

COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Engineering		
ACADEMIC UNIT	Department of Financial and Management Engineering		
LEVEL OF STUDIES	Postgraduate		
COURSE CODE	I.5	SEMESTER	A
COURSE TITLE	Artificial Intelligence in Supply Chain Management		
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, state the weekly teaching hours and the total credits</i>	WEEKLY TEACHING HOURS	CREDITS	
Credits are awarded for the whole of the course	3	6	
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail in section (4).			
COURSE TYPE <i>general background, special background, specialization, general education, skills development</i>	Special background		
PREREQUISITE COURSES	No		
LANGUAGE OF INSTRUCTION AND OF ASSESSMENT	English		
MODE OF TEACHING <i>in-person (%)</i> <i>synchronous distance learning (%)</i> <i>asynchronous distance learning (%)</i> <i>(In the case of synchronous distance learning, the total weekly duration of teaching is recorded)</i>	Synchronous distance learning (95%) Asynchronous distance learning (5%)		
AVAILABILITY TO ERASMUS STUDENTS	No		
COURSE WEBSITE (URL)	https://aisbd.aegean.gr/en/c/ai-supply-chain-management		

(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
- Brief Guide for drafting Learning Outcomes

Upon successful completion of the MSc course “Artificial Intelligence in Supply Chain Management”, students will have achieved learning outcomes aligned with Level 7 of the European Qualifications Framework and the Qualifications Framework of the European Higher Education Area, demonstrating highly specialized knowledge, advanced cognitive skills, and professional competences in a complex and rapidly evolving domain. Specifically, they will possess a systematic and critical understanding of core supply chain management principles, including demand forecasting, inventory control, warehouse operations, freight transportation, sustainability, and city logistics, and will be able to integrate these foundations with advanced Artificial Intelligence methodologies. Students will acquire in-depth theoretical and applied knowledge of Supervised Learning and Reinforcement Learning, including regression, classification, deep neural architectures, predictive optimization, and agent-

based systems, and will be capable of selecting, designing, and implementing appropriate AI models for complex supply chain problems. They will develop advanced analytical and problem-solving skills, enabling them to critically evaluate data, design feature engineering processes, interpret model outputs, and embed predictive and prescriptive analytics into operational decision-making loops. Furthermore, they will demonstrate the ability to manage complexity, uncertainty, and dynamic interactions within multi-echelon supply chains by conceptualizing and assessing hybrid AI systems and agentic architectures. At the competence level, graduates will be able to exercise autonomy and professional judgment in designing AI-enabled supply chain solutions, communicate technical findings effectively to specialist and non-specialist stakeholders, and take responsibility for strategic decision-making in digitally transformed logistics environments. Overall, the course equips students to lead innovation in intelligent, data-driven, and sustainable supply chain ecosystems.

General Competences

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

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

Central to the course is the development of advanced capabilities in the search, analysis, and synthesis of data and information through the systematic use of appropriate digital technologies, including data analytics platforms and AI modelling tools. Students are trained to transform complex supply chain data into actionable knowledge, integrating predictive and prescriptive models into operational contexts. The course strongly promotes adaptability to new situations, as participants engage with dynamic, data-rich, and uncertain supply chain environments where AI-driven solutions must continuously evolve. The structure of the course encourages both independent work particularly in analytical modelling, and critical evaluation of AI methods—and teamwork, especially in case-based discussions and the design of integrated AI-enabled supply chain solutions. Given the globalized and interconnected nature of modern logistics networks, the course fosters the ability to work effectively in an international and interdisciplinary environment, bridging supply chain management, operations research, computer science, and sustainability studies. Emphasis on freight transportation sustainability, carbon footprint assessment, and city logistics enhances respect for the natural environment and strengthens social and professional responsibility. Moreover, the course promotes criticism and self-criticism through reflective evaluation of model performance and limitations, while encouraging the production of new research ideas in intelligent logistics systems and agent-based architectures. Through project-oriented activities, students also develop competences in project planning and management. Overall, the course nurtures creative, analytical, and inductive thinking required for leadership in AI-driven supply chain transformation.

