

STUDY PLAN
MASTER IN (Civil Engineering/ Transportation)
(Thesis Track)

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| Plan Number | | | 2005 | <i>T</i> |
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I. GENERAL RULES CONDITIONS:

1. These requirements shall conform with the general frame of the program of Graduate Studies.
2. Background requirement for Master program
 - Bachelor Degree in Civil Engineering.& Bachelor Degree in Highway and Bridges Engineering

II. SPECIAL CONDITIONS: None.

III. THE STUDY PLAN : Studying (33) Credit Hours as follows:

1. Obligatory courses: (18) Credit Hours:

| Course No. | Course Title | Credit hrs. | Theory | Prac. | Pre-request |
|------------|--------------------------------------|-------------|--------|-------|-------------|
| 0901780 | Advanced Traffic Engineering | 3 | 3 | - | - |
| 0901781 | Highway Geometric Design | 3 | 3 | - | - |
| 0901782 | Highway Pavement Design | 3 | 3 | - | - |
| 0901783 | Traffic Flow Theory | 3 | 3 | - | - |
| 0901786 | Highway Construction and Maintenance | 3 | 3 | - | - |
| 0901789 | Transportation Planning | 3 | 3 | - | - |

2. Elective Courses: Studying (6) Credit hours from the following:

| Course No. | Course Title | Credit hrs. | Theory | Prac. | Pre-request |
|------------|--|-------------|--------|-------|-------------|
| 0901756 | Advanced Geotechnical Engineering | 3 | 3 | - | - |
| 0901784 | Transportation Safety | 3 | 3 | - | - |
| 0901785 | Digital Image Processing | 3 | 3 | - | - |
| 0901787 | Remote Sensing | 3 | 3 | - | - |
| 0901788 | Airport Planning and Design | 3 | 3 | - | - |
| 0901790 | Statistics in Transportation | 3 | 3 | - | - |
| 0901791 | Special Topics in Civil Engineering | 3 | 3 | - | - |
| 0901792 | Geographical Information Systems (GIS) | 3 | 3 | - | - |

3. Thesis: 9 Credit hours (0901799).

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IV. GENERAL RULES CONDITIONS:

1. These requirements shall conform with the general frame of the program of Graduate Studies.
2. Background requirement for Master program
 - Bachelor Degree in Civil Engineering.& Bachelor Degree in Highway and Bridges Engineering

V. SPECIAL CONDITIONS: None.

VI. THE STUDY PLAN : Studying (33) Credit Hours as follows:

1. Obligatory courses: (24) Credit Hours:

| Course No. | Course Title | Credit hrs. | Theory | Prac. | Pre-request |
|------------|--------------------------------------|-------------|--------|-------|-------------|
| 0901780 | Advanced Traffic Engineering | 3 | 3 | - | - |
| 0901781 | Highway Geometric Design | 3 | 3 | - | - |
| 0901782 | Highway Pavement Design | 3 | 3 | - | - |
| 0901783 | Traffic Flow Theory | 3 | 3 | - | - |
| 0901784 | Transportation Safety | 3 | 3 | - | - |
| 0901786 | Highway Construction and Maintenance | 3 | 3 | - | - |
| 0901789 | Transportation Planning | 3 | 3 | - | - |
| 0901790 | Statistics in Transportation | 3 | 3 | - | - |

2. Elective Courses: Studying (9) Credit hours from the following:

| Course No. | Course Title | Credit hrs. | Theory | Prac. | Pre-request |
|------------|--|-------------|--------|-------|-------------|
| 0901756 | Advanced Geotechnical Engineering | 3 | 3 | - | - |
| 0901785 | Digital Image Processing | 3 | 3 | - | - |
| 0901787 | Remote Sensing | 3 | 3 | - | - |
| 0901788 | Airport Planning and Design | 3 | 3 | - | - |
| 0901791 | Special Topics in Civil Engineering | 3 | 3 | - | - |
| 0901792 | Geographical Information Systems (GIS) | 3 | 3 | - | - |

