COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	FINANCIAL AND MANAGEMENT ENGINEERING		
LEVEL OF STUDIES	UNDERGRATUATE		
COURSE CODE	GE0128	SEMESTER	7
COURSE TITLE	OPERATIONS RESEARCH II		

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	5
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, specialised general knowledge, skills development*	Special background/ Specialised general knowledge/Skills development
PREREQUISITE COURSES:	Prerequisite knowledge from Courses: Operations Research I, Linear Algebra
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	No
COURSE WEBSITE (URL)	http://www.fme.aegean.gr/en/c/operations-research-ii

(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 course aims in presenting the basic concept of Dynamic, Integers and Non-linear optimization modeling and problem solutions.

A successful student should be able to:

- understand the concepts of optimization
- identify how a problem of the real world can be mathematically formulated to a dynamic, integer or non-linear programming problem
- use the basic techniques for solving optimizations problems
- identify the optimal policy and interpret the solution in terms of the real world problem

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*
	Showing social, professional and ethical responsibility and

Working independently	*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 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
- Production of free, creative and inductive thinking

(3) SYLLABUS

- Introduction to Dynamic Programming
- A Prototype Example for Dynamic Programming
- Optimal Policy-Shortest path problem in Dynamic Programming-Exercises
- Dynamic Programming for equipment replacement
- Stochastic shortest path problem -Exercises
- Stochastic Dynamic Programming
- Resource allocation- Knapsack problem-Exercises
- Travel Salesman Problem-Exercises
- Introduction to Integer Programming, Branch & Bound
- Modeling Dynamic Programming problems-Exercises
- Introduction to Non-Linear Programming: Problems without constraints-Exercises
- Non-Linear Programming: Problems without equality constraints-Exercises
- Exercises in Non-linear Programming.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	

Use of ICT in teaching	YES	Electronic Lecture Notes, Exercises
Use of ICT in laboratory education	NO	-
Use of ICT in communication with students	YES	Announcements, Email

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.

Activity	*Semester workload*
Lectures	39
Study and analysis of bibliography	18
Non-directed study	70
Final Exams	3
Course total	***130***

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	
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.*	Midterm exam (optional) and final exams in Greek

(5) ATTACHED BIBLIOGRAPHY

A) Suggested Bibliography:

