UNIVERSITY OF THE AEGEAN
SCHOOL OF ENGINEERING

DEPARTMENT OF FINANCIAL AND MANAGEMENT ENGINEERING

# COURSE OUTLINES
# ACADEMIC YEAR 2019 - 2020

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# 1. Course Outlines for Semester A

## 1.1. Calculus I

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Engineering | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | **ΓΕ0182** | **SEMESTER** | **1st** |
| **COURSE TITLE** | Calculus I | | |

| **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** |
|---|---|---|
| | 6 | 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, specialised general knowledge, skills development* | General Background |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/mathematical-analysis-i |

### (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*

After the successful completion of the course the students will be able to understand and compute derivatives and integrals of real functions of one real variable.

**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*
*……*
*Others…*
*…….*

## (3) SYLLABUS

Limits and continuity, Differentiation, Applications of derivatives, Integration, Logarithms, exponential functions, inverse trigonometric functions, Techniques of integration, Improper integrals

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | 5 in class examinations and final exam |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | |
| Tutorials | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| Course total | ***180*** |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*

Finney R. L., Weir M. D., Giordano F. R., Thomas' Calculus

*- Related academic journals:*

## 1.2. Introduction to Economics

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FINANCIAL AND MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **OI0103** | **SEMESTER** | **1** |
| **COURSE TITLE** | INTRODUCTION TO ECONOMICS | | |

| **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** |
|---|---|---|
| | 3 | 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, specialised general knowledge, skills development* | general background |
| **PREREQUISITE COURSES:** | No |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/introduction-economic-theories |

**(2) LEARNING OUTCOMES**

| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
|---|
| This course focuses on the economic way of thinking, and the economic principles and models that constitute the underpinnings of economics. The general objective is to encourage students to think like economists, by linking economic ideas and tools to real-world issues, and to provide them with the knowledge that is necessary for understanding more complex microeconomic and macroeconomic models. Special emphasis is placed on the analysis, and link to real-world issues, of central economic ideas, such as: choice; trade-off; opportunity cost; the margin; incentives; the forces of demand and supply; equilibrium; economic rent; self-interest and social interest; and the scope and limitations of government actions. |

By the end of this course, students will be able to:

- Understand the economic way of thinking.
- Understand the limitations placed upon the economic system by the availability of resources and the technology.
- Explain how the competitive markets work on the basis of the forces of demand and supply.
- Understand the notion of market failure in terms of efficiency and equity, and the role of government actions in markets.
- Understand the economic forces that affect their professional and personal life.

**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
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Criticism and self-criticism
Production of free, creative and inductive thinking

**(3) SYLLABUS**

1. What is Economics? (definition of Economics, distinction between Microeconomics and Macroeconomics, the central questions in Economics, the six basic notions that define the economics way of thinking)
2. The Diagrams in Economics (construction and interpretation of scatter diagrams, diagrammatical interpretation of linear and non-linear relationships, diagrammatical interpretation of relationships with a maximum or minimum point, computation of the slope of a linear relationship, diagrammatical illustration of relationships among more than two variables)
3. The Economics Problem (the production possibilities frontier and computation of opportunity cost, efficient allocation of resources, economic growth, economic coordination)
4. Demand and Supply (demand, supply, market equilibrium, demand elasticity, supply elasticity)
5. Efficiency (individual and market demand curves, consumer surplus, individual and market supply curves, producer surplus, efficiency of the competitive market)
6. Government Intervention in Markets (the effects of government intervention on the efficient operation of the competitive market: taxes, interventions in the markets for agricultural products, minimum wage)

**(4) TEACHING and LEARNING METHODS - EVALUATION**

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td>Face to face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td></td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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>39</td></tr>
<tr><td>Study of bibliography</td><td>111</td></tr>
<tr><td></td><td></td></tr>
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<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>150</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br><br>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<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Written exam at the end of the semester (in Greek), which involves open-ended questions and problem solving.</td></tr>
</table>

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*

Parkin, M., Powell, M. and Matthews, K. Essential Economics, Kritiki Ed., Athens, 2013 (in Greek).
D. Acemoglu, D. Laibson, J.A. List. Microeconomics, Kritiki Ed., Athens, 2013 (in Greek).

## 1.3. Physics I

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FINANCIAL AND MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | ΓΕ01030 | **SEMESTER** | **1st** |
| **COURSE TITLE** | PHYSICS I | | |
| **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** |
| Courses | | 3 | |
| **Physics I – Lab** | | 3 | |
| Courses plus **Physics I – Lab** | | 6 | 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, specialised general knowledge, skills development* | General background | | |
| **PREREQUISITE COURSES:** | No | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/physics-i | | |

### (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 main objective of the Physics I course is to present to the undergraduate students with an easy and logical way the basic concepts and principles of physics and furthermore to assist them in order to deeply understand those principles as well, through a big variety of their applications in the modern life. To achieve the above-mentioned objectives, an emphasis in the analysis of the correct scientific way of thinking is primarily given, as well as in the methodology and the problem-solving techniques. Very important objective is also the challenge to cause the interest of the undergraduate students in physics, using as a reference, several examples, achievements and applications of physics which have highlight the role of physics in other scientific sectors like those of Medicine and technical sciences.

*At the end of the courses the undergraduate students should be able to:*

- ✓ *learn Matter and Model building, Coordinate Systems, One-Dimensional Motion with Constant Acceleration, Freely Falling Objects*

- ✓ *calculate Vector and Scalar products, to be able to perform vectors composition in order to calculate fundamental quantities like the instant velocity and the acceleration, describing the One-Dimensional Motion*
- ✓ *learn the theory of the Two -Dimensional Motion with Constant Acceleration and to be able to calculate fundamental quantities for the Two-Dimensional Motion description like the projectile motion*
- ✓ *learn the theory describing the uniform circular motion and the relative motion as well*
- ✓ *understand and to be able to calculate the tangential and radial Acceleration*
- ✓ *understand the concept of force, the inertial frames and the Newton's laws*
- ✓ *be able to apply the Newton's laws in order to calculate fundamental quantities for the One and Two-Dimensional Motions description*
- ✓ *learn the mechanical energy conservation theorem and the work- kinetic energy theorem*
- ✓ *be able to calculate fundamental quantities for the motion description under the influence of non-conservative forces*
- ✓ *be able to apply the work- kinetic energy theorem*
- ✓ *understand the linear momentum and its conservation*
- ✓ *learn the theory of collisions in one and two dimensions*
- ✓ *learn the rotational kinematics in order to be able to calculate the angular velocity and acceleration*
- ✓ *understand the concept of vector product and to be able to calculate the torque*
- ✓ *to be able to calculate the angular momentum of a rotating rigid object*
- ✓ *learn the theory of the rolling motion of a rigid object*
- ✓ *understand the mathematical representation of simple harmonic motion*
- ✓ *be able to calculate the energy of the simple harmonic oscillator*
- ✓ *be familiar with the fundamental description of fluid mechanics, the Archimedes's principle and the Bernoulli's equation*
- ✓ *be able to calculate the buoyant forces*

*LABORATORY*

The main objective of the Physics I – Lab is to present to the undergraduate students with an easy and scientific way all the basic concepts and principles of physics and furthermore to assist them to deeply understand those principles as well, through the experiments. Very important objective is also the challenge to cause the interest of the undergraduate students in experimental physics and at the same time to help familiarize themselves with all the modern experimental techniques for electrical measurements as well as with the usage of complex scientific instruments in the Laboratory. Additionally, the preparation of a technical report or note is thoroughly analyzed and it is mandatory from the undergraduate students in every laboratory exercise in order to help them to develop all the required skills necessary in the science of the engineer.

*At the end of the courses the undergraduate students should be able to:*

- *be able to prepare technical reports*
- *be able to perform statistical analysis in experimental data*
- *measure lengths with the use of a caliper*
- *be able to measure the gravity acceleration using the method of freely falling objects*
- *be able to measure the viscosity of the liquids*
- *be able to measure the spring constant and to validate the Hook's law*
- *validate the second Netwon's law by performing experimental measurements*
- *measure the torque in several rigid objects*

**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
Adapting to new situations , decision-making, working in an international environment,
Production of new research ideas
Respect for the natural environment, Criticism and self-criticism
Production of free, creative and inductive thinking

**(3) SYLLABUS**

The courses cover basic topics of Classical Physics. At the beginning a reference in the specific chapter of classical mechanics called kinematics is made. It includes the study of a mass or a solid object in one or two dimensions, projectile motion and the uniform circular motion. Following the specific chapter of the mechanics called dynamics is also covered and studied in depth. It includes the definition and the interpretation of the Newton's laws and inertial frames. The principle of energy conservation is studied thoroughly as well as the work-kinetic energy theorem. After that, the collisions theory in one or two dimensions is analyzed as well as the conservation law of the linear momentum and the rotational motion of a rigid object around a constant axis. Additionally, the gravitational law and the Fluid mechanics are studied in detail. Finally, the periodic movements and the simple harmonic motion through which we understand the mechanical wave's propagation are also studied thoroughly.

| COURCES | OUTLINE AND LEARNING OBJECTIVES |
|---|---|
| 1 | ➢ Standards of Length, Mass, and Time, Matter and Model Building, Density and Atomic Mass, Dimensional Analysis, Conversion of Units, Coordinate Systems, Vector and Scalar Quantities, Some Properties of Vectors, Components of a Vector and Unit Vectors. Coordinate Systems, Position, Velocity, and Speed, Instantaneous Velocity and Speed, Acceleration, Motion Diagrams, One-Dimensional Motion with Constant Acceleration, Freely Falling Objects, Kinematic Equations Derived from Calculus |
| 2 | ➢ The Position, velocity, and acceleration Vectors. Two -Dimensional Motion with Constant Acceleration. Projectile Motion. Relative Velocity and Relative Acceleration |

| | |
|---|---|
| 3 | ➢ Relative motion. Lorenz transformations. Uniform Circular Motion. Tangential and Radial Acceleration |
| 4 | ➢ The concept of force. Newton's first law and inertial frames. Newton's second law. The gravitational force and weight. Motion in accelerated frames. |
| 5 | ➢ Applications on the Newton's second law to uniform circular motion. Newton's third law. Applications on Newton's laws. Forces of friction. |
| 6 | ➢ Systems and Environments. Work done by a constant and a varying force. Kinetic energy and the work- kinetic energy theorem. Potential energy of a system. The non isolated system. Conservation of energy. |
| 7 | ➢ Kinetic energy and the work-kinetic energy theorem. Conservative and non conservative forces. Changes in mechanical energy for non conservative forces. Relationship between conservative forces and potential energy. |
| 8 | ➢ Linear momentum and its conservation. Impulse and momentum. Collisions in one dimension. Two-dimensional collisions. |
| 9 | ➢ Angular position, velocity and acceleration. Rotational kinematics: Rotational motion with constant acceleration. Angular and linear quantities. Rotational kinetic energy. Calculation of moments of inertia. |
| 10 | ➢ The vector product and torque. Angular momentum. Angular momentum of a rotating rigid object. Conservation of angular momentum. The motion of gyroscopes and tops. Angular momentum as a fundamental quantity. |
| 11 | ➢ Torque. Relationship between torque and angular acceleration. Work, power and energy in rotational motion. Rolling motion of a rigid object. The center of mass. Motion of a system of particles. Rocket propulsion. |
| 12 | ➢ Motion of an object attached to a spring. Mathematical representation of simple harmonic motion. Energy of the simple harmonic oscillator. Simple harmonic oscillator and uniform circular motion. The pendulum. Damped and forced oscillations |
| 13 | ➢ Fluid mechanics. Variation of pressure with depth. Buoyant forces and Archimedes's principle. Bernoulli's equation. |

The Physics I – Lab covers all the basic topics of Classical and Modern Physics in the field of the mechanics. More specifically the following topics are analyzed and studied thoroughly: Experimental data taking techniques. Statistical analysis of experimental data and errors. Length measurements with the use of a caliper. Study of Freely Falling objects. Measurement of the viscosity of the liquids. Measurement of the gravitational acceleration with the help of the mathematical and physical pendulum. Study of the simple harmonic oscillation. Calculation of the spring constant. Newton's Laws. Energy and Momentum conservation. The vector product and torque. Angular momentum conservation. Torsional oscillation.

More detailed the order of the Physics I – Lab training exercises are as in the following:

- Statistical analysis of experimental data
- Length measurements with the use of a calliper
- Study of Freely Falling objects
- Measurement of the viscosity of the liquids
- Measurement of the gravitational acceleration with the help of the mathematical and physical pendulum, Study of the simple harmonic oscillation.
- Calculation of the spring constant
- Experimental verification of Newton's Laws. Momentum conservation. Mechanical energy conservation.
- The vector product and torque. Angular momentum conservation. Torsional oscillation

**(4) TEACHING and LEARNING METHODS - EVALUATION**

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td>Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td>Use of ICT in teaching</td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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>39</td></tr>
<tr><td>Laboratory training exercises</td><td>39</td></tr>
<tr><td>Study of bibliography</td><td>90</td></tr>
<tr><td>Seminars</td><td>20</td></tr>
<tr><td>Examinations</td><td>3</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>191</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure</td><td>For the PHYSICS I course: Final examination in writing at the end of the semester in Greek, which include questions (development), knowledge and understanding of the content of the course, and problem solving. The score of the</td></tr>
</table>

| | |
|---|---|
| *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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | final examinations in writing, counts 70% of the total score for the PHYSICS I course.<br><br>For the Physics I –Lab : The total number of the Labs training exercises is 6. One absent is allowed. Although the relative training exercise has to be done. The evaluation process of the students includes :<br><br>• Oral examination in each Lab<br>• Technical report<br>• Final oral examination<br><br>The final score in the Physics I – Lab is the outcome of the mean value of the score in the final oral examination (50%) and the score regarding the technical reports evaluation (50%).<br><br>The final score in the Physics I – Lab counts 30% of the total score for the PHYSICS I course. |

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*

The Physics I courses are based on the books of:

- *R. Serway/Jewett, "Physics for scientists and Engineers,"*
- *Hugh D. Young, "University Physics, Volume 1, Mechanism and Thermodynamics"*

Other useful books:

- *Halliday and Resnick, "Physics, Vol. 1"*

For the Physics I – Lab :

- «Laboratory Training Exercises », K. Papageorgiou, I. Gialas, K. Theodosiou, University of the Aegean, Department of Financial and Management Engineering, 2006
- Instructors notes

*- Related academic journals:*

Physics Letters
Physical Review Letters
European Physical Journal (EPJ)
Journal of High Energy Physics (JHEP)
Nuclear Physics A
Nuclear Instruments and Methods in Physics
Journal of Instrumentation (**JINST**)

## 1.4. Introduction to systems design

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FINANCIAL & MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **MH0103** | **SEMESTER** | **1st** |
| **COURSE TITLE** | INTRODUCTION TO SYSTEMS DESIGN | | |

| **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** |
|---|---|---|
| LECTURE | 3 | 3 |
| LABORATORY | 3 | 3 |
| | | |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | **6** | **6** |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | General background (Core course) |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | - |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/introduction-systems-design |

**(2) LEARNING OUTCOMES**

| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
|---|
| - Technical knowledge in<br>o Understanding the basic design concepts, including the development of technical specifications, axiomatic approach to design, the relationship between the form and function of the product with the product's materials and manufacturing processes<br>o Selection of materials and manufacturing processes<br>o Production cost estimation based on the bill of materials and the routing<br>o Applying these principles in developing drawings for various complex parts.<br>o Understanding what is required in order to design products and processes.<br>o Understanding the principles of mechanical engineering drawing. |

- Applying the above principles and the rules of mechanical engineering drawing in developing part drawings

- Students obtain proven knowledge and understanding of basic areas of engineering system design, which is based on their secondary education background
- They are in a position to use the knowledge and understanding they obtained from the course in a manner that indicates a professional approach in their work or profession; they obtained abilities that are evident from the synthesis and support of positions and from problem solving in their knowledge area
- They have the ability to collect and interpret relevant information (within their knowledge area), and to develop views that show critical thinking in relevant scientific topics
- They have developed those abilities of acquiring knowledge that are necessary to continue their study under a certain degree of independence.
- They are in a position to present information, concepts, problems and solutions in a specialized as well as a general audience

**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…* |
| | *…….* |

- Innovative thinking
- Decision-making
- Working independently
- Team work
- Working in an interdisciplinary environment
- Production of free, creative and inductive thinking

**(3) SYLLABUS**

**Description**

This is an introductory course into product design. The course presents basic design concepts, including the development of technical specifications, the axiomatic approach to design, and the relationship between the form and function of the product with its materials and manufacturing processes. The course also presents the principles of mechanical drawing through a series of drawing exercises, in which the students sketch complex parts and develop related CAD drawings. Finally, each student participates in a group project, in which a commercial product is analyzed and discussed in a term paper.

| Week | Topics – Theory Lectures | Topics - Laboratory |
|---|---|---|
| 1 | • Design and Production in 21$^{o}$ century. | • Introduction to Engineering Drawing |
| 2 | • Translation of customer requirements into product specifications | • Drawing views, layout views |

| | | |
|---|---|---|
| | | • Homework 1 |
| 3 | • Translation of customer requirements into product specifications | • Drawing views, layout views<br>• Homework 2 |
| 4 | • Functional product specifications, design parameters, and decomposition<br>• Midterm exam 1 (Theory – Laboratory) | • Drawing views and sections<br>• Homework 3 |
| 5 | • Functional product specifications, design parameters, and decomposition | • Drawing sections, dimensions<br>• Homework 4 |
| 6 | • Design and production processes | • Drawing threads<br>• Homework 5 |
| 7 | • Design and production processes | • Introduction to design with AutoCAD 2011<br>• Homework 6 |
| 8 | • Introduction to the design project | • Design with AutoCAD 2011<br>• Homework 7 |
| 9 | • Product costing | • Design with AutoCAD 2011<br>• Homework 8 |
| 10 | • Midterm exam (Theory – Laboratory)<br>• Design project discussion and support | • Design with AutoCAD 2011<br>• Homework 9 |
| 11 | • Product costing | • Design with AutoCAD 2011<br>• Homework 10 |
| 12 | • Computer Aid Product Design - Theory<br>• Design project discussion and support | • Design with AutoCAD 2011 - (3D design)<br>• Homework 11 |
| 13 | • Design project presentations | • Design with AutoCAD 2011 - (3D design)<br>• Homework 12 |

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face Lectures |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT in teaching, laboratory education, communication with students |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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 |
| Laboratory | 39 |
| Weekly homework(design theory and drawing) | 50<br>(25 Theory & 25 Laboratory) |
| Study | 33<br>(Theory & Laboratory) |
| Semester Project | 10 |
| Two midterm exams | 6 |
| Final Exam | 3 |

| | |
|---|---|
| *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* | <table><tr><td></td><td></td></tr><tr><td>**Course total**</td><td>**180**</td></tr></table> |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | **Assessment Methods:**<br><br>- Homework 25%<br>- Project 15%<br>- Two midterm exams 30% (15% each)<br>- Final exam 30% |

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*
*Notes are provided:*

*Minis, I., Integrated Product and Production Processes Development, Department of Financial and Management Engineering, University of Aegean, 2001*

*Additional Biography*


1. *Papadaniil, E., D., and Sfantzikopoulos, M., M., Mechanical Design, Department of Mechanical Engineering, National Technical University, 1999*
2. *Antoniadis, A. Th., Mechanical Design,* Publisher *TZIOLA, 2$^{NT}$ Publication, 2014*
3. *Notes from Work with the AutoCad 2011', I Kappos, 2010, Publications Kleidarithmos*

## 1.5. Chemistry

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Engineering | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | ΓΕ0114 | SEMESTER | 1st |
| **COURSE TITLE** | Chemistry | | |

| **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** |
|---|---|---|
| | 3 | 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, specialised general knowledge, skills development* | General background, special background, specialised general knowledge |
| **PREREQUISITE COURSES:** | No |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/chemistry |

### (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 explores the principals of inorganic chemistry. After successful completing the course, students will be expected to be able to:

- Name and write formulas for common binary and ternary inorganic compounds
- Describe the atomic structure
- Use chemical formulas to solve various kinds of chemical problems
- Interconvert masses, moles, and formulas
- Calculate concentrations of solutions when they are diluted
- Describe the wave properties of light and how wavelength, frequency, and speed are related
- Describe the four quantum numbers, and give possible combinations of their values for specific atomic orbitals
- Write the electron configurations of atoms
- Relate the electron configuration of an atom to its position in the periodic table
- Describe the periodic table and some of the relationships that it summarizes

- Discuss chemical periodicity of the following physical properties: electron affinity, electro negativity,
  ionization energy, atomic radii
- Write Lewis dot representations of atoms
- Predict bonding between specified elements (ionic, covalent)
- Write Lewis dot and dash formulas for molecules and polyatomic ions
- Describe the basic concepts of molecular orbital theory
- Perform calculations involving the use of solutions to chemical reactions
- Understand the condition of chemical equilibrium and following laws
- Recognize and describe non electrolytes, strong electrolytes, and weak electrolytes
- Describe the theories of Bronsted-Lowry, Lewis και Arrhenius of acids and bases
- List properties of aqueous solutions of acids and bases
- Write oxidation-reduction equations
- Explain the common ion effect
- Recognize buffer solutions and describe their chemistry
- Understand the basic concepts of thermochemistry and applies them in simple chemical reactions
- Understand the basic concept of environmental chemistry (toxic organic compounds, heavy metals, etc.)

-

**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
Adapting to new situations
Production of new research ideas
Respect for the natural environment
Criticism and self-criticism
Production of free, creative and inductive thinking

## (3) SYLLABUS

The course includes the following topics: Structure of atom, Atomic orbit, Periodical table of elements, Chemical bonds, Thermochemistry - Thermodynamic, Chemical balance, Non electrolytic solutions, Acids - Bases - Salts, Oxidation – Reduction, Chemical kinetic, Elements of organic chemistry, Elements of environmental chemistry, Elements of analytic chemistry, Spectroscopical methods of analysis.

Module Contents (Syllabus):

| |
|---|
| General introduction , Structure of atom |
| Atomic orbitals |
| Electronic Shell Atoms |
| Periodic table of elements |
| Intermediate Examination |
| Chemical bond |
| Chemical thermodynamic |

| |
|---|
| Chemical equilibrium |
| Solutions |
| Acids-Bases-Salt |
| Oxidation-Reduction<br>Chemical kinetic |
| Introduction to Environmental Chemistry, Toxic Organics - Heavy Metals |
| Introduction to Organic and Analytical Chemistry |

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT in teaching |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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***<br>Lectures: 39<br>Study and analysis of bibliography: 145<br>Intermediate examination: 3<br>Examinations: 3<br>Course total: 190 |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Intermediate and final examinations at the end of the semester, which include questions (development), knowledge and understanding of the content of the course, and problem solving. |

## (5) ATTACHED BIBLIOGRAPHY

- *Suggested bibliography:*


Γενική & Ανόργανη Χημεία (Σ. Παπαστεφάνου, Μ. Λάλια-Καντούρη, 2012)
Βασικές Αρχές Ανόργανης Χημείας (Γ. Πνευματικάκης, Χ. Μητσοπούλου, Κ. Μεθενίτης, 2006)
Γενική Χημεία-Θεωρία και Εφαρμογές (Μ. Κονσολάκης, 2012)
Χημεία – Η Κεντρική Επιστήμη (T.L. Brown, H.E. Lemay, Jr., B.E. Bursten, P.M. Woodward, M.W. Stoltzfus, 2016)
Σημειώσεις (Εισαγωγή στην Περιβαλλοντική και Αναλυτική Χημεία)
Notes


Additional References:

Στοιχεία Γενικής Χημείας (Π. Ακριβός, 2004)
Χημεία Περιβάλλοντος (Θ. Κουϊμτζής, Κ. Φυτιάνος, Κ. Σαμαρά - Κωνσταντίνου, 1998)

- *Related academic journals:*

Inorganica Chimica Acta
Analytica Chimica Acta
Analytical Letters
New Journal of Chemistry

# 2. Course Outlines for Semester B

## 2.1. Introduction to Informatics

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FINANCIAL AND MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **ΓΕ0102** | **SEMESTER** | **2** |
| **COURSE TITLE** | INTRODUCTION TO INFORMATICS | | |

| **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** |
|---|---|---|
| | 3 | 4.5 |
| | | |
| | | |
| *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* | General Background, Skills Development |
| **PREREQUISITE COURSES:** | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/el/node/1473 |

**(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 is addressed to undergraduate students the basic theory in Informatics.
Specifically:
Programming using C: Control Structures, Iteration Structures
Informatics theory: Memory Management, Central Processing Unit, Networks, Software
Boolean Algebra: Functions, Circuits
Hecadecimal, Octal, Binary, Decimal Numbers conversion

**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*
*Adapting to new situations*
*Working independently*
*Team work*
*Working in an international environment*
*Criticism and self-criticism*
*Production of free, creative and inductive thinking*

**(3) SYLLABUS**

Introduction, Information Systems
Software (System Software, Application Software)
Computer Hardware, Computer Networks
Numeral System (Hexadecimal, Binary, Decimal Numbers Conversion)
Programming (Control Structures, Iteration Structures)
Informatics theory (Memory Management, Central Processing Unit)
Boolean Algebra

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | **Composition and execution of programs and verification by the teacher** |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*The student's study hours for each learning activity are given as well as* | |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lab hours | 39 |
| Homework | 40 |
| Oral examinations | 13 |
| | |
| | |
| | |
| | |
| | |
| | |
| Course total | ***92*** |

| | |
|---|---|
| *the hours of non-directed study according to the principles of the ECTS* | |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Examination in written form at the end of the semester<br><br>Program evaluation in the laboratory<br><br>Homework evaluation at the e-class interface |

**(5) ATTACHED BIBLIOGRAPHY**

- *Suggested bibliography:*

Εισαγωγή στην επιστήμη των υπολογιστών, Behrouz Forouzan, Εκδόσεις Κλειδάριθμος ΕΠΕ
Η επιστήμη των υπολογιστών: Μια ολοκληρωμένη παρουσίαση, J. Glenn Brookshear, Εκδόσεις Κλειδάριθμος ΕΠΕ
Εισαγωγή στην πληροφορική, Evans Alan, Martin Kendall, Poatsy Mary Anne, Εκδόσεις Κριτική ΑΕ

- *Related academic journals:*

## 2.2. Linear Algebra and Analytic Geometry

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Engineering | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | **ΓΕ0183** | **SEMESTER** | **2nd** |
| **COURSE TITLE** | Linear Algebra and Analytic Geometry | | |

| **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** |
|---|---|---|
| | 6 | 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, specialised general knowledge, skills development* | General Background |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/linear-algebra |

### (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*

After the successful completion of the course the students will be able to understand systems of linear equations, matrices, vectors in Euclidean spaces and eigenvalues and eigenvectors.

**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*
*……*
*Others…*
*…….*

**(3) SYLLABUS**

Systems of linear equations, Matrices, Determinants, Vectors in the 2-dimensional and in the 3-dimensional space, Vectors in Euclidean spaces, Eigenvalues and eigenvectors

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | 5 in class examinations and final exam |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | |
| Tutorials | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| Course total | ***180*** |

**(5) ATTACHED BIBLIOGRAPHY**

- *Suggested bibliography:*

1. Strang G., Introduction to Linear Algebra
2. Lipschutz S., Lipson M., Schaum's Outline of Linear Algebra

## 2.3. Physics II

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FINANCIAL AND MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | ΓΕ01061 | **SEMESTER** | **2nd** |
| **COURSE TITLE** | PHYSICS 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** |
| Courses | | 3 | |
| **Physics I – Lab** | | 3 | |
| Courses plus **Physics I – Lab** | | 6 | 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, specialised general knowledge, skills development* | General background | | |
| **PREREQUISITE COURSES:** | No | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/physics-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 main objective of the Physics II course is to cover fundamental issues of Electromagnetism. The presentation of the fundamental concepts and principles of Physics in a comprehensive and logical way to the students as well as the assistance in the deepening of these principles through a wide variety of their applications in modern life. In order to achieve the above objectives, emphasis is placed first of all on the correct scientific way of thinking and at the same time on the analysis of the methodology and the solving problems techniques. A very important goal is also to provoke the interest of students by reporting example and applications of physics that highlight the role of physics in other fields.
At the end of the courses the undergraduate students should be able to:

- ✓ understand the meaning of the electrical field
- ✓ calculate the electrical fields of a point like and continuous charge distributions
- ✓ understand the meaning of the electrical flux and to calculate the electrical field with the help of the Gauss's Law
- ✓ understand the meaning of the electrical potential and to calculate the electrical potential of a discrete and continuous charge distributions
- ✓ obtain the potential energy due to point like charges

- ✓ understand the meaning and to calculate the capacity and the energy stored in a charged capacitor
- ✓ understand the meaning of an electrical current and to be able to calculate the total resistance of an electrical circuit
- ✓ be able to calculate the currents of an electrical circuit using the Kirchhoff's rules
- ✓ understand the meaning of the magnetic field and the force acting on a current-carrying conductor or in a moving charge
- ✓ understand the meaning of the torque on a current loop in a uniform magnetic field
- ✓ be able to apply the Ampere law in a simple circuit
- ✓ understand the meaning of the inductance and to be able to apply the Faraday's law of induction and the Lentz rule
- ✓ understand the alternating current circuits

*LABORATORY*

The main objective of the Laboratory Physics II (electromagnetism) is to present to the undergraduate students with an easy and scientific way all the basic concepts and principles of physics and furthermore to assist them to deeply understand those principles as well, through the experiments. Very important objective is also the challenge to cause the interest of the undergraduate students in experimental physics and at the same time to help familiarize themselves with all the modern experimental techniques for electrical measurements as well as with the usage of complex scientific instruments in the Laboratory. Additionally, the preparation of a technical report or note is thoroughly analyzed and it is mandatory from the undergraduate students in every laboratory exercise in order to help them to develop all the required skills necessary in the science of the engineer.

