COURSE OUTLINE

(1) GENERAL

SCHOOL	Engineering		
ACADEMIC UNIT	Mechanical Engineering		
LEVEL OF STUDIES	Undergraduate (towards 5-year Diploma Degree)		
COURSE CODE	ΟΠ0902	**SEMESTER**	8th
COURSE TITLE	Production Planning and Control		

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 and Practice Exercises	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	Yes (tutoring)
COURSE WEBSITE (URL)	https://www.mie.uth.gr/?page_id=18442&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*

During the course, students will be exposed to classical decision problems for the planning and control of supply and production operations in manufacturing firms and will learn to analyze and solve them with mathematical models and quantitative methods.

After successful completing the course, students will be able to:

- Develop appropriate forecasting methods and estimate their accuracy.
- Explain the effects of different inventory control policies on inventory levels and related costs and describe applications of each policy.
- Describe the process and importance of mid-term production planning.
- Compare traditional inventory control policies with material requirements planning.
- Create production schedules using various techniques and evaluate them using various performance measures

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
- Working independently
- Decision-making
- Project planning and management
- Criticism and self-criticism
- Promotion of free, creative, and inductive thinking

(3) SYLLABUS

Forecasting. Forecast characteristics. Quantitative forecasting methods: regression methods, time-series methods (moving average, exponential smoothing for stationary time-series and time-series with trend and/or seasonality).

Aggregate production planning. Prototype example. Zero-inventory plan. Constant-workforce plan. Formulation and solution of aggregate inventory problems as linear programming problems.

Inventory control under constant demand. The Economic Order Quantity (EOQ) model. EOQ extensions to quantity discounts resource-constrained multiple product systems. EOQ extension to finite production rate and multiple products: Economic Lot Sizing Problem (ELSP). Power-of-two lot sizing policies.

Inventory control under known time-varying demand. Dynamic Lot Sizing Problem (DLSP). Heuristic DLSP policies (constant order quantity, constant order period, part-period balancing, Silver-Meal method). Optimal DLSP policy (Wagner-Whitin). DLSP extension to accommodate capacity constraints.

Material Requirements Planning (MRP). Basic MRP process.

Production scheduling. Sequencing rules. Sequencing theory for one machine. Sequencing algorithms for multiple machines.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY ***Face-to-face, Distance learning, etc.***	Face-to-face teaching in a classroom
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Use of ICT in teaching (web-based learning process support), research activities (searching bibliographic sources on the internet), and communication with students (option of electronic homework submission).

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

Activity	*Semester workload*
Lectures	70
Homework	30
Independent study	50
Course total	*150*

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.*	I. Written exam (80%): II. Homework (20%) The evaluation criteria are made known to the students at the beginning of the semester and are posted in the course's webpage.

(5) ATTACHED BIBLIOGRAPHY

Suggested bibliography:

- Graves, S.C., Rinnooy Kan, A.H.G., Zipkin, P.H., eds. 1993. Logistics of Production and Inventory, Handbooks in Operations Research and Management Science, Vol. 4, North Holland ISBN 0-4444-87472-0.
- Nahmias, S. Lennon Olsen T. 2015. Production and Operations Analysis. Waveland, Long Grove, IL, ISBN 1-4786-2306-3.
- Silver, E.D. Pyke, D.F., Peterson, R. 1998. Inventory Management and Production Planning and Scheduling, Wiley ISBN 0-471-11947-4.
- Ιωάννου, Γ. 2006. Διοίκηση Παραγωγής και Υπηρεσιών. Εκδόσεις Σταμούλη, ISBN 960-351-628-7.
- Ξανθόπουλος, Α., Κουλουριώτης, Δ. 2018. Διοίκηση Παραγωγής και Επιχειρησιακών Λειτουργιών. Εκδόσεις Τζιόλα, ISBN 978-960-418-692-1.
- Παπαδόπουλος, Χ.Θ. 2015 Διοίκηση Επιχειρησιακών Λειτουργιών¨Ποσοτική και Υπολογιστική Προσέγγιση. Εκδόσεις Σοφία, ISBN 978-960-6706-85-1.
- Παππής, Κ.Π. 2006. Προγραμματισμός Παραγωγής. Εκδόσεις Σταμούλης ISBN 960-351-650-3.
- Russell, R.S., Taylor, B.W. 2016. Οργάνωση Παραγωγής και Διοίκηση Εφοδιασμού. Επιστημονική Επιμέλεια Τατσιόπουλος Ηλίας. Εκδόσεις Τζιόλα, ISBN 978-960-418-557-3
- Slack, N., Chambers, S., Johnston, R. 2010. Διοίκηση Παραγωγής Προϊόντων και Υπηρεσιών. Επιστ. Επιμέλεια Αδαμίδης Εμμανουήλ. Εκδόσεις Κλειδάριθμος, ISBN 978-960-461-315-1

Related academic journals:

- Computers and Industrial Engineering, Elsevier
- Flexible Services and Manufacturing Journal, Springer
- IISE Transactions, Taylor & Francis
- International Journal of Production Research, Taylor & Francis
- International Journal of Production Economics, Elsevier
- Management Science, INFORMS
- Manufacturing and Service Operations M*anagement, INFORMS*
- *Production and Operations Management, Wiley*
- *Production Planning and Control, Taylor & Francis*