2. A comprehensive exam (0901798).

Course Description

- 0901756 Advanced Geotechnical Engineering (3 credit hours)**
Composition, structure, and engineering behavior of claysoils, shear strength of cohesive and granular soils, Improvement of soils by compaction, drainage, and use of admixtures, seepage, erosion, and desigal filters. Soil Dynamics, blasting.
- 0901780 Advanced Traffic Engineering (3 credit hours)**
Traffic characteristics, capacity and level of service, models of traffic flow, levels of capacity analysis, analysis, design and planning of traffic operations: freeways, two-lane and multilane highways; signalized and priority intersections.
- 0901781 Highway Geometric Design (3 credit hours)**
Functional system characteristics, design controls and criteria, traffic characteristics and highway capacity, access control, elements of design, cross section elements, rural and urban highway design, two-lane highways, arterials, freeways, design of at-grade intersections and interchanges, ramp design.
- 0901782 Highway Pavement Design (3 credit hours)**
Basic principles, design methods, pavement evaluation, overlay design, recent methods in pavement design, stabilized mixes, cement, asphalt, lime, quality control, selection of materials, stresses in flexible and rigid pavement, basic principles of flexible and rigid pavement design.
- 0901783 Traffic Flow Theory (3 credit hours)**
Microscopic Flow Characteristics, Macroscopic Flow Characteristics, Microscopic Density Characteristics, Macroscopic Density Characteristics, Microscopic Speed Characteristics, Macroscopic Speed Characteristics, Demand Supply Analysis, Capacity Analysis, Traffic Stream Models, Shock Wave Analysis, Queueing Analysis.
- 0901784 Transportation Safety (3 credit hours)**
Traffic accidents: magnitude and characteristics, user/Vehicle/ environment interaction, accident reduction and prevention framework, the data-base and its management, identification of hazardous locations, problem diagnosis via analysis of accident data and observation of traffic behaviour (TCT), economic appraisal: cost of accidents, value of life, design of evaluation studies, regression-to-mean, risk compensation, accident migration, safety audit.
- 0901785 Digital Image Processing (3 credit hours)**
Digital Image Representation, Elements of Digital Image Processing Elements of Visual Perception, An Image Model, Uniform Sampling and Quantization, Image Encoding, Image Restoration.

- 0901786 Highway Construction and Maintenance (3 credit hours)**
Types and properties of asphalt cement, aggregate characteristics and uses, uses of asphalts in road construction, weight-volume relationships, properties of asphalt mixtures, mix design, roadbed construction processes and machineries, subgrades, subbases and bases, materials variability, and common maintenance operations.
- 0901787 Remote Sensing (3 credit hours)**
Introduction to remote sensing, fundamentals of remote sensing, remote sensing satellites (Landsat, SPOT); vectors (aircraft, artificial satellites), sensors, data used in remote sensing, image interpretation, applications of remote sensing.
- 0901788 Airport Planning and Design (3 credit hours)**
Airport planning, airport configuration, airport capacity and delay, geometric design of the airside, airport pavement design, planning and design the terminal area, environmental impact of airports, ground transportation and parking.
- 0901789 Transportation Planning (3 credit hours)**
Land use-transportation model, urban transportation planning process, (UTP), forecasting travel demand, transportation modeling, trip generation, trip distribution, modal split, traffic assignment, development and evaluation of transportation alternatives, economic analysis, implementation.
- 0901790 Statistics in Transportation (3 credit hours)**
The concept of probability, discrete and continuous distributions, random variable functions, estimation, hypothesis testing, regression and correlation: linear and multiple regression, significance tests.
- 0901791 Special Topics in Civil Eng. (3 credit hours)**
Structured presentation of new and developing areas of knowledge in civil engineering offered by the faculty in their specialized areas of expertise to augment the formal courses available.
- 0901792 Geographical Information System (3 credit hours)**
Origins and applications, GIS concepts and spatial models, GIS functionality, coordinate systems, Digitizing, Data exchange standards, Vector and raster modes, Data storage and retrieval, Database Management systems, Techniques in spatial decision support.