At the end of the courses the undergraduate students should be able to:

- *measure and validate the Ohm's law*
- *measure the magnetic force around current carrying conductor*
- *operate an oscilloscope and to perform simple measurements of electrical quantities*
- *calculate and measure the magnetic field of a solenoid*
- *experimentally study the resonance in RLC electrical circuit*
- *measure of the heat transfer by a current carrying resistor and relates it with the temperature variation (thermidometry)*

**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
Adapting to new situations, decision-making, working in an international environment,
Production of new research ideas
Respect for the natural environment, Criticism and self-criticism
Production of free, creative and inductive thinking

**(3) SYLLABUS**

The Physics II courses cover all the basic topics of Classical and Modern Physics in the field of the electromagnetism. More specifically the following topics are analyzed and studied thoroughly:

The electric field. Properties of electric charges. Coulomb's Law. Electric field of a continuous charge distribution. Motion of charged particles in a uniform electric field - Electric flux. Gauss's Law. Application of Gauss's law to various charge distributions. Conductors in electrostatic equilibrium.- Potential difference and electric potential. Potential differences in a uniform electric field. Electric potential due to continuous charge distributions. Electric potential due to a charged conductor. - Electric potential and potential energy due to point charges. Obtaining the value of the electric field from the electric potential. Applications of electrostatics. - Capacitors. Definition and calculation of capacitance. Combinations of capacitors. Energy stored in a charged capacitor and electric field. Electric dipole in an electric field. Capacitor with dielectrics. An atomic description of dielectrics. Current and resistance. Electric current. Resistance. A model for electrical conduction. Resistance and temperature. Electrical power. - Direct current circuits. Electromotive force. Resistors in series and parallel. Kirchhoff's rules. RC circuits. Electrical meters.- Magnetic fields and forces. Magnetic force acting on a current-carrying conductor. Torque on a current loop in a uniform magnetic field. Applications involving charged particles moving in a magnetic field. The Hall effect. - Sources of the magnetic field. The Biot-Savart law. The magnetic force between two parallel conductors. Ampere's law. The magnetic field of a solenoid.- Magnetic flux. Gauss's law in magnetism. Displacement current and the general form of Ampere's law. Magnetism in matter.- Faraday's law of induction. Motional Electro Magnetic Force (EMF). Lenz's law. Induced EMF and electric fields. Generators and motors. Eddy currents. Self-inductance. Maxwell equations. Inductance and solenoids. *RL* circuits. Energy in a magnetic field. Oscillations in an *LC* circuit. The *RLC* circuit. Alternating current circuits. Inductance. Resistors, inductors and capacitors in an *AC* circuit. The *RLC* series circuit. Filters and power transmission. The *RLC* series circuit. Power in an *AC* circuit. Resonance in a series *RLC* circuit. The transformer and power transmission. Electromagnetic waves. Maxwell equations. Electromagnetic antenna transmission. Spectrum of the electromagnetic radiation.

| COURCES | OUTLINE AND LEARNING OBJECTIVES |
|---|---|
| 1 | ➢ Electrical Fields. Properties of electric charges. Coulomb's Law. Electric field of a continuous charge distribution. Motion of charged particles in a uniform electric field. |
| 2 | ➢ Gauss's Law. Electric flux. Application of Gauss's law to various charge distributions. Conductors in electrostatic equilibrium |
| 3 | ➢ Potential difference and electric potential. Potential differences in a uniform electric field. Electric potential due to continuous charge distributions. Electric potential due to a charged conductor. Electric potential and potential energy due to point |

| | |
|---|---|
| | charges. Obtaining the value of the electric field from the electric potential. Millikan experiment. Applications of electrostatics |
| 4 | ➢ Capacitors. Definition and calculation of capacitance. Combinations of capacitors. Energy stored in a charged capacitor and electric field. Electric dipole in an electric field. Capacitor with dielectrics. An atomic description of dielectrics. |
| 5 | ➢ Current and resistance. Electric current. Resistance. A model for electrical conduction. Resistance and temperature. Electrical power. |
| 6 | ➢ Direct current circuits. Electromotive force. Resistors in series and parallel. Kirchhoff's rules. Wheatstone bridge. RC circuits. Electrical meters |
| 7 | ➢ Magnetic fields and forces. Magnetic force acting on a current-carrying conductor. Torque on a current loop in a uniform magnetic field. Applications involving charged particles moving in a magnetic field. The Hall effect. |
| 8 | ➢ Sources of the magnetic field. The Biot-Savart law. The magnetic force between two parallel conductors. Ampere's law. The magnetic field of a solenoid.- Magnetic flux. Gauss's law in magnetism. Displacement current and the general form of Ampere's law. Magnetism in matter |
| 9 | ➢ Faraday's law of induction. Motional Electro Magnetic Force (EMF). Lenz's law. Induced EMF and electric fields. Generators and motors. Eddy currents. Self-inductance. Maxwell equations. |
| 10 | ➢ Inductance and solenoids. *RL* circuits. Energy in a magnetic field. Oscillations in an *LC* circuit. The *RLC* circuit. |
| 11 | ➢ Alternating current circuits. Inductance. Resistors, inductors and capacitors in an *AC* circuit. The *RLC* series circuit. Filters and power transmission. |
| 12 | ➢ The *RLC* series circuit. Power in an *AC* circuit. Resonance in a series *RLC* circuit. The transformer and power transmission. |
| 13 | ➢ Electromagnetic waves. Maxwell equations. Electromagnetic antenna transmission. Spectrum of the electromagnetic radiation. |

***Laboratory Training exercises***

The Physics II – Lab covers all the basic topics of the electromagnetism including experiments and laboratory measurements . The students are familiarized with the data taking procedure, the analysis and data

processing methods. More specifically the following topics are analyzed and studied thoroughly in the Lab :

| COURCES | OUTLINE AND LEARNING OBJECTIVES |
|---|---|
| 1 | ➢ Current scale - Laplace force. Experimental verification and measurement of the Laplace force |
| 2 | ➢ Joule's law – Calorimetry. Experimental verification of the Joule's law. |
| 3 | ➢ Electrical measurements. Resistance connections. Experimental verification of the Ohm's law. Whetstone bridge and measurement of the value of an unknown resistance. |
| 4 | ➢ Study of an electrical RLC circuit in serial and parallel resonance |
| 5 | ➢ Study of the magnetic field of a solenoid. Measurement of the magnetic field using a second solenoid as a probe. Magnetic force acting on a current-carrying conductor. |
| 6 | ➢ Oscilloscope. Familiarity of the undergraduate students with the basic functions and the usage of the oscilloscope for the measurement of continuous and alternating voltage, frequency and phase difference between two waveforms. Study of the beat and measurement of its characteristics. Lissajous curves. |

**TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT in teaching |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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 | 39 |
| Laboratory training exercises | 39 |
| Study of bibliography | 90 |
| Seminars | 20 |
| Examinations | 3 |
| | |
| | |
| | |
| | |
| Course total | ***191*** |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | <u>For the PHYSICS II course</u>: Final examination in writing at the end of the semester in Greek, which include questions (development), knowledge and understanding of the content of the course, and problem solving. The score of the final examinations in writing, counts 70% of the total grade for the PHYSICS I course.<br><br><u>For the Physics II –Lab :</u> The total number of the Labs training exercises is 6. One absent is allowed. Although the relative training exercise has to be completed. The evaluation process of the students includes : |

| | |
|---|---|
| | • Oral examination in each Lab<br>• Technical report<br>• Final oral examination<br><br>The final score in the Physics II – Lab is the outcome of the mean value of the score in the final oral examination (50%) and the score regarding the technical reports evaluation (50%).<br><br>The final score in the Physics II – Lab counts 30% of the total grade for the PHYSICS II course. |

**(5) ATTACHED BIBLIOGRAPHY**

- *Suggested bibliography:*

The Physics II courses are based on the books of:

- R. A. Serway, J.W. Jewett, "Physics for scientists and Engineers, Volume 2, Electromagnetism, Light and Optics, Modern Physics ", (Translated into Greek)
- *Hugh D. Young, "University Physics, Volume B', Electromagnetism, Optics, Modern Physicss"*

Other useful books:

- "University Physics with Modern Physics, Volume 2, Electromagnetism", Hugh D. Young and R. Freedman, (translated into Greek
- "University Physics with Modern Physics, Volume 3, Electromagnetism", Hugh D. Young and R. Freedman, (translated into Greek)

For the Physics II – Lab :

- «Laboratory Physics II Training Exercises (Electromagnetism) », K. Papageorgiou, I. Gialas, K. Theodosiou, University of the Aegean, Department of Financial and Management Engineering, 2006
- Instructors notes

- *Related academic journals:*

Physics Letters
Physical Review Letters
European Physical Journal (EPJ)
Journal of High Energy Physics (JHEP)
Nuclear Physics A
Nuclear Instruments and Methods in Physics
Journal of Instrumentation (JINST)

## 2.4. Statics

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | **MH0102** | **SEMESTER** | **2nd** |
| **COURSE TITLE** | STATICS | | |

| **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 lab | 5 | 4,5 |
| | | |
| | | |
| *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* | Engineering background, specialised knowledge, skills development |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/statics |

**(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 is addressed to undergraduate students and aims to allow students to:

- Develop a high level of understanding of the fundamental principles of applied mechanics and the modeling of force systems in engineering statics.
- Demonstrate an integrated understanding of engineering statics principles through applications involving problem solving and through creation of design solutions to engineering scenarios.
- Work cooperatively with others to facilitate a collegial atmosphere conducive to learning for all students in the class.

- Prepare for and attend each class by reading the assigned sections before class, completing homework before class, and actively participating in class.

Upon successful completion of this course, the students will be capable of performing the following tasks:

- Prepare appropriate free body diagrams.
- Solve 2-D and 3-D particle and rigid body equilibrium problems.
- Solve problems involving moments.
- Solve problems involving friction.
- Calculate shear and bending moment diagrams in beams.

**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
- Respect for the natural environment
- Adapting to new situations
- Decision-making
- Working independently
- Team work
- Production of free, creative and inductive thinking
- Criticism and self-criticism

**(3) SYLLABUS**

1. Basic principles of statics
2. Force and moment in two dimensions (2D)
3. Resultant force and moment in plane, couple of forces
4. Force and moment in three dimensions (3D)
5. Space resultant force and moment
6. Equilibrium (balance) in 2 and 3 dimensions, construction of free-body diagram
7. Trusses
8. Centroids, moment of inertia
9. Beams, external forces
10. Beams, internal forces, construction of N, Q, M diagrams
11. Frames, machines
12. Cables
13. Friction

**(4) TEACHING and LEARNING METHODS - EVALUATION**

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td>Face to face teaching and lab</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td>Use of eClass in delivering notes and presentations</td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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>39</td></tr>
<tr><td>Lab</td><td>26</td></tr>
<tr><td>Bibliography study</td><td>80</td></tr>
<tr><td>Formulation of laboratory topıcs</td><td>40</td></tr>
<tr><td>Tests</td><td>20</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>205</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br><br>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<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Grading will be determined on two exams: a mid-term exam at the half of the semester and a final exam. Mid-term exam covers the first 40 % of the topics of the course while the final exam covers the rest 60 % of the topics. The students that fail the course will be re-examined in September at the whole topic of the course (100 %).<br>The course grade will be calculated as follows:<br>(Mid-term exam 40 %) + (Final exam 60 %) = (Total 100 %)<br>Exam in September covers the whole topic of the course 100 %</td></tr>
</table>

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography: Vector Mechanics for Engineers: Statics by Ferdinand Beer, E. Russell Johnston Jr., Elliot Eisenberg and David Mazurek*
*- Related literature:*

- *Engineering Mechanics – Statics (12th edition) by R.C. Hibbeler*
- *Engineering Mechanics - Statics by J. L. Meriam and L. G. Kraige*
- *Engineering statics by A. S. Hall*
- *Statics by Arthur Stanley Ramsey*

## 2.5. Macroeconomics

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FINANCIAL AND MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **OI0101** | **SEMESTER** | **2** |
| **COURSE TITLE** | MACROECONOMICS | | |
| **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** |
| | | 3 | 4.5 |
| *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* | General background | | |
| **PREREQUISITE COURSES:** | No | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/el/c/makrooikonomike | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| Macroeconomics analyze the economy as a whole (national or domestic product, consumption, savings, investment, employment, prices etc.). The main focus is on the mechanisms which determine the level of product, (un)employment, and prices in a national economy, as well as on state intervention at the macro level (fiscal and monetary policy). Special emphasis is given to the internationalization of economic relationships and their consequences for the capacity of the state to manage a national economy.<br>By the end of this course, students will be able to:<br>- Understand the main principles of macroeconomics,<br>- Recognize the main approaches in macroeconomics,<br>- Apply the above theoretical tools in contemporary macroeconomic problems. |

| **General Competences**<br>*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*<br>*Adapting to new situations*<br>*Decision-making*<br>*Working independently*<br>*Team work*<br>*Working in an international environment*<br>*Working in an interdisciplinary environment*<br>*Production of new research ideas* | *Project planning and management*<br>*Respect for difference and multiculturalism*<br>*Respect for the natural environment*<br>*Showing social, professional and ethical responsibility and sensitivity to gender issues*<br>*Criticism and self-criticism*<br>*Production of free, creative and inductive thinking*<br>*……*<br>*Others…*<br>*…….* |
| Search for, analysis and synthesis of data and information<br>Adapting to new situations<br>Decision-making<br>Working independently<br>Team work<br>Working in an international environment<br>Criticism and self-criticism<br>Production of free, creative and inductive thinking | |

**(3) SYLLABUS**

| |
|---|
| 1. Introduction – Measuring prices and unemployment<br>2. Measurement and components of GDP<br>3. Aggregate demand and aggregate supply<br>4. The classical theory of self-regulated economy<br>5. The Keynesian critique of self-regulated economy<br>6. Government budget and fiscal policy<br>7. Money and the banking system<br>8. Money, interest rates and the economy<br>9. Monetary policy<br>10. Balance of payments and exchange rate |

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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 of bibliography | 96 |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

| | | |
|---|---|---|
| *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* | Course total | ***135*** |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Written exam at the end of the semester, in Greek, which involves open-ended questions and problem solving. | |

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*

1. R.A. Arnold: *Economics*, Epikentro Ed., Thessaloniki 2007 (in Greek).
2. P. Krugman & R. Wells: *Macroeconomics*, Epikentro Ed., Thessaloniki 2009 (in Greek).
3. J.E. Stiglitz & C.E. Walsh: Principles of Macroeconomics, Papazissis Ed., Athens 2009 (in Greek**).**

## 2.6. Probabilities

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | Polytechnic School | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | **ΓΕ0143** | **SEMESTER** | **2nd** |
| **COURSE TITLE** | Probability / Probability Tutorials | | |

| **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** |
|---|---|---|
| | 6 | 4.5 |
| | | |
| | | |
| *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* | General Background |
| **PREREQUISITE COURSES:** | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/probabilities |

### (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 objective of the course is twofold. On one hand, to introduce student to basic underlying principles of the Probability Theory and on the other hand the deep understanding of its meanings and how they are applied in solving theoretical and practical problems. In addition, it is sought the acquisition of the prerequisite background for understanding subsequent courses of the study cycle, but also the linkage of the field of knowledge with acquired knowledge and concepts that have been encountered earlier in the study cycle.

Upon successful completion of the course, the student will be able to:

- ✓ Describe the concepts of a random experiment, a sample space and an event
- ✓ Describe the classical and the axiomatic foundations of Probability Theory and use the main properties of probability measure
- ✓ Apply the basic enumeration principles and use the formulas for the number of permutations and combinations of a set of objects

- ✓ Describe the concept of conditional probability and of the stochastic independence of events
- ✓ Solve probability problems using the total probability theorem, Bayes' formula and the multiplication rule
- ✓ Describe the concept of random variable, of distribution function, of probability mass function and of probability density function
- ✓ Recognize the most important special discrete and continuous distributions

**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*
*……*
*Others…*
*…….*

- ✓ Analysis and synthesis of data and information
- ✓ Working independently
- ✓ Teamwork

## (3) SYLLABUS

Sample spaces, events, probability, products and sample spaces, finite sample spaces, counting rules, conditional probability, the multiplication rule, the law of total probability and Bayes' rule, independence. *Discrete random variables*: Random variables, the probability distribution of a discrete random variable, functions of discrete random variables, the Bernoulli and Binomial distribution, the Geometric distribution, the Hypergeometric distribution, the negative Binomial distribution, the Poison distribution; *Continues random variables*: Probability density functions, functions of continues random variables, the uniform distribution, the exponential distribution, the normal distribution;

## (4) TEACHING and LEARNING METHODS - EVALUATION

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

**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 | 39 |
| Tutorials | 39 |
| Study and analysis of bibliography | 57 |
| | |
| | |
| | |
| | |
| | |
| | |
| Course total | ***135*** |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Weekly assignments (25%) and final exam (75%) |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*


1. Koutras, M., *Introduction to probability. Theory and Applications*, Volume 1, Stamoulis, 2004
2. Koutras, M., *Introduction to probability. Theory and Applications*, V;olume 2, Stamoulis, 2004
3. Hoel, P., Port, S., Stone, C, *Introduction to probability theory*, Crete University Press, 2009
4. Ross, S., *A first course in probability*, Klidarithmos, 2011
5. Walpole Ronald E., Myers Raymond H., Myers Sharon L., Ye Keying, *Probability and Statistics*, Tziola, 2019
6. Montgomery Douglas- Runger C. George, *Applied probability and statistics for engineers*, Tziola, 2017
7. Papoulis Athanasios,Pillai S. Unnikrishna, *Probability, random variables and stochastic processes*, Tziola, 2019

# 3. Course Outlines for Semester C

## 3.1. Strength of Materials

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | **MH0111** | **SEMESTER** | **3rd** |
| **COURSE TITLE** | Strength of Materials | | |

| **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 labs | 5 | 4.5 |
| | | |
| | | |
| *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* | Engineering background, specialised knowledge, skills development |
| **PREREQUISITE COURSES:** | Statics |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/strength-materials |

**(2) LEARNING OUTCOMES**

| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
|---|
| The course is addressed to undergraduate students and aims to allow students to:<br>• Develop a high level of understanding of the fundamental principles of applied mechanics and the modeling of force systems in engineering statics.<br>• Demonstrate an integrated understanding of engineering statics principles through applications involving problem solving and through creation of design solutions to engineering scenarios.<br>• Work cooperatively with others to facilitate a collegial atmosphere conducive to learning for all students in the class.<br>• Prepare for and attend each class by reading the assigned sections before class, completing homework before class, and actively participating in class. |

Upon successful completion of this course, the students should be able to do the following:

- Prepare appropriate free body diagrams.
- Solve 2-D and 3-D particle and rigid body equilibrium problems.
- Solve problems involving moments.
- Solve problems involving friction.
- Calculate shear and bending moment diagrams in beams.

**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
- Respect for the natural environment
- Adapting to new situations
- Decision-making
- Working independently
- Team work
- Production of free, creative and inductive thinking
- Criticism and self-criticism

**(3) SYLLABUS**

*Class 1: Overview of Mechanics of Materials*
- External loads / equivalent forces / centroids
- Types of support reactions
- Equations of equilibrium
- Free body diagrams: internal forces
- Free body diagrams: (internal forces and support reactions)
- Shear and moment diagrams

*Class 2: Definition of stress*
- Definition/derivation of stress (3 normal and 3 shear stress)
- Definition/derivation of normal stress
- Tensile stress/strain diagrams
- Plastic deformation
- Ductile and brittle fracture

*Class 3: Tensile and compression mechanical behaviour*
- Modulus of elasticity (Young's moduli)
- Mechanical property definitions for yield stress, ultimate strength, etc
- Hooke's law
- Poisson ratio
- ·Thermal stresses and deformations

*Class 4: Shear*
- Definition/derivation of shear stress
- Shear force/shear areas in simple connections
- Allowable Stress/Factors of Safety

*Class 5: Torsion*
- Introduction to torsion / Torsion of shafts
- Derivation of shear strain
- Torsion formula
- Derivation / Definition of polar moment of inertia
- Absolute maximum shear stress

*Class 6: Beam bending*
- General review of beams
- Axial shear and bending moment diagrams
- Moments of inertia of a cross-section
- Centroids of areas; general equations, "composite" areas, axes of symmetry
- Moments of inertia of an area (2nd moment of area): Ix, Iy, Iz = J (polar moment of inertia)

*Class 7: Beam bending*
- Graphical method for constructing shear and moment diagrams
- Review of bending deformation of a straight, prismatic, homogeneous beam subjected to pure bending
- The "flexure formula"
- Examples of beam bending

*Class 8: Beam bending*
- The "flexure formula"
- Examples of beam bending

*Class 9: Deflections of Beams and Shafts*
- The elastic curve and how to draw it
- Displacement and slope by integration
- Examples of slope and displacement using the integration Method

*Class 10: Combined Loadings*
- Review of principle of superposition (is valid if);
- The loading must be linearly related to the stress or displacement
- The loading must not significantly change the original geometry of the member
- State of stress caused by combined loadings

*Class 11: Mechanical behaviour of metallic materials*
- Creep
- Fatigue

*Class 12: Mechanical behaviour of metallic materials*
- Fatigue with the presence of cracks / notches
- Hardness

*Class 13: Mechanical behaviour of metallic materials*
- Impact
- Effect of corrosion exposure on the life cycle of a material

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face teaching and lab |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | **Use of eClass in delivering notes and presentations** |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational* | |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 39 |
| Lab | 26 |
| Bibliography study | 80 |
| Fomrulation of laboratory topics | 40 |
| Tests | 20 |
| | |

| | |
|---|---|
| *visits, project, essay writing, artistic creativity, etc.*<br><br>*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* | <table><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>Course total</td><td>***205***</td></tr></table> |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Grading will be determined on two exams: a mid-term exam at the half of the semester and a final exam. Mid-term exam covers the first 40 % of the topics of the course while the final exam covers the rest 60 % of the topics. The students that fail the course will be re-examined in September at the whole topic of the course (100 %).<br>The course grade will be calculated as follows:<br>(Mid-term exam 40 %) + (Final exam 60 %) = (Total 100 %)<br>Exam in September covers the whole topic of the course 100 % |

**(5) ATTACHED BIBLIOGRAPHY**

- Suggested bibliography: Mechanics of Materials 5th Edition by Ferdinand Beer, E. Russell Johnston Jr., Brian DeWolf and David Mazurek, ISBN-10: 0077221400, McGraw-Hill Science/Engineering/Math; 5 edition (May 8, 2008)

- Related literature:


- Mechanics of materials by R. C. Hibbeler, 8th edition, Pearson Prentice Hall, 2011, ISBN 0136022308,
- Mechanics of Materials by James M. Gere and Barry J. Goodno, 8th edition, 2012, Cencage Learning, ISBN: 1111577730

## 3.2. Applied Microeconomics

**(1) GENERAL**

| | | | | |
|---|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FINANCIAL AND MANAGEMENT ENGINEERING | | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | | |
| **COURSE CODE** | **OI0102** | **SEMESTER** | **3** | |
| **COURSE TITLE** | APPLIED MICROECONOMICS | | | |
| **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** |
| | | | 3 | 4.5 |
| *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* | General background | | | |
| **PREREQUISITE COURSES:** | No | | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK | | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/applied-microeconomics | | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| This course analyses the behaviour of the individual consumer and the individual producer (consumer theory and producer theory), as well as the organisation of different forms of markets. Specifically, the first part presents the theory of demand and the empirical analysis of demand functions: the utility function, the consumer equilibrium, demand functions, and elasticities of demand. The second part is dedicated to the theory of production: the production function, the producer equilibrium and cost functions. Finally, the third part examines the two extreme market structures, namely perfect competition and monopoly.<br>The general objective is to encourage students to think not just like economists, but also like business managers, by linking microeconomics models to the operation of firms (e.g., by understanding the importance of consumer preferences and demand elasticities for the sales and pricing strategies of a firm). |

By the end of this course, students will be able to:

- To explain consumer's decisions with respect to consumption levels and the restrictions that the consumer's budget and the market prices place upon these decisions.
- To explain how a firm can utilise its knowledge of the elasticities of demand for its product.
- To understand the basic principles of the econometric estimation of a demand function.
- To understand the relationship between the level of the inputs used by a firm and the levels of production and (short-run and long-run) costs.
- To understand the role of the price of a firm's product, the prices of inputs and the firm's budget on the firm's decisions regarding profits.
- To discern between the ways that two extreme firm types – the perfectly competitive firm and the monopoly – make their decisions.

**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
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Criticism and self-criticism
Production of free, creative and inductive thinking

**(3) SYLLABUS**

1. Market operation (the basic decision making process, definition of economic profits, the aims of the firm, market demand, market supply, market equilibrium)
2. The utility function and consumer equilibrium (consumer preferences, indifference curves, utility function, budget constraint, utility maximisation, derivation of individual demand function)
3. Demand function analysis: elasticities (market demand curve, the price elasticity of demand and its role in the firm's pricing strategy, income (or expenditure) elasticity of demand, cross-price elasticity of demand)
4. Introduction to the econometric estimation of demand functions (types of data and methods of data collection, estimation of single-equation demand models: regression analysis and the ordinary least squares method)
5. The production function (production functions, average product and marginal product, isoquants, product maximisation, cost minimisation, returns to scale, output elasticity)
6. Short-run costs (total fixed cost, total variable cost, total cost, average fixed cost, average variable cost, average cost, marginal cost)
7. Long-run costs (long-run total cost, long-run average fixed cost, long-run marginal cost, economies of scale, economies of scope)
8. Perfect competition (characteristics of a perfectly competitive market, the demand curves faced by a firm and a sector, short-run and long-run equilibrium of a perfectly competitive firm)

| |
|---|
| 9. Monopoly (characteristics of a monopolistic market, the demand curve faced by a monopolistic firm, short-run and long-run equilibrium of a monopolistic firm) |

**(4) TEACHING and LEARNING METHODS - EVALUATION**

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td>Face to face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td></td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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>39</td></tr>
<tr><td>Study of bibliography</td><td>91</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>130</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br><br>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<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Written exam at the end of the semester, in Greek, which involves open-ended questions and problem solving.</td></tr>
</table>

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*


- E. Mansfield: Managerial Economics: Theory, Applications and Cases, Benos Publ., Athens, 2000, (in Greek).
- W. Nicholson: Microeconomic Theory: Basic Principles and Extensions, Kritiki Publ., Athens, 1998 (in Greek).

## 3.3. Thermodynamics

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FINANCIAL AND MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **MH0105** | **SEMESTER** | **3rd** |
| **COURSE TITLE** | THERMODYNAMICS | | |
| **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** |
| Courses | | 3 | 4,5 |
| | | | |
| | | | |
| *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* | General background | | |
| **PREREQUISITE COURSES:** | No | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/thermodynamics | | |

### (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 main objective of this course is to present to the undergraduate students with an easy and logical way the basic concepts and principles of thermodynamics and furthermore to assist them to understand deeper those principles as well. To achieve the above-mentioned objectives, an emphasis in the analysis of the correct scientific way of thinking is primarily given, as well as in the methodology and the problem-solving techniques. Very important objective is also the challenge to cause the interest of the undergraduate students, through a big variety of examples and applications of thermodynamics in the modern life.

*At the end of the courses the undergraduate students should be able to:*

- ✓ *recognize and understand the concept of closed and open thermodynamic systems*

- ✓ *understand the concept of pure substances*
- ✓ *solve thermodynamic problems related with the phase change of pure substances*
- ✓ *understand the ideal-gas equation of state*
- ✓ *learn the first law of Thermodynamics and to be able to solve problems based on this specific law expressing the energy conservation of the thermodynamic system*
- ✓ *understand the concepts and the definition of heat and internal energy*
- ✓ *to be able to solve thermodynamic problems formulating the energy balance for closed and steady-flow systems*
- ✓ *understand the concepts of enthalpy and specific heat of ideal-gases, solids and liquids under either constant volume or constant pressure*
- ✓ *calculate the enthalpy and the specific heat of ideal-gases, solids and liquids*
- ✓ *understand the second law of Thermodynamics and the concept of reversible and non-reversible processes*
- ✓ *solve problems related to heat engines*
- ✓ *solve problems related to refrigerators and heat pumps and to calculate the coefficient of performance or the energy efficiency rate*
- ✓ *understand the concept of entropy*
- ✓ *formulate the Clausius inequality and to understand the principle of energy increment of isolated thermodynamic systems*
- ✓ *learn the* T- ds relations and to be able to solve the entropy variation of pure instances
- ✓ *learn the Carnot cycle and its importance in the Thermodynamics and to solve relating problems*
- ✓ *learn and understand the Otto cycle and the Diesel cycle as well*
- ✓ *learn and understand the Sterling cycle*
- ✓ *learn and understand the ideal cycle for vapor power cycles and the Rankine cycle as well*

**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
Adapting to new situations , decision-making,
Production of new research ideas, Project planning and management, Criticism and self-criticism
Production of free, creative and inductive thinking

**(3) SYLLABUS**

The courses cover all the basic topics of the Thermodynamics including: Introduction to Thermodynamics and the thermodynamic properties of matter. The concept of work and heat. First law of Thermodynamics (closed and open systems). Internal energy. Enthalpy and Specific Heats of Ideal gases, solids and liquids. Second law of Thermodynamics. Irreversible processes and the Carnot

cycles. The Carnot Heat Engine. The Carnot Refrigerator and Heat Pump. Entropy. Cycles analysis: Otto, Sterling, Brayton and Rankine cycles. Mixtures of ideal gases. Wet air analysis.

Courses:

| COURCES | OUTLINE AND LEARNING OBJECTIVES |
|---|---|
| 1 | ➢ Basic concepts of Thermodynamics. Thermodynamics and Energy. Closed and open systems. Processes and Cycles. Temperature and the Zeroth Law of Thermodynamics. Pressure. |
| 2 | ➢ Introduce the concept of a pure substance. Phases of a pure substance. Phase-change processes of pure substances. |
| 3 | ➢ Property diagrams for phase-change processes. The Ideal-Gas equation of state. Other equations of state. Property Tables. |
| 4 | ➢ Heat transfer. Energy transfer by work. Mechanical and no-mechanical forms of work. Conservation of mass principle, The First Law of Thermodynamics. |
| 5 | ➢ Energy balance for closed systems. Energy balance for steady-flow systems. Some steady-flow engineering devices. |
| 6 | ➢ Internal energy. Enthalpy and Specific Heats of Ideal gases, solids and liquids. |
| 7 | ➢ Introduction to the Second Law of Thermodynamics. Thermal energy reservoirs. Heat engines. Energy conversion efficiencies. |
| 8 | ➢ Refrigerators and Heat pumps. Heat pump systems. Perpetual-motion machines. Reversible and irreversible processes. |
| 9 | ➢ Entropy. The increase of Entropy Principle. Entropy change of pure substances. Isentropic processes. |
| 10 | ➢ Property diagrams involving entropy. The *T- ds* relations. Entropy change of Ideal Gases. Liquids and Solids. Reversible steady-flow work. Entropy Balance. |
| 11 | ➢ The Carnot cycle. The Carnot principles. The Thermodynamic temperature scale. The Carnot Heat Engine. The Carnot Refrigerator and Heat Pump. |
| 12 | ➢ Basic considerations in the analysis of power cycles.<br>➢ Overview of reciprocating engines Otto Cycle: The ideal cycle for spark-ignition engines Diesel Cycle: The ideal cycle for compression-ignition engines: Stirling and Ericsson cycles. Brayton cycle: The ideal cycle for gas-turbine engines. |
| 13 | ➢ The Carnot vapor cycle. Rankine cycle: The ideal cycle for vapor power cycles. |

## (4) TEACHING and LEARNING METHODS - EVALUATION

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

| TEACHING METHODS<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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 | 39 |
| | Seminars | 13 |
| | Study of bibliography | 90 |
| | Examinations | 3 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | Course total | ***145*** |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | One final examination (100%) in writing at the end of the semester in Greek, which include questions (development), knowledge and understanding of the content of the course, and problem solving. | |

## (5) ATTACHED BIBLIOGRAPHY

- *Suggested bibliography:*

The courses in THERMODYNAMICS are based on the books:

(1) "**THERMODYNAMICS AND ADVANCED THERMODYNAMICS**", Apostolos Polyzakis

*(2)* "**Thermodynamics for engineering's**", 8th Edition, Cengel Yunus A., Boles Michael A.

- *Related academic journals:*

Other useful books:

*(1)* ***J.M. Smith, H.C. Van Ness, M.M. Abbott, ¨Introduction to Thermodynamics¨***

(2) ***Sonntag R., Borgnake C., Van Wylen, "Fundamentals of Thermodynamics"***

## 3.4. Calculus II

### (1) GENERAL

| | | | | |
|---|---|---|---|---|
| **SCHOOL** | School of Engineering | | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | | |
| **LEVEL OF STUDIES** | Undergraduate | | | |
| **COURSE CODE** | **ΓΕ0184** | **SEMESTER** | **3** | |
| **COURSE TITLE** | Calculus 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** |
| | | | 3 | 3 |
| | | | | |
| | | | | |
| *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* | General Background | | | |
| **PREREQUISITE COURSES:** | - | | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/el/c/mathematike-analuse-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*

By the end of this course, students will be able to:

- Realize the differences in basic notions of Analysis, when you pass from one dimension to several.
- Recognize the importance of Vector Calculus, when it comes to Physical Applicarions.
- Understand some physical terms, that they already have seen in other cources (Physics , Mechanics), from the Mahematical point of view.

