

COURSE OUTLINE

(1) GENERAL

SCHOOL	ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF CIVIL ENGINEERING		
LEVEL OF STUDIES	GRADUATE		
COURSE CODE	MCC202	SEMESTER	Spring
COURSE TITLE	Freight transportation and logistics		
INDEPENDENT TEACHING ACTIVITIES <i>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</i>		WEEKLY TEACHING HOURS	CREDITS
		3	7.5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	General background, special background, specialized general knowledge		
PREREQUISITE COURSES:	-		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No		
COURSE WEBSITE (URL)	https://eclass.uth.gr/courses/PRD_P_158/		

(2) LEARNING OUTCOMES

Learning outcomes <i>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.</i> 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
The aim of the course is to develop a clear understanding of the role and functioning of freight transport systems and to provide the necessary knowledge for analyzing such systems and designing effective solutions that facilitate the flow of goods from the point of origin through to their consumption, disposal or recycling, and reintegration into the supply chain. The course is designed to cultivate scientists and professionals with expertise in the design of efficient freight transport and logistics systems, employing up-to-date methodologies and internationally recognized best practices. It equips students with the competencies required for employment in sector-specific organizations and enterprises, as well as in academic and research institutions. Furthermore, it empowers them to contribute to the achievement of their organization's strategic goals while advancing their own scientific development and professional careers.

Upon completion of the course, students will be:

- able to have a clear understanding of concepts related to the operation of freight transportation and logistics, the legal and regulatory framework, the organization and the roles of stakeholders
- aware of intelligent systems used to facilitate freight transportation and logistics
- able to develop methodological frameworks forecasting freight flows
- able to analyze functional characteristics and requirements arising from the synergy of the systems involved in the freight transportation and logistics
- able to design efficient freight transportation systems and logistics
- able to assess the impacts of freight transportation systems and logistics in economy, environment and society
- able to evaluate the efficiency of freight transportation and logistics systems and contribute in the decision-making process

The competencies to be developed will enable participants to:

- Analyze a freight transport system in terms of the stakeholders involved and their respective roles.
- Assess the impacts of freight transport systems and identify opportunities for improvement.
- Select appropriate measures, solutions, and policies that support sustainable transport.
- Evaluate the contribution of such interventions to overall sustainability.

Participants will also acquire proficiency in:

- Developing technical solutions to address complex problems.
- Identifying the risks and limitations associated with the methodologies they apply.
- Communicating and promoting their findings and results to relevant stakeholders.

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

Adapting to new situations

Decision-making

Working independently

Team work

Working in an international environment

Working in an interdisciplinary environment

Production of new research ideas

Project planning and management

Respect for difference and multiculturalism

Respect for the natural environment

Showing social, professional and ethical responsibility and sensitivity to gender issues

Criticism and self-criticism

Production of free, creative and inductive thinking

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Others...

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Search for, analysis and synthesis of data and information with the use of the necessary technology

Decision making

Individual work

Teamwork

Working in an interdisciplinary environment

Project planning and management

Respect for the natural environment

(3) SYLLABUS

- Introduction to freight transportation
- European and national legal framework
- Intermodal transportation
- Freight centers
- Urban freight transportation
- Logistics and supply chain
- Freight transportation analysis
- Location-allocation optimization problems
- Routing problems
- Multicriteria evaluation: Analytical Hierarchy Process, PROMETHEE-GAIA, EVALOG
- Business models

(4) TEACHING and LEARNING METHODS – EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	Face-to-face, Distance learning	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	Use of ICT in teaching and in communication with students	
TEACHING METHODS <i>The manner and methods of teaching are described in detail.</i> <i>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.</i> <i>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</i>	<i>Activity</i>	<i>Semester workload</i>
	Lectures	39
	Study and analysis of bibliography	55
	Projects	70
	Preparation and presentation of the projects	10
	Educational visits	14
	Course total	188
STUDENT PERFORMANCE EVALUATION Description of the evaluation procedure <i>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</i> <i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i>	Language of evaluation: Greek The assessment consists of the following components: • Problem-solving exercises during the semester: 30% • Semester project: 40% • Final written examination: 30% The evaluation focuses on the student's ability to identify and utilize relevant data sources and information, understand the core concepts introduced throughout the course, and apply analytical approaches to develop and assess solutions relevant to the supply chain.	

