COURSE OUTLINE

(1) GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	Mechanical Engineering		
LEVEL OF STUDIES	*Undergraduate (towards 5-year Diploma Degree)*		
COURSE CODE	ΟΠ0802	**SEMESTER**	8th
COURSE TITLE	Supply Chain Coordination		

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	4	3
Practice Exercises / Laboratory Exercises	1	3
	5	6
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialized general knowledge, skills development*	Background
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	https://www.mie.uth.gr/?page_id=18463&lang=en

(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.*

The aim of the course is to familiarize students with the contemporary challenges of the Supply Chain, focusing on the importance of coordination, information, and cutting-edge technologies for better decision-making. The course will present and clarify the concepts of Logistics and Supply Chain Management, study the impact of lack of coordination, and analyze the Bullwhip Effect. Furthermore, the critical role of information in decision-making will be presented, as well as the importance of Digital Transformation through the integration of cutting-edge technologies such as: Artificial Intelligence, Blockchain Technology, the Internet of Things, Digital Twins, and Big Data Analytics.

To address the challenges of the supply chain, students will explore a wide range of concepts, including time series analysis for demand forecasting, inventory management (single and multi-period), and various optimization problems. In addition, they will use the basic principles of game theory as a means of interpreting supply chain coordination issues.

Upon successful completion of the course, students are expected to:

- Define key concepts of the supply chain.
- Understand the differences between logistics and supply chain management.
- Understand the causes of the bullwhip effect and the need to mitigate it.

- Understand the importance of digital transformation and the integration of cutting-edge technologies in the supply chain.
- Understand the critical role of information in the supply chain for decision-making in competitive environments.
- Be able to analyze time series and perform demand forecasts.
- Understand and apply single-period and multi-period inventory management models.
- Be able to address various optimization problems.
- Apply basic principles of game theory in the context of the supply chain.
- Be familiar with the analysis of case studies of real-world supply chain issues.

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*
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.
- Decision-making.
- Team work.
- Project planning and management.
- Criticism and self-criticism.
- Production of free, creative and inductive.

(3) SYLLABUS

- Introduction to logistics and supply chain management,
- Contemporary challenges in the supply chain,
- The importance of coordination in the supply chain,
- The bullwhip effect (analysis, causes, and the need for mitigation),
- Supply chain coordination through contracts,
- The value of information (downstream and upstream), incentives for information exchange, and managing asymmetric information in the supply chain,
- Information sharing in competitive environments,
- Game theory in supply chain analysis,
- The importance of digital transformation and cutting-edge technologies:
  - Artificial Intelligence,
  - Blockchain Technology,
  - Internet of Things,
  - Digital Twins,
  - Big Data Analytics.
- Time series analysis for demand forecasting:
  - Forecasting Methods,
  - Forecast Error Metrics.
- Inventory management:
  - Newsvendor Model,
  - Continuous Review System,
  - Periodic Review System.
- Practical applications in various optimization problems,
- Case studies from the global supply chain.

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face-to-face teaching in a classroom and in a computer lab (if necessary)</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students.</td><td>Use of ICT in teaching (delivery of lectures with slides, web-based learning process support), research activities (searching bibliographic sources on the internet), and communication with students (option of electronic homework submission).</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>Lectures</td><td>70</td></tr><tr><td>Practice Exercises</td><td>30</td></tr><tr><td>Independent Study</td><td>50</td></tr><tr><td>Course Total
(25 hours of workload per credit)</td><td>150</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>I. Writing final exam (70%)
II. Assignment with presentation (30%)

Specifically-defined evaluation criteria are given at the beginning of the semester.</td></tr>
</table>

(5) ATTACHED BIBLIOGRAPHY

Suggested bibliography:

- Albrecht, M. (2010). Supply Chain Coordination Mechanisms (Vol. 628). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-02833-5
- Amit, R. K. (2024). Game Theory with Applications in Operations Management. Springer Nature Singapore. https://doi.org/10.1007/978-981-99-4833-8
- Basu, R. (2023). Managing Global Supply Chains (3rd ed.). Routledge. https://doi.org/10.4324/9781003341352
- Choi, T.-M. (Ed.). (2012). Handbook of Newsvendor Problems (Vol. 176). Springer New York. https://doi.org/10.1007/978-1-4614-3600-3
- McCain, R. A. (2019). Θεωρία Παιγνίων. Εκδότης: BROKEN HILL PUBLISHERS LTD. ISBN: 9789925575404.
- Russell, R. S., Taylor, B. W., & Τατσιόπουλος, Η. Π. (Επιστ. Επιμέλεια) (2016). Οργάνωση Παραγωγής και Διοίκηση Εφοδιασμού, 8η Έκδοση. Εκδότης: ΕΚΔΟΣΕΙΣ Α. ΤΖΙΟΛΑ & ΥΙΟΙ Α.Ε. ISBN: 9789604185573.
- Sarkis, J. (Ed.). (2024). The Palgrave Handbook of Supply Chain Management. Springer International Publishing. https://doi.org/10.1007/978-3-031-19884-7
- Stadtler, H., Kilger, C., & Meyr, H. (Eds.). (2015). Supply Chain Management and Advanced Planning. Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-55309-7
- Sunil, C., Ανδρουτσόπουλος, Κ., & Μαντάς, Μ. (Επιστ. επιμέλεια) (2020). Διοίκηση Εφοδιαστικής Αλυσίδας, 7η Έκδοση. Εκδότης: ΕΚΔΟΣΕΙΣ Α. ΤΖΙΟΛΑ & ΥΙΟΙ Α.Ε. ISBN: 9789604188758.
- ΒΙΔΑΛΗΣ, Μ. (2017). ΕΦΟΔΙΑΣΤΙΚΗ (LOGISTICS): ΜΙΑ ΠΟΣΟΤΙΚΗ ΠΡΟΣΕΓΓΙΣΗ. Εκδότης: ΕΚΔΟΣΕΙΣ ΚΛΕΙΔΑΡΙΘΜΟΣ ΕΠΕ. ISBN: 9789604617692.

- ΜΑΡΙΝΑΚΗΣ, Ι., & ΜΥΓΔΑΛΑΣ, Α. (2008). ΣΧΕΔΙΑΣΜΟΣ ΚΑΙ ΒΕΛΤΙΣΤΟΠΟΙΗΣΗ ΤΗΣ ΕΦΟΔΙΑΣΤΙΚΗΣ ΑΛΥΣΙΔΑΣ. Εκδότης: "σοφία" Ανώνυμη Εκδοτική & Εμπορική Εταιρεία. ISBN: 9789606706172.

Related academic journals:

- Annals of Operations Research, Springer
- Artificial Intelligence, Elsevier
- Autonomous Agents and Multi-Agent Systems, Springer
- European Journal of Operations Research, Elsevier
- Expert Systems with Applications, Elsevier
- Games and Economic Behavior, Elsevier
- International Journal of Game Theory, Springer
- International Journal of Production Economics, Elsevier
- Management Science, INFORMS
- Manufacturing & Service Operations Management, INFORMS
- Operations Research, INFORMS
- The International Journal of Logistics Management, Emerald