**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*

*Respect for difference and multiculturalism*

| | |
|---|---|
| *Adapting to new situations*<br>*Decision-making*<br>*Working independently*<br>*Team work*<br>*Working in an international environment*<br>*Working in an interdisciplinary environment*<br>*Production of new research ideas* | *Respect for the natural environment*<br>*Showing social, professional and ethical responsibility and sensitivity to gender issues*<br>*Criticism and self-criticism*<br>*Production of free, creative and inductive thinking*<br>*……*<br>*Others…*<br>*…….* |
| Working Independenly | |

**(3) SYLLABUS**

Lectures Outline:

1) Sequences and Series of real numbers

2) Polar Coordinates

3) Functions of several variable

4) Limit and Continuity of real functions of several variable

5) Derivative of real functions of several variable

6) Directional Derivatives

7) Maxima, Minima and Saddle points

8) Constrained Optimization, Lagrange Multipliers

9) Line Integrals

10) Double Integrals of Cartesian and Polar coordinates

11) Triple Integrals of Cartesian, Cylindrical and Spherical coordinates

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to Face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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 | |
| Exercises | |
| | |
| | |
| | |
| | |
| | |

| | | |
|---|---|---|
| *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* | | |
| | | |
| | Course total | ***180*** |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | 1) Weekly Quizzes<br><br>2) Intermediate Exams<br><br>3) Final Exam | |

## (5) ATTACHED BIBLIOGRAPHY

- *Suggested bibliography:*

Finney R. L., Weir M. D., Giordano F. R., Απειροστικός Λογισμός, Πανεπιστημιακές Εκδόσεις Κρήτης.

## 3.5. Introduction to Management

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | FINANCIAL AND MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | ΓΕ0101 | **SEMESTER** | **3** |
| **COURSE TITLE** | Introduction to Management | | |

| **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** |
|---|---|---|
| | 3 | 4,5 |
| | | |
| | | |
| *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* | Track Compulsory |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | NO |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/undergraduate-programme |

**(2) LEARNING OUTCOMES**

| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
|---|
| Upon successful completion of the course the student should be confident about the following:<br><br>(1) Understanding of basic concepts referring to four Management Functions,<br>(2) Understanding Rational Decision-Making process and System Analysis,<br>(3) Understanding Decision-Trees Method as a basic approach for modeling and resolution of real-world decision-making problems.<br>(4) Understanding the processes of the management systems analysis, the analysis of external & internal environment, the implementation of PESTEL, SWOT, and 5 Forces Analysis. |

(5) Implementing all the above in solving real-world problems in case studies / adopting decision-trees analysis.
(6) Understanding of basic concepts in decision theory and modeling of the decision making process.
(7) Handling of uncertainty nature in Management Process.

**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

Adapting to new situations

Decision-making

Working independently

Working in an interdisciplinary environment

Production of new research ideas

Criticism and self-criticism

Production of free, creative and inductive thinking

**(3) SYLLABUS**

Description

This course introduces students to the manager and the management process in the context of organisations and society. The focus is on effective management of the corporation in a changing society. Topics covered include:

(1) Action through processes and/or sequences of tasks and activities, which dynamically involve multiple departments and actors

(2) The basic managerial operations namely, planning/design, organisation, direction and control of managerial processes

(3) Systems theory and cybernetics in management

(4) Introductory concepts in management: performance measurement and productivity, leadership, communication skills, motivation, management of human resources Management as an art and management as a science: the role of decision-making in managerial tasks

(5) Effective managerial decision-making with the aid of quantitative methods and techniques

(6) Management and the role of uncertainty and complexity

(7) Strategic analysis with the aid of probabilistic decision trees

(8) Introduction to decision analysis for managers: from the concept of the expected monetary value, to utility theory, subjective probability and sensitivity analysis

Module Contents (Syllabus)

1. Fundamental of management science, introduction to quantitative methods assisting every-day management and decision making
2. The Function of Planning/Design: Identification of internal & external factors of the organization, PESTEL analysis, SWOT analysis, discussion of real cases.
3. The Function of Planning/Design: Environmental Factors based on models of Thompson, and Porter, (5 forces analysis), Corporate Ethic, Corporate Social Responsibility
4. Rational Decision Making, Strategic, Tactical & Operational Goals, Development Plans
5. The Function of Organizing: Structure of Organizations, Design of Structures, Typical cases of organizational structures, discussion of real cases.
6. The Function of Organizing: Change Management Principles, the problem of re-structuring of Organizations and BPR
7. The Function of Direction: Behavioral Aspects and HR Managements, Leadership and Management
8. The Function of Direction: Corporate Policy, Direction & Communication, Team Coaching, Managerial Roles
9. The Function of Control: Fundamentals of Control Process, Types of Control, Integrated Control Systems, Quality Assessment, Cost of Control Processes.
10. Quantitative Methods and Management, Introduction to Decision Trees Theory, Modeling of Real Cases.
11. Exploring the methods introduced by Raiffa for modeling and resolution of decision making problems.
12. Decision Trees and Utility Principle, discussion of real-cases
13. Decision Making using non-probabilistic methods like maximin, maximax, Hurwicz, Savage, and Laplace methods. Discussion of real-cases

**(4) TEACHING and LEARNING METHODS - EVALUATION**

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td colspan="2">Face to face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td colspan="2">Use of web sources for elaboration of projects</td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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 colspan="2"><table><tr><th>Activity</th><th>Semester workload</th></tr><tr><td>Scheduled Lectures</td><td>39 hrs</td></tr><tr><td>Partial (mid-semester) exams</td><td>46 hrs</td></tr><tr><td>Preparation for the final exam</td><td>50 hrs</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>Course total</td><td>135 hrs</td></tr></table></td></tr>
</table>

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Final exam on course notes for 100% of the final mark of the student.<br><br>Mid-semester exams offer up to 20% bonus in the final mark. |

**(5) ATTACHED BIBLIOGRAPHY**

- *Suggested bibliography:*

A) Course Notes

B) Additional Reading

(1) P. Zalimidis, G. Dounias (2005), Management Engineering, Pyxida Editions, (in Greek)
(2) Harold Koontz and Cyril O'Donnell, (1968), Principles of Management: An Analysis of Managerial Functions, 4th Ed., McGraw-Hill, New York, USA Charles (3) W. L. Hill, Steven McShane, (2006), Principles of Management, McGraw-Hill, USA
(4) A.Golub, Decision Analysis, Gotsis Editions (in Greek)
(5) G. Mantzaris, Modern Business Administration, Giourdas Editions (in Greek)
- *Related academic journals:*

## 3.6. Programming in C

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Engineering | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | ΓΕ0107 | **SEMESTER** | 3 |
| **COURSE TITLE** | Programming in C | | |

| **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** |
|---|---|---|
| | | |
| | | |
| | | |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | 3 | 5 |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Prescribed Core Module |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/computer-programming<br><br>http://www.fme.aegean.gr/en/c/computer-programming-lab |

### (2) LEARNING OUTCOMES

| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
|---|
| At the end of the course, students are able to<br><br>○ Understand the basic programming concepts. |

- Understand the use of arrays to store lists and tables of values.
- Use pointers and Strings.
- Understand the close relationships among pointers, arrays and strings.
- Understand the notion of data abstraction and ADTs
- Divide a problem into its logical set of components.
- Understand how a good program design can reduce coding and debugging
- time.
- Design and code most mid-level problems from the start.

**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
- Adapting to new situations
- Decision-making
- Working independently
- Working in an interdisciplinary environment
- Production of new research ideas

## (3) SYLLABUS

- Introduction. Writing, compiling, and debugging C programs. Hello world.
- Variables and datatypes, operators.
- Control flow. Functions and modular programming. Variable scope. Static and global variables.
- More control flow. Input and output.
- Arrays and Strings
- Pointers and memory addressing
- Memory allocation, Multidimensional Arrays
- Functions
- Exchanging Function Input/Output Arguments
- C standard library utilities: ctype.h, stdlib.h, assert.h, stdarg.h, time.h
- An Introduction to user-defined datatypes
- Searching and sorting algorithms
- A complete real world programming example
- Review

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | | |
|---|---|---|
| **DELIVERY** *Face-to-face, Distance learning, etc.* | In class teaching, laboratory assignments, the GNU C compiler | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY** *Use of ICT in teaching, laboratory education, communication with students* | Use of ICT in communication with students | |
| **TEACHING METHODS** | ***Activity*** | ***Semester workload*** |

| | |
|---|---|
| *The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | Lectures: 39 hours (1.56 ECTS)<br>Personal study: 83 hours (3.32 ECTS)<br>End of semester exam: 3 hours (0.12 ECTS)<br>Course total: *125 hours (5 ECTS)* |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | *Language of evaluation:*<br>Greek.<br><br>*Method of evaluation:*<br>Laboratory Assignments 30%<br>Final Exams 100% |

## (5) ATTACHED BIBLIOGRAPHY

**1) Principal Reference:**

Tan H., and H.,D' Orazio , C for Engineers, (in Greek)

**2) Additional References:**

BRIAN W. KERNIGHAN, DENNIS M. RITCHIE, The C Programming Language, (in Greek)

# 4. Course Outlines for Semester D

## 4.1. Programming with Matlab – A Laboratory Course

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate level | | |
| **COURSE CODE** | ΓΕ0145 | **SEMESTER** | **4** |
| **COURSE TITLE** | PROGRAMMING WITH MATLAB – A LABORATORY COURSE | | |

| **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** |
|---|---|---|
| | 3 | 4,5 |
| | | |
| | | |
| *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* | • general background<br>• special background<br>• specialised general knowledge<br>• skills development |
| **PREREQUISITE COURSES:** | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek. Basic knowledge of English language is suggested for the use in code comments and variables in the MATLAB programming language. |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | |
| **COURSE WEBSITE (URL)** | http://matlabfme.blogspot.gr/ |

**(2) LEARNING OUTCOMES**

| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
|---|
| The laboratory course is designed for undergraduate students and aims to present the basic functionalities of the MATLAB programming language so it may be used as a scientific tool during the student's studies or as a professional tool after graduation.<br><br>After successfully completing the course requirements, students will be able to apply their MATLAB programming knowledge to analyze problems and solve assignments given to them during their undergraduate years -or- use MATLAB as part of their final year project/thesis. The MATLAB programming language is particularly helpful to engineering schools and it provides the graduate engineer with a strong technical knowledge in one of the most prominent computer languages for |

engineers worldwide.

Upon successful completion of the laboratory requirements, the student will be capable of:

- Understand and use the MATLAB computing interface (IDE)
- To write modern and clean MATLAB code
- To assign numeric values to variables and do simple and complicated arithmetic operations between those variables
- To define numeric matrices/arrays and do simple and complicated arithmetic operations between scalars and matrices and between matrices
- To define and use text strings
- To understand the notion of functions in programming languages. To create and use custom MATLAB functions
- To understand the IF, FOR, WHILE, SWITCH, TRY-CATCH commands and to use them in real-life examples and problems
- To assign values to cells and cell arrays.
- To understand the multi-level structure of the struct variable and to assign values to structs and struct arrays.
- To read data from text files, Excel files and web services and to analyze these data.
- To perform basic statistical analysis using the MATLAB computing language
- To be able to transform algorithms into computer programs and solve simple combinatorial optimization problems

**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*
*Decision-making*
*Working independently and in teams*
*Adapting to new situations*

**(3) SYLLABUS**

**The MATLAB very basics and the MATLAB IDE**

Using MATLAB as a tool. Best practices.
Getting Acquainted with the IDE of MATLAB. Understanding the WorkSpace, the Command Window and the Matlab Editor
Working with numbers and arithmetic operators. Do simple calculus and define variables in the MATLAB workspace

**Defining and working with Numeric Arrays 1/2**

An introduction to numeric arrays
Using common MATLAB functions to create numeric arrays

Creating/Updating and Saving a MATLAB script file (m-files)

**Defining and working with Numeric Arrays 2/2**

Matrix/Array Indices. Calculus between matrix elements and between arrays/matrices.
Comparison Operators/ Logical-Boolean Operators
Most common arithmetic Matrix/Array functions

**Creating and understanding Functions**

Input and output variables
Local Functions and sub-functions

**Control Flow Statements (part I)**

The command If
The command For

**Control Flow Statements (part II)**

The command While
The command Switch-Case
The command try – catch

**Cells and Cell Arrays**

Text and Strings and String Arrays
Working with cell arrays
Most common cell array functions

**Structs and Struct Arrays**

Working with structs and struct arrays
Most common struct array functions

**Read/Write From/To text files and web-services**

Read from text file/Write to text file
Read from Excel File/Write to Excel file
Read and Write data from/to web services

**Statistical Functions in Matlab**

Working with most common statistical functions in MATLAB

**Basic Algorithm Design**

Explaining and solving combinatorial optimization problems with MATLAB

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT in teaching, laboratory education, communication with students |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*The student's study hours for each learning activity are given as well as* | |

| ***Activity*** | ***Semester workload*** |
|---|---|
| | 36 |
| | 3 |
| | 10 |
| | 90 |
| | 3 |
| | |
| | |
| | |
| | |
| Course total | ***142*** |

| | |
|---|---|
| *the hours of non-directed study according to the principles of the ECTS* | |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | The Language of evaluation is the Greek language. The evaluation method is the following one:<br><br>• Four(4) mandatory assignments that count 20% towards the final grade.<br>• Non-Mandatory mid-term exam that count 40% towards the final grade.<br>• Final examination that counts 40% (mid-term exam given) or 80% (mid-term exam not given). |

**(5) ATTACHED BIBLIOGRAPHY**

- *Suggested bibliography:*
  - Lecture Notes (http://matlabfme.blogspot.gr)
  - «Μάθετε το MATLAB 7» - Duane Hanselman, Bruce Littlefield (Kleidarithmos Publications)
  - «MATLAB» - Stormy Attaway (Kleidarithmos Publications)

- *Related academic journals:*

## 4.2. Ordinary Differential Equations

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Engineering | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | **ΓΕ0185** | **SEMESTER** | **4** |
| **COURSE TITLE** | Ordinary Differential Equations | | |

| **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** |
|---|---|---|
| | 6 | 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, specialised general knowledge, skills development* | General Background |
| **PREREQUISITE COURSES:** | Mathematical Analysis I |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/differential-equations |

### (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*

After the successful completion of the course the students will be able to solve first order differential equations, second order linear equations, higher order linear equations, systems of first order linear equations and use the Laplace transform.

**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*
*……*
*Others…*
*…….*

## (3) SYLLABUS

| |
|---|
| First order differential equations, Second order linear equations, Higher order linear equations, Systems of first order linear equations, Laplace transform |

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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***<br>Lectures<br>Tutorials<br><br><br><br><br><br><br><br>Course total: ***180*** |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Final exam |

## (5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

W.E. Boyce και R.C. DiPrima, Elementary Differential Equations and Boundary Value Problems

## 4.3. Databases

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Engineering | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | ΓΕ0116 | **SEMESTER** | 4 |
| **COURSE TITLE** | Databases | | |

| **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** |
|---|---|---|
| | | |
| | | |
| | | |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | 3 | 5 |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Prescribed Core Module |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/databases-tutorial<br>http://www.fme.aegean.gr/en/c/databases |

### (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*

- Define program-data independence, data models for database systems, database schema and database instances.
- Recall Relational Algebra concepts, and use it to translate queries to Relational Algebra statements and vice versa.
- Identify Structure Query Language statements used in creation and manipulation of database.
- Define functional dependencies and normalization concepts.
- Identify the methodology of conceptual modeling through Entity Relationship model.
- Identify the methodology of logical model.
- Identify the methodology of physical model.
- Develop an understanding of the differences between OODBMS, ORDBMS and RDBMS and the practical implications of each approach.
- Analyze and design a real database application.
- Develop and evaluate a real database application using a database management system.
- Improve teamwork management skills.
- Enhance negotiation and discussion skills.

**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*
*……*
*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
- Working in an interdisciplinary environment
- Production of new research ideas

## (3) SYLLABUS

- Introduction to Databases and Database Environment
- Entity Relationship and Enhanced Entity Relationship Modeling
- The Relational Model
- Relational Algebra
- SQL: Data Manipulation Language
- SQL: Data Definition Language
- Normalization
- Methodology – Conceptual Database Design
- Methodology – Logical Database Design
- Methodology – Physical Database Design
- Object Oriented DBMSs
- Introduction to NoSQL Databases
- Project Assignment
- Review

## (4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td>In class teaching, laboratory experience, Open Source RDBMS software</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td>Use of ICT in communication with students</td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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>39 hours (1.56 ECTS)</td></tr><tr><td>Personal study</td><td>83 hours (3.32 ECTS)</td></tr><tr><td>End of semester exam</td><td>3 hours (0.12 ECTS)</td></tr><tr><td>Course total</td><td>125 hours (5 ECTS)</td></tr></table></td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br><br>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<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Language of evaluation:<br>Greek.<br><br>Method of evaluation:<br>Final Project 30%<br>Final Exams 70%</td></tr>
</table>

## (5) ATTACHED BIBLIOGRAPHY

**1) Principal Reference:**

D. Dervos Courses in Databases, Volume A, (in Greek)

**2) Additional References:**

Ramakrishnan Raghu, and Gehrke Johannes, Database Management Systems, Volume A (in Greek)

## 4.4. Environmental Engineering

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Engineering | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | ΓΕ0117 | SEMESTER | 4 |
| **COURSE TITLE** | Environmental Engineering | | |

| **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** |
|---|---|---|
| | 3 | 4.5 |
| | | |
| | | |
| *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* | General background, special background, specialised general knowledge |
| **PREREQUISITE COURSES:** | No |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | |

### (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 introduces the principles of environmental engineering, emphasizing on management of water resources and wastewater. After successful completing the course, students will be expected to be able to:

- Understand the basic concepts of ecology with emphasis on terrestrial and aquatic ecosystems, environmental conditions, natural resources, organisms, food chains and biogeochemical cycles

- Understand the basic principles of environmental engineering with emphasis on atmosphere and especially in composition and structure, the greenhouse effect, the ozone hole and the acid rain

- Understand the importance of water for growth and health
- Understand the universality of the problem of water resources, their use, the consumptions, the quality characteristics of drinking water, their categories, the phenomenon of eutrophication, the main sources of pollution of surface water and groundwater
- Understand the importance of proper management of water resources, with emphasis at source, in transit, in storage, in processing and distribution in water supply network so finally arrived to the consumer at the desired quality for the analogue use, at the same time ensuring the sustainability
- Understand the importance of cost management of water resources and the final price
- Understand biological and physico-chemical methods that apply to the treatment and reuse of wastewater
- Understand the use of simple mathematical equations for designing wastewater treatment systems
- Planning a wastewater treatment plant and check the proper operation
- Select the appropriate wastewater management system

**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
Adapting to new situations
Decision-making
Project planning and management
Respect for the natural environment
Criticism and self-criticism
Production of free, creative and inductive thinking

**(3) SYLLABUS**

The Environmental Engineering course deals with ecology, atmosphere, management of aquatic resources and wastewater. The biogeochemical circles of elements in the environment, the environmental conditions and their relations with the organisms in the ecosystems, the structure and the constitution of atmosphere and the phenomenon of greenhouse are the crucial subjects. Major themes of the course include the water resources, the circle of use of water, the qualitative characteristics of drinking water and relevant legislation, the physicochemical processes of water treatment, the organic chlorination by-products, the pesticides and the procedure of choice of source and method of treatment of water. The origin, quantity and the quality, the kinetics of biological growth

and the active sludge, the lakes of treatment and the biological filters, the anaerobic and physicochemical treatment of wastewater are developed. The planning of wastewater treatment plant and the choice of administrative systems are also discussed.

Module Contents (Syllabus):

| |
|---|
| ➢ Ecology and Environmental Chemistry (ecosystems, organisms, food chains, biogeochemical cycles) |
| ➢ Terrestrial and aquatic ecosystems (environmental conditions, humidity, temperature, light, natural resources)<br>➢ Introduction to Environmental Engineering (Atmosphere-Greenhouse effect) |
| ➢ Water Resources<br>➢ Water quality (pesticides, organic disinfection by-products) |
| ➢ Water Sources<br>➢ Water networks – City Tank |
| ➢ Water Treatment |
| ➢ Intermediate Examination |
| ➢ Chemical Precipitation |
| ➢ Chemical Oxidation - Disinfection<br>➢ Select source and water treatment process |
| ➢ Origin, Quantity and Wastewater Quality |
| ➢ Elements of Environmental Microbiology and Biochemistry<br>➢ Biological Growth Kinetic<br>➢ Active Sludge |
| ➢ Treatment Ponds<br>➢ Biological Filters |
| ➢ Anaerobic Treatment<br>➢ Physico-Chemical Treatment |
| ➢ Sludge Treatment<br>➢ Design Of Wastewater Treatment Plant - Select Schema Management |

## (4) TEACHING and LEARNING METHODS - EVALUATION

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

**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 | 39 |
| Study and analysis of bibliography | 98 |
| Intermediate examination | 3 |
| Examinations | 3 |
| | |
| | |
| | |
| | |
| | |
| Course total | 143 |

**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.*

Intermediate and final examinations at the end of the semester, which include questions (development), knowledge and understanding of the content of the course, and problem solving.

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*


Περιβαλλοντική Μηχανική Ι – Εισαγωγή στην Τεχνολογία του Νερού και Υγρών Αποβλήτων (Σ.Α. Αυλωνίτης, 2013)

Εισαγωγή στην Περιβαλλοντική Μηχανική (Α. Γ. Κούγκολος, 2007)

Επεξεργασία Νερού (Α. Ανδρεαδάκης, 2008)

Περιβαλλοντική Μηχανική Ι - Διαχείριση Υδατικών Πόρων (Θ. Λέκκας, 1996)

Περιβαλλοντική Μηχανική ΙΙ - Διαχείριση Υγρών Αποβλήτων (Θ. Λέκκας, 2005)

Ποιοτικά Χαρακτηριστικά και Επεξεργασία Νερού (Μ. Μήτρακας, 2001)

Βιολογικός Καθαρισμός Αστικών Αποβλήτων (Α. Στάμου, 2004)

Καθαρισμός Νερού (Σ. Τσώνης, 2003)

Ρύπανση και Τεχνολογία Προστασίας Περιβάλλοντος (Τ. Αλμπάνης, 2006)

Μηχανική Υγρών Αποβλήτων – Επεξεργασία & Επαναχρησιμοποίηση, Τόμος Α, Β (Metcalf & Eddy, 2014)


Notes

Additional References:

Χημεία Περιβάλλοντος (Θ. Κουϊμτζής, Κ. Φυτιάνος, Κ. Σαμαρά - Κωνσταντίνου, 1998)
Η ρύπανση των θαλασσών (Κ. Φυτιάνος, 1996)

*- Related academic journals:*

Environmental Technology
Global Nest Journal
Science of the Total Environment
Water Research
Desalination and Water Treatment

## 4.5. Chemical Technology

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Engineering | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | MH0106 | SEMESTER | 4 |
| **COURSE TITLE** | Chemical Technology | | |

| **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** |
|---|---|---|
| | 3 | 4.5 |
| | | |
| | | |
| *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* | General background, special background, specialized general knowledge |
| **PREREQUISITE COURSES:** | No |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/chemical-technology |

### (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*

Main purpose of this course is to introduce students to issues such as unit systems, mass and energy balances, calculations in chemical technology, fluid flow, heat transfer, processing and use of water in the chemical industry, hygiene and safety in the chemical industry. After successful completing the course, students will be expected to be able to:

- Understand the basic principles of physical and chemical processes used in the production process as well as the rules that govern
- Understand processes such as catalysis, adsorption, precipitation and filtration
- Resolve application exercises in various systems of physical-chemical processes of industrial instrument
- Evaluate the efficiency of processes
- Understand the anti-pollution technology

- Understand issues regarding water technology

**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
Adapting to new situations
Decision-making
Project planning and management
Respect for the natural environment
Criticism and self-criticism

**(3) SYLLABUS**

There will be analysis of physical and chemical processes that occur in the production of goods and the understanding of the basic rules and principles that govern these processes. Particular attention is paid to certain processes, catalysis, adsorption, sedimentation and filtration. Examples and exercises of application in various industrial systems are given for the better understanding of the chemical and natural processes. Special topics on water technology are also presented.

Module Contents (Syllabus):

| |
|---|
| Introduction to Technical Calculations |
| Basic definitions |
| Mass Balances |
| Energy Balances |
| Chemical Equilibrium |
| Intermediate Examination |
| Chemical Kinetic |
| Physicochemical Processes |
| Heterogeneous Processes<br>Catalysis |
| Drinking water and wastewater technology |
| Adsorption |
| Precipitation |
| Filtration |

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT in teaching |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Intermediate and final examinations at the end of the semester, which include questions (development), knowledge and understanding of the content of the course, and problem solving. |

| *Activity* | *Semester workload* |
|---|---|
| Lectures | 39 |
| Study and analysis of bibliography | 98 |
| Intermediate examination | 3 |
| Examinations | 3 |
| | |
| | |
| | |
| | |
| | |
| Course total | 143 |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*


Βασικές Αρχές και Υπολογισμοί στη Χημική Μηχανική (D. M. Himmelblau, J.B. Riggs, 2006)
Εισαγωγή στη Χημική Τεχνολογία (Ζαμπούλης, Δ., Ζουμπούλης Α., Μάτης Κ., Μαύρος, Π., 2009)
Χημική Τεχνολογία (Ζαμπούλης, Δ., Ζουμπούλης Α., Καραπάντσιος Θ., Μάτης Κ., Τριανταφυλλίδης Κ., 2013)
Βασικές Αρχές και Υπολογισμοί στη Χημική Μηχανική (D. M. Himmelblau, J.B. Riggs, 2017)
Μηχανική Χημικών Διεργασιών (J. M. Smith, 1997)
Notes

AdditionalReferences:

Περιβαλλοντική Μηχανική Ι - Διαχείριση Υδατικών Πόρων (Θ. Λέκκας, 1996)

Χημική Ισορροπία (Σ. Ι. Καρέκου, 1997)

- *Related academic journals:*

Journal of Chemical Technology and Biotechnology
Chemical Engineering Journal

## 4.6. Dynamics – Kinematics

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FINANCIAL AND MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | ΓΕ0147 | SEMESTER | 4 |
| **COURSE TITLE** | Dynamics-Kinematics | | |

| **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** |
|---|---|---|
| | 3 | 4,5 |
| | | |
| | | |
| *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* | General background, special background, specialized general knowledge |
| **PREREQUISITE COURSES:** | None |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/dynamics-and-kinematics |

### (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 main objective of this course is to introduce the undergraduate student with completeness and with the easiest way into the basic principles of the classical kinematics and dynamics as well as into these of special relativity, the understanding of which will allow him/her not only to easily deal with problems in practical applications, but also to further deepening in more complex topics of mechanics. Very important objective is also the challenge to cause the interest of the undergraduate students by solving a lot of examples and problems in order not only to highlight the strength of the new Models and techniques used in modern physics for the description of complex systems but also to be able to

apply the mathematic formalism in several complex problems and physics applications which are associated with the specialty of an engineer.

*At the end of the courses the undergraduate students should be able to:*

- ✓ *learn the mathematical representation and the methods defining the kinematics of a point like body*
- ✓ *to be able to calculate the velocity and the acceleration in the curvilinear and plane motion*
- ✓ *be able to solve harmonic oscillation problems*
- ✓ *learn and understand the mathematical representation of the kinematics of a solid object*
- ✓ *be able to solve kinematical problems of planar and rotation motion of a solid object*
- ✓ *be able to solve rotational composition problems*
- ✓ *learn the Euler equations*
- ✓ *learn the velocity projection theorem and to be able to solve related problems*
- ✓ *learn the Coriolis theorem*
- ✓ *learn the general theorems of a point like body Dynamics, the work-kinetic energy theorem, the angular momentum theorem, the center of mass, the static torque, the angular velocity and acceleration*
- ✓ *be able to calculate the angular momentum of a point like object, to calculate the center of mass of a solid body or that of a system og point like objects, to be able to calculate the work, the angular velocity and acceleration of a solid body rotating around an axis or around a fixed point*
- ✓ *learn about the conservative systems*
- ✓ *learn the D' Alembert principle and to be able to solve related problems*
- ✓ *formulate the Euler dynamical equations*
- ✓ *learn the dynamics of a solid body*
- ✓ *be able to calculate the torque of inertia of s solid body*
- ✓ *learn the theorem of parallel axes*
- ✓ *learn the D' Alembert – Lagrange principle and the concepts of possible displacements as well as the motion degrees of freedom and to be able to solve related problems*
- ✓ *understand the concept and the use of the generalized coordinates*
- ✓ *understand the fundamental principle of the Analytical Dynamics, the Lagrange equation and to be able to solve problems with the help of that equation*
- ✓ *learn the principle of least action, the calculus of variations and the Hamilton equation and to be able to solve related problems*
- ✓ *be able to solve problems in the approximation of small oscillations*
- ✓ *be able to solve problems of freely oscillated systems with two or more degrees of freedom*
- ✓ *learn the introductory concepts and principles of the Special Relativity, like the covariant of the laws of motion m the principle of the special relativity and the Lorentz transformations*
- ✓ *learn the introductory concepts for the Minkowski time and space*

**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*
*……*
*Others…*
*…….*

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision making
Production of new research ideas
Criticism and self-criticism
Production of free, creative and inductive thinking

**(3) SYLLABUS**

The courses cover all the basic physics topics of the classical kinematics and dynamics and includes: Kinematics of a point-like body and that of a solid body. Dynamics of a point-like body and that of a solid body. D' Alembert – Lagrange principle. Collisions. Introduction to the Analytical Mechanics. . Lagrange equations. Principle of least action. Calculus of variations. Hamilton equation. Oscillations. Special relativity concepts. Lorentz transformations.

Module Contents (Syllabus):

| | |
|---|---|
| 1 | ➢ Kinematics of a point like body. Displacements and motion. Velocity and acceleration. Methods for determination of a point like object motion. Curvilinear and plane motion. |
| 2 | ➢ Harmonic oscillation. Mathematical pendulum. Central motion. |
| 3 | ➢ Solid object kinematics. Rotational kinematics. Rotation of a body around a fixed axis. |
| 4 | ➢ Rotation of a solid body around a point. Euler angles and equations. Planar motion of a solid object. Kinematical constrains. Velocity projection theorem. Absolute and relative motion. Coriolis theorem. |
| 5 | ➢ Dynamics of a point like body. Angular momentum and acceleration definition. Work – kinetic energy theorem. Angular momentum and angular momentum theorem |
| 6 | ➢ Conservative systems. Static torque. Energy conservation. D' Alembert principle. Relative motion. Euler equations. |
| 7 | ➢ Dynamics of a solid body. Impulse. Center of mass. Torque of inertia. Parallel axes theorem. Inertia ellipsoid. Kinetic energy. Euler dynamical equations |
| 8 | ➢ D' Alembert – Lagrange principle. Possible displacements. Motion degrees of freedom. Unilateral and bilateral constrains. General equation of dynamics. |
| 9 | ➢ Collision. General theorems of collision. Momentum and impulse. Conservation of momentum. Collisions and kinetic energy. Elastic and inelastic collisions. Friction. Collision coefficient. Central collisions. Head-on and off-center collisions. |
| 10 | ➢ Introduction to Analytical Dynamics. Generalized coordinates. Lagrange equations. |
| 11 | ➢ Principle of least action. Calculus of variations. Hamilton equation. |

| | | |
|---|---|---|
| 12 | ➢ Small oscillations. Free and forced oscillation. Systems and oscillations of systems with two or more degrees of freedom. Lagrange equations. | |
| 13 | ➢ Special Relativity. Introductory concepts. The covariant of the laws of motion. Principle of special relativity. Lorentz transformations. Minkowski time and space. Time dilation. | |

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT in teaching and laboratory education |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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 | 39 |
| Tutorial | 13 |
| Study and analysis of bibliography | 90 |
| Examinations | 3 |
| | |
| | |
| | |
| | |
| Course total | 145 |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | One final examination (100% of the total score) at the end of the semester in Greek. In the examination are included questions and topics development, in order to check the degree of knowledge and understanding of the content of the course, and problem solving. |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*

The courses are based on the books of:

- *"Theoretical Mechanics "*, ***G. Karachalios and V. Loukopoulos***
- *"Technical Mechanics II - Dynamics)"*, ***S.A. Paipetis***

Additional references:

- *"Theoretical Mechanics (Kinematics and dynamics of a point like and a solid body)"*, ***Panagiotounakos and Papadopoulos (National Technical University of Athens)***
- *"Technical Mechanics (Kinematics and dynamics of a point like and a solid body)"*, ***S. Timoshenko***

*- Related academic journals:*

International Journal of Theoretical and Applied Mechanics (IJTAM)
Theoretical and Applied Mechanics Letters
Journal of Applied Mechanics (ASME)

## 4.7. Statistics

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | SHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | FINANCIAL AND MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRATUATE | | |
| **COURSE CODE** | **GEO110** | **SEMESTER** | **4** |
| **COURSE TITLE** | **STATISTICS** | | |
| **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 |
| **SPSS Lab** | | 2 | |
| | | | |
| *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* | General background/Special background/ Specialised general knowledge/Skills development | | |
| **PREREQUISITE COURSES:** | Prerequisite knowledge from Courses: Probabilities | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/el/c/statistiki | | |

### (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 consists in introducing the basic concepts of Statistical Inference. These concepts are prerequisites for future courses.

