Intelligent Transportation System (ITS) Master Program Course Descriptions
(2019/2020)

Faculty: Engineering   **Department: Civil Engineering**

A0867601 Fundamentals of ITS   3 C.H.

This course will provide the basic knowledge regarding the definition of ITS, function, impacts, benefits and challenges, ITS architecture, the historical development of ITS from policy and market economic perspectives. Also, it will cover the different applications of ITS and Advanced Traffic Management and Traveler Information, vehicle location and route navigation and guidance concepts, traffic and incident management, planning and human factor issues for ITS. The course will also cover ITS and road safety in addition to environmental issues related to ITS.

Prerequisite: None

A0867602 Road Traffic Flow and Control   3 C.H.

This course will cover the topics of traffic flow theory, mathematical modeling of traffic, deterministic and probabilistic relations, queuing theory, arrival analysis, traffic delay models, traffic stream shockwaves, gap acceptance models, traffic signals, traffic control measures, traffic signal timing plans.

Prerequisite: None

A0867603 Traffic Modelling and Simulation   3 C.H.

This course will provide students with the basics of transportation modeling and simulation. It will cover theory for car-following, lane-changing, speed adaptation, Microscopic, Mesoscopic and Macroscopic traffic simulation approaches, the mathematical simulation framework, Network Supply Models, computer simulation techniques, O-D estimation, cell transmission models. It will also cover on-line simulation and simulation based optimization, calibration and validation of traffic simulation models, and the applications of traffic simulation models.

Prerequisite: A0867602

A0867604 ITS Architecture and Standards   3 C.H.

This course will cover the topics of introduction to Intelligent Transportation Systems (ITS), connected and automated driving standards and architecture, ITS security standards.

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Prerequisite: A0867601

A0867605 Analytical Techniques in Transportation Engineering   3 C.H.

This course will cover the topics of introduction to transportation systems analysis, experimental design, analysis of variance, probability models, regression analysis, representation of transportation problems, discrete choice analysis.

Prerequisite: A0867603

A0867606   Research Methodologies   3 C.H.

This course will cover the topics of introduction to research, qualitative and quantitative research framework, data management, preparing research proposals, ethics in research, communication skills.

Prerequisite: None

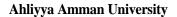## A0867607   Advanced Transportation Planning   3 C.H.

This course will cover the topics of fundamentals of transport systems, introduction to transportation planning, transportation planning and decision making, characteristics of urban travel, data availability and travel surveys, travel demand analysis, introduction to traffic flow theory and simulation approaches, introduction to transportation network models, prediction of origin to destination flows, users' response to ITS and applications for real-time systems. In addition, this course will address the topics of transport policy and multi-modal transport studies, intermodal integration planning, accessibility and mobility planning.

Prerequisite: A0867605

A0867608 Traffic Safety   3 C.H .

This course will cover the following topics in detail; accident definition and types, accident cost, factors affecting road accidents, roadway safety appraisal techniques, road safety measures, accident data collection, roadway design standards, traffic education, and law enforcement, before and after studies.

Prerequisite: None

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A0867609   Special Topics in ITS   3 C.H.

This course will must be developed and designed in a well-structured manner to cover a topic in the area of ITS that is not offered in the course plan for the program.

Prerequisite: Department Approval

A0867201   Communication Systems in ITS   3 C.H .

This course will provide a summary of the components and functions of automotive sensors and mobile communications systems. It will cover an overview of RADAR sensor technology, radio channel modeling, smart antenna, medium access control, routing protocol, data dissemination, handover, security, mesh networking, road traffic estimation and monitoring, and location-based services.

Prerequisite: A0867604

A0867202   GIS Applications in ITS   3 C.H .

This course will provide the required background related to the geographic information technology and the application of geo-informatics in transportation engineering. It will cover the topics of basic concepts of GIS, RS, GPS, and land-use and transportation data, Cartography, Coordinate & Reference systems, map generation and analysis, transportation network development and algorithms, in addition to transportation models and their applications in GIS.

Prerequisite: A0867602

A0867101   ICT for Transport   3 C.H.

This course will include the topics of information and communication systems in transportation such as smart cities, advances driver assistance systems, adaptive cruise control, active safety, v2v/v2i, and driverless vehicle.

Prerequisite: None

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Faculty: Engineering   **Department: Civil Engineering**

A0867610   Thesis   9 C.H .

Prerequisite: Passing 21 Credit Hours