This course is a continuation of the soil mechanics theories and the recent empirical formula for this subject.

## Airport Designing and Engineering

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Co-requisite
3032031	Airport Designing and Engineering	3	3	0	-----	-----

To develop an understanding of the aviation system, its functions, and the airport planning process, as well as to impart knowledge and techniques on the conduct of the various elements of master planning and the design of basic airport facilities.

## Advanced Railway Engineering

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Co-requisite
3032032	Advanced Railway Engineering	3	3	0	-----	-----

To provide the students an awareness of advanced issues and problems of current interest to the railway industry; To enable the students to apply existing technology to the design, construction, and maintenance of railway physical facilities.

## Transportation Planning

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Co-requisite
3032033	Transportation Planning	3	3	0	-----	-----

The aim of this course is to understand the analytical methods, measures and institution for transportation planning. Some of the topics covered:

1. Transportation Planning Process and basic knowledge of the transportation planning
2. Governmental institution and finance for transportation planning
3. Survey and demand forecasting methods
4. Role of transportation planning for the project