A successful student should be able to:

- understand and use basic statistical concepts underlying the characteristics of a population based on a random sample
- compute and interpret confidence intervals for estimations
- conduct hypothesis testing for the mean of a population, the binomial p, the difference between the means of two population, the variance of a population
- comprehend “non-parametric statistic” and conduct the appropriate tests
- use linear regression to examine the relation between an independent and a dependent variable, along with interpreting the results of regression

**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* *Project planning and management*

| | |
|---|---|
| *information, with the use of the necessary technology* | *Respect for difference and multiculturalism* |
| *Adapting to new situations* | *Respect for the natural environment* |
| *Decision-making* | *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-Probability Theory, Distributions and moments-Exercises
- Sample distributions, Student distribution, χ2 distribution, F distribution-Exercises
- Sampling, Central Limit Theorem-Exercises
- Descriptive statistics
- Estimation, Unbiased Estimators (bias, consistency, adequacy, completeness)-Exercises
- Estimator of minimum variance-Exercises
- Maximum likelihood estimators-Exercises
- Confidence intervals-Exercises
- Hypothesis testing for the mean
- Exercises in hypothesis testing for the mean
- Hypothesis testing for binomial p, difference of means, variance-Exercises
- Goodness of fit, Kolmogorov-Smirnov test-Exercises
- Correlation, Regression Analysis

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*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** | YES | SPSS Lab |
| **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*

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 39 |
| Laboratory | 26 |
| Study and analysis of bibliography | 10 |

| | |
|---|---|
| *workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.*<br><br>*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* | Essay writing: 12<br>Non-directed study: 40<br>Final Exams: 3<br>Course total: ***130*** |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Final Exams in Greek = 80% + Assignment in SPSS in Greek = 20% |

## (5) ATTACHED BIBLIOGRAPHY

*- Suggested bibliography:*


[1]. Εισαγωγή στη Στατιστική, Τ. Παπαϊωάννου, Σ .Β. Λουκάς, Εκδόσεις Σταμούλη Α.Ε., Κωδικός Βιβλίου στον Εύδοξο: 22745 (in greek)

[2]. Πιθανότητες και Στατιστική για Μηχανικούς, Γ. Ζιούτας,, Εκδόσεις "σοφία" Ανώνυμη Εκδοτική & Εμπορική Εταιρεία, Κωδικός Βιβλίου στον Εύδοξο: 12656654(in greek)

[3]. Εισαγωγή στις πιθανότητες και τη στατιστική, Δαμιανού Χ., Χαραλαμπίδης Χ., Παπαδάκης Ν., Εκδόσεις Συμμετρία, 2010(in greek)

[4]. Πιθανότητες και Στατιστική, (Schaum's Outline of PROBABILITY AND STATISTICS), Murray R. Spiegel, Μετάφραση: Σωτήριος Κ. Περσίδης(in greek)

[5]. Στατιστική, Κολυβά-Μαχαίρα, Ε. Μπόρα-Σέντα, Ζήτη(in greek)

[6]. Ανάλυση Δεδομένων με τη Βοήθεια Στατιστικών Πακέτων SPSS, Excel, S-Plus, Ν. Δ. Σσάντας, Φρ. Θ. Μωϋσιάδης, Ντ. Μπαγιάτης, Θ. Φατζηπαντελής, Εκδόσεις Ζήτη, Θεσσαλονίκη 1999.(in greek)

[7]. Introductory Statistics, S M. Ross, Second Edition,, Academic Press; 2 edition, 2005

[8]. Theoretical statistics, D. R. Cox, D. V. Hinkley, London:Chapman and Hall, New York, 1979.

[9]. Statistics: An Introduction using R, M. J. Crawley, Wiley; 1 edition, 2005.

[10]. Introduction to probability and statistics: principles and applications for engineering and the computing sciences, J. S. Milton, Jesse C. Arnold, 3rd ed. New York :McGraw-Hill, 1995.

[11]. Introduction to statistical theory, Paul G. Hoel, Sidney C. Port, Charles J. Stone, Boston :Houghton-Mifflin, 1971.

[12]. An Introduction to Statistics, G. Woodbury, Duxbury Press; 1 edition, 2001)

## 4.8. Transport Phenomena (Fluid – Heat)

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Engineering | | |
| **DEPARTMENT** | Financial and Management Engineering | | |
| **ACADEMIC UNIT** | Chios | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | **ΓΕ 0148** | **SEMESTER** | 4 |
| **COURSE TITLE** | **Transport Phenomena** | | |
| **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** |
| | | 3 | 4.5 |
| | | | |
| | | | |
| *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* | | |
| **PREREQUISITE COURSES:** | -------- | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | ---------- | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/transport-phenomena-fluids-heat | | |

### (2) LEARNING OUTCOMES

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| By the end of the course students should be capable to:<br>• Know what various quantities mean and be able to determine the properties of a fluid (density, viscosity, compressivity, etc) |

- Understand the meaning of pressure and more specifically the pressure of a gas and hydrostatic pressure.
- Be able to use the ideal gas law.
- Be able to solve problems of fluids in equilibrium, eg. Calculate pressure and forces acting on the walls of the container.
- Apply Bernoulli equation in the motion of ideal fluids.
- Know Reynolds' theorem for the study of mass, momentum and energy transport and be able to apply it in open systems.
- Be able to identify laminar and turbulent flow.
- Be able to calculate flows in closed pipes and flow differences because of major (primary) and minor (secondary) losses.

**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?*

| | |
|---|---|
| *Adapting to new situations* | *Respect for difference and multiculturalism* |
| *Decision-making* | *Respect for the natural environment* |
| *Working independently* | *Showing social, professional and ethical* |
| *Team work* | *responsibility and sensitivity to gender issues* |
| *Working in an international environment* | *Criticism and self-criticism* |
| *Working in an interdisciplinary environment* | *Production of free, creative and inductive thinking* |
| *Production of new research ideas* | |

- *Working independently*

**(3) SYLLABUS**

Some Characteristics of Fluids, Analysis of Fluid Behavior, Measures of Fluid Mass and Weight, Density, Specific Weight, Specific Gravity, Ideal Gas Law, Viscosity, Compressibility of Fluids, Compression and Expansion of Gases, Vapor Pressure, Surface Tension, Viscosity. - Pressure at a Point, Pressure Variation in a Fluid at Rest, Incompressible Fluid, Standard Atmosphere, Measurement of Pressure. - Flotation, Archimedes' Principle, Basic equations of Fluid Statics, Rigid body motion of a fluid, Forces exerted by fluids on a surface.-Newton's Second Law along and normal to a Streamline; Static, Stagnation, Dynamic, and Total Pressurε; Examples of Use of the Bernoulli Equation, Confined Flows, Flowrate Measurement, Restrictions on Use of the Bernoulli Equation.-The Velocity Field, Eulerian and Lagrangian Flow Descriptions, The Acceleration Field, The Material Derivative, Convective Effects, Control Volume and System, The Reynolds Transport Theorem.-Conservation of Mass—The Continuity Equation, Derivation of the Continuity Equation, Fixed Nondeforming Control Volume, Newton's Second Law—The Linear Momentum Equation, Derivation of the Linear Momentum Equation, Application of the Linear Momentum Equation, First Law of Thermodynamics—The Energy Equation, Derivation of the Energy Equation, Comparison of the Energy Equation with the Bernoulli Equation.- **(Additional optional material – two additional lectures)** Irrotational Flow, Some Basic, Plane Potential Flows, Uniform Flow, Source and Sink, Vortex, Flow around a Circular Cylinder, Viscous Flow, Stress-Deformation Relationships, The Navier–Stokes Equations, Some Simple Solutions for Viscous Incompressible Fluids, Steady, Laminar Flow between Fixed Parallel Plates, Couette Flow, Steady, Laminar Flow in Circular Tubes

**(4) TEACHING and LEARNING METHODS - EVALUATION**

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td>Face-to-face or via distant learning because of covid-19</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td>Classweb, zoom</td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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></td><td></td></tr>
<tr><td>Lectures</td><td>3.5</td></tr>
<tr><td>mid and final Exams</td><td>1.0</td></tr>
<tr><td>Course total</td><td>4.5</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
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</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br><br>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<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>One final written exam (or via internet)</td></tr>
</table>

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*

**A) Principal Reference:**


- Fluid Mechanics, Munson - Okooshi - Huensch – Rothmayer, 8η Έκδοση /2016**,** ISBN: 978-960-418-525-2 (in Greek Translation)
- Applied Fluid Engineering, Horst Herr, 2010, 1η εκδοση, 2010. (in Greek translation)


**B) Additional Reference:**

- Fluid Mechanics, Antonios Liakopoulos, 1st edition, 2010 (in Greek)
- Fluid Mechanics, Streeter/Wylie/Bedford Edition 576/2009, (in Greek translation)
- Engineering Fluid Mechanics, C.T. Crowe, D.F. Elger, B.C. Williams, J.A. Roberson, 9th edition, 2009 John Wiley and Sons

# 5. Course Outlines for Semester E

## 5.1. Econometrics

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Engineering | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | **OI0114** | **SEMESTER** | **5** |
| **COURSE TITLE** | Econometrics | | |

| **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** |
|---|---|---|
| | 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* | General Background |
| **PREREQUISITE COURSES:** | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/el/c/oikonometria |

### (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*

1. Acquaintance with regression models and statistical data analysis techniques.
2. Learning of popular software packages for estimating regression models.
3. Developing a solid understanding of the practical aspects of econometric model building (outlier detection, data visualisation, diagnostic testing, etc).

**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*
*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*
*……*

| *Production of new research ideas* | *Others…*<br>*…….* |
|---|---|

- ✓ Search for, analysis and synthesis of data and information, with the use of the necessary technology
- ✓ Decision-making
- ✓ Working independently
- ✓ Team work
- ✓ Production of free, creative and inductive thinking

## (3) SYLLABUS

Principles of econometric modelling (model selection, coefficient estimation and model adequacy), the Gauss-Markov regression framework, significance tests, model selection criteria, cases of nonlinear regressions that can be transformed to linear ones, relaxing the assumptions of the Gauss-Markov theorem (non-normality, serial correlation, heteroskedasticity and multicollinearity), consequences for the validity of statistical tests, diagnostic testing for model adequacy.

## (4) TEACHING and LEARNING METHODS - EVALUATION

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Final Exam and laboratory assignments |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 39 |
| Laboratory practice | 30 |
| Study and analysis of bibliography | 81 |
| | |
| | |
| | |
| | |
| | |
| | |
| Course total | ***150*** |

**(5) ATTACHED BIBLIOGRAPHY**

- *Suggested bibliography:*


1. Christou G., Introduction to Econometrics, Vol.A', Gutenberg (in Greek)
2. Chalkos G., Econometrics. Theory and Practice, Minitab, SPSS & Excel», Gkiouras (in Greek)
3. Kintis A., Applications of econometrics, Sbilias (in Greek)


- *Related academic journals:*

## 5.2. Financial Accounting and Financial Statement Analysis

**(1) GENERAL**

| | | | | |
|---|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FINANCIAL AND MANAGEMENT ENGINEERING | | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | | |
| **COURSE CODE** | **OI0104** | **SEMESTER** | **5** | |
| **COURSE TITLE** | FINANCIAL ACCOUNTING AND FINANCIAL STATEMENT ANALYSIS | | | |
| **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** |
| | | | 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* | General background | | | |
| **PREREQUISITE COURSES:** | none | | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/financial-accounting-and-financial-statement-analysis | | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| The course's objective is to introduce the students to the principles and basic issues of Financial Accounting, as well as to the Financial Statement Analysis as an important tool to the business decision making. In the first part of the course will be presented the importance of Financial Accounting, the model of basic accounting recording as well as the preparation of the Financial Statement preparation. The second part deals with the techniques of Financial Statement Analysis and Interpretation. |

After the successful course completion the student will be able to:

1. Understand the importance of the Financial Accounting information
2. Apply the basic skills on accounting recording and preparing the Financial Statements (Profit & Loss account, Balance Sheet, Profit Appropriation account)
3. Use the relevant techniques in analyzing and interpreting Financial Statements as well as their application in decision making

**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
- Adapting to new situations
- Decision-making
- Working independently
- Team work
- Working in an international environment
- Project planning and management
- Criticism and self-criticism
- Production of free, creative and inductive thinking

**(3) SYLLABUS**

1. The Finance function of the economic entity
2. The Accounting information system and Financial Management
3. Aim and functions of Accounting
4. Distinctions of Accounting
5. Principles of Financial Accounting
6. The accounting process
7. Basic Accounting recording
8. The Profit & Loss Account (Revenues – Expenses)
9. The importance of Depreciation
10. The Balance Sheet (Assets, Liabilities, Shareholders Equity)
11. The Financial Statements of SA companies
12. The Profit Appropriation Account
13. The Cash Flow Statements (Cash inflows – Cash outflows)
14. The Financial analysis techniques
15. Financial Statement analysis
16. Liquidity, Performance, Effectiveness analysis
17. Capital structure and Feasibility analysis.
18. Financial Ratios interpretation
19. Conclusions and Reporting

**(4) TEACHING and LEARNING METHODS - EVALUATION**

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td>Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td></td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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>39</td></tr>
<tr><td>Study and analysis of bibliography</td><td>111</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>150</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br><br>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<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Written exams at the end of the semester, in Greek, which involve problem solving that ensure the content understanding (a. recording of economic transactions & Financial Statement preparation and b. Financial Statement analysis)</td></tr>
</table>

**(5) ATTACHED BIBLIOGRAPHY**


- *Suggested bibliography:*
1. K. Kantzos, Financial Statement Analysis, Interbooks, Athens, 2002 ( in Greek)
2. A. Papas, Introduction to Financial Accounting, vol. A & B, Benos, Athens, 2002 (in Greek)
3. W. Meigs & R. Meigs, Accounting, The basis for business decisions, Papazisis, Athens, 1988 (in Greek)

## 5.3. Automatic Control Systems

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FINANCIAL & MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **MH0107** | **SEMESTER** | **5** |
| **COURSE TITLE** | AUTOMATIC CONTROL SYSTEMS | | |

| **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** |
|---|---|---|
| LECTURE | 3 | 5 |
| | | |
| | | |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | **3** | **5** |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Specialised general knowledge (Required core course) |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | - |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/automatic-control-systems |

**(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*

- Technical knowledge in
  - Understanding dynamic systems
  - Familiarization with modeling of mechanical, electrical, and electro-mechanical systems, and the related mathematical background
  - Understanding and familiarization with transient response and systems stability
  - Familiarization with key techniques of stability analysis
  - Understanding the types and characteristics of classical controllers
  - Control system synthesis (design)
  - Understanding and familiarization with frequency response methods

- Students obtain the necessary learning skills that allow them to continue their studies in a self-sufficient and independent manner

- Application of the above in solving problems in analysis and synthesis of control systems.
- Students obtain proven knowledge and understanding of basic areas of control systems, which is based on their educational background, and, although it is supported by advanced scientific texts, it includes inputs from the state of the art of their field of knowledge
- They are in a position to use the knowledge and understanding they obtained from the course in a manner that indicates a professional approach in their work or profession; they obtained abilities that are evident from the synthesis and support of positions and from problem solving in their knowledge area
- They have the ability to collect and interpret relevant information (within their knowledge area), and to develop views that show critical thinking in relevant scientific topics
- They have developed those abilities of acquiring knowledge that are necessary to continue their study under a significant degree of independence

**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…* |
| | *…….* |

Decision-making
Working independently
System design
Working in an interdisciplinary environment
Production of free, creative and inductive thinking

**(3) SYLLABUS**

| Week | Contents |
|---|---|
| 1 | • Introduction to dynamic systems and automatic control |
| 2 | • Laplace transform I |
| 3 | • Laplace transform II<br>• Test 1 |
| 4 | • Modeling of electrical and mechanical components and systems |
| 5 | • Modeling of electromechanical systems |
| 6 | • Transfer functions<br>• Block diagrams<br>• Controllers<br>• Test 2 |
| 7 | • Steady state response<br>• Transient response I |
| 8 | • Transient response II<br>• Routh stability criterion |
| 9 | • Stability: Root locus<br>• Test 3 |
| 10 | • Stability: Root locus<br>• Controller synthesis |
| 11 | • Frequency response<br>• Bode diagrams |
| 12 | • Polar diagrams<br>• Test 4 |
| 13 | • Nyquist stability criterion |

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Lectures face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT in teaching, laboratory education, communication with students |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational* | |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 39 |
| Weekly Homework | 53 |
| Study | 53 |
| Four Tests | 2 |
| Final Exam | 3 |
| | |
| **Course total** | **150** |

| | |
|---|---|
| *visits, project, essay writing, artistic creativity, etc.*<br><br>*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**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | **Assessment Methods:**<br><br>- Homework 10%<br>- Four brief test 40% (10% each)<br>- Final exam 50% |

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*

**A) Principal Reference:**

Dorf R.C, Bishop, R.H, *Modern Control Systems,* Publisher TZOLA-12th ed., [2016]

**B) Additional References:**

Krikelis N., *Introduction to Automatic Control*, Athens Technical University Editions, [2000]

## 5.4. Probability Models

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | **ΓΕΟ108** | **SEMESTER** | **5** |
| **COURSE TITLE** | PROBABILITY MODELS | | |
| **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** |
| | | 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* | *general background, special background, specialised general knowledge, skills development* | | |
| **PREREQUISITE COURSES:** | No | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/probability-models | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| The main aim of the course is to familiarize student with stochastic phenomena and stochastic processes of the real world that can be described and explained by the language of mathematics. The course is actually a high-level extension of Probability Theory and it can be adapted to the needs of a Financial Engineer in order to be a useful tool for examining complex financial and engineering problems. After the successful completion of the course, the student will have:<br>to know and understand the basic concepts of probability theory.<br>to know and understand the basic concepts of probability modelling. |

to be in position to classify problems with the use of Markov chains. into different categories, i.e., homogeneous Markov, non homogeneous, etc.

to perform real life problems modelling with the use of Markov chains.

to be able to solve efficiently Markov models.

**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*
*Adapting to new situations*
*Decision-making*
*Working independently*
*Working in an international environment*
*Working in an interdisciplinary environment*
*Critical thinking*
*Production of free, creative and inductive thinking*

**(3) SYLLABUS**

Revision on Probability Theory, Basic properties, Conditional probabilities, Law of Total Probability, Bayes Theorem, Independent Events, Continuous and Discrete random variables, Probability density function, Probability distribution, Discrete probability distributions, Continuous probability distributions, Expectation, Variance, Poisson Process, Transient analysis of Discrete Time Markov Chains, Asymptotic analysis of Discrete Time Markov Chains, Transient analysis of Continuous Time Markov Chains, Asymptotic analysis of Continuous Time Markov Chains, Examples and Real life Applications.

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | *Face-to-face* |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | *Use of ICT in teaching,* |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.* | |

| ***Activity*** | ***Semester workload*** |
|---|---|
| *Lectures* | 39 |

| | | |
|---|---|---|
| *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.*<br><br>*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* | *study and analysis of bibliography* | 105 |
| | | |
| | | |
| | *exams* | 6 |
| | | |
| | | |
| | | |
| | | |
| | Course total | ***150*** |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | - Midterm exam (optional: maximum 2 points on final grade), Final examination (problem solving) |

**(5) ATTACHED BIBLIOGRAPHY**


*- Suggested bibliography:*
*Introduction to stochastic process, O. Chryssafinou, ed. ΣΟΦΙΑ, Athens, 2004 (in Greek)*
*Introduction to Stochastic Processes, E. Cinlar, Prentice-Hall, Engenwood Cliffs, 1975*

*Probability and Statistics with Reliability, Queuing, and Computer Science Applications K.S. Trivedi Wiley-Interscience, 2002 ISBN 978-0471333418 830 Pages*

*Introduction to Probability Models, S.M. Ross, Academic Press, 2009, ISBN 978-0123756862, 800 Pages*

*- Related academic journals:*
*Journal of Applied Probabilities, European Journal of Operational Research, etc…..*

## 5.5. Business Applications of Information Systems

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | FINANCIAL AND MANAGEMENT ENGINEERING DPT | | |
| **LEVEL OF STUDIES** | UNDER-GRADUATE (Prescribed Core Module) | | |
| **COURSE CODE** | ΓΕ0160 | **SEMESTER** | **5** |
| **COURSE TITLE** | BUSINESS APPLICATIONS OF INFORMATION SYSTEMS | | |
| **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** |
| | | 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* | General Background/Special background/Skills development | | |
| **PREREQUISITE COURSES:** | | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek (teaching material in English) | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/el/c/epikheiresiakes-epharmoges-eu | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| This course provides a set of fundamental concepts and frameworks for understanding the potential impact of information technology (IT) on business strategy and structure.<br>Course topics:<br>o Computers in the modern enterprise and Information Systems (IS)<br>• The business value chain and the business-IT alignment<br>• Business integration through Enterprise Application Integration<br>• Business Cases (UPS and other) |

- Key IT Technologies
  - Information Systems Layers (3-tiers architecture)
  - Client Server and P2P architectures
  - Open Standards
  - Key IT technologies taxonomy
- Application Programming Interface (API)
  - Towards and API economy
  - How to use and develop APIs
  - Examples and Use (hands-on experience)
- Information Systems in practice: The case of Identity Management Systems
  - IMS definition and examples
  - Single-Sign-On
  - Federated Identity Management Systems
  - Hands-on experience: eIDAS in Europe

On successful completion of the course, students will be able to:

1. Understand the managerial and technical issues of the Enterprise Information Systems while acquiring sufficient cross-disciplinary theoretical and conceptual background.
2. Familiarize with critical aspects and key technologies of the development of Entreprise Information Systems (layers of functionality, architectures, open standards etc.).
3. Understand the increasing business value of APIs, analyze the structure of an API and learn how to build and use APIs.
4. Apply the above concepts and acquired knowledge to understand and assess the development of Identity Management Systems (IMS)

**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
- Adapting to new situations
- Technical understanding of business strategies
- Hands-on experience with the use of technical systems
- Working independently
- Team work
- Working in an international environment
- Working in an interdisciplinary environment
- Production of free, creative and inductive thinking

**(3) SYLLABUS**

A. Lectures 1,2,3: Introduction to Enterprise Information Systems
B. Lectures 4,5,6,7: Enterprise Key Technologies and APIs (hands-on experience)

| |
|---|
| C. Lectures 8-13: Get closer to what the real thing is - Identity Management Systems (theory and hands-on experience) |

**(4) TEACHING and LEARNING METHODS - EVALUATION**

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td>Face to face. Teaching methods for this course are based on lectures, discussion of case studies and code development. Active student participation is essential and helps students understanding the basic concepts and tools of the course.</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td>Use of ICT in teaching, code development and communication with students</td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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>39</td></tr>
<tr><td>Study and Analysis of Bibliography</td><td>39</td></tr>
<tr><td>Exercises and Preparation for the course</td><td>39</td></tr>
<tr><td>Personal web site for reporting work in the course</td><td>5</td></tr>
<tr><td>Sum-up</td><td>25</td></tr>
<tr><td>Exams</td><td>3</td></tr>
<tr><td>Course total</td><td>150</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br><br>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<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Student assessment is made as follows:<br>• Final exam: 60%<br>• Class Participation and Homework -- included the development of a personal website (20%)<br>• Assignments (20%)<br><br>A necessary prerequisite for taking into consideration the score of the Assignment in the final mark is that students should receive at least 4/10 in the final exams.</td></tr>
</table>

**(5) ATTACHED BIBLIOGRAPHY**

- Suggested bibliography:

D. Avison & G. Fitzgerald, 2006, Ανάπτυξη Προηγμένων Πληροφοριακών Συστημάτων
Ε. Κιουντουζής, 2009, Μεθοδολογίες Ανάλυσης & Σχεδιασμού Πληροφοριακών Συστημάτων

- Related academic journals:

Case Study: UPS - Delivering packages and e-commerce solutions, 2001, MIT CISR
Technical Document: Application programming interface
Paper: Architecture of P2P Systems, 2010, Springer
Paper: Federated Identity Management Systems: A Privacy-Based Characterization, 2013, IEEE

## 5.6. Operations Management

**(1) GENERAL**

| | | | | |
|---|---|---|---|---|
| **SCHOOL** | School of Engineering | | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | | |
| **LEVEL OF STUDIES** | Undergraduate | | | |
| **COURSE CODE** | **ΔΕΟ116** | **SEMESTER** | **5** | |
| **COURSE TITLE** | Operations Management | | | |
| **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** |
| *Credits are awarded for the whole of the course* | | | 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 | | | |
| **PREREQUISITE COURSES:** | None | | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/el/c/dioikese-leitourgion | | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| The learning outcomes of this course that the students will acquire with the successful completion of the course are as follows:<br>• Understand the main principle of operations management with emphasis on planning, execution and control issues<br>• Choose the right tools and techniques in order to design and manage the operations of a company or an organization (e.g. facility location, logistics, etc)<br>• Choose and assess various information systems that can be used in order to optimize the operations management of a company or an organization<br>• Make decisions (strategic, tactical, operational) in terms of company/organization operation |

**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…* |
| | *…….* |

- Decision making
- Team work
- Search for, analysis and synthesis of data
- Application of optimization methods and techniques
- Choose and assess of operations tools for business management
- Production of free, creative and inductive thinking

**(3) SYLLABUS**

a. Introduction to operations management
b. Process design
c. Design of products and services
d. Design of a production facility and product flows
e. Design of job positions and task management
f. Design of supply chain networks I
g. Design of supply chain networks II
h. The role of ICT in operations management I
i. The role of ICT in operations management II
j. Quality planning and control

**(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 for teaching and communication with students |

**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*

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 39 |
| Self-study | 50 |
| Case studies | 30 |
| Mid-term exam | 3 |
| Essay writing | 25 |
| Final exam | 3 |
| Course total | 150 |

| | |
|---|---|
| *visits, project, essay writing, artistic creativity, etc.*<br><br>*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**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | <table><tr><th>*Evaluation type*</th><th>*Percentatge (%)*</th></tr><tr><td>Final exams</td><td>50%</td></tr><tr><td>Mid-term exams</td><td>20%</td></tr><tr><td>Team project</td><td>30%</td></tr><tr><td>Total</td><td>100%</td></tr></table><br>The evaluation criteria described above are available in the webpage of the course |

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*


- Lecture notes
- Slack, N., Chambers, S. and Johnston, R. (2010) “Operations Management”, 5th English version, Kleidarithmos Publications.
- Dan Reid., R., Sanders, N.R. (2016) “Operations Management”, Kritiki Publications


*- Related academic journals:*


- Jacobs, R. and Chase, R., (2016) “Operations and Supply Chain Management: The Core”, 4th ed., McGraw-Hill.
- Ioannou, G. (2005), “Production and Service Management”, Stamoulis Publications
- Kakouris, A. (2013), “ Operations Management”, Propobos Publications

# 6. Course Outlines for Semester F

## 6.1. Operations Research I

**(1) GENERAL**

| | | | | |
|---|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | | |
| **ACADEMIC UNIT** | Financial and Management Engineering | | | |
| **LEVEL OF STUDIES** | Undergraduate | | | |
| **COURSE CODE** | **ΓΕΟ118** | **SEMESTER** | **6** | |
| **COURSE TITLE** | OPERATIONS RESEARCH I | | | |
| **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** |
| | | | 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* | *general background, special background, specialised general knowledge, skills development* | | | |
| **PREREQUISITE COURSES:** | No | | | |
| **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-i | | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| The objective of this course is to provide students with the appropriate basic tools of mathematical programming for the decision support in management and operations systems. The course "Operations Research II" completes to a greater extent this knowledge in order to give students an entire Operations Research methodology. After the successful completion of the course, the student will have:<br>to know and understand the basic concepts of mathematical programming theory.<br>to know and understand the basic concepts of mathematical modelling. |

to be in position to recognize and classify problems into different categories, i.e., linear programming, integer programming, etc.

to perform the modelling of mathematical programming problems.

to be able to solve efficiently linear programming models

to recognize and apply the appropriate tools for solving linear programming problems.

to analyze, recognize and apply the most suitable methodologies and respective algorithms to solve particular linear programming cases.

**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*
*Adapting to new situations*
*Decision-making*
*Working independently*
*Working in an international environment*
*Working in an interdisciplinary environment*
*Critical thinking*
*Production of free, creative and inductive thinking*

**(3) SYLLABUS**

Introduction to operations research, linear programming, modelling, Simplex method, Big M method, duality, sensitivity analysis. IOR Tutorial and Excel Solver. Network optimization, graphs and networks, the shortest path, minimum spanning trees, maximum flow problem, minimal cost flow problem.

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | *Face-to-face* |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | *Use of ICT in teaching, use of specific software* |
| **TEACHING METHODS** | |

| ***Activity*** | ***Semester workload*** |
|---|---|
| *Lectures* | 39 |

| | | |
|---|---|---|
| *The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | *study and analysis of bibliography* | 75 |
| | *laboratory practice* | 30 |
| | | |
| | *exams* | 6 |
| | | |
| | | |
| | | |
| | | |
| | Course total | ***150*** |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | - Midterm exam (optional: maximum 2 points on final grade), Final examination (problem solving) | |

**(5) ATTACHED BIBLIOGRAPHY**


*- Suggested bibliography:*
*F.S. Hillier, G. J. Lieberman, Introduction to Operations Research, 8th edition, Mc Graw-Hill International Edition*
*Operations Research: Applications and Algorithms, W. L. Winston, Duxbury Press, 2003*
*Linear Programming, J.P. Ignizio, T.M. Cavalier, Prentice Hall, 1993*
*Operations Research: Principles and Practice, A. Ravindran, D.T. Philips, J.J. Solberg, Wiley, 1987*
*Linear Programming and Network Flows, M. S. Bazaraa, J.J. Jarvis, H.D. Sherall, Wiley, 1990*
*Introduction to Operations Research Techniques, H. G. Daellenbach, J. A. George, Allyn and Bacon, 1983*
*Model Building in Mathematical Programming, H. P. Williams, Wiley, 1999*
*An Introduction to Management Science: Quantitative Approaches to Decision Making, D.R. Anderson, D.J. Sweeney, T.A. Williams, J.D. Camm, R.K. Martin, South-Western College Pub, 2011*
*Tools for Thinking: Modelling in Management Science, M. Pidd, Wiley, 2003*
*Introduction to Management Science, B.W. Taylor, Prentice Hall, 2009*
*A Practical Introduction to Management Science, D.A. Waters, Addison Wesley Publishing Company, 1998*

*- Related academic journals:*
*European Journal of Operational Research, etc…..*

## 6.2. Financial Analysis

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | **OI0118** | **SEMESTER** | **6** |
| **COURSE TITLE** | Financial Analysis | | |
| **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* | General Background | | |
| **PREREQUISITE COURSES:** | NO | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | NO | | |
| **COURSE WEBSITE (URL)** | http://eclass.chios.aegean.gr/courses/DBA138/ | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| At the completion of the course's education process, the student will be able to:<br>Identify the institutional framework of principal money markets and capital markets.<br>Analyze the economic structure of the principal money markets and capital markets.<br>Evaluate investment opportunities.<br>Evaluate bonds.<br>Evaluate stocks.<br>Construct portfolios of securities, based on risk and expected return. |

Evaluate portfolio performance.
Analyze the structure and operation of financial derivatives.
Analyze market efficiency.