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- Jason Monios, Rickard Bergqvist, Intermodal Freight Transport and Logistics, June 5, 2017 by CRC Press, 280 Pages, ISBN 9781498785129 - CAT# K30183
- Coyle, J. J., Novack, R. A., Gibson, B. J. and Bardi, Edward J., 2011, Transportation: A supply chain perspective, 7th Edition, Cengage Learning. Link: <http://danangtimes.vn/Portals/0/Docs/121293332-032478919XTransportation.pdf>
- European Commission, 2011, Roadmap to a single European transport arena –Towards a competitive and resource efficient transport system. White Paper of the European Commission. COM (2011) 144 final. Link: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0144&from=EN>
- Globalized freight transport: Intermodality, E-commerce, Logistics, and Sustainability (Transport Economics, Management and Policy), Edited by Thomas R. Leinbach and Cristina Capineri, ISBN 13: 9781845425029
- Andrés Monzón, Floridea Di Ciommo, Sara Hernández, Eftihia Nathanail, Giannis Adamos, Maria Tsami, Ricardo Poppeliers, Odile Heddebaout, Tuuli Jarvi, Marko Nokkala, Juno Kostinen, Derek Palmer, Clare Harmer, Katie Millard, Jardar Andersen, Petter Christiansen, Albert Gabor, Adam Pusztai, Almos Virag, Jan Spousta, 2015, CITY-HUBS: Sustainable and Efficient Interchange Stations. Taylor and Francis Group, 2015.
- Chopra S., Meindl P., 2012, Supply Chain management: Strategy, planning and operation, 5th edition, ISBN 0132743957
- Christopher Martin, 2016, Logistics & Supply Chain Management. 4th Edition, Harlow: Financial Times Prentice Hall, Link: http://www.icesi.edu.co/blogs/supplychain0714/files/2014/07/Martin_Christopher_Logistics_and_Supply_Chain_Management_4th_Edition____2011-1.pdf
- TRB's National Cooperative Freight Research Program (NCFRP) Web-Only Document 1: Background research material for freight facility location selection: A guide for public officials (NCFRP Report 13), Link: <http://www.nap.edu/download/22862#>
- Federal Highway Administration (FHWA) & United States Department of Transport (USDOT), 2016, FAF4 Freight traffic assignment, Link: https://faf.ornl.gov/fafweb/data/Final%20Report_FAF4_August_2016_BP.pdf
- Anjos, M. F., Vieira V.C.M., 2016, Mathematical optimization approaches for facility layout problems: The state-of-the-art and future research directions, European Journal of Operational Research, Volume 261, Issue 1, 16 August 2017, Pages 1-16. Link: <https://reader.elsevier.com/reader/sd/E23AC356FFDD3991C4A15FC2F607A9CEC7831DAF1C8CE3C55E530A94CA8E680DD12FE055C6E3A804923F5C4F466EEDC5>
- Daskin, MS, 2010, A Brief Introduction to the SITATION Software. Department of IOE, University of Michigan. Ann Arbor, MI 48109. Summer, 2010.
- Sun Y., Lang M., Wang D., 2015, Optimization models and solution algorithms for freight routing planning problem in the multi-modal transportation networks: A review of the state-of-the-art. The Open Civil Engineering Journal, 2015, 9, 714-723. Link: <https://benthamopen.com/contents/pdf/TOCIEJ/TOCIEJ-9-714.pdf>
- National Academies of Sciences, Engineering, and Medicine. 2017. Guide for Conducting Benefit-Cost Analyses of Multimodal, Multijurisdictional Freight Corridor Investments. Washington, DC: The National Academies Press. Link: <https://www.nap.edu/download/24680>
- Osterwalder A., Pigneur Y., 2010, Business model generation: A handbook for visionaries, game changers, and challengers, Wiley & Sons, Hoboken, NJ.
- Karakikes, I.; Nathanail, E., Assessing the Impacts of Crowdshipping Using Public Transport: A Case Study in a Middle-Sized Greek City. Future Transp. 2022, 2, 55–83. <https://doi.org/10.3390/futuretransp2010004>.
- Nathanail, E., Karakikes, I., Mitropoulos, L. & Adamos, G., (2021). "A sustainability cross-case assessment of city logistics solutions". Case Studies on Transport Policy, Volume 9, Issue 1, March 2021, Pages 219-240. ISSN 2213-624X. DOI: 10.1016/j.cstp.2020.12.005.

- Nathanail, E. & Karakikes, I., (2021). "How accurately do experts perceive the effectiveness of Urban Freight Transport solution in medium sized cities", *Int. J. Logistics Systems and Management*, Vol. 39, No. 4, pp. 519–550.
- Karakikes, I. & Nathanail, E (2020). "Using the Delphi Method to Evaluate the Appropriateness of Urban Freight Transport Solutions". *Smart Cities 2020*, Volume 3, Issue 4, pp. 1428-1447. doi:10.3390/smartcities3040068
- Kiouisis Vasileios, Nathanail Eftihia, Karakikes Ioannis, 2018, "Assessing traffic and environmental impacts of smart lockers logistics measure in a medium-sized municipality of Athens", *Data analytics: Paving the way to sustainable urban mobility - in the book series "Advances in Intelligent Systems and Computing"*, Springer, ISSN: 2194-5357.
- Karakikes, I., Nathanail, E., Savrasovs, M., 2018. "Techniques for smart urban logistics solutions' simulation: a systematic review", in *Lecture Notes in Networks and Systems*, v. 68, Reliability and Statistics in Transportation and Communication

- Related academic journals:

- Transportation Research Part A – Policy
- Transportation Research Part D – Transport and the Environment
- Transportation Research Part E – Logistics and Transportation
- Int. J. Logistics Systems and Management
- Supply Chain Management
- Journal of Business Logistics