1. **Βιβλίο [11031]: ΕΦΑΡΜΟΣΜΕΝΟΣ ΜΑΘΗΜΑΤΙΚΟΣ ΠΡΟΓΡΑΜΜΑΤΙΣΜΟΣ,** Βασιλείου Παναγιώτης – Χρήστος**. Κωδικός Βιβλίου στον Εύδοξο: 11031,** Έκδοση: 1η έκδ./2001, Συγγραφείς: Βασιλείου Παναγιώτης – Χρήστος, ISBN: 9604317164, Τύπος: Σύγγραμμα, Διαθέτης (Εκδότης): Ζήτη Πελαγία & Σια Ι.Κ.Ε. **(in Greek)**
2. **Βιβλίο [112703809]: ΕΙΣΑΓΩΓΗ ΣΤΗΝ ΕΠΙΧΕΙΡΗΣΙΑΚΗ ΕΡΕΥΝΑ, Θεωρία και Ασκήσει,** Φακίνος Δημήτρης, Οικονόμου Αντώνης**. Κωδικός Βιβλίου στον Εύδοξο: 112703809,** Έκδοση: 1η έκδ./2022, Συγγραφείς: Φακίνος Δημήτρης, Οικονόμου Αντώνης, ISBN: 9789600238839, Τύπος: Σύγγραμμα, Διαθέτης (Εκδότης): ΕΚΔΟΣΕΙΣ Α.ΠΑΠΑΖΗΣΗΣ ΜΟΝΟΠΡΟΣΩΠΗ ΙΔΙΩΤΙΚΗ ΚΕΦΑΛΑΙΟΥΧΙΚΗ ΕΤΑΙΡΕΙΑ **(in Greek)**
3. **Βιβλίο [102072205]: ΕΙΣΑΓΩΓΗ ΣΤΗΝ ΕΠΙΧΕΙΡΗΣΙΑΚΗ ΕΡΕΥΝΑ,** HILLIER FREDERICK S., LIEBERMAN GERALD J., ΔΙΑΜΑΝΤΙΔΗΣ ΑΛΕΞΑΝΔΡΟΣ (Επιστ. Επιμέλεια), **Κωδικός Βιβλίου στον Εύδοξο**: 102072205, Έκδοση: 11η έκδ./2022, Συγγραφείς: Hillier Frederick S., Lieberman Gerald J., Διαμαντίδης Αλέξανδρος (Επιστ. Επιμέλεια), ISBN: 9789604189168, Τύπος: Σύγγραμμα, Διαθέτης (Εκδότης): ΕΚΔΟΣΕΙΣ Α. ΤΖΙΟΛΑ & ΥΙΟΙ Α.Ε. **(in Greek)**
4. **Βιβλίο [122086451]: ΕΙΣΑΓΩΓΗ ΣΤΗΝ ΕΠΙΧΕΙΡΗΣΙΑΚΗ ΕΡΕΥΝΑ,** Taha A. Hamdy, Στέφανος Κατσαβούνης, Αθανασία Μάνου (Επιστ. Επιμέλεια), **Κωδικός Βιβλίου στον Εύδοξο: 122086451,** 11η/2024, ISBN: 9786182210437, Τύπος: Σύγγραμμα, Διαθέτης (Εκδότης): ΕΚΔΟΣΕΙΣ Α. ΤΖΙΟΛΑ & ΥΙΟΙ Α.Ε. **(in Greek)**
5. **Βιβλίο [68402209]: ΔΙΟΙΚΗΤΙΚΗ ΕΠΙΣΤΗΜΗ - ΛΗΨΗ ΕΠΙΧΕΙΡΗΜΑΤΙΚΩΝ ΑΠΟΦΑΣΕΩΝ ΣΤΗΝ ΚΟΙΝΩΝΙΑ ΤΗΣ ΠΛΗΡΟΦΟΡΙΑΣ,** Πραστάκος Γρηγόρης Π., **Κωδικός Βιβλίου στον Εύδοξο: 68402209,** Έκδοση: 2η έκδ./2017, Συγγραφείς: Πραστάκος Γρηγόρης Π., ISBN: 9786185304201, Τύπος: Σύγγραμμα, Διαθέτης (Εκδότης): UNIBOOKS ΙΚΕ. **(in Greek)**
6. **Βιβλίο** [**94645784**] **ΕΠΙΧΕΙΡΗΣΙΑΚΗ ΕΡΕΥΝΑ**, 1η έκδ./2021, Κολέτσος Ι., Στογιάννης Δ., Κωδικός Βιβλίου στον Εύδοξο: 94645784. Τύπος: Σύγγραμμα, Διαθέτης (Εκδότης): Συμεών. **(in Greek)**
7. **Βιβλίο** [**102070461**]: **ΒΕΛΤΙΣΤΟΠΟΙΗΣΗ ΣΤΗΝ ΕΠΙΧΕΙΡΗΣΙΑΚΗ ΕΡΕΥΝΑ**, RONALD L. RARDIN, Έκδοση: 2η Αμερικανική έκδ./2022 . Κωδικός Βιβλίου στον Εύδοξο: 102070461. Τύπος: Σύγγραμμα, Διαθέτης (Εκδότης): ΚΛΕΙΔΑΡΙΘΜΟΣ ΕΠΕ. **(in Greek)**
8. **Βιβλίο** [35475]: **ΕΠΙΧΕΙΡΗΣΙΑΚΗ ΈΡΕΥΝΑ ΚΑΙ ΒΕΛΤΙΣΤΟΠΟΙΗΣΗ ΓΙΑ ΜΗΧΑΝΙΚΟΥΣ**, , Καρλαύτης Μ., Λαγαρός Ν., Έκδοση: Α'έκδ./2010. Κωδικός Βιβλίου στον Εύδοξο: 35475, Τύπος: Σύγγραμμα, Διαθέτης (Εκδότης): Σ.ΑΘΑΝΑΣΟΠΟΥΛΟΣ & ΣΙΑ Ι.Κ.Ε. **(in Greek)**

B) Additional Bibliography:

1. Operations Research – Applications and Algorithms, 3rd Edition, Winston W., Duxbury Press, 1994
2. Dynamic programming : models and applications, E.V. Denardo, Englewood Cliffs, N.J. :Prentice-Hall, c1982,2003
3. Integer Programming, Laurence A. Wolsey, ISBN: 978-0-471-28366-9, December 1998, Wiley.
4. Nonlinear Programming, Dimitris P. Bertsekas, ISBN: 978-1-886529-05-2, 3rd Edition, Athena Scientific, Belmond, Massachusetts.