**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…* |
| | *…….* |

Decision-making
Working independently
Production of free, creative and inductive thinking

**(3) SYLLABUS**

The investment process and the markets for money and capital

The time value of money

Risk and return

Valuation of fixed income securities

Stock valuation

Investment appraisal

Portfolio theory

Capital market theory
Efficient markets
Mutual fund management
Derivative financial products

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-Face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT in teaching (PPT presentations)<br>Communication with students via e-mail and e-class platform<br>Uploading course material on e-class platform |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.* | ***Activity*** \| ***Semester workload***<br>Lectures \| 39 |

| | |
|---|---|
| *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.*<br><br>*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* | Study and analysis of bibliography: 21<br>Independent study: 65<br>Course total: ***125*** |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Evaluation of students and assessment of learning outcomes takes place via written exams at the end of the semester.<br>In the framework of written exams, the students respond to short-answer questions, produce essays and solve exercise.<br>In special cases of learning difficulties, performance evaluation takes place via oral exams.<br><br>Performance evaluation rules are written on the module's website |

**(5) ATTACHED BIBLIOGRAPHY**


- *Suggested bibliography:*

Brealey, R.A., Myers, S.C., Allen, F. (2013) Principles of corporate finance. McGraw Hill

Brigham, E.F. Ehrhardt, M.C. (2013) Financial management: Theory and practice. South-Western College Pub.

Bodie, Z., Kane, A. & Marcus, A. (2009) Investments. 8th Edition. McGraw Hill.

- *Related academic journals:*

Journal of Finance
Journal of Financial Economics
Journal of Financial and Quantitative Analysis
Review of Financial Studies
Journal of Corporate Finance
Journal of Applied Corporate Finance
Financial Analysts Journal

## 6.3. Industrial Organization and Game Theory

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FINANCIAL AND MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | ΓΕ0121 | **SEMESTER** | 6 |
| **COURSE TITLE** | INDUSTRIAL ORGANIZATION AND GAME THEORY | | |
| **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** |
| | | 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 | | |
| **PREREQUISITE COURSES:** | Microeconomics | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/el/c/biomekhanike-organose-theoria-paignion | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| The course examines the organization of industries, the strategies of firms, and the intervention of the state in the process of competition. More concretely, the course is divided into two parts. The first part presents the advanced microeconomics of the different market structures and the corresponding firm strategies (perfect competition, competitive selection, monopoly, monopolistic competition, game |

theory, oligopolies, collusion). The second part is dedicated to the core of the Industrial Organization. It analyzes the theory and the empirics of concentration and market power, the price and non-price strategies of firms (price discrimination, vertical relationships, product differentiation, …) and the dynamics of entry and exit in different sectors (barriers to entry, entry deterrence, predatory pricing, mergers and acquisitions, …).

By the end of this course, students will be able to:

- Understand the main principles of modern Industrial Organization
- Use game theory in modeling strategic interaction in markets
- Relate theoretical tools to practical problems in business strategy and public policy

**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
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Criticism and self-criticism
Production of free, creative and inductive thinking

**(3) SYLLABUS**

1. Introduction: Object, evolution and schools of Industrial Organization - Reminder: Basic microeconomic concepts
2. Beyond perfect competition: competitive selection and monopolistic competition
3. Monopoly: Regulation and deregulation
4. Introduction to game theory
5. Basic oligopoly models
6. The instability of oligopoly: between collusion and price wars
7. Market structure and market power
8. Price discrimination
9. Vertical relationships
10. Entry costs and market structure
11. Strategic behaviour, entry and exit

**(4) TEACHING and LEARNING METHODS - EVALUATION**

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td>Face to face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td></td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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>39</td></tr>
<tr><td>Study of bibliography</td><td>111</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>150</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br><br>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<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Written exam at the end of the semester, in Greek, which involves open-ended questions and problem solving.</td></tr>
</table>

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*

1. L. Cabral: *Introduction to Industrial Organization*, Kritiki Ed, Athens, 2003 (in Greek).
2. D.E. Waldman & E.J. Jensen: *Industrial Organization: Theory and Practice*, Ellin Ed., Athens, 2006 (in Greek).

## 6.4. Strategic Management and Planning

**(1) GENERAL**

| | | | | |
|---|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | | |
| **LEVEL OF STUDIES** | Undergraduate | | | |
| **COURSE CODE** | **ΔΕ0104** | **SEMESTER** | **6** | |
| **COURSE TITLE** | Strategic Management and Planning | | | |
| **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** |
| | | | 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* | General Background | | | |
| **PREREQUISITE COURSES:** | | | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | no | | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/strategic-management | | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| On successful completion of the course, students will be able to:<br>○ Understand what strategy is and why it matters<br>○ Think strategically about a company, its position, the long-term direction, resources and competitive capabilities, the caliber of its strategy, and the opportunities to acquire a sustainable competitive advantage.<br>○ Prepare strategic analysis across various sectors and analyze the conditions of competition and the competitive challenges in the global environment.<br>○ Analyze the process of developing and implementing a business strategy<br>○ Apply the concepts and analytical tools to assess the strategic status of a company |

- Understand the ethical and socially responsible dimension of a business strategy
- Identify the key points for successful execution of the selected strategy and the administrative tasks associated with its implementation in order to be able to promote the proper execution of the strategy, and work effectively as members of an execution team.

**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*
*Adapting to new situations*
*Decision-making*
*Team work*
*Showing social, professional and ethical responsibility and sensitivity to gender issues*
*Criticism and self-criticism*
*Production of free, creative and inductive thinking*

**(3) SYLLABUS**

The course focuses on the theory and practice of business strategy and aims to provide a framework through which students will be able to recognize and respond to the strategic challenges businesses face today. The course begins with a set of basic concepts and terms that are necessary for understanding the meaning of strategy and strategic management. Then, it presents the framework, methods and tools for strategic analysis of a company, investigates a large number of strategic problems, including the creation of alternative strategies, and the shaping of a strategic plan. Some of the questions addressed are how a company can better position itself against the forces of the market, how a company can innovate strategically and "change the rules of the game" in its favor, how a company can create those unique skills necessary to achieve competitive advantage and maintain and improve its market position. Finally, it focuses on how these strategic choices can be 'tied' to the daily activities of the company in order to create an organization with a great ability to adapt to challenges over time.

Using case studies from the Greek and international business arena students are expected to understand the complex processes that take place in the business environment and contribute to the critical evaluation of various methods and approaches that are proposed and implemented.

1. Introduction - Basic concepts, definitions and scope of Strategy
2. The tools of strategic analysis I: Analysis of the External Environment
3. The tools of strategic analysis II: Analysis of the Internal Environment, Resources & Capabilities
4. Competitive Advantage I: Analysis and options
5. Competitive Advantage II: Implementation and evaluation
6. Strategic Analysis in Practice: Lessons from case studies
7. Implementation Strategy I: Organization and Structures
8. Implementation Strategy II: Control
9. Implementation Strategy III: Managing Strategic Change
10. Implementation Strategy: Lessons learned from case studies
11. Strategic Issues for SME

| |
|---|
| 12. Current Trends in Strategic Management<br>13. Overview – Presentation of work assignments |

**(4) TEACHING and LEARNING METHODS - EVALUATION**

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td>Face to face. Teaching methods for this course are based on lectures and presentation / discussion of case studies. Active student participation is essential and helps students understand the basic concepts and tools of the course. Furthermore, the presentation of case studies from the Greek and international business scenes enables students to understand the complex processes that occur in business environments and contributes to the critical evaluation of the various methods and approaches proposed and implemented</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td></td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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>39</td></tr>
<tr><td>Study and Analysis of bibliography</td><td>20</td></tr>
<tr><td>Project work</td><td>20</td></tr>
<tr><td>Essay writing</td><td>28</td></tr>
<tr><td>Hours of non-directed study</td><td>30</td></tr>
<tr><td>Exams</td><td>3</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>140</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br>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<br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Language of evaluation: Greek<br>Student assessment is made as follows:<br>• Final exam: 70%<br>• Group Work Assignment: 30%<br>A necessary prerequisite for taking into consideration the score of the Work Assignment in the final mark is that students should receive at least 5/10 in the final exams.<br>The work assignments aim to familiarize students with the theoretical issues discussed in the lectures and the case studies. All work will be delivered to the instructor in electronic form. The work assignment may involve (a) a Strategic Analysis of a company where students can have access to, and an evaluation of its existing strategy, or (b) the presentation of a case study or of a scientific article from the international academic literature. The themes of the work assignments will be defined in consultation with the instructor.</td></tr>
</table>

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*

*A) Main Reference:*

*1. Β. Παπαδάκης: Στρατηγική των Επιχειρήσεων: Ελληνική και Διεθνής Εμπειρία, Τόμος Α: Θεωρία, Εκδόσεις Μπένου, (Ε΄ Έκδοση), Αθήνα 2007 (in Greek)*

*2. Thompson, A. Strickland, A.J. & Gamble, J.E. (2010) Σχεδιασμός και Υλοποίηση Επιχειρησιακής Στρατηγικής, 16η Αμερικανική Έκδοση, 1η Ελληνική Έκδοση, Επιστημονική Επιμέλεια: Γ. Πολλάλης, Εκδόσεις Utopia (in Greek)*

*B) Additional References:*

• *Johnson G. and K. Scholes, Exploring Corporate Strategy: Text and Cases, London, Prentice Hall Europe (the most contemporary edition).*

• *Grant R.M., Contemporary Strategy Analysis: Concepts, Techniques Applications, Blackwell Business, (the most contemporary edition).*

## 6.5. Data Analysis

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Engineering | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | ΓΕ0172 | **SEMESTER** | 6 |
| **COURSE TITLE** | Data Analysis | | |

| **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** |
|---|---|---|
| | | |
| | | |
| | | |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | 3 | 5 |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Prescribed Core Module |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek. |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/data-analysis |

**(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*

At the end of the course, students are able to

- Understand the data analysis process.
- Have a working knowledge of different data analysis tools and visualization techniques.
- Have an understanding of various statistical data analysis models.
- Have a working knowledge of some of the more significant current research in the area of data analysis.
- Be able to effectively apply a number of data analysis algorithms to solve data analysis problems from various problem domains.
- Be familiar with several successful applications of data analysis.

**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
- Adapting to new situations
- Decision-making
- Working independently
- Working in an interdisciplinary environment
- Production of new research ideas

**(3) SYLLABUS**

- Introduction to Data Analysis
- Data Collection, Cleaning and Exploration
- Data Visualization
- Introduction to Statistical Models for Data Analysis
- Regression
- Linear Discriminant Analysis and Classification
- Bayesian Modeling
- High-Dimensional Data
- Spectral methods (PCA/SVD)
- Clustering
- Case Study: Recommender Systems
- Case Study: Business Analytics
- Case Study: Social Network Analysis

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY** | Use of ICT in communication with students |

<table>
<tr><td>Use of ICT in teaching, laboratory education, communication with students</td><td></td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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>39 hours (1.56 ECTS)</td></tr><tr><td>Personal study</td><td>83 hours (3.32 ECTS)</td></tr><tr><td>End of semester exam</td><td>3 hours (0.12 ECTS)</td></tr><tr><td>Course total</td><td>125 hours (5 ECTS)</td></tr></table></td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br><br>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<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Language of evaluation:<br>Greek.<br><br>Method of evaluation:<br>Final Project 30%<br>Final Exams 70%</td></tr>
</table>

**(5) ATTACHED BIBLIOGRAPHY**

**1) Principal Reference:**

I. Papadimitriou, Data Analysis, (in Greek)

**2) Additional References:**

T. E. Mpehrakis, Multidimensional Data Analysis, (in Greek)

## 6.6. Engineering Materials

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | **MH0114** | **SEMESTER** | **6** |
| **COURSE TITLE** | Engineering Materials | | |
| **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* | Engineering background, specialised knowledge, skills development | | |
| **PREREQUISITE COURSES:** | - | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/el/c/tekhnika-ulika | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| The course is addressed to undergraduate students and aims to allow students to:<br>• Recognize how the internal structure of a material (both at the micro and macro levels) controls the mechanical properties.<br>• Be able to explain how dislocation motion is responsible for permanent deformation in metals and how the ability to undergo slip influences the mechanical properties of the material.<br>• Realize their ability to control the mechanical properties of materials through a variety of processes and the implications on materials selection and design.<br>• Demonstrate an integrated understanding of engineering materials principles through applications involving problem solving and through creation of design solutions to engineering |

scenarios.

- Work cooperatively with others to facilitate a collegial atmosphere conducive to learning for all students in the class.
- Prepare for and attend each class by reading the assigned sections before class, completing homework before class, and actively participating in class.

Upon successful completion of this course, the students should be able to do the following:

- understand how materials are being made (basic material science),
- use the principles from chemistry, physics, statistics, and mathematics in engineering applications,
- emphasize on properties and how they are influenced by thermal and mechanical treatments,
- relate the microstructure of a material to its properties,
- identify, formulate, and solve engineering problems,
- understand the effects of the environment on materials and the possible failure modes of structures,
- characterize engineering materials and design for possible applications, and
- understand and contribute to the challenges of a rapidly changing society

**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
- Respect for the natural environment
- Adapting to new situations
- Decision-making
- Working independently
- Team work
- Production of free, creative and inductive thinking
- Criticism and self-criticism

**(3) SYLLABUS**

1. Atomic and molecular structure of materials
2. Imperfections in materials
3. Diffusion
4. Mechanical properties of materials
5. Dislocations and strengthening mechanisms
6. Failure of engineering materials
7. Phase diagram
8. Phase transformation

9. Applications and processing of metals
10. Introduction to ceramics
11. Introduction to polymers
12. Introduction to composites
13. Other properties

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face teaching |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | **Use of eClass in delivering notes and presentations** |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | <table><tr><th>*Activity*</th><th>*Semester workload*</th></tr><tr><td>Lectures</td><td>39</td></tr><tr><td>Bibliography study</td><td>90</td></tr><tr><td>Essay writing</td><td>46</td></tr><tr><td>Tests</td><td>25</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>Course total</td><td>***200***</td></tr></table> |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Grading will be determined on two exams: a mid-term exam at the half of the semester and a final exam. Mid-term exam covers the first 40 % of the topics of the course while the final exam covers the rest 60 % of the topics. The students that fail the course will be re-examined in September at the whole topic of the course (100 %).<br>The course grade will be calculated as follows:<br>(Mid-term exam 40 %) + (Final exam 60 %) = (Total 100 %)<br>Exam in September covers the whole topic of the course 100 % |

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography: William D. Callister, Jr., Materials Science and Engineering, John Wiley & Sons, Inc.*

*- Related literature:*

- *D.R. Askeland and P.P. Phulé: The Science and Engineering of Materials, 4th Edition, Brooks/Cole.*
- *J.M. Shackelford, Introduction to Materials Science for Engineers, 5th Edition, Prentice-Hall, Inc*

# 7. Course Outlines for Semester G

## 7.1. Technology and Innovation Management

**(1) GENERAL**

| | | | | |
|---|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | | |
| **LEVEL OF STUDIES** | Undergraduate | | | |
| **COURSE CODE** | **ΓΕ0126** | **SEMESTER** | **7** | |
| **COURSE TITLE** | Technology and Innovation Management | | | |
| **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** |
| | | | 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* | General Background | | | |
| **PREREQUISITE COURSES:** | | | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | no | | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/technology-and-innovation-management | | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| **Upon completion of the course, students will be able to:**<br>• Understand the concepts of invention, innovation, technology, research, technological development, and industry life cycle;<br>• Analyze and interpret different strategies for innovation and the management processes related to each of them;<br>• Understand how to better integrate the dimension of technology in their pursuit of commercial success.<br>• Better identify the technological needs and requirements of an enterprise as an important |

factor for its development

- Evaluate the means of accessing technology solutions.
- Apply tools and techniques for selecting technology programs and investing in new technologies.
- Implement tools and techniques for the organization and completion of a technology transfer process,
- Understand the problems that arise in collaboration agreements among the various 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* | *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
Decision-making
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of free, creative and inductive thinking

**(3) SYLLABUS**

Successful innovation in new products, services and processes is becoming increasingly important in achieving competitive advantage. Companies that innovate grow faster, have higher productivity and are more profitable than those that do not innovate. Innovation, however, is a risky business, as many new technologies fail to be converted into new products and services for consumption.

The course begins by defining some basic concepts: what is innovation, what is research and development and why they are important for modern businesses. Then, it focuses on the notion of technology life cycle and how it relates to the life cycle of products and markets associated with a technology. Through practical examples and case studies, students can discover ways in which the positioning, tactics, and procedures used by firms can influence the development and diffusion of an innovation.

Students can explore additional ways in which businesses can appropriate and exploit the benefits of an innovation. By the end of the course, students will have a better understanding of key issues in technology management and innovation, as well as of the skills required for their successful implementation at a strategic and operational level.

1. Introduction - Scope of the course and method of study
2. Basic concepts and key terms
3. The evolution of technology and markets: Technology cycle and market cycle
4. Exploiting Technology for Competitive Advantage: The role of complementary assets
5. Appropriating technology (appropriability)
6. Technological standards and their economic importance

7. Technology, Innovation, and Strategy
8. Research and Development & Choosing among alternative technology projects
9. Technology Transfer and Technological Cooperation
10. Organizational skills to develop innovative
11. Financing Innovation
12. Innovation in Greece and the innovative performance of Greek firms
13. Summary – Course wrap up

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face. Teaching methods for this course are based on lectures and presentation / discussion of case studies. Active student participation is essential and helps students understand the basic concepts and tools of the course. Furthermore, the presentation of case studies from international business scene enables students to understand the complex processes that occur in business environments and contributes to the critical evaluation of the various methods and approaches proposed and implemented in the management of technology and innovation. |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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**<br>*Description of the evaluation procedure*<br><br>*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,* | Language of evaluation: Greek<br>1. A mandatory interim exam (30%) - Students from previous years are not required to participate in the interim exam.<br>2. An optional presentation - work assignment based on either (a) a case study of a real company (detailed instructions and methodology are given by the tutor) or (b) an academic case study suggested by the tutor (20%)<br>3. A final exam on all the material of the course (70% or 50%). |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 39 |
| Project work | 20 |
| Work assignment | 20 |
| Study of bibliography | 25 |
| Hours of non-directed study | 30 |
| Interim exam | 3 |
| Exams | 3 |
| | |
| | |
| Course Total | ***140*** |

| | |
|---|---|
| *public presentation, laboratory work, clinical examination of patient, art interpretation, other*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | |

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*

*1. Schilling, Melissa (2005) Strategic Management of Technological Innovation, McGraw-Hill, Irwin.*
*2. White Margaret A.,Bruton Garry D (2010), Η Στρατηγική Διαχείριση της Τεχνολογίας και της Καινοτομίας, Εκδόσεις ΚΡΙΤΙΚΉ (in Greek)*
*2. ΚΑΡΑΓΙΑΝΝΗΣ ΗΛΙΑΣ, ΜΠΑΚΟΥΡΟΣ ΙΩΑΝΝΗΣ, Καινοτομία και Επιχειρηματικότητα, Εκδόσεις ΣΟΦΙΑ. (in Greek)*
*3. Cabral, L. Βιομηχανική Οργάνωση, Εκδόσεις ΚΡΙΤΙΚΗ (Κεφ. 16 & 17) (in Greek)*

*B) Additional References:*

*1. Κομνηνός Νίκος, Κυργιαφίνη Λίνα, και Σεφερτζή Έλενα (επιμ) (2001) Τεχνολογίες Ανάπτυξης Καινοτομίας*
*σε Περιφέρειες και Συμπλέγματα Παραγωγής, Αθήνα: Εκδόσεις: Gutenberg.*
*2. Σπαής Γεώργιος (2007) Εισαγωγή στη Διαχείριση Τεχνολογικών Καινοτομιών, Αθήνα: Εκδόσεις ΚΡΙΤΙΚΗ.*
*3. Γεωργαντά Ζωή, (2003) Επιχειρηματικότητα και Καινοτομίες, Εκδόσεις ΑΝΙΚΟΥΛΑ.*
*4. Κονταράτος, Α. (2006) Η Τέχνη της Διοίκησης της Επιστημονικής και Τεχνολογικής Έρευνας, Αθήνα: Εθνικό Ίδρυμα Ερευνών.*
*5. Afuan, A. (2003) Innovation Management, Oxford University Press.*

## 7.2. Decisions Analysis and Knowledge Engineering

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | FINANCIAL AND MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | ΔΕ0103 | **SEMESTER** | **7** |
| **COURSE TITLE** | DECISION ANALYSIS & KNOWLEDGE ENGINEERING | | |

| **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** |
|---|---|---|
| | 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* | Track Compulsory |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | NO |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/undergraduate-programme |

**(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*

Upon successful completion of the course the student should be confident about the following:

Understanding of basic concepts in decision theory.

Modeling of the decision making process.

Handling of uncertainty.

Computer Assisted Decision Making.

Understanding the particularities of decision analysis methods.

Preconditions for the proper adjustment of the methods taught in real decision problems.

How to apply the proper method for each decision problem.

Understanding of the role of a Knowledge and Decision Engineer: From the data collection process, to the design, implementation and application of the proper decision making methodology.

The course constitutes a precondition for elaborating later a Diploma Thesis in the domain.

**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

Adapting to new situations

Decision-making

Working independently

Working in an interdisciplinary environment

Production of new research ideas

Criticism and self-criticism

Production of free, creative and inductive thinking

**(3) SYLLABUS**

Description

The course primarily refers to methods for decision-making under uncertainty and deals with analytical approaches in this respect. Topics covered include:

o decision making processes, decision trees, Bayes-theorem and Bayesian revision
o value of information, basic utility theory, multi-attribute decision making, construction and analysis of decision trees and influence diagrams using decision analysis software
o quantification of judgments, risk preferences, and degree of risk aversion via subjective expected utility

Generalizations of expected utility theory to problems in which consequences are descriptively complex and multi-attributed are illustrated with applications in engineering and management.

The course also teaches mathematical logic principles (propositional and categorical logic) as a basis for understanding rule based systems for decision support (expert systems, fuzzy rule based systems).

Furthermore the course contains introductory lectures to approximate reasoning, fuzzy decision analysis and computational intelligence-based approaches for the handling of uncertainty, in real-world problems (soft computing, fuzzy rule-based systems, neural computation, inductive machine learning, evolutionary computing – genetic programming, hybrid and adaptive intelligent schemes, nature inspired intelligence). Some lectures include demonstration of indicative algorithms and programs for computer assisted decision analysis.

Finally, the course contains a brief reference to other decision methodologies such as multi-criteria decision making, analytical hierarchical process, game-theory for strategic decision making, etc.

Module Contents (Syllabus)

14. Introduction to the Decision Making Process
15. Types of Decisions / Data Analysis / Uncertainty
16. Introduction to Mathematical Logic – Logic Operators
17. Propositional Logic (Truth Tables – Logical Consequences – Laws – Normal Forms – Examples
18. Predicate Logic – Symbols – Laws of Predicate Calculus – Prenex and Skolem Normal Forms – Examples
19. Mechanical Theorem Proving – Herbrand Theorem – Resolution Principle – Solved Problems and Case Studies
20. 1st Written Test
21. Decisions Under Uncertainty – Subjective Probabilities (Bayes) – Decision Trees – Raiffa's Basic Problem
22. Utility Theory and Decision Trees – Risk and Utility Functions – Special Topics in Decision Analysis
23. Solved Problems and Case Studies in Decision Analysis
24. 2nd Written Test
25. Computational Methods for Decision Making (Inductive Learning and Inductive Decision Trees, Fuzzy Logic and Fuzzy Rule Based Systems) – Presentation of related algorithms and programs
26. Evolutionary Computation and Decision Making – Neural Networks – Nature Inspired Intelligence – Other data driven decision making methodologies

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory* | **Use of web sources for elaboration of projects** |

| | |
|---|---|
| *education, communication with students* | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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*** |
|---|---|
| Scheduled Lectures | 39 hrs |
| Partial (mid-semester) exams | 46 hrs |
| Project elaboration (written text and oral presentation) | 25 hrs |
| Preparation for the final exam | 40 hrs |
| | |
| | |
| | |
| | |
| | |
| Course total | ***150 hrs*** |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Final exam on course notes for 100% of the final mark of the student.<br><br>Two mid-semester exams offer up to 20% bonus in the final mark. A project with written and oral part offers up to 10% additional bonus to the final mark of the student. |

**(5) ATTACHED BIBLIOGRAPHY**

- *Suggested bibliography:*

A) Course Notes

B) Additional Reading

1. Decision Analysis, Raiffa H., Addison-Wesley, 1968.
2. Decision Making with Multiple Objectives, Keeney R., Raiffa H., Wiley, 1976.
3. Applied Decision Analysis, Bunn D., McGraw-Hill, 1984.
4. C-L Chang, R C-T Lee (1973), Symbolic Logic and Mechanical Theorem Proving, Academic Press 5. Z. Chen (1999), Computational Intelligence for Decision Support, CRC Press

- *Related academic journals:*

IEEE Transactions on Knowledge and Data Engineering
Intelligent Data Analysis

## 7.3. Simulation

**(1) GENERAL**

| | | | | |
|---|---|---|---|---|
| **SCHOOL** | Polytechnic School | | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | | |
| **LEVEL OF STUDIES** | Undergraduate | | | |
| **COURSE CODE** | **ΓΕ0125** | **SEMESTER** | **7** | |
| **COURSE TITLE** | Simulation | | | |
| **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** |
| | | | 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* | General Background | | | |
| **PREREQUISITE COURSES:** | | | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/el/c/prosomoiose | | | |

**(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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| The objective of the course is twofold. On one hand, to introduce student to Simulation underlying principles and on the other hand the deep understanding of its meanings and how they are applied in solving theoretical and practical problems. In addition, it is sought the acquisition of the prerequisite background for understanding subsequent courses of the study cycle, but also the linkage of the field of knowledge with acquired knowledge and concepts that have been encountered earlier in the study cycle.<br><br>Upon successful completion of the course, the student will be able to: |

- ✓ identify the components of a simulation model
- ✓ generate random numbers from specific discrete and continuous distributions, construct empirical distributions and analyze the random samples
- ✓ calculate the appropriate performance metrics of a system
- ✓ perform a statistical analysis of simulation results
- ✓ design system models with the required degree of detail that serves the problem under consideration
- ✓ develop simple simulation models that are the basis of more complex systems
- ✓ develop end to end simulation programs in general purpose language (R is indicated as an example) for the study and evaluation of the behavior of simpler systems
- ✓ use software packages (simulators) to study and evaluate the behavior of complex queuing networks and stock systems, as well

**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
- ✓ Decision-making
- ✓ Working independently
- ✓ Team work
- ✓ Production of free, creative and inductive thinking

**(3) SYLLABUS**

Random numbers: Pseudorandom number generation, using random numbers to evaluate integrals; Generating discrete random variables: The inverse transform method, generating a Poisson random variable, generating a Binomial random variable, the acceptance-rejection technique, generating random vectors; Generating continues random variables: The inverse transform algorithm, the rejection method, the polar method for generating normal random variables, generating a Poisson Process; The discrete event simulation approach: A single-server queuing system, a queuing system with two servers in series, a queuing system with two parallel servers, an inventory model; Statistical analysis of simulated data; Variance reduction techniques.

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory* | |

<table>
<tr><td>education, communication with students</td><td></td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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>39</td></tr><tr><td>Laboratory practice</td><td>30</td></tr><tr><td>Study and analysis of bibliography</td><td>81</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>Course total</td><td>150</td></tr></table></td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br><br>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<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Final Exam (80%) and laboratory assignments (20%)</td></tr>
</table>

**(5) ATTACHED BIBLIOGRAPHY**


*- Suggested bibliography:*

1. Μπούτσικας, Μ., *Μέθοδοι Προσομοίωσης και Υπολογιστικές Στατιστικές Τεχνικές*, Πανεπιστημιακές Σημειώσεις, Πανεπιστήμιο Πειραιά, 2004.
2. Κουϊκόγλου, Β., Κωνσταντάς, Δ., *Προσομοίωση Συστημάτων Διακριτών Γεγονότων*, Δίσιγμα, 2016
3. Βιδάλης, Μ., *Προσομοίωση Επιχειρησιακών Συστημάτων*, Πανεπιστημιακές Σημειώσεις, Πανεπιστήμιο Αιγαίου, 2005.
4. Ρουμελιώτης, Μ., Σουραβλάς Σ., *Τεχνικές Προσομοίωσης*, Τζιόλα, 2015.
5. Σφακιανάκης, Μ., *Προσομοίωση και Εφαρμογές*, Εκδόσεις Πατάκης, 2001.
6. Averill M. Law, W. David Kelton, *Simulation Modeling and Analysis*, McGraw-Hill, Inc., 1991.
7. Ross S. M., *Simulation*, 4th edition, Elsevier Academic Press, 1997.

*- Related academic journals:*

## 7.4. Cost Accounting

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FINANCIAL AND MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **ΓΕ0112** | **SEMESTER** | **7** |
| **COURSE TITLE** | COST ACCOUNTING | | |
| **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** |
| | | 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* | General background | | |
| **PREREQUISITE COURSES:** | none | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/cost-accounting | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| The course's objective is to introduce the students to the principles of Management Accounting and to their use in business decision making. The course starts with the Distinctions of Management Accounting (Cost Accounting, Decision Accounting, Control Accounting). The Costing methods and techniques and their use in Pricing are presented in the first part of the course and the use of Marginal Costing and Contribution Margin in Short-Term Decision Making in the second part.<br>After the successful course completion the student will be able to:<br>4. Understand the importance of the Management Accounting information. |

5. Use the skills obtained in the course in product and services Pricing and Costing.
6. Correctly use the cost in the basic management functions (Planning, Decision Making and Control)

**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
- Adapting to new situations
- Decision-making
- Working independently
- Team work
- Working in an international environment
- Project planning and management
- Criticism and self-criticism
- Production of free, creative and inductive thinking

**(3) SYLLABUS**

**A. Introduction**
- Aim and distinctions of Management Accounting
- Cost elements, Cost classification

**B. Cost Accounting**
- Costing based on the production process
- Analysis and control of Direct Materials, Direct Labour and P.OH
- Cost and Revenue centers
- Costing Methods (Job order costing & Process costing
- ABC costing
- Services costing
- Applications: Pricing

**C. Accounting for Decision Making**
- Costing based on the way Fixed costs are treated
- Costing methods (Variable or Direct costing & Full absorption costing)
- Applications: Break Even Analysis & Short term decision making

**(4) TEACHING and LEARNING METHODS - EVALUATION**

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td>Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td></td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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>39</td></tr>
<tr><td>Study and analysis of bibliography</td><td>111</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
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<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>150</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br><br>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<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Written exams at the end of the semester, in Greek, which involve problem solving that ensure the content understanding (a. product costing and b. Short-Term Decision Making)</td></tr>
</table>

**(5) ATTACHED BIBLIOGRAPHY**


- *Suggested bibliography:*
1. R. Garrison, Cost Accounting, Kleidarithmos, Athens, 2006 ( in Greek)
2. Avg. Dimitras – Ap. Ballas, Cost Accounting For Planning, Gutenberg, Athens, 2009 ( in Greek)

## 7.5. Operations Research II

**(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**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| The course aims in presenting the basic concept of Dynamic, Integers and Non-linear optimization modeling and problem solutions.<br><br>A successful student should be able to:<br>• understand the concepts of optimization<br>• identify how a problem of the real world can be mathematically formulated to a dynamic, integer or non-linear programming problem<br>• 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* |
| *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
- 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.*

*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 | 39 |
| Study and analysis of bibliography | 18 |
| Non-directed study | 70 |
| Final Exams | 3 |
| Course total | ***130*** |

**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.*

Final Exams in Greek = 100%

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*


[1]. Εφαρμοσμένος Μαθηματικός Προγραμματισμός, Π.-Χ. Γ. Βασιλείου, Εκδ Ζήτη, 2001, Κωδικός Βιβλίου στον Εύδοξο: 11031. (in greek)

[2]. Διοικητική Επιστήμη: Λήψη επιχειρησιακών αποφάσεων στην κοινωνία της πληροφορίας, Γ. Πραστάκος, Εκδ. Σταμούλη, 2003, Κωδικός Βιβλίου στον Εύδοξο: 23089. (in greek)

[3]. Εισαγωγή στην Επιχειρησιακή Έρευνα, 10η Έκδοση, Hillier Frederick S., Lieberman Gerald J., Διαμαντίδης Αλέξανδρος (επιμέλεια), Εκδόσεις Τζιόλα, 2017, Κωδικός Βιβλίου στον Εύδοξο: 59386820. (in greek)

[4]. Operations Research – Applications and Algorithms, 3rd Edition, Winston W., Duxbury Press, 1994

[5]. Dynamic programming : models and applications, E.V. Denardo, Englewood Cliffs, N.J. :Prentice-Hall, c1982,2003
[6]. Integer Programming, Laurence A. Wolsey, ISBN: 978-0-471-28366-9, December 1998, Wiley.
[7]. Nonlinear Programming, Dimitris P. Bertsekas, ISBN: 978-1-886529-05-2, 3rd Edition, Athena Scientific, Belmond, Massachusetts.