(3) COURSE SYLLABUS

- 1 Introduction to Supply Chain Management and Logistics
- 2 Demand Forecasting
- 3 Inventory Management
- 4 Warehouse operations
- 5 Freight transportation & sustainability
- 6 City logistics
- 7 Introduction to Artificial Intelligence and Its Role in Supply Chain Management
- 8 Supervised Learning — Models, Methods, and Applications
- 9 Advanced Supervised Learning — Deep Architectures and Predictive Optimization
- 10 Reinforcement Learning, AI Agents, and Integrated AI Systems in Supply Chain Management

(4) TEACHING AND LEARNING METHODS - ASSESSMENT

MODE OF TEACHING Face-to-face, distance learning, etc.	Distance learning														
MODE AND FREQUENCY OF COMMUNICATION WITH THE STUDENTS	Mode of communication • Video conference • Email • Laboratory training Frequency: weekly														
ENSURING THE MODE OF COMMUNICATION AMONG STUDENTS <i>Team assignments and discussions, collaborative learning platforms with the use of AI, video conference, QA sessions, κ.α.</i>	• Team assignments and discussions • Video conference • Learning platforms with the use of AI														
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, in laboratory training, in the communication with students</i>	• Video conference tool • Tool for preparing self & team exercises (AI exercises) • Laboratory training														
TECHNOLOGICAL EQUIPMENT REQUIREMENTS	• Laptop / desktop • Tool for AI tasks														
PLAGIARISM POLICY/ PLAGIARISM DETECTION TOOLS	Use of Turnitin tool.														
ARTIFICIAL INTELLIGENCE POLICY <i>(1) The use of Artificial Intelligence is prohibited in all circumstances</i> <i>(2) The use of Artificial Intelligence is allowed only with the permission of the instructor</i> <i>(3) The use of Artificial Intelligence is allowed only with an explicit reference to the literature</i> <i>(4) Students are free to use Artificial Intelligence</i>	The use of Artificial Intelligence is allowed only with an explicit reference to the literature.														
ORGANISATION OF TEACHING <i>The mode and methods of teaching are described in detail.</i> <i>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, work placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artworks, etc.</i> <i>The student's study hours for each learning activity are stated, as well as the hours of independent study, according to the principles of the ECTS.</i>	<table border="1"> <thead> <tr> <th>Activity</th><th>Semester workload</th></tr> </thead> <tbody> <tr> <td>Lectures</td><td>30</td></tr> <tr> <td>Self-study</td><td>50</td></tr> <tr> <td>Case studies</td><td>35</td></tr> <tr> <td>Team project</td><td>30</td></tr> <tr> <td>Final exam</td><td>5</td></tr> <tr> <td>Course total</td><td>150</td></tr> </tbody> </table>	Activity	Semester workload	Lectures	30	Self-study	50	Case studies	35	Team project	30	Final exam	5	Course total	150
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Course total	150														
STUDENT ASSESSMENT <i>Description of the assessment method</i> <i>Language of assessment, methods of assessment, formative or summative assessment, multiple choice questions test, short answer questions, essay questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory assignment, 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>	<table border="1"> <thead> <tr> <th>Evaluation type</th><th>Percentage (%)</th></tr> </thead> <tbody> <tr> <td>Final exams</td><td>70%</td></tr> <tr> <td>Team project</td><td>30%</td></tr> <tr> <td>Total</td><td>100%</td></tr> </tbody> </table>	Evaluation type	Percentage (%)	Final exams	70%	Team project	30%	Total	100%						
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(5) RECOMMENDED BIBLIOGRAPHY

- Suggested bibliography:

