COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Engineering		
ACADEMIC UNIT	Department of Planning and Regional Development – Department of Civil Engineering		
LEVEL OF STUDIES	Postgraduate		
COURSE CODE	MCC203	SEMESTER	Fall
COURSE TITLE	Intelligent Transportation Systems and Traffic Management		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	WEEKLY TEACHING HOURS	CREDITS
Lectures	3	7,5

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	special background
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	
COURSE WEBSITE (URL)	https://pmtspmaster.uth.gr/courses/effyi-systimata-metaforon-sti-diacheirisi-kykloforias/

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

By completion of the course, students will be able to know: 1. Strategies and measures implemented internationally for traffic management, 2. Applications of Intelligent Transport Systems for the collection and analysis of traffic data, to operate and manage of road systems, in the communication of vehicles – infrastructure, in road safety 3. The use of modern technologies to apply techniques and methods in the subjects of congestion management, demand management and incident management 4. Key concepts from traffic flow theory and queue theory.
They will also be able to formulate: • Design and Functional Requirements • Evaluation and Performance Criteria, for the selection of technologies and applications related to traffic management, incident and queue/congestion management, and analysis and prediction.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*

Production of new research ideas	*Others…* *…….*
Search for, analysis and synthesis of data and information, with the use of the necessary technology Adapting to new situations Decision-making Working in an international environment Direct application of knowledge at a professional level Project planning and management Respect for difference and multiculturalism Respect for the natural environment Teamwork and collaboration Connection with the market through real solving problems	

(3) SYLLABUS

- The road network. Traffic operation and traffic problems. The role and necessity of ITS.
- Review of Traffic Engineering pprinciples
- Traffic management. Traditional and modern approaches.
- The evolution of ITS. EU Directives 40/2010 and 2023/2661. EU Action Plan
- Common ITS applications in urban and interurban networks
- Autonomous and connected vehicles (CAVs). V2V, V2I, and V2X communications.

Cooperative intelligent transport systems (C-ITS). Benefits and concerns

- Freeway operations and ITS. Traffic management strategies and measures.
- ITS for incident management and traffic congestion management. Cost-benefit assessment
- Key ITS applications in the urban network. Traffic lights, travel times, parking management.
- KPIs for efficiency of ITS. Visualizations and end user apps
- Also included one educational visit as well as 1 or 2 lectures by invited speakers

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Communication with Students, posting of documents, material, and bibliography at e-class</td></tr>
<tr><td>TEACHING METHODS
The manner and methods of teaching are described in detail.
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lecture theory</td><td>35%</td></tr>
<tr><td>Lecture exercises</td><td>11%</td></tr>
<tr><td>One person or team project</td><td>40%</td></tr>
<tr><td>Educational visit</td><td>7%</td></tr>
<tr><td>Guest speaker</td><td>7%</td></tr>
<tr><td>Course total</td><td>100%</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION
Description of the evaluation procedure

Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Typically, there are 2 projects within the semester (40%) and an exam at the end of the semester (60% of the final grade) Exams include theory and exercises. In addition to the assignments during the semester, the final exams may include a presentation/assignment at the end of the semester</td></tr>
</table>

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

1. *Active Traffic Management on Road Networks: a macroscopic approach. A.Kurzhanskiy, P.Varaiya . Philosophical Transactions of the Royal Society A (2010) 368, pp 4607-4626*
2. *Active Traffic Management: The Next Step in Congestion Management US DOT FHWA, 2007*
3. *AECOM Limited (2015) Study on Key Performance Indicators for Intelligent Transport Systems – Final Report*
4. *CEN/TC 278 Intelligent transport systems, ITS standards for Europe*
5. *Directive (EU) 2023/2661 of the European Parliament and of the Council of 22 November 2023 amending Directive 2010/40/EU on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport (Text with EEA relevance)*
6. *Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport*
7. *Economics and Finance for Transportation Infrastructure E.S. Prassas, R.P. Roessa, Springer 2013*
8. *Freeway Management and Operations Handbook, September 2003 (Updated June 2006) US Department of Transportation, Federal Highway Administration*
9. *Freeway Ramp Metering: An Overview. M. Papageorgiou, IEEE Intelligent Transportation Systems, Conference Proceedings, 2000*
10. *Highway Capacity Manual 2022, Transportation Research Board*
11. *Intelligent Transportation Systems Functional Design for Effective Traffic Management Book Springer 2016*
12. *ITS and Traffic Management, Chapter 11 Handbooks in Operations Research and Management Science Vol. 14, 2007*
13. *Manual on Uniform Traffic Control Devices for streets and highways, 2009 (revised 2012) US Department of Transportation, Federal Highway Administration*
14. *Markos Papageorgiou (2004) Overview of Road Traffic Control Strategies, IFAC Proceedings Volumes Volume 37, Issue 19, October 2004, Pages 29-40*
15. *Perspectives on Intelligent Transportation Systems (ITS), Joseph M. Sussman Springer (2005)*
16. *Αντωνίου, Κ., Σπυροπούλου, Ι., (2015) «Αρχές κυκλοφοριακής τεχνικής και προσομοίωσης» Ελληνικά Ακαδημαϊκά Ηλεκτρονικά Συγγράμματα και Βοηθήματα.*
17. *Θέματα από την Κυκλοφοριακή Μηχανική. Παντελής Κοπελιάς. Εκδόσεις Κριτική, 2025*