## 7.6. Modeling Analysis and Design of Stochastic Systems

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | FINANCIAL AND MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRATUATE | | |
| **COURSE CODE** | **GE0129** | **SEMESTER** | **7** |
| **COURSE TITLE** | **MODELLING, ANALYSIS AND DESIGN OF STOCHASTIC SYSTEMS** | | |
| **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: Probabilities, Probability Models | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/modelling-analysis-and-design-stochastic-systems | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| The aim of the course is to provide the students the capability of modeling, analysis and design of systems the evolution of which is arbitrary. To this direction the course provides the appropriate background for understanding the behavior of a real world system and modeling its evolution using stochastic processes such as Markov processes. The course mainly focuses on queuing systems and their application is production and service systems.<br><br>A successful student should be able to: |

- comprehend the concept of a stochastic process
- use Markov processes in system modeling and be familiar with the performance and dependability measures computation
- identify and characterize a queuing model
- compute the basic performance measures of a queuing model
- apply queuing theory in production, manufacturing and client-server systems

**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
- 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**

REVIEW FRO PROBABILITY MODELS

- Probability Models Review, Introduction to Stochastic Process and Queuing Systems
- Introduction to stochastic modeling
- Discrete Time Markov Chains (DTMC)
- Continuous Time Markov Chains (CTMC)
- Exercises in DTMC and CTMC

QUEUING SYSTEMS

- Characteristics of queuing systems, PASTA, Little's Law
- The M/M/1 model- Exercises
- The M/M/k model - Exercises
- The M/M/1/k model - Exercises
- The M/M/s/k and M/M/inf models - Exercises
- The M/M/1/k/k and M/M/s/k/k models - Exercises

**(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* | **Use of ICT in teaching** | YES | Electronic Lecture Notes, Exercises |

| | | | |
|---|---|---|---|
| *education, communication with students* | **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.*

*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 | 39 |
| Study and analysis of bibliography | 18 |
| Non-directed study | 70 |
| Final Exams | 3 |
| Course total | ***130*** |

**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.*

Final Exams in Greek = 100%

**(5) ATTACHED BIBLIOGRAPHY**

- *Suggested bibliography:*

Στοχαστικά Μοντέλα στην Επιχειρησιακή Έρευνα, Θεωρία και Εφαρμογές, Φακίνος, Δ., Εκδόσεις Συμμετρία, 2007, Κωδικός Βιβλίου στον Εύδοξο: 45393. (in greek)

Στοχαστικές Μέθοδοι στις Επιχειρησιακές Έρευνες, Βασιλείου, Π.Χ., Εκδόσεις Ζήτη, 2000, Κωδικός Βιβλίου στον Εύδοξο: 11282. (in greek)

Ουρές Αναμονής, 2η έκδ./2008, Δ. Φακίνου, Εκδόσεις ΣΥΜΜΕΤΡΙΑ, Κωδικός Βιβλίου στον Εύδοξο: 45392. (in greek)

Στοχαστικές Ανελίξεις: Θεωρία και Εφαρμογές, 1η εκδ./2003, Τ.Ι. Δάρας, Π.Θ. Σύψας, Εκδόσεις ΖΗΤΗ, Κωδικός Βιβλίου στον Εύδοξο: 11281. (in greek)

Modeling, Analysis, Design, and Control of Stochastic Systems, Kulkarni, V.G., Sprienger, 1999

Introduction to Probability Models, G. Bolch, S. M. Ross, Academic Press, (10th ed.), 2009.

Probability and Statistics with Reliability, Queuing, and Computer Science Applications (2nd ed.), Trivedi K. S., John Wiley & Sons, 2001

## 7.7. Financial Econometrics

### (1) GENERAL

| | | | |
|---|---|---|---|
| ***SCHOOL*** | SCHOOL OF ENGINEERING | | |
| ***ACADEMIC UNIT*** | DEPARTMENT OF FINANCIAL AND MANAGEMENT ENGINEERING | | |
| ***LEVEL OF STUDIES*** | UNDERGRADUATE | | |
| ***COURSE CODE*** | **OI0116** | ***SEMESTER*** | **7** |
| ***COURSE TITLE*** | Financial Econometrics | | |

| **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** |
|---|---|---|
| | | |
| | 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:** | • PROBABILITIES<br>• STATISTICS<br>• ECONOMETRICS |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | NO |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/el/c/khrematooikonomike-oikonometria |

### (2) LEARNING OUTCOMES

| **Learning outcomes**<br>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.<br>Consult Appendix A<br>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area<br>Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B<br>Guidelines for writing Learning Outcomes |
|---|
| The course is addressed to undergraduate students of the Financial Engineering track. Its main objective is to introduce the student to the basic techniques required in the study of key problems of Finance. These problems, which are mainly of a quantitative nature, have their principles in modeling issues, pricing issues and risk management. The student successfully completing the course:<br>• will be familiar with the different categories of financial data and the way we use them in econometric analysis. |

- will have acquired basic knowledge on the subject of the time series.
- will be able to apply these techniques to studying important financial problems (eg volatility modeling).
- will be able to make predictions with financial data using advanced econometric techniques and will also be able to examine their effectiveness.

**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
- 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
- Criticism and self-criticism
- Production of free, creative and inductive thinking

**(3) SYLLABUS**

Repeat basic concepts of Probability and Statistics. Introduction to time series analysis: Basic concepts - stationarity. Autoregressive models. Moving average models and mixed models. Non-Stationary models: ARIMA and Box-Jenkins Methodology. Testing stationarity. Selecting ARIMA models. Forecasting. Seasonality. Removal of trend. Modeling of volatility. Every lecture is accompanied by real-data applications in R

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>Face-to-face, Distance learning, etc. | Face to face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>Use of ICT in teaching, laboratory education, communication with students | **Use of ICT in teaching.**<br>**Use of ICT in laboratory education.** |
| **TEACHING METHODS**<br>The manner and methods of teaching are described in detail.<br>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, | |

| Activity | Semester workload |
|---|---|
| Lectures/Laboratory practice | 39 |
| Study and analysis of the bibliography | 90 |

<table>
<tr>
<td>clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.<br><br>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><td>Projects</td><td>18</td></tr>
<tr><td>Final exam</td><td>3</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>150</td></tr>
</table>
</td>
</tr>
<tr>
<td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br><br>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<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td>
<td>Written examinations at the end of the semester, in Greek, which include questions of knowledge development and understanding of the content of the course, as well as problem solving.<br><br>Additional assessment of candidates on the basis of projects given on a regular basis.</td>
</tr>
</table>

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*


- Σύγχρονες μέθοδοι ανάλυσης χρονολογικών σειρών (2013). Σ. Δημέλη. Εκδόσεις ΟΠΑ
- Οικονομετρικά υποδείγματα και εφαρμογές με το Eviews (2010). Κ. Συριόπουλος και Δ. Φίλιππας. Εκδόσεις Ανικούλα.
- Analysis of financial time series, Second Edition (2005). R. Tsay. Wiley.
- The Econometrics of Financial Markets (1997). J.Y. Campbell A.W. Lo and C. Mackinlay. Princeton University Press.
- Applied Econometric Time Series, Fourth Edition (2014). W. Enders. Wiley.
- Introductory Econometrics for Finance, Second Edition (2008). C. Brooks. Cambridge.

# 8. Course Outlines for Semester H

## 8.1. Marketing

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | **ΓΕ0113** | **SEMESTER** | **8** |
| **COURSE TITLE** | Marketing | | |
| **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** |
| | | 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* | General Background | | |
| **PREREQUISITE COURSES:** | | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | no | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/marketing | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| On successful completion of the course, students will be able to:<br>• Understand the basic concepts of Marketing Operation<br>• Be aware of the individual modules to achieve and to design and monitor a comprehensive Marketing Plan<br>• Understand why a business should operate "client driven " and to create value for its customers<br>• Analyze the purchasing behavior of consumers and business customers<br>• Perform market research with various methods<br>• Analyze a market into separate sections |

- Be aware of the steps in the design of products and services
- Discuss the methods by which is the pricing of products and services
- Analyze the key issues regarding the management of distribution and marketing channel
- Describe the basic methods for promotion, communication and advertising products and services
- Understand the influence of the Internet in all functions of marketing.

**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
Adapting to new situations
Decision-making
Team work
Working in an international environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking

**(3) SYLLABUS**

The course focuses on both the theory and the practical applications of Marketing in areas of interest to the Financial & Management Engineers. The course starts by defining the basic concepts in the topic of Marketing and their relation to business planning. It analyses the principles, methodologies, systems and tools that support marketing management, with specific references to the analysis of internal and external business environment, the organization of market analysis ( including market research techniques ) to determine demand, competition analysis, market segmentation, targeting and positioning, creating competitive advantage , shaping strategy and the Marketing mix (product, price, place, and promotion). Finally, the course makes a thorough reference to the design, planning, and implementation of Marketing plans.

1. General Definitions, the Marketing Process
2. Marketing strategy for developing customer relationships.
3. Analysis of the External Environmental
4. Understanding the purchasing behavior of consumers and business customers
5. Market Research
6. Market Segmentation
7. Branding in Products and Services
8. New product development and product life cycle strategies
9. Pricing.
10. Distribution and Logistics
11. Retail & Wholesale
12. Promotion, Communication and Advertising
13. Marketing and the Internet

**(4) TEACHING and LEARNING METHODS - EVALUATION**

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td>Face to face. Teaching methods for this course are based on lectures and presentation / discussion of case studies. Active student participation is essential and helps students understand the basic concepts and tools of the course. Furthermore, the presentation of case studies from the Greek and international business environment enables students to understand the complex processes that occur in marketing management and contributes to the critical evaluation of the various methods and approaches proposed and implemented.<br><br>The following teaching methods are applied:<br><br>• Lectures<br>• Presentation of case studies<br>• Team assignments<br>• Group Presentations</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td>Use of ICT in teaching (presentation of case studies via Youtube)</td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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>39</td></tr>
<tr><td>Study and Analysis of bibliography</td><td>20</td></tr>
<tr><td>Project work</td><td>20</td></tr>
<tr><td>Essay writing</td><td>28</td></tr>
<tr><td>Hours of non-directed study</td><td>30</td></tr>
<tr><td>Exams</td><td>3</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>140</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br><br>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</td><td>Language of evaluation: Greek<br>Student assessment is made as follows:<br>• Final exam: 70%<br>• Group Work Assignments: 30%<br><br>The work assignments aim to familiarize students with the theoretical issues discussed in the lectures and the case studies. The themes of the work assignments are defined in consultation with the instructor.</td></tr>
</table>

| | |
|---|---|
| *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | |

**(5) ATTACHED BIBLIOGRAPHY**

Suggested bibliography:

A) Principal Reference:
Armstrong Gary & Philip Kotler (2009) Εισαγωγή στο Μαρκετινγκ, 9η έκδοση, Εκδ. Επίκεντρο

B) Additional References:

1. Kotler, Philip (2001) Εισαγωγή στο μάρκετινγκ μάνατζμεντ. 1η έκδ. - Αθήνα : Γκιούρδας Β.
2. Perreault, Jr. William, Joseph Cannon, & E.J. McCarthy (2012) Βασικές Αρχές Μάρκετινγκ: Μια Στρατηγική Προσέγγιση, Εκδόσεις Π. Χ. Πασχαλίδης – Broken Hill Publishers Ltd.
3. Πασχαλούδης, Δημήτρης (2009) Μάρκετινγκ: Όσα πρέπει να γνωρίζετε και δεν έχετε ρωτήσει, Εκδόσεις Κριτική.

## 8.2. Human Recourses Management

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | OF ENGINEERING | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FINANCIAL AND MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **ΓΕ0122** | **SEMESTER** | **8** |
| **COURSE TITLE** | HUMAN RESOURCES MANAGEMENT | | |

| **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** |
|---|---|---|
| | 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 |
| **PREREQUISITE COURSES:** | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/el/c/dioikese-anthropinou-dunamikou |

**(2) LEARNING OUTCOMES**

| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
|---|
| This module aims to provide a framework to the concepts and current trends of HRM, and to underline HRM's critical importance for the continuous improvement and competitiveness of modern enterprises and organizations.<br><br>By the end of this course, students will be able to: |

- ✓ recognize HRM's critical contribution to optimize the performance, productivity, corporate reputation and achievement of strategic business goals
- ✓ understand the importance of human factor and the HRM role to the sustainable development of enterprises and organizations
- ✓ comprehend the current trends and individual functions of HRM
- ✓ implement the most appropriate techniques and methods of HRM
- ✓ select the appropriate solutions to current organizational problems

**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
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Criticism and self-criticism
Production of free, creative and inductive thinking

**(3) SYLLABUS**

- ✓ Meaning and Aims of Human Resource Management
- ✓ Analysis and Job Descriptions
- ✓ Planning and Recruiting HR
- ✓ Employee selection
- ✓ Training and Development Process
- ✓ Performance Appraisal
- ✓ Rewards Management
- ✓ Motivation in the workplace- theory and practice
- ✓ Organization Behavior

**(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* | | |
| **TEACHING METHODS** | ***Activity*** | ***Semester workload*** |

| | |
|---|---|
| *The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | Lectures: 39<br>Study of bibliography: 111<br>Course total: ***150*** |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Written exam at the end of the semester, in Greek, which involves open-ended questions and problem solving. |

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*


1. Slides – Presentations
2. Baxevanidou, M. – Rekleitis, P. (2012). 2nd Edition. Human Resources Management. Athens, Propompos
3. Papalexandri, N. & Mpourantas, D. (2002). Human Resources Management. Athens, Mpenou
4. Dessler, G. (2011). Human Resource Management. 12th Edition. Prentice Hall, Boston.
5. Robbins, St. P., Judge, T., A., (2011). Organization Behavior. Athens. Kritiki

## 8.3. **Systems Reliability**

**(1) GENERAL**

| | | | | |
|---|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | | |
| **ACADEMIC UNIT** | Financial and Management Engineering | | | |
| **LEVEL OF STUDIES** | Undergraduate | | | |
| **COURSE CODE** | **ΓΕΟ144** | **SEMESTER** | **8** | |
| **COURSE TITLE** | SYSTEM RELIABILITY | | | |
| **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** |
| | | | 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* | *general background, special background, specialised general knowledge, skills development* | | | |
| **PREREQUISITE COURSES:** | No | | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/systems-reliability | | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| *The objective of this course is to provide students with the appropriate knowledge in order to conduct a reliability study and more specifically, it aims to make known the advantages of these kinds of studies to engineers and their use in the decision-making process for the strengthening of the systems. After the successful completion of the course, the student will have:*<br>*to know the basic concepts of reliability engineering modelling.*<br>*to know the basic concepts of reliability, availability and maintainability.*<br>*to be in position to apply all these concepts in different application areas*<br>*to identify complex systems and compute complex failure/operation probabilities* |

*to understanding scientific papers, in related areas.*

*to improve teamwork skills*

*to perform a critical and analytical study of scientific papers.*

*to synthesis information from different but related scientific papers*

*to make a synthetic presentation of scientific papers and improvement proposals.*

**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*
*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*
*Critical thinking*
*Production of free, creative and inductive thinking*

**(3) SYLLABUS**

Basic principles of system reliability. Reliability modelling with reliability block diagrams. Reliability modelling with fault-trees. Computational techniques for the reliability evaluation of complex technological systems. Reliability evaluation with the use of Markov models. Reliability evaluation of electrical systems. Reliability evaluation of electronic systems. Reliability evaluation of mechanical systems. Reliability evaluation of information systems.

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | *Face-to-face* |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | *Use of ICT in teaching, and specific software* |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop,* | |

| ***Activity*** | ***Semester workload*** |
|---|---|
| *Lectures* | 39 |
| *study and analysis of bibliography* | 30 |
| *project* | 60 |
| *Mini dissertation writing* | 18 |

| | |
|---|---|
| *interactive teaching, educational visits, project, essay writing, artistic creativity, etc.*<br><br>*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* | *exams* 3<br>Course total ***150*** |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | - Projects (selection of a scientific paper in Reliability Engineering and in an application area proposed by the student, analysis and presentation) by group of 2 or 3 students.<br>- Assessment grade is based on the final report and its presentation. |

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*

*Διαλυνάς, Ε.Ν., «Ανάλυση Αξιοπιστίας Τεχνολογικών Συστημάτων», Εκδόσεις Συμεών, Αθήνα (in Greek)*

*Billinton, R., Allan, R.N., «Reliability Evaluation of Engineering Systems», Pitman Books Ltd, London, 1983*

*Ionescu, D.C., Limnios, N., «Statistical and Probabilistic Models in Reliability», Birkhauser, Boston, 1999*

*Pagès A., Gondran M., «Fiabilité des Systèmes», Collection de la Direction des Etudes et Recherche d'Electricité de France, Paris, 1980 (in French)*

*Trivedi K, S, (2002) Probability and Statistics with Reliability, Queuing and Computer Science Applications. John Wiley and Sons, New York*

*- Related academic journals:*

*Reliability Engineering and System Safety, IEEE transactions on reliability.*

## 8.4. Portfolio Management

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | ENGINEERING | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FINANCIAL AND MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | OI0110 | SEMESTER | 8 |
| **COURSE TITLE** | Portfolio Management | | |
| **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** |
| | | 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:** | Knowledge from other courses: financial analysis, macroeconomics | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/financial-analysis | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| The main objective of this study is to introduce the students in the portfolio managers way of thinking. The student will apply the portfolio and investment analysis theories in real data, and after this course a successful student should be able to:<br>- Understand and present the fundamental portfolio management theories,<br>- evaluate the prices of the securities,<br>- understand the benefits of the diversification,<br>- understand the behavioral influence on assets pricing, |

- the pros and cons of several investment strategies.

**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
- 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
- Criticism and self-criticism
- Production of free, creative and inductive thinking

**(3) SYLLABUS**

- Stocks and Bonds Pricing
- Stock Prices Analysis using Financial Indices-Beta Coefficient
- Markowitz Optimization
- Capital Asset Pricing Model and Security Market Line
- Technical Analysis and Efficient Market Hypothesis
- Evaluation of Asset Portfolios
- Active vs Passive Portfolios

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | **Face to face** |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | **Use of ICT in teaching.**<br>**Use of ICT in laboratory education.** |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.* | ***Activity*** / ***Semester workload***<br>Lectures/Laboratory practice: 39 |

| | |
|---|---|
| *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.*<br><br>*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* | Study and analysis of the bibliography: 80<br>Projects: 28<br>Final exam: 3<br>Course total: **150** |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Written examinations at the end of the semester, in Greek, which include questions of knowledge development and understanding of the content of the course, as well as problem solving.<br><br>Final Grade:<br>50% assignments + 50% final exam. |

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*


- Edwin J. Elton, Martin J. Gruber, Stephen J. Brown, William N. Goetzmann (2016) Modern Portfolio Management and Investment Analysis, Utopia Publications.
- Bodie Zvi, Kane Alex, Marcus Alan J. (2014) Investments, Utopia Publications.
- Vasileiou D., Iriotis N. (2018) Investment Analysis and Portfolio Management, Rosili Publications.
- Reilly K. Frank, Brown C. Keith (2018) Investment Analysis and Portfolio Management, Broken Hill Publications.
- Papadamou S.(2009) Portfolio Management, Dardanos G. – Dardanos K. Publications.

## 8.5. Derivatives and New Financial Products

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Engineering | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | **OI0112** | **SEMESTER** | |
| **COURSE TITLE** | Derivatives and new financial products | | |
| **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** |
| | | 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:** | FINANCIAL ANALYSIS | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | YES | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/derivatives-and-new-financial-products | | |

**(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*

Financial derivative products are one of the basic tools of modern finance. In fact, within the current global volatile financial environment, financial derivatives are becoming increasingly important as can be used both for hedging and speculation. The course is addressed to undergraduate students of the Financial Engineering Track and focuses on both the structure and the operating mechanisms of the financial derivatives markets. More specifically, we present (a) the main types of financial derivatives (forwards, futures, options and swaps), (b) the various pricing techniques (e.g., mark-to-market (futures) and binomial model (options), etc.,) and their underlying ideas (eg., absence of arbitrage).

Emphasis will be given on both real-world applications as well as the underlying mathematical framework. Examples stemming from risk management and speculation will be presented.

More specifically, upon successful completion of the course, the students will be able to:

- Recognize the various categories of financial derivatives and fully understand their structure, basic characteristics and importance in modern Finance. Special emphasis will be given to Forward contracts, Futures contracts and Options.
- Know how the daily settlement of Futures contracts is carried out. Furthermore, to use Futures contracts for hedging purposes.
- Calculate the value and the price of Forward and Futures contracts (when the underlying asset is not paying dividends and when the underlying is paying dividends).
- Know the basic structural properties of options (both European and American) written on a stock.
- Calculate bounds for the price of options (both European and American) and realize the connection between these bounds and the absence of arbitrage. Moreover, if the above bounds are not satisfied, to know how to achieve arbitrage.
- Price European options with the Black-Scholes model.
- Price European and American options with binomial trees.

**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
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
Criticism and self-criticism
Production of free, creative and inductive thinking

**(3) SYLLABUS**

Introduction to financial derivatives. Forward and Futures contracts. The mechanism of Futures market, part I: Daily settlement (the case of Futures contract on currency, stocks and indexes). The mechanism of Futures market, part II: hedging with Futures (Long hedge, Short hedge). The mechanism of Futures market, part III: hedging with Futures (basis risk arising from different dates or/and different assets – cross hedging). Calculate the value and the price of Forward and Futures

contracts (when the underlying asset does not pay/pay dividends). Options, part I: a basic introduction. Options, part II: properties of options (European and American) written on a stock. Options, part III: bounds for the price of options (European and American) + arbitrage opportunities. Pricing European options with the Black-Scholes model. Pricing European and American options with binomial trees.

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | **Use of ICT in teaching.**<br>**Use of ICT in laboratory education.** |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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/Laboratory practice | 39 |
| Study and analysis of the bibliography | 84 |
| Projects | 18 |
| Final exam | 3 |
| 2 midterm exams | 6 |
| Lectures/Laboratory practice | 39 |
| Study and analysis of the bibliography | 84 |
| | |
| | |
| Course total | ***150*** |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Written examinations at the end of the semester, in Greek, which include questions of knowledge development and understanding of the content of the course, as well as problem solving.<br><br>Final grade is calculated as:<br><br>Final exam:50%<br>Exercises: 15%<br>Midterm exams:35% |

**(5) ATTACHED BIBLIOGRAPHY**

**BASIC MANUAL (IN GREEK)**

Χρηματοοικονομικά Παράγωγα (2014). Θ. Πουφινάς και Χ. Φλώρος. Εκδόσεις Δίσιγμα.

**ADDITIONAL READING (IN GREEK)**

Εισαγωγή στα Παράγωγα Χρηματοοικονομικά Προϊόντα (2017). Π. Αγγελόπουλος. Εκδόσεις Σταμούλη.

Βασικές αρχές των αγορών συμβολαίων και δικαιωμάτων (2017). John C. Hull, Εκδόσεις Κλειδάριθμος.

**ADDITIONAL READING (IN ENGLISH)**

Options, futures and other derivatives, third edition (2015). J. C. Hull. Pearson.

Fundamental of futures and option markets, 9th edition (2017). J. C. Hull. Pearson.

## 8.6. Stochastic Models

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | FINANCIAL AND MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRATUATE | | |
| **COURSE CODE** | **MH0108** | **SEMESTER** | **8** |
| **COURSE TITLE** | **STOCHASTIC MODELS** | | |
| **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: Probabilities, Statistics | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/stochastic-models | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| The aim of the course is to provide the students with the appropriate mathematical background of stochastic models that can be applied in finance.<br><br>A successful student should be able to:<br>• comprehend the concept of Financial Derivatives<br>• perform Forwards ,Futures and Options pricing<br>• understand the concept of Risk Neutral Probability Measure<br>• understand and use martingales<br>• perform option pricing in discrete time using the binomial model |

- comprehend option pricing in continuous time

**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
- 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**

- Equities, Bonds, Stock Market
- Financial Derivatives
- Types of Traders (Hedgers, Speculators Arbitrageurs), Investment Strategies (Bull spread, Bear spread, Butterfly Spread, Straddle, Strip and Strap, Strangles)
- Simple, Discount, Compound interest, Present Value Analysis
- Forwards and Futures pricing
- Option pricing and Hedging – One-period Binomial Model
- Risk neutral Probability Measure
- σ-algebra, Measure, , Stochastically Independent Events, Conditional Expectation , Stochastic Process
- Martingales
- Dynamic Portfolio, Self-financing Portfolio in discrete time, Mutliperiod Binomial Model, No-arbitrage pricing in Mutliperiod Binomial Model
- Brownian Motion, Geometric Brownian
- Black-Scholes Formula
- Applications of Black-Scholes Formula

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*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.*

*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 | 39 |
| Study and analysis of bibliography | 18 |
| Non-directed study | 70 |
| Final Exams | 3 |
| Course total | ***130*** |

**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.*

Final Exams in Greek = 100%

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*

Στοχαστικά χρηματοοικονομικά, Βασιλείου Π. – Χ., Εκδόσεις ΖΗΤΗ, 1η έκδοση, 2001, Κωδικός Βιβλίου στον Εύδοξο: 11280. (in greek)

Σημειώσεις παραδόσεων: Παράγωγα Χρηματοοικονομικά προϊόντα (εισαγωγή στην στοχαστική χρηματοοικονομική ανάλυση), Μπούτσικας Μιχαήλ, Τμήμα Στατιστικής και Αναλογιστικής Επιστήμης, Πανεπιστήμιο Πειραιά.

Στοιχειώδης εισαγωγή στα χρηματοοικονομικά μαθηματικά, Ross S., ΕΚΔΟΣΕΙΣ ΠΑΝΕΠΙΣΤΗΜΙΟΥ ΜΑΚΕΔΟΝΙΑΣ, 1η έκδοση, 2007, Κωδικός Βιβλίου στον Εύδοξο: 4659. (in greek)

An Elementary Introduction to Mathematical Finance: Options and other Topics, Ross, S., Cambridge University Press; 2nd edition , 2002.

Options, Futures and Other Derivatives, Hull, J., 5th edition, Prentice Hall, 2003.

The Mathematics of Financial Derivatives, Willmott, P., Howison, S., Dewynne, J., Cambridge University Press. .1997.

An Introduction to the Mathematics of Financial Derivatives, Neftci, S. N., Academic Press, 2000.

## 8.7. Supply Chain Management I

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | Engineering | | |
| **ACADEMIC UNIT** | Financial & Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | **ΔΕ0118** | **SEMESTER** | **8** |
| **COURSE TITLE** | Supply Chain Management I | | |

| **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** |
|---|---|---|
| Credits are awarded for the whole course | 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* | Specialised general knowledge |
| **PREREQUISITE COURSES:** | None |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/supply-chain-management |

**(2) LEARNING OUTCOMES**

| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
|---|
| By completing this module, each student will be able to:<br>• Understand the fundamental principles for the management of supply chains with emphasis on planning and execution processes<br>• Understand the different distribution channels and the role of third party logistics operators (3PLs, 4PLs)<br>• Understand the importance of keeping stock and techniques for optimization stock levels<br>• Understand the role of suppliers, the methods for organizing procurement activities and models for suppliers relationship management<br>• Understand methods and techniques for design a warehouse / distribution centre |

- Choose information systems for warehouse management and material handling equipment
- Organize transportation systems and choose the most suitable transportation mean
- Understand the importance of city logistics, UCCs and reverse logistics
- Choose information systems for transportation management
- Evaluate and make use of emerging technologies (Logistics 4.0) for managing information flow in supply chain networks

**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…* |
| | ……. |

- Decision making
- Team work
- Search for, analysis and synthesis of data
- Application of optimization methods and techniques
- Choose and assess of operations tools for supply chain operations
- Production of free, creative and inductive thinking

**(3) SYLLABUS**

This course aims at presenting the fundamental processes of supply chain planning and execution in enterprises and organizations. Emphasis is given to the strategic role and the trends in managing supply networks, in customer service level, in use of quantitative methods and techniques for solving typical supply chain problems as well as in the description of emerging technologies and information systems for the optimization of logistics and transport operations.