1. Christopher, M., 2016. "Logistics & Supply Chain Management". 5th ed. Harlow: Pearson Education.
2. Chopra, S. and Meindl, P., 2019. "Supply Chain Management: Strategy, Planning, and Operation". 7th ed. Boston, MA: Pearson.
3. Handfield, R.B., Giunipero, L.C., Monczka, R.M. and Patterson, J.L., 2026. "Purchasing and Supply Chain Management". 8th ed. Boston, MA: Cengage Learning.
4. Simchi-Levi, D., Kaminsky, P. and Simchi-Levi, E., 2021. "Designing and Managing the Supply Chain: Concepts, Strategies and Case Studies". 4th ed. New York, NY: McGraw-Hill Education.
5. Hugos, M.H., 2018. "Essentials of Supply Chain Management". 4th ed. Hoboken, NJ: John Wiley & Sons.
6. Wisner, J.D., Tan, K.C. and Leong, G.K., 2019. "Principles of Supply Chain Management: A Balanced Approach". 4th ed. Boston, MA: Cengage Learning.
7. Mangan, J., Lalwani, C. and Lalwani, C.L., 2016. "Global Logistics and Supply Chain Management". 3rd ed. Chichester: Wiley.
8. Bowersox, D.J., Closs, D.J. and Cooper, M.B., 2019. "Supply Chain Logistics Management". 5th ed. New York, NY: McGraw-Hill Education.
9. Huang, S.H., 2013. "Supply Chain Management for Engineers". Boca Raton, FL: CRC Press.
10. Lutz, H., 2025. "Supply Chain Management Basics: An Introduction for Non-Business Majors". Online edition. Great River Learning.
11. Minis, I., Zeimpekis, V., Dounias, G., Ampazis, N. (Eds.) (2011) *Supply Chain Optimization, Design and Management: Advances and Intelligent Methods*, IGI Global Publishing, ISBN: 978-1-61520633-9
12. Sutton, R. S., & Barto, A. G. (2018). *Reinforcement learning: An introduction* (2nd ed.). The MIT Press.
13. Rolf, B., Jackson, I., Müller, M., Lang, S., Reggelin, T., & Ivanov, D. (2023). A review on reinforcement learning algorithms and applications in supply chain management. *International Journal of Production Research*, 61(20), 7151–7179. <https://doi.org/10.1080/00207543.2022.2140221>
14. Boute, R. N., Gijbels, J., van Jaarsveld, W., & Vanvuchelen, N. (2022). Deep reinforcement learning for inventory control: A roadmap. *European Journal of Operational Research*, 298(2), 401–412. <https://doi.org/10.1016/j.ejor.2021.07.016>
15. Giannopoulos, P. G., Dasaklis, T. K., Tsantilis, I., & Patsakis, C. (2025). Machine learning algorithms in intermittent demand forecasting: A review. *International Journal of Production Research*. <https://doi.org/10.1080/00207543.2025.2578701>
16. Ivanov, D. (2023). Intelligent digital twin (iDT) for supply chain stress-testing, resilience, and viability. *International Journal of Production Economics*, 263, 108938. <https://doi.org/10.1016/j.ijpe.2023.108938>

- Related academic journals:

1. "Supply Chain Management: An International Journal"
Focuses on supply chain theory and practice, strategy, performance and innovation. Published by Emerald Group Publishing.
2. "International Journal of Physical Distribution & Logistics Management"
Covers logistics, physical distribution, and supply chain topics with managerial and operational perspectives. Published by Emerald Group Publishing.
3. "International Journal of Logistics Management"
Dedicated to logistics and supply chain research, including technological and managerial innovations. Published by Emerald Group Publishing.
4. "International Journal of Operations & Production Management"
Offers interdisciplinary research on operations, supply chain strategy, and logistics systems. Published by Emerald Group Publishing.
5. "Journal of International Logistics and Trade"

Internationally scoped journal addressing logistics, global trade, and supply chain challenges. Published by Emerald Group Publishing.

6. *"Supply Chain Analytics"*

An Elsevier journal dedicated to advanced analytical methods in supply chain management, including AI-driven modelling and predictive analytics.

7. *"Decision Support Systems"*

Interdisciplinary Elsevier journal focusing on decision-making technologies, analytics, and systems that often include AI and data-driven supply chain applications.

8. *"European Journal of Operational Research"*

Publishes research on operations research methods with applications including supply chain optimisation and intelligent systems. Published by Elsevier.

9. *"Journal of Strategic Information Systems"*

Elsevier journal covering information systems strategy with emphasis on digital transformation and information technologies—relevant for AI applications in supply chains.

10. *"Journal of Business Logistics"*

Well-established journal publishing logistics and supply chain research including technology, analytics, AI, and integration topics.

11. *"International Journal of Production Research"*

Publishes research on production and operations systems, supply chains, analytics, optimization, and technology-enabled decision-making. Published by Taylor and Francis.

12. *"International Journal of Production Economics"*

Focuses on economic and quantitative analysis of production and supply chains, including planning, inventory, risk, and sustainability. Published by Elsevier.

13. *"Production and Operations Management"*

Covers strategic and tactical operations and supply chain management, emphasizing rigorous theory, empirics, and managerial relevance. Published by Sage.

14. *"Annals of Operations Research"*

Features methodological and applied operations research, including optimization, stochastic models, algorithms, and decision analysis across domains. Published by Springer.

15. *"International Journal of Logistics Research and Applications"*

Explores logistics and supply chain theory and practice, including transportation, warehousing, service design, and policy implications. Published by Taylor and Francis.

16. *"Computers and Operations Research"*

Publishes computational methods for operations research, including algorithms, simulation, heuristics, and data-driven optimization applications. Published by Elsevier.