The syllabus of the course is as follows:

- Introduction to supply networks: Definitions and main characteristics
- Order processing and customer service
- Distribution channels and third/fourth party logistics operations (3PLs, 4PLs)
- Demand forecasting and stock control for the retail sector (pull scenarios)
- Design and operation of a warehouse / distribution centre
- Information systems for warehouse management (e.g. WMS, pick-to-light, voice picking, etc.) and material handling equipment
- Organization of transportation networks and type of transportation modes
- Green logistics and sustainable transport
- City logistics and reverse logistics
- Emerging technologies (Logistics 4.0)
- Case studies / Best practices from Greece and abroad

**(4) TEACHING and LEARNING METHODS - EVALUATION**

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td>• Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td></td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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>30</td></tr><tr><td>Self-study</td><td>60</td></tr><tr><td>Case studies</td><td>57</td></tr><tr><td>Team project</td><td>50</td></tr><tr><td>Final exam</td><td>3</td></tr><tr><td>Course total</td><td>200</td></tr></table></td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br><br>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<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td><table><tr><th>Evaluation type</th><th>Percentatge (%)</th></tr><tr><td>Final exams</td><td>80%</td></tr><tr><td>Team project</td><td>20%</td></tr><tr><td>Total</td><td>100%</td></tr></table><br>The evaluation criteria described above are available in the webpage of the course</td></tr>
</table>

**(5) ATTACHED BIBLIOGRAPHY**


*- Suggested bibliography:*

- Ballou, R.H. (2004) “Business Logistics/Supply Chain Management”, Fifth Edition, Prentice Hall, Englewood Cliffs, New Jersey
- Stock, J.R., Lambert D.M. (2000), “Strategic Logistics Management”, Irwin, UK
- Rushton, A., Oxley, J., Croucher, P. (2000) “The Handbook of Logistics & Distribution Management”, Second Edition, The Institute of Logistics & Transport

- 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
- Papadimitriou, E., Schinas, O. (2004) «Introduction to Logistics» Stamoulis Publications, Athens, ISBN 960351411X (in Greek)

*- Related academic journals:*

- International Journal of Physical Distribution and Logistics Management
- Supply Chain Management: An International Journal
- International Journal of Logistics Research and Applications
- International Journal of Logistics Management
- Transportation Research Part C: Emerging technologies
- Transportation Research Part D: Transport & Environment
- Transportation Research Part E - Logistics and Transport Review
- International Journal of Production Economics
- Omega - International Journal of Management Science
- Interfaces

## 8.8. Production Systems

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FINANCIAL & MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **MH0109** | **SEMESTER** | **8** |
| **COURSE TITLE** | PRODUCTION SYSTEMS | | |
| **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** |
| | LECTURE | 3 | 5 |
| | | | |
| | | | |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | | **3** | **5** |
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Special background (Required stream course. Stream II: Engineering Management) | | |
| **PREREQUISITE COURSES:** | - | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | - | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/el/c/sustemata-paragoges | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| - Understanding of basic concepts in<br>  ○ Aggregate production planning<br>  ○ Inventory management<br>  ○ Material requirements planning, capacity planning<br>  ○ Shop floor control<br>  ○ Lean manufacturing<br>  ○ Factory dynamics, including push and pull systems<br>  ○ Production lines<br>- Application of the above in solving problems of inventory and production management. |

- Students obtain proven knowledge and understanding of basic areas of production systems, which is based on their educational background, and, although it is supported by advanced scientific texts, it includes inputs from the state of the art of their field of knowledge
- They are in a position to use the knowledge and understanding they obtained from the course in a manner that indicates a professional approach in their work or profession; they obtained abilities that are evident from the synthesis and support of positions and from problem solving in their knowledge area
- They have the ability to collect and interpret relevant information (within their knowledge area), and to develop views that show critical thinking in relevant scientific topics
- They have developed those abilities of acquiring knowledge that are necessary to continue their study under a significant degree of independence
- They are in a position to present information, concepts, problems and solutions in a specialized as well as a general audience

**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…* |
| | *…….* |

- System design
- Adapting to new situations
- Decision-making
- Working independently
- Team work
- Working in an interdisciplinary environment
- Production of free, creative and inductive thinking
-

**(3) SYLLABUS**

**DESCRIPTION**

This course presents fundamental concepts of production planning, management and control. Specific topics discussed include aggregate production planning, inventory management, production databases, materials planning, manufacturing resource planning, just-in-time production, management of factory dynamics, push and pull systems.

| Week | Contents |
|---|---|
| 1 | • Introduction (Product Design and Manufacturing), |
| 2 | • Aggregate Production Planning I |
| 3 | • Aggregate Production Planning II |
| 4 | • Inventory management under known Demand I |
| 5 | • Inventory management under known Demand II |
| 6 | • Inventory management under uncertain Demand I |
| 7 | • Inventory management under uncertain Demand II |
| 8 | • Production Databases. Principles of MRP I: Materials Planning |
| 9 | • Material Requirements Planning – MRP I |
| 11 | • Manufacturing Resource Planning – MRP II |
| 12 | • Principles of JIT – Shop Floor Dynamics |
| 13 | • Push and Pull Systems. CONWIP |

**(4) TEACHING and LEARNING METHODS - EVALUATION**

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td>Lectures face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td>Use of ICT in teaching, laboratory education, communication with students</td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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>39</td></tr>
<tr><td>Weekly Homework</td><td>44</td></tr>
<tr><td>Two Midterm Exams</td><td>6</td></tr>
<tr><td>Study</td><td>43</td></tr>
<tr><td>Semester Project</td><td>15</td></tr>
<tr><td>Final Exam</td><td>3</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>150</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br><br>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written</td><td>Assessment Methods:<br><br>- Homework 10%<br>- Two midterm exams 40% (20% each)<br>- Term project 10%<br>- Final exam 40%</td></tr>
</table>

| | |
|---|---|
| *work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | |

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*

**A) Principal Reference:**

- Minis, I., *Introduction to Production Systems, c*ourse notes, University of the Aegean
- Ioannou G., *Production and Service Management*, Publisher Stamoulis, Athens, 2005

**B) Additional References:**

Other useful references include:

- Nahmias, S. *Production and Operations Analysis*, 2nd Edition, Irwin, 1993
- Vollmann, T.E., Berry , W.L and Whybank, D.C., *Manufacturing Planning and Control Systems*, 4th Edition, Irwin/McGraw Hill, 1997
- Hopp, W.J. and Spearman, M.L., *Factory Physics*, 2nd Edition, McGraw Hill, 2001
- Gershwin, S.B., *Manufacturing Systems Engineering*, Prentice Hall, 1994.

## 8.9. Cost Benefit Analysis and Investment Decisions

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | FINANCIAL AND MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | OI0111 | **SEMESTER** | **8** |
| **COURSE TITLE** | COST BENEFIT ANALYSIS & INVESTMENT DECISIONS | | |

| **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** |
|---|---|---|
| | 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* | Track Compulsory (Tr. II) and Track Elective (Tr. I) |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | NO |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/undergraduate-programme |

**(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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| Module Objective<br><br>Upon successful completion of the course the student should be confident about the following: |

Understanding of basic concepts necessary for elaborating feasibility studies (cash-flow diagram representations, investment horizon, viewpoint of analysis, opportunity cost of capital, taxation, depreciation, inflation)

Emphasis on the proper use of the four investment criteria for comparing mutual alternatives, under the unified methodological framework of incremental analysis

Application of the above in solving real-world problems and case studies / analysis of the perspective of an engineering career in the field of consulting

**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*

*Adapting to new situations*

*Decision-making*

*Working independently*

*Team work*

*Working in an international environment*

*Project planning and management*

**(3) SYLLABUS**

**Description:**

An introductory course on the principles of engineering economy in which the basic concepts regarding benefit and cost in both monetary and non-monetary terms are discussed. Students are exposed to managing actual problems, public projects, socio-economic studies, and major private investment decisions.

Topic areas include:

o Basic Concepts (Economic Life, Cash-Flow Diagrams, Viewpoint, Mutual Alternatives)
o Interest formulas - Equivalence
o Present Worth, Annual Worth, Incremental Analysis in Investment Decisions

o Bond Evaluation using Present Worth, Benefit-Cost Ratio, Rule of Delta
o Internal Rate of Return, Descartes' Rule, Nostrom's Condition, Bergman's Rule
o Depreciation, Taxation and Inflation in cost-benefit analysis
o Multiple alternatives, Sensitivity Analysis, Capital budgeting
o Socio-economic Studies, International Projects

**Module Contents (Syllabus):**

1.Basic Concepts (Cost of Capital, Viewpoint, Types of Investment Decisions, Cash-Flow Diagrams)

**2**. Equivalence – Interest and Mathematics of Finance - Compound Interest Factor Tables (P/A, P/F, A/F, F/P, A/P, F/A, P/G, A/G)

**3.** Compound Interest , Interest and Principal Separation, Nominal and Effective Rate of Interest, Continuous Compounding

4. Present Worth, Annual Worth, Incremental Analysis

**5.** Unequal investment horizons and Present Worth, Infinite Investment Horizon, Present Worth and Bond Valuation)

**6.** 1st Written Test

**7.** Benefit-Cost Ratio (B/C) Internal Rate of Return (IRR)

**8.** B/C and Rule of Delta, IRR and Nostrom Condition, ,Descartes' Rule of Signs, Bergmann's Rule, Incremental Analysis in B/C and IRR)

**9.** 2nd Written Test

**10.** Depreciation and Taxation in Cost-Benefit Studies

**11.** Inflation - Sensitivity Analysis – Loans

**12.** Multiple Alternatives – Cost of Capital – Capital Budgeting – Big Projects – Public Projects

**13.** Non-economic Costs and Benefits - Socio-economic Studies / Feasibility Studies - Consulting Career in Engineering Economy Topics

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.* | ***Activity*** \| ***Semester workload***<br>Scheduled Lectures \| 39 hrs |

| | | |
|---|---|---|
| *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.*<br><br>*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* | Partial (mid-semester) exams | 46 hrs |
| | Project elaboration (written text and oral presentation) | 25 hrs |
| | Preparation for the final exam | 40 hrs |
| | | |
| | | |
| | | |
| | | |
| | | |
| | Course total | 150 hrs |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Final exam on course notes for 100% of the final mark of the student.<br><br>Two mid-semester exams offer up to 20% bonus in the final mark. A project with written and oral part offers up to 10% additional bonus to the final mark of the student. | |

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*

*A) Course Textbook:*

*1. Dounias G. And Moustakis V.S. (2008 – 2nd Edition), Engineering Economy (textbook), Pyxida Publications, Chios, (in Greek), ISBN: 978-960-86696-2-8*

*B) Additional Reading:*

*1. 2. Eugene Lodewick Grant, William Grant Ireson, Richard S. Leavenworth, (1982), Principles of engineering economy, 5th Ed., Wiley, USA*

*3. Henry Malcolm Steiner (1996), Engineering Economic Principles, McGraw Hill, USA*

# 9. Course Outlines for Semester I

## 9.1. Manufacturing Process

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | **ΔΕ0114** | **SEMESTER** | **9** |
| **COURSE TITLE** | Manufacturing Processes | | |
| **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* | Engineering background with techno-economic specialised knowledge, skills development | | |
| **PREREQUISITE COURSES:** | - | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | NO | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/production-processes | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| The course is addressed to undergraduate students and aims to allow students to:<br>• Describe the relationship of product design, product function, materials used, and manufacturing processes used.<br>• Compare basic physical, mechanical, manufacturing properties, and testing methods of common engineering materials.<br>• Compare relative advantages/disadvantages of common engineering materials.<br>• Understand the relative advantages/disadvantages of common forming and shaping manufacturing processes.<br>• Understand the relative advantages/disadvantages of common machining manufacturing |

processes.

- Demonstrate the ability to calculate machining speeds and feeds for specific applications.
- Demonstrate the ability to define and document a manufacturing process.

**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
- Respect for the natural environment
- Adapting to new situations
- Decision-making
- Working independently
- Team work
- Production of free, creative and inductive thinking
- Criticism and self-criticism

**(3) SYLLABUS**

*Class 1: Introduction to manufacturing processes*
*Class 2: Casting*
- Sand casting
- Croning sand casting
- Lost wax casting
- Metallic mould
- Continuous casting

*Class 3: Manufacturing with material removal: cutting tools*
- Types of cutting tools
- Materials of cutting tools
- Wear mechanisms of cutting tools
- Parameters that influence wear

*Class 4: Machining processes and machine tools: Turning*
*Class 5: Machining processes and machine tools: Turning and Milling*
*Class 6: Machining processes and machine tools: Milling*
*Class 7: Machining processes and machine tools: Drilling and Sawing*
*Class 8: Machining processes and machine tools: Grinding*
*Class 9: Forming and shaping processes*
- Rolling
- Forging
- Extrusion
- Sheet metal forming

*Class 10: Assembly processes*
- Welding

- Brazing and soldering
- Adhesive bonding
- Riveting

*Class 11: Non-metal fabrication processes: injection moulding*
*Class 12: Surface techniques*
*Class 13: Manufacturing in a competitive environment*
- Cost / volume / profit analysis
- Speed to market

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face teaching and lab |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | **Use of eClass in delivering notes and presentations** |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Grading will be determined on the basis of Laboratory projects and a comprehensive final exam (alternatively a semester project). Two laboratory projects will be entered that students will be graded for each scheduled lab for participation and progress toward course objective.<br>The course grade will be calculated as follows:<br>Laboratory project: turning 20 %<br>Laboratory project: milling 20 %<br>Final exam or a semester project 60 %<br><br>Exam in September covers the whole topic of the course 100 % |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 39 |
| Bibliography study | 86 |
| Technical demonstration | 5 |
| Essay writing | 45 |
| Tests/presentations | 30 |
| | |
| | |
| | |
| | |
| Course total | ***205*** |

**(4) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography: Manufacturing, Engineering and Technology SI, Serope Kalpakjian, Stephen R. Schmid, 6th edition, Prentice Hall, 2009, ISBN 9810681445.*

*- Related literature:*

- *Introduction to manufacturing processes, John A. Schey, 2nd edition, McGraw-Hill, 1987, ISBN 0070552797.*
- *Product Design for Manufacture and Assembly, G. Boothroyd, P. Dewhurst and W. Knight, Marcel Dekker, 1994.*
- *Manufacturing Processes For Engineering Materials, Serope Kalpakjian, 4th edition, Pearson Education, 2009, ISBN 8131702456.*
- *Fundamental Principles of Manufacturing Process, by Robert H. Todd, Dell K. Allen, Leo Alting, Industrial Press Inc., 1994, ISBN 0831130504.*
- *Introduction to Manufacturing Processes and Materials, Robert Creese, Taylor & Francis, 1999, ISBN 0824799143.*

## 9.2. Web Application Development

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Engineering | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | ΓΕ0141 | **SEMESTER** | 9 |
| **COURSE TITLE** | Web Application Development | | |

| **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** |
|---|---|---|
| | | |
| | | |
| | | |
| *Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).* | 3 | 5 |

| | |
|---|---|
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Elective Module |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek. In case of ERASMUS students: English |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/web-application-development |

**(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*

At the end of the course, students are able to

- Understand the concepts, terms and technologies used in web site design and development
- Understand the theories and principles underlying web site design and development.
- Demonstrate how to develop web sites through an iterative process.
- Master the design principles and techniques of dynamic web application development.

**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
- Adapting to new situations
- Decision-making
- Working independently
- Working in an interdisciplinary environment
- Production of new research ideas

**(3) SYLLABUS**

- Introduction to HTML
- More on HTML
- Introduction to CSS
- More on CSS
- Introduction to Javascript
- More on Javascript
- Introduction to PHP
- More on PHP
- Introduction to Database Driven Websites
- PHP/Databases Connectivity
- The MVC model
- jQuery and AJAX
- Project Assignment
- Review

**(4) TEACHING and LEARNING METHODS - EVALUATION**

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

| | |
|---|---|
| *education, communication with students* | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | *Language of evaluation:*<br>Greek.<br><br>*Method of evaluation:*<br>Final Project 30%<br>Final Exams 70% |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 39 hours (1.56 ECTS) |
| Personal study | 83 hours (3.32 ECTS) |
| End of semester exam | 3 hours (0.12 ECTS) |
| Course total | *125 hours (5 ECTS)* |

**(5) ATTACHED BIBLIOGRAPHY**

**1) Principal Reference:**

H. Douligeris, R. Navropodi, and E. Kopanaki, Web Technologies, (in Greek)

**2) Additional References:**

Welling Luke, and Thomson Laura, PHP and MySQL Web Development, (in Greek)

## 9.3. Business Communication

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | FINANCIAL AND MANAGEMENT ENGINEERING DPT | | |
| **LEVEL OF STUDIES** | UNDER-GRADUATE (Elective Stream Module) | | |
| **COURSE CODE** | ΓΕ0139 | **SEMESTER** | **9** |
| **COURSE TITLE** | Business Communication | | |
| **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** |
| | | 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 | | |
| **PREREQUISITE COURSES:** | | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/business-communication | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>***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.***<br>***Consult Appendix A***<br>• ***Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area***<br>• ***Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B***<br>• ***Guidelines for writing Learning Outcomes*** |
| The course "Business Communication" aims to reflect the student on the principles that govern human communication, with emphasis on communication that takes place through the use of the language code. An attempt is made for students to understand the systematicity of the language system, with the ultimate goal of becoming more proficient users of spoken and written language.<br><br>Upon the successful completion of the course, the students:<br><br>a) will be trained in writing various types of text related to their scientific and professional interests (report, proposal, curriculum vitae, etc.), and b) will be familiar with writing an academic essay, |

through the presentation and analysis of preparation techniques and presentation of a leaflet (bibliographic research, bibliographic references, etc.), with particular emphasis on the linguistic style (rhetoric) of a scientific work.

**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…* |
| | *…….* |

Working Independently
Adapting to new situations
Criticism and self-criticism
Production of free, creative and inductive thinking

**(3) SYLLABUS**

| WEEK | CONTENT |
|---|---|
| 1η | • Introduction to "Business Communication" – outline of course<br>• Communication in Companies and Organizations |
| 2η | • Presentation and analysis of the communication model |
| 3η και 4η | • Language and communication: The language code, the meaning of the language sign<br>• Language as a system: from sound to the text |
| 5η | • Text and communication: thematic content, structure, style<br>• The concept of "error" in the textual use of language |
| 6η | • Written speech: Textual items used in business communication:<br>○ Application<br>○ Announcement |
| 7η | • Curriculum vitae |
| 8η | • Report<br>• Proposal |
| 9η | • Presentation: From written word to the oral presentation of an announcement |
| 10η, 11η και 12η | • Academic essay: preparation, structure, rhetoric<br>○ bibliographic research<br>○ compilation of bibliographic bulletins<br>○ References |
| 13η | ○ Concluding remarks |

**(4) TEACHING and LEARNING METHODS - EVALUATION**

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td></td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td></td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table></td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br><br>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<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Students who attend the course are evaluated based on their participation in the writing of various types of texts during the semester and from the final exam.</td></tr>
</table>

**(5) ATTACHED BIBLIOGRAPHY**


Φραγκομίχαλος, Κ., *Στρατηγική Επικοινωνίας*, Εκδόσεις Γρηγόρης, Αθήνα, 1993 (διανεμόμενο εγχειρίδιο)

Μιχαλακοπούλου, Π., *Γλώσσα και κείμενο: Η χρήση τους στα πλαίσια της επιχειρησιακής επικοινωνίας*, (σημειώσεις)

Παναγιωτοπούλου Ρ., *Η επικοινωνία στις Οργανώσεις*, εκδόσεις Κριτική ΑΕ, Αθήνα, 1997

## 9.4. Special Issues in Operations Management

**(1) GENERAL**

| | | | | |
|---|---|---|---|---|
| **SCHOOL** | OF ENGINEERING | | | |
| **ACADEMIC UNIT** | FINANCIAL AND MANAGEMENT ENGINEERING | | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | | |
| **COURSE CODE** | **ΔΕ0119** | **SEMESTER** | **9** | |
| **COURSE TITLE** | ADVANCED SUBJECTS IN OPERATIONS MANAGEMENT | | | |
| **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** |
| | | | 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* | General Background | | | |
| **PREREQUISITE COURSES:** | NONE | | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK-ENGLISH | | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | YES | | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/courses | | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| The aim of this course is to present advanced subjects in operations management. The main focus is on process-operations modeling, analysis and management for continuous improvement . At the end of the course the student should be able to understand and elaborate on:<br>• Advanced issues in operations management<br>• Choosing appropriate methodologies and tools (costing, quality, project management etc.) in operations management<br>• The importance of human resources in operations management<br>• The importance of quality management and project management in operations management<br>• The use of information systems and ERP systems n operations management |

**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
- Use of Information and ERP systems
- Decision Making
- Team Work
- Project Planning and Management

**(3) SYLLABUS**

The course modules are:

1.1 Introduction to Advanced Subjects in Operations Management
1.2 Products and Services and their role in Operations Management
1.3 Strategy in Operations Management
1.4 Operations-Process Management
1.5 Operations-Process Costing and Analysis
1.6 Performance Measurement
1.7 Human Resources in Operations Management
1.8 Quality Management
1.9 The Role of Standards in Operations Management
1.10 Project Management
1.11 Special Issues in Operations Planning
1.12 Information Systems and ERP in Operations Management
1.13 Case Study

**(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 |
| **TEACHING METHODS** *The manner and methods of teaching are described in detail.* | |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lecturing | 39 |
| Essay Writing | 111 |
| Course total | ***150*** |

| | |
|---|---|
| *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.*<br><br>*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**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | |

| ***Τύπος εξέτασης*** | ***Ποσοστό (%)*** |
|---|---|
| Final Exams | 70% |
| Team Essay | 30% |
| | |
| Total | 100% |

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*


- Red Dan R., Sanders Nada R. (2012). Operations Management: An Integrated Approach 5th Edition. John Wley & Sons.
- M. Glykas (2013) Business Process Management: Theory and Applications. Springer
- Eliyahu M. Goldratt(2004) The Goal: A Process of Ongoing Improvement, North River Press
- Jacobs F.R., Chase, R.B. & Aquilano N.J.(2007) Operations and Supply Management, 12th Edition, McGraw Hill International Edition, ISBN 978 007 128804 0
- William J. Stevenson (2007) Operations Management, 9th edition, McGraw Hill
- David Walters (2007) Operations Management: A value chain approach, New York: Palgrave MacMillan

## 9.5. Environmental Systems Design and Implementation

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Engineering | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | ΓΕ0117 | SEMESTER | 9 |
| **COURSE TITLE** | Environmental Systems Design and Implementation | | |

| **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** |
|---|---|---|
| | 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* | General background, special background, specialized general knowledge |
| **PREREQUISITE COURSES:** | No |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/environmental-systems-design-and-implementation |

**(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 this course is the comprehension of operation of environmental systems and to give a better understanding of the critical environmental problems that face our world. After successful completing the course, students will be expected to be able to:

- Understands the basic concepts used in environmental science

- Face environmental science as an interdisciplinary study that combines knowledge and information from the physical sciences, such as biology and geology and from the social sciences, such as economics, politics and ethics in order to give an overview of how nature works and how everything interlock
- Understand the operation of environmental systems
- Analyze critical environmental issues
- Understand the reasons of environmental problems
- Understand the importance of natural resources
- Estimate populations changes
- Understands the concept of alternative sustainable strategies and their impact on development and the environment
- Understand the role of policy to the environment
- Understand the basic principles of environmental protection
- Understand the basic processes applied in anti-pollution technology
- Understand the environmental impact assessment procedure
- Understand the risks and toxicity to human health caused by the degradation and deterioration of ecosystems
- Enhance environmental consciousness

**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
Adapting to new situations
Decision-making
Project planning and management
Respect for the natural environment
Criticism and self-criticism
Production of free, creative and inductive thinking

**(3) SYLLABUS**

Throughout this course, students will get insight into the theory and practice of environmental systems. Sustainable strategies that contribute to the development and growth of Society in balance with the environment are examined. Close attention is also paid to the way that human, social, political, economic, and ethical institutions influence natural systems.

Module Contents (Syllabus):

| |
|---|
| The concept of the environment, Environmental-ecological movement , The environmental theory of social balance |
| The environmental problems and their causes , Environmental systems |
| Natural Resources – Sustainability of ecosystems |
| Solid waste management system, Recycling, Alternative Packaging Management System and other products, Population Estimates |
| Water pollution - Water resources management system |
| Environmental quality assurance systems |
| Intermediate examination |
| Environmental impact assessment<br>The environmental licensing process for projects and activities |
| Energy, environment and sustainable development |
| Air and pollution of the atmosphere |
| Risks, toxicity and human health |
| Economy and environment, Politic and environment |
| Projects presentation |

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT in teaching |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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***<br>Lectures: 39<br>Study and analysis of bibliography: 80<br>Homework: 38<br>Examinations: 3<br>Course total: 160 |
| **STUDENT PERFORMANCE EVALUATION** | |

| | |
|---|---|
| *Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Homework and intermediate examinations at the end of the semester, which include questions (development), knowledge and understanding of the content of the course, and problem solving. |

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*

Βιώνοντας στο Περιβάλλον I - Αρχές Περιβαλλοντικών Επιστημών (G. Tyler Miller, JR, 1999 )
Βιώνοντας στο Περιβάλλον II - Προβλήματα Περιβαλλοντικών Συστημάτων (G. Tyler Miller, JR, 2009)
Περιβαλλοντικές Επιστήμες (G. Tyler Miller, JR, 2006)
Περιβαλλοντική Επιστήμη - Προς ένα Βιώσιμο Περιβάλλον (R. T. Wright, D.F. Boorse, 2013)
Notes

Additional References:

Περιβαλλοντικά μοντέλα: Τύχη & μεταφορά ρύπων στον αέρα, νερό και έδαφος (J. L. Schnoor, 2003)
Αειφορία & περιβάλλον: Η Ευρωπαϊκή και εθνική προοπτική (Γ. Ι. Τσάλτας, Κ. Γ. Κατσιμπάρδης, 2004)

*- Related academic journals:*

Ecological Economics
Energy Policy
Environmental Pollution
Environmental Impact Assessment Review
Water Policy
Solid State Sciences

## 9.6. Business Process Management Systems

**(1) GENERAL**

| | | | | |
|---|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | | |
| **ACADEMIC UNIT** | FINANCIAL AND MANAGEMENT ENGINEERING DPT | | | |
| **LEVEL OF STUDIES** | UNDER-GRADUATE (Elective Stream Module) | | | |
| **COURSE CODE** | ΓΕ0171 | **SEMESTER** | **9** | |
| **COURSE TITLE** | BUSINESS PROCESS MANAGEMENT SYSTEMS (BPMS) | | | |
| **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** |
| | | | 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/Special background/Skills development | | | |
| **PREREQUISITE COURSES:** | | | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek (teaching material in English) | | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes | | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/el/c/bpms | | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>***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.***<br>***Consult Appendix A***<br>• ***Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area***<br>• ***Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B***<br>• ***Guidelines for writing Learning Outcomes*** |
| This course provides a set of fundamental concepts for understanding Business Process Management (BPM) and Business Process Management Systems (BPMS), business process modeling, process automation, enactment and use.<br>Course topics:<br>o Enterprise IT Systems (ERPs, CRMs etc.), the concept of "business-IT alignment" and the need for an Enterprise Application Integration (EAI). EAI and BPMS.<br>o Business Process Analysis<br>o Business Process Design by using: |

- BPMN
- XML and Web Services
- E-Forms for interaction with human participants

- Best practices and techniques for modeling business processes:
  - Methods and examples
  - "Hands-on" experience: create business process models by using BMPS software
- Strategies for orchestrating enterprise IT systems and human activity through Business Process Management Systems
- Familiarization with practical use of BPM in:
  - e-business
  - e-government 2.0

On successful completion of the course, students will be able to:

5. Understand the managerial and technical issues related to the applications of Business Process Management (BPM) and Business Process Management Systems (BPMS) in the modern business and government organization (while acquiring sufficient cross-disciplinary theoretical and conceptual background).
6. Familiarize with business process analysis.
7. Derive business requirements for successful BPM innovation by comparing “as-is” and “to-be” process models.
8. Acquire modeling knowledge and skills, and use these methods and skills in business process model design and execution.
9. Understand the various evolution stages of a business process model and the complex life cycle of business process automation.

**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
- Adapting to new situations
- Technical understanding of business strategies
- Hands-on experience with the use of technical systems
- Working independently
- Team work
- Working in an international environment
- Working in an interdisciplinary environment
- Production of free, creative and inductive thinking

**(3) SYLLABUS**

D. Lectures 1,2: Enterprise Information Systems and Enterprise Integration Architectures. The role of Business Process Management as an enterprise integration facility
E. Lecture 3: BPM, Business Processes and Business Process Models
F. Lectures 4 ,5, 6: Business Process Analysis - Business Process Modeling by using BPMN (Introduction)
G. Lectures 7 & 8: Business Process Modeling by using BPMN (In detail) – including e-forms for human participants
H. Lectures 9, 10, 11: Business Process Modeling (Hands-On)
I. Lectures 12 & 13: Process modeling in depth and sum-up

**(4) TEACHING and LEARNING METHODS - EVALUATION**

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td>Face to face. Teaching methods for this course are based on lectures, discussion of case studies and code development. Active student participation is essential and helps students understanding the basic concepts and tools of the course.</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td>Use of ICT in teaching, process design and communication with students</td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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>39</td></tr>
<tr><td>Study and Analysis of Bibliography</td><td>39</td></tr>
<tr><td>Exercises and Preparation for the course</td><td>39</td></tr>
<tr><td>OneNote document for reporting work in the course</td><td>5</td></tr>
<tr><td>Sum-up</td><td>25</td></tr>
<tr><td>Exams</td><td>3</td></tr>
<tr><td>Course total</td><td>150</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br><br>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,</td><td>Student assessment is made as follows:<br>• Final exam: 60%<br>• Class Participation and Homework -- included the development of an OneNote document (20%)<br>• Assignments (20%)<br><br>A necessary prerequisite for taking into consideration the score of the Assignment in the final mark is that students should receive at least 4/10 in the final exams.</td></tr>
</table>

| | |
|---|---|
| *clinical examination of patient, art interpretation, other*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | |

**(5) ATTACHED BIBLIOGRAPHY**

- Suggested bibliography:

M. Weske, 2007, Business Process Management: Concepts, Languages, Architectures, Springer, Κεφ. 1,3 & 4.7

- Related academic journals:

BPMN1.1, OMG Specification, Feb 2008
BPMN2.0. OMG Specification, March 2011
BPMN2.0 by example, non-normative OMG document
Paper: Business Process Paradigms, 2016, Springer

## 9.7. Money – Credit – Banking

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | ENGINEERING | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FINANCIAL AND MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | OI0119 | SEMESTER | 9 |
| **COURSE TITLE** | Money-Credit-Banking | | |

| **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** |
|---|---|---|
| | 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:** | Knowledge from other courses: financial analysis, macroeconomics, portfolio management |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/money-credit-and-banking |

**(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*

Banks play a significant role in the financial system, and this course examines the financial intermediation channel. A successful student should be able to:

- analyze the financial system, focusing on the financial intermediation,
- highlight the role of the financial system,
- present the basic banking instruments,
- show what happens in an economy when the banking instruments are not used properly,
- criticize the contemporary banking system, and the regulatory framework.

**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
- 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
- Criticism and self-criticism
- Production of free, creative and inductive thinking

**(3) SYLLABUS**

Economic Activity and Banking. Banking and Financial Intermediation. Bank Instruments, products, accounts. Interest Rates and Banking. Bank Risks – CAMELS rating system. Credit Risk and Modelling. Credit Risk and Securitization. Interest Rates and Hedging. Banks, Exchange Rates and Risk Hedging. Market and Liquidity Risk. The role of Central Banks. Basel I, II, and III. Banking Crises.

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | **Face to face** |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | **Use of ICT in teaching.**<br>**Use of ICT in laboratory education.** |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational* | |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures/Laboratory practice | 39 |
| Study and analysis of the bibliography | 90 |
| Projects | 18 |
| Final exam | 3 |
| | |
| | |

| | |
|---|---|
| *visits, project, essay writing, artistic creativity, etc.*<br><br>*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* | <table><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>Course total</td><td>150</td></tr></table> |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Written examinations at the end of the semester, in Greek, which include questions of knowledge development and understanding of the content of the course, as well as problem solving.<br><br>Final Grade: 100% final exam. |

**(5) ATTACHED BIBLIOGRAPHY**

- *Suggested bibliography:*


Sapountzoglou G. & Pentotis H., (2017) "*Banking Economics*", Benos Publications.

Siriopoulos K. and Papadamou S. (2014) Introduction to Banking and Capital Markets, Utopia Publications.

Antzoulatos A. (2020). Banking, Kontou A. Publications.

Howells P., & Bain K. (2009). Money, Credit , Banks: A European Approach, Kritiki Publications.

Christopoulos A. & Dokas I (2012) Issues in Banking and Finance, Kritiki Publications.

## 9.8. Financial Risk Analysis and Management

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FINANCIAL AND MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **OI0112** | **SEMESTER** | **9** |
| **COURSE TITLE** | Financial Risk Analysis and Management | | |
| **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** |
| | | | |
| | | 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:** | ● PROBABILITIES<br>● STATISTICS<br>● DERIVATIVES AND NEW FINANCIAL PRODUCTS | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | YES | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/financial-risk-analysis-and-management | | |

### (2) LEARNING OUTCOMES

| |
|---|
| **Learning outcomes**<br>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.<br>Consult Appendix A<br>● Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area<br>● Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B<br>● Guidelines for writing Learning Outcomes |
| The course is addressed to undergraduate students of the Financial Engineering track. Its main objective is to introduce the student to the key issues of financial risk analysis and management. More specifically, the student will be able, after associating the concept of risk with the concept of probability, to use both measurement and management – hedging techniques of financial risks. The student, upon successful completion of the course, will be able to:<br>● Understand the concept of risk and its distinction from the concept of uncertainty. |

- Familiarize himself/herself with the key financial risks:
  - Credit risk.
  - Interest rate risk.
  - Liquidity risk.
  - Operational risk.
  - Market risk.
- To know and be able to apply the various techniques of financial risks measurement.
- To fully understand the way in which the modern financial instruments (eg Derivatives) are used to hedge financial risks (eg Credit Default Swaps, Interest Rate Swaps, etc).
- To become familiar with the concept of Value-at-Risk (VaR) and its variants, to know and be able to apply different ways of calculating and estimating it, and to understand its usefulness in measuring the financial risk.

**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<br>Respect for difference and multiculturalism<br>Respect for the natural environment |
| Adapting to new situations | Showing social, professional and ethical responsibility |
| Decision-making | and sensitivity to gender issues |
| Working independently | Criticism and self-criticism |
| Team work | Production of free, creative and inductive thinking |
| Working in an international environment | …… |
| Working in an interdisciplinary environment | Others… |
| Production of new research ideas | ……. |

- 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
- Criticism and self-criticism
- Production of free, creative and inductive thinking

**(3) SYLLABUS**

Introduction to the concept of risk and its distinction from the concept of uncertainty. Basic descriptive risk measures. Interest rate risk. Interest rate risk management. Credit risk. Credit risk management. Liquidity risk. Liquidity risk management. Operational risk. Market risk I. Market risk II: Introduction to the concept of value-at-risk (VaR). VaR-I specific issues: Marginal and incremental VaR. VaR-II Special Issues: The case that fluctuations and correlations are functions of time. VaR-III Special Issues: Historical simulation and Monte-Carlo simulation.

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>**Face-to-face, Distance learning, etc.** | Face to face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY** | **Use of ICT in teaching.**<br>**Use of ICT in laboratory education.** |

| | |
|---|---|
| **Use of ICT in teaching, laboratory education, communication with students** | |
| **TEACHING METHODS**<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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 | <table><tr><th>*Activity*</th><th>*Semester workload*</th></tr><tr><td>Lectures/Laboratory practice</td><td>39</td></tr><tr><td>Study and analysis of the bibliography</td><td>90</td></tr><tr><td>Projects</td><td>18</td></tr><tr><td>Final exam</td><td>3</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>Course total</td><td>**150**</td></tr></table> |
| **STUDENT PERFORMANCE EVALUATION**<br><br>Description of the evaluation procedure<br><br>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<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students. | Written examinations at the end of the semester, in Greek, which include questions of knowledge development and understanding of the content of the course, as well as problem solving.<br><br>Additional assessment of candidates on the basis of projects given on a regular basis. |

**(5) ATTACHED BIBLIOGRAPHY**

- *Suggested bibliography:*


- Διαχείριση τραπεζικών και χρηματοοικονομικών κινδύνων (2010). Ν. Σχοινιωτάκης και Γ.Συλλιγάρδος. Εκδόσεις Δίσιγμα.

- Διαχείριση χρηματοοικονομικών κινδύνων με το MATLAB: Μια εφαρμοσμένη προσέγγιση (2009). Α. Ζαπράνης. Εκδόσεις Κλειδάριθμος.

- *Financial risk manager handbook, second edition (2003). P. Jorion. Wiley*

## 9.9. Project Management

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | Engineering | | |
| **ACADEMIC UNIT** | Financial & Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | **ΔΕ0102** | **SEMESTER** | **9** |
| **COURSE TITLE** | Project Management | | |

| **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** |
|---|---|---|
| Credits are awarded for the whole course | 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* | Specialised general knowledge |
| **PREREQUISITE COURSES:** | None |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/project-management |

**(2) LEARNING OUTCOMES**

| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
|---|
| By completing this module, each student will be able to:<br>• Understand the fundamentals of project management<br>• Plan a project in a correct manner by taking into consideration time, cost, and quality. Manage also the risks of a project<br>• Accomplish successfully a project by taking into consideration project planning (processes, teams), project management and control of sound execution<br>• Implement the main methods and techniques of project management such as PERT, Gantt Chart, Work Breakdown Structure, CPM method, budget planning, etc.<br>• Problem solving and decision making concerning the execution of a project |

- Use of software tools (MS-Project) in order to plan and execute a project efficiently

**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…* |
| | *…….* |

- Project planning and execution
- Decision making
- Team work
- Search for, analysis and synthesis of data
- Application of optimization methods and techniques
- Choose and assess of operations tools for project management
- Production of free, creative and inductive thinking

**(3) SYLLABUS**

Most companies and organisations understand that they are based on projects, which means that the majority of their operations, that have a significant added-value, are based on projects. The main aim of this course is the understanding of the role of project management as well as of the tool and techniques that can be used for optimal project planning and assessment such as CPM, PERT, Gantt chart, project budgeting process, etc. The course includes an overview of project management processes such as project planning, project execution, as well as special knowledge that deal with the competences and skills that a Project Manager should have such as control techniques, human resource planning, problem solving, and decision making. Last but not least, the course includes a laboratory part where students work on real-life projects by using MS-Project software tool.

The syllabus of the course is as follows:

- Introduction to project management: Definitions and main characteristics
- Strategic project management
- Time management
- Cost and quality planning
- Plan analysis and risk assessment
- Project management: processes and teams
- Management and leadership in a project environment
- Project control
- Problem solving and decision making
- Project finalization and re-assessment

**(4) TEACHING and LEARNING METHODS - EVALUATION**

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td>• Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td>Use of ICT in teaching, laboratory education</td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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>30</td></tr>
<tr><td>Self-study</td><td>60</td></tr>
<tr><td>Case studies</td><td>57</td></tr>
<tr><td>Team project</td><td>50</td></tr>
<tr><td>Final exam</td><td>3</td></tr>
<tr><td>Course total</td><td>200</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br><br>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<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>
<table>
<tr><th>Evaluation type</th><th>Percentatge (%)</th></tr>
<tr><td>Exams (mid-term and final)</td><td>80%</td></tr>
<tr><td>Team project</td><td>20%</td></tr>
<tr><td>Total</td><td>100%</td></tr>
</table>
<br>The evaluation criteria described above are available in the webpage of the course</td></tr>
</table>

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*


- Maylor, H. (2003) "Project Management», 3rd English edition, Kleidarithmos Publications, ISBN 960-209-853-8 (In Greek)
- Jack R. Meredith, J.R., Mantel Jr., S.J. (2008) Project Management: A Managerial Approach, Wiley publications
- Kerzner, H. (2009) Project Management Case Studies, Wiley publications

- PMI (2008) Project Management Body of Knowledge, Project Management Institute, USA
- Kyrittopoulos, K. (2006), Handbook of Project Risk Management" Kleidarithmos Publications (In Greek)

*- Related academic journals:*

- International Journal of Project Management
- International Journal of Project Organisation and Management
- International Journal of Managing Projects in Business
- The Journal of Modern Project Management
- Project Management Journal (PMI)
- International Journal of Information Systems and Project Management
- International Journal of Information Technology Project Management

## 9.10. Banking Products and Services

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | OF ENGNEERNG | | |
| **ACADEMIC UNIT** | FINANCIAL AND MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **ΓΕ0127** | **SEMESTER** | **9** |
| **COURSE TITLE** | BANKING PRODUCTS AND SERVICES | | |

| **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** |
|---|---|---|
| | 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* | GENERAL BACKGROUND |
| **PREREQUISITE COURSES:** | NONE |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK-ENGLISH |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | YES |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/el/courses |

**(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 introduce the banking system. The role of Central Banking is explained as well as its connection with banks and governmental entities. The typical organizational structure of a retail bank is presented as well as its core and supporting processes. There is a detailed presentation of products and services offered by banks with particular emphasis on products related to financial and management engineers (project financing, insurance etc.). All products and services are further explained with the use of well established banking distribution channels like e-banking, m-banking and selected examples and case studies.

After completing the course the student will be able to:

1. Understand the banking system and its role to the economy,
2. Know the typical organizational structure and processes of a retail bank,
3. Know the basic and well known banking products and services and their usage to issues related to financial and management engineering,
4. Understand issues related to banking risk management

**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
- Project planning and management
- Respect for difference and multiculturalism
- Criticism and self criticism
- Team work

**(3) SYLLABUS**

Introduction to the Banking System and the role of Banks
The role of Central Bank and Banking
Categories of Banking Products and Services
Deposit Products
Credit Products
Investment Products
Banking Risk-Credit Risk
Organizational Structure of Retail Banks
Retail Banking Processes
Banking Information Systems, e-banking, m-banking
Banking Managerial Systems
Banking Chart of Accounts Analysis
Project Financing Case Studies

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to Face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory* | **Use of ICT in Teachning** |

| | |
|---|---|
| *education, communication with students* | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | <table><tr><th>*Activity*</th><th>*Semester workload*</th></tr><tr><td>Lecturing</td><td>39</td></tr><tr><td>Project Essay Writing</td><td>111</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>Course total</td><td>***150***</td></tr></table> |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | 1. Team Essay (25%)<br>2. Final Exams (75%) |

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*

Omarini A., Retail Banking, Business Transformation and Competitive Strategies for the Future. Pelgrave Macmillan, 2015

Padmalatha Suresh, Justin Paul, Management of Banking and Financial Services, 2nd Edition. O'reilly, 2010.

*- Related academic journals:*

1. **Journal of Banking and Finance. Elsevier.**
2. **Journal of Money, Credit and Banking. Wiley.**
3. **International Journal of Central Banking. BIS.**
4. **Banking and Financial Services Policy Report.** Wolters Kluwer Legal

## 9.11. International Macroeconomics and Finance

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | ENGINEERING | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FINANCIAL AND MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | OI0113 | SEMESTER | 9 |
| **COURSE TITLE** | International Macroeconomics and Finance | | |

| **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** |
|---|---|---|
| | 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:** | Knowledge from other courses: financial analysis, macroeconomics, portfolio management |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/international-macroeconomics-and-finance |

**(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 consists in introducing the basic concepts of International Macroeconomics and Finance. These concepts are significant for financial decisions. A successful student should be able to:

- understand how macroeconomic policies and the global money and capital markets work,
- explain how the changes in interest rates, prices impact on exchange rates,
- compare the systems of fixed and floating exchange rates,
- deal with issues as pandemics, financial crises, natural disasters etc, and

- be able to study the influence of several factors, such as governance quality, in exchange rate.

**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
- Adapting to new situations
- Decision-making
- Working independently
- Teamwork
- Working in an international environment
- Working in an interdisciplinary environment
- Production of new research ideas
- Criticism and self-criticism
- Production of free, creative and inductive thinking

**(3) SYLLABUS**

Global Macroeconomy. Exchange rates: essentials. Exchange Rates I: the monetary approach in the long run. Exchange Rates II: the asset approach in the short run. National and International Accounts: Income, Wealth and the Balance of Payment. Balance of Payments I: the gains from financial globalization. Balance of payments II: output, exchange rates and macroeconomic policies in the short run. Fixed versus Floating: international monetary experience. Exchange rate crises: how pegs work and how they break. The Euro. Topics in International Macroeconomics.

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | **Face to face** |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | **Use of ICT in teaching.**<br>**Use of ICT in laboratory education.** |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements,* | |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures/Laboratory practice | 39 |
| Study and analysis of the bibliography | 90 |
| Projects | 18 |

| | |
|---|---|
| *clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.*<br><br>*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* | Final exam: 3<br>Course total: **150** |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Written examinations at the end of the semester, in Greek, which include questions of knowledge development and understanding of the content of the course, as well as problem solving.<br><br>Final Grade: 100% final exam. |

**(5) ATTACHED BIBLIOGRAPHY**

- *Suggested bibliography:*


Feenstra C. Robert, Taylor M. Alan (2012). International Economics, Epikentro Publications.

Antzoulatos A. (2011) Governments, Financial Markets and the Macroeconomy, Diplographia Publications.

Salvatore Dominick (2017). International Economics, Tziola Publications.

Krugman Paul, Obstfeld Maurice, Melitz Marc (2016). International Economics, Kritiki Publications.

Leventakis I. (2017). International Macroeconomics and Finance. Εκδόσεις UNIBOOKS Publications.

## 9.12. Energy Systems Theory and Applications

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Engineering | | |
| **DEPARTMENT** | Financial and Management Engineering | | |
| **ACADEMIC UNIT** | Chios | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | **ΓΕ0169** | **SEMESTER** | 9 |
| **COURSE TITLE** | **Energy Systems: Theory and Applications** | | |
| **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** |
| | | 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* | *Specialised general knowledge (General Elective)* | | |
| **PREREQUISITE COURSES:** | None | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | ---------- | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/energy-systems-theory-and-applications | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| By the end of the course students should be capable to:<br>• Know what are the energy sources used in the world today, their advantages and disadvantages, reserves, consumption in Greece and worldwide.<br>• Recognize if a specific energy need can be fulfilled by renewable sources. |

- To understand how the Sun supplies energy to the Earth. They will have heard about the black body radiation theory, and the radiation laws.
- They will hear again about the methods of heat transmission (they have already heard about this in the Thermodynamics course). They will be able to use elements of thermodynamics to estimate thermal loads, building insulation, water heating, etc.
- Understand how a wind turbine operates, and what are the involved quantities and sizes.
- Understand how the photovoltaics operate. They will have heard elements of solid state physics theory.
- Understand how the nuclear reactors operate and what are the advantages and disadvantages. They will have heard elements of nuclear physics theory.
- Have a more scientifically based opinion on greenhouse effect and climatic change.

**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?*

*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*
*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*

- *Production of free, creative and inductive thinking*

**(3) SYLLABUS**

The general issue of producing and using energy is being examined. Predominant forms of energy production. Trends of energy production and consumption. What are the alternative solutions. Renewable sources of energy. Elements of fluid mechanics, heat transmission. Physics principles for renewable energy production. Advantages and disadvantages, perspectives. Economic, environmental and social impact. Focus on wind and photovoltaic energy production. Short introduction to nuclear energy. Discussion on energy storage systems and connecting to the electricity distribution network.

Introduction to renewable energy sources – Heat Transfer – Solar Radiation – Heating of Buildings – Solar Collectors - Concentrated solar collectors – Atomic Theory - Photovoltaic conversion – Fluid Mechanics – Introduction to wind energy – Wind Generators for electrical energy production – Nuclear Energy – Nuclear Power Plants – Energy Storage and Transportation

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | *Face-to-face. Extensive use of teleconferencing platforms to deliver lectures via internet* |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | *Extensive use of teleconferencing platforms to deliver lectures via internet, conduct exams and communicate with students* |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.* | ***Activity*** \| ***Semester workload*** |

| | |
|---|---|
| *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.*<br><br>*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* | *Lectures* 4<br>*Exams,* 1<br><br><br><br><br>Course total *5*<br><br> |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | *One final exam* |

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*

**A) Principal Reference:**


- Energy and environmental physics (in Greek) — Athanasios Argyriou, Mirsini Giannouli
- Renewable energy resources (in English) — John Twidell, Tony Weir
- Lecturer's notes (mainly greek)


**B) Additional References:**


- Renewable energy resources (in greek) — Th. Tsoutsos, I. Kanakis
- Renewable energy, 3rd edition (in English) — Bent Sorensen
- Energy management and renewable energy resources (in Greek) — Eva Maleviti
- Climatic change - Sustainable development and renewable energy resources (in Greek) — Mary Ananiadou-Tzimopoulou, Sotiris Tsiouris

# 10. Course Outlines for Semester J

## 10.1. Risk Analysis

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Engineering | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | **ΔΕ0111** | **SEMESTER** | **10** |
| **COURSE TITLE** | Risk Analysis | | |

| **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** |
|---|---|---|
| *Credits are awarded for the whole of the course* | 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 |
| **PREREQUISITE COURSES:** | None |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/risk-analysis |

**(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 learning outcomes of this course that the students will acquire with the successful completion of the course are as follows:

- Understanding of the meaning of crisis
- Understand the main principles of risk analysis
- Methods for crisis management
- Learn and apply certain quantitative methods for identifying, assessing and managing risks in projects, processes, products, services, etc.
- Hands on experience in crisis management issues in multiple fields

**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…* |
| | *…….* |

- Decision making
- Team work
- Search for, analysis and synthesis of data
- Application of optimization methods and techniques
- Choose and assess of operations tools for business management
- Production of free, creative and inductive thinking

**(2) SYLLABUS**

| ΕΒΔΟΜΑΔΑ | ΠΕΡΙΕΧΟΜΕΝΟ ΜΑΘΗΜΑΤΟΣ |
|---|---|
| 1 | 1. Introduction to the course<br>2. Main characteristics of Risk analysis and risk management.<br>3. Definitions |
| 2 | 4. Process planning of risk management<br>5. Types of risks |
| 3 | 6. Risk identification<br>7. Methods for risk identficiation |
| 4 | 8. Risk analysis (qualitative)<br>9. Consequences |
| 5 | 10. Risk analysis (quantitative)<br>11. Cost-benefit analysis. |
| 6 | 12. Resistance to risk<br>13. Strategy for risk management and tackling |
| 7 | 14. Monitoring and control<br>15. Maturity of an organisation in terms of risk management |
| 8 | 16. Special issues – Crisis management<br>17. Special issues– Communicating risk issues |
| 9 | 18. Human perception for risk<br>19. Risk analysis systems using Failure Mode and Effect Analysis method |
| 10 | 20. Ποσοτική ανάλυση κινδύνων στις στρατηγικές αποφάσεις<br>21. Risk analysis and investments<br>22. Course work |
| 11 | 23. Presentation of cases studies from students (Part A) |

| | |
|---|---|
| 12 | 24. Presentation of cases studies from students (part B) |
| 13 | 25. Review of risk analysis main characteristics<br>26. Q&A – comments – final review of the module |

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT for teaching and communication with students |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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***<br>Lectures: 39<br>Self-study: 50<br>Case studies: 30<br>Mid-term exam: 3<br>Essay writing: 25<br>Final exam: 3<br>Course total: 150 |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | ***Evaluation type*** / ***Percentatge (%)***<br>Final exams: 50%<br>Mid-term exams: 20%<br>Team project: 30%<br>Total: 100%<br><br>The evaluation criteria described above are available in the webpage of the course |

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*

- Project risk management, C. Chapman, S. Ward, Publisher Epikedro.

*- Related academic journals:*

- Manual for project risk management, K. Kyrittopoulos, Publisher Klidarithmos
- Risk Analysis: A Quantitative Guide, David Vose, 2000, John Wiley.
- Effective Opportunity Management for Projects: Exploiting Positive Risk, David Hillson, 2004, CRC Press LLC.
- Project Management Body of Knowledge, PMI, 2008, Project Management Institute, USA.

## 10.2. Entrepreneurship

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | FINANCIAL AND MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **ΓΕ 0157** | **SEMESTER** | **10** |
| **COURSE TITLE** | **ENTREPRENEURSHIP** | | |

| **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* | GENERAL KNOWLEDGE |
| **PREREQUISITE COURSES:** | NO |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | NO |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/c/entrepreneurship |

**(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 conceptual framework, and the content of business environment. Additionally, the module introduces them to the basic aspects of business development and the process of establishing and developing a business, by identifying the business opportunity and implement the business plan. For a further knowledge of the relevant issues, the student will also be informed of some practical dimensions of modern entrepreneurship, which relate to the business networks, as well as new forms of business financing.

**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…* |
| | *…….* |

- *Production of free, creative and inductive thinking*
- *Search for, analysis and synthesis of data and information, with the use of the necessary technology*
- *Working independently*
- *Team work*
- *Criticism and self-criticism*

**(3) SYLLABUS**

1st lecture: Introduction

2nd lecture: Entrepreneurship and Economy
**Game 1**

3rd lecture: Business Plan I (Structure)

4th lecture: Business Plan II (Market research, Competitive advantage)
**Game 2**

5th lecture: Business Plan III (Marketing- Pricing – Communication – Sales)

6th lecture: Business Plan IV (Costs, Taxation)
**Game 3**

7th lecture: Financing – Alternative ways for Funding

8th lecture: Female Entrepreneurship - GUEST LECTURER
**Game 4**

9th lecture: Clusters

10th lecture: Industrial zones

11th lecture: International Entrepreneurship - GUEST LECTURER
**Game 5**

12th lecture: e – Entrepreneurship, Social-entrepreneurship

13th lecture: Conclusion – Past exam papers

**(4) TEACHING and LEARNING METHODS - EVALUATION**

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td>Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td>Use of ICT in teaching, laboratory education, communication with students</td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br>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>39</td></tr>
<tr><td>Case study analysis</td><td>41</td></tr>
<tr><td>Study Hours</td><td>45</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>125</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION</td><td>Evaluation in Greek<br><br>Evaluation with short-answer and open-ended questions<br><br>Evaluation with semester project</td></tr>
</table>

**(5) ATTACHED BIBLIOGRAPHY**

***Suggested bibliography***


**Entrepreneurship, 2nd Edition**
Mariotti Steve - Glackin Caroline
Tziolas Editions

**Innovation and Entrepreneurship**
Bessant J. -Tidd J.
Tziolas Editions

**Entrepreneurship**
David Deakins, Mark Freel
Kritiki Editions

**Entrepreneurship**
P.Petrakis
Edition: P.Petrakis

**Entrepreneurship**
Storey David, Greene Francis
Kritiki Editions

## 10.3. Computer Networks and Communications

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | FINANCIAL AND MANAGEMENT ENGINEERING DPT | | |
| **LEVEL OF STUDIES** | UNDER-GRADUATE (Elective Module) | | |
| **COURSE CODE** | ΓΕ0136 | **SEMESTER** | **10** |
| **COURSE TITLE** | COMPUTER NETWORKS AND COMMUNICATIONS | | |

| **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** |
|---|---|---|
| | 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/Special background/Skills development |
| **PREREQUISITE COURSES:** | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek (teaching material in English) |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/el/c/diktua-upologiston-epikoinonies |

**(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***

This course provides a set of fundamental concepts for understanding Data Networks, the Internet (especially the TCP/IP protocols) and the evolution of innovation in network infrastructures, including the recent wave of blockchain.

On successful completion of the course, students will be able to:

Understand the design principles of Data Networks and the architecture of the Internet while acquiring

sufficient theoretical and conceptual background .

Realize how the Internet is structured horizontally (as a netwrks of networks) and vertically (TCP/IP protocol stack)

Familiarize with probing the Internet by using the approprite traceroute tools

Acquire knowledge on the complex interconnectin agreements betweeen ISPs

Understand the various Intrernet innovation waves, including the latest blockchain innovation catalyst.

Acquire knowledge and skills for understanding the evolution of Internet structure and organization as well as the peculiar characteristics of information storage and processing in blockchain-based applications.

**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
- Adapting to new situations
- Technical understanding of business strategies
- Hands-on experience with the use of technical systems
- Working independently
- Team work
- Working in an international environment
- Working in an interdisciplinary environment
- Production of free, creative and inductive thinking

**(3) SYLLABUS**

Lectures 1: Introduction to Data Networks

Lectures 2 & 3: What is the Internet?

Lectures 4-7: The Internet structure and topology (ISPs, peering points, interconnection agreements) – Probing the Internet

Lectures 8, 9, 10: Internet Protocols in Detail - TCP/IP & application layer

Lectures 11, 12, 13: New innovations patterns: the blockchain

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face. Teaching methods for this course are based on lectures, discussion of case studies and code development. Active student participation is essential and helps students understanding the basic concepts and tools of the course. |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | Use of ICT in teaching, process design and communication with students |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Student assessment is made as follows:<br>• Final verbal exam (focus areas: Internet probing – blockchain applications): 50%<br>• Class Participation and Homework -- included the development of a an OneNote document (20%)<br>• Assignments (30%)<br><br>A necessary prerequisite for taking into consideration the score of the Assignment in the final mark is that students should receive at least 4/10 in the final exams. |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | 39 |
| Study and Analysis of Bibliography | 52 |
| Exercises and Preparation for the course | 26 |
| OneNote document for reporting work in the course | 5 |
| Sum-up | 25 |
| Exams | 3 |
| Course total | 150 |
| | |
| | |
| | |

**(5) ATTACHED BIBLIOGRAPHY**

- Suggested bibliography:

A. S. Tanenbaum, Computer Networks, 2010

- Related academic journals:

Paper: A study on traceroute potentiality in revealing the Internet AS-level topology, 2014, IEEE
Paper: An assessment of IP interconnection in the context of Net Neutrality, 2012, BEREC Report

Report: How blockchain technology could change our lives, 2017, European Parlement (Scientific Foresight Unit)
Paper: The Blockchain as a Software Connector, 2016, IEEE

## 10.4. Scientific Programming with Python

### (1) GENERAL

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Engineering | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | ΓΕ0175 | **SEMESTER** | 10 |
| **COURSE TITLE** | Scientific programming with python | | |

| **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** |
|---|---|---|
| | 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* | *specialised general knowledge* |
| **PREREQUISITE COURSES:** | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | |

### (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 examines the field of Algorithms and focuses on technologies for designing and implementing software applications. It is aimed at students who are about to develop software applications that require understanding and ability to write programs above the introductory level.

The student with the successful completion of the course is able:

- To introduce concepts and techniques related to the field of Algorithms
- To focus on software design and implementation technologies
- To learn methodologies for the development of software applications that require understanding and ability to write programs above the introductory

- To present skills for the use of specific architectural solutions in software design through the use of various Data Structures
- To teach methodologies for conducting research in the field of Algorithms and Software Development
- To enable students to implement a host of real-world applications that run in a modern programming environment and bring together the functionality provided by the Python programming language

**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*
- *Adapting to new situations*
- *Decision-making*
- *Working independently*
- *Production of new research ideas*
- *Project planning and management*
- *Production of free, creative and inductive thinking*

**(3) SYLLABUS**

Python is nowadays a highly popular and easy-to-use programming language with support from an active international community. Python is a powerful tool for computational thinking and scientific programming, as it offers the ability to easily write efficient code that resolves from simple to complex scientific problems.

The course content includes introductory knowledge of the Python syntax, but also covers stronger language features used in scientific programming, with emphasis on their application to data analysis.

Syllabus:

(a) Data structures
(b) Program control structures
(c) Functions and libraries
(d) Files and internet connection
(e) Object-Oriented Programming
(f) Permanent pickles, sql databases
(g) Regular expression (regex)
(h) Data processing and analysis with numpy, scipy, pandas
(i) Visualization of matplotlib data

(4) **TEACHING and LEARNING METHODS - EVALUATION**

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td>Face-to-face delivery and laboratory practice</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td>• Use of ICT in teaching (through PowerPoint presentations)<br>• Use of ICT in laboratory education (through specialized software tools)<br>• Use of ICT in communication with students (through eclass and email presentations)</td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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>39</td></tr>
<tr><td>Study and analysis of bibliography</td><td>55</td></tr>
<tr><td>Supervising of laboratory practise</td><td>55</td></tr>
<tr><td>Exams</td><td>3</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>152</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br><br>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<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>• Intermediate and final exams that include understanding of the content of the course, as well as problem solving.<br>• Laboratory works.<br>• Assessment of candidates based on their presence in the lectures.</td></tr>
</table>

**(5) ATTACHED BIBLIOGRAPHY**

- *Suggested bibliography:*

John V. Guttag , «Υπολογισμοί και προγραμματισμός με την Python», ISBN : 978-960-461-665-7
Αριστείδης Σ. Μπούρας - Ιωάννης Θ. Κάππος, «Αλγοριθμική και προγραμματισμός υπολογιστών σε Python», SBN : 978-960-461-804-0

## 10.5. Applied Matrix Theory

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Engineering | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | **ΓΕ0177** | **SEMESTER** | **10** |
| **COURSE TITLE** | Applied Matrix Theory | | |

| **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** |
|---|---|---|
| | 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* | General Background |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | |

**(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*

After the successful completion of the course the students will have a deep understanding of the course syllabus.

| **General Competences**<br>*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*<br>*Adapting to new situations*<br>*Decision-making*<br>*Working independently*<br>*Team work*<br>*Working in an international environment*<br>*Working in an interdisciplinary environment*<br>*Production of new research ideas* | *Project planning and management*<br>*Respect for difference and multiculturalism*<br>*Respect for the natural environment*<br>*Showing social, professional and ethical responsibility and sensitivity to gender issues*<br>*Criticism and self-criticism*<br>*Production of free, creative and inductive thinking*<br>*……*<br>*Others…*<br>*…….* |
| | |

**(6) SYLLABUS**

1. Norm and Inner Product in R^n
2. Matrices and Linear Transformations,
3. Matrix Rank,
4. Fundamental Subspaces,
5. Orthogonal Matrices,
6. QR Factorization,
7. Diagonalization of Symmetric Matrices,
8. SVD Factorization,
9. Applications

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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 | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| Course total | ***75*** |

| | |
|---|---|
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | 1. Weekly Assignments<br>2. Final Exam |

**(5) ATTACHED BIBLIOGRAPHY**

- *Suggested bibliography:* Strang G., Γραμμική Άλγεβρα και Εφαρμογές

- *Related academic journals:*

## 10.6. Mathematical Analysis

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Engineering | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | **ΓΕ0178** | **SEMESTER** | **10** |
| **COURSE TITLE** | Mathematical Analysis | | |

| **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** |
|---|---|---|
| | 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* | General Background |
| **PREREQUISITE COURSES:** | - |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No |
| **COURSE WEBSITE (URL)** | |

**(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*

After the successful completion of the course the students will have a deep understanding of the course syllabus. Moreover they will acquire an understanding of mathematical proofs.

| **General Competences**<br>*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*<br>*Adapting to new situations*<br>*Decision-making*<br>*Working independently*<br>*Team work*<br>*Working in an international environment*<br>*Working in an interdisciplinary environment*<br>*Production of new research ideas* | *Project planning and management*<br>*Respect for difference and multiculturalism*<br>*Respect for the natural environment*<br>*Showing social, professional and ethical responsibility and sensitivity to gender issues*<br>*Criticism and self-criticism*<br>*Production of free, creative and inductive thinking*<br>*……*<br>*Others…*<br>*…….* |
| | |

**(3) SYLLABUS**

The following notions are discussed in a rigorous manner:

1. Real Numbers,
2. Sequences and Series,
3. Continuous Functions,
4. Riemann Integral,
5. Derivative,
6. Sequences and Series of Functions

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*The student's study hours for each learning activity are given as well as* | |

| ***Activity*** | ***Semester workload*** |
|---|---|
| Lectures | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| Course total | ***75*** |

| | |
|---|---|
| *the hours of non-directed study according to the principles of the ECTS* | |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | 3. Weekly Assignments<br>4. Final Exam |

**(5) ATTACHED BIBLIOGRAPHY**

| |
|---|
| - *Suggested bibliography:* Σ. Νεγρεπόντης, Σ. Γιωτόπουλος, Ε. Γιαννακούλιας (1999), *Απειροστικός Λογισμός (Τόμοι Ι, ΙΙα, ΙΙβ)*, Εκδόσεις Συμμετρία<br><br>- *Related academic journals:* |

## 10.7. Services Marketing

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Engineering, University of Aegean | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | **ΓΕ0179** | **SEMESTER** | **10** |
| **COURSE TITLE** | Services' Marketing | | |
| **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** |
| | | 3 | 5 |
| **COURSE TYPE** *general background, special background, specialised general knowledge, skills development* | Specialised General Knowledge – General Elective Course | | |
| **PREREQUISITE COURSES:** | None | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | No | | |
| **COURSE WEBSITE (URL)** | | | |

**(2) LEARNING OUTCOMES**

| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
|---|
| Upon successful completion of the course, students will be able to:<br><br>• Understand the differences between Marketing of Services and Marketing of Products<br>• Learn what Digital Marketing for Businesses is and how to design a Digital Marketing Plan<br>• Identify critical factors that determine the success of Services' Marketing<br>• Categorize Services based on (a) their nature and (b) consumer purchasing behavior<br>• Understand the concept of Quality in Services and its value as a comparative competitive advantage.<br>• Be able to design the Marketing Strategy, pricing policies, organization and administration, ways and means of disposal, methods of effective communication and promotion of a Service.<br>• Choose the appropriate promotion tool based on the nature of the Service |

**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
- Adapting to new situations
- Decision-making
- Team work
- Working in an international environment
- Criticism and self-criticism
- Production of free, creative and inductive thinking

**(3) SYLLABUS**

Course Description

The aim of the course is to identify the strategic approach of Services' Marketing, highlighting the differences in philosophy and in the practices and methods with the Marketing of Products. The course also discusses the ways and methodology for the successful design, implementation and promotion of services.
More specifically, the course introduces Services Marketing and its strategic importance. Then it presents the criteria for service classification, the significant differences between services and products, as well as quality considerations in services. It analyzes new customer engagement strategies, the implementation of Market Research in Services, efficient portfolio management, pricing methods and policies and the factors that affect it, and the role of Digital Marketing services provision.

Course Outline
1 The main differences between products and services
2 Ways of Classifying Services.
3 New customer approach strategy
4 Analysis of critical P's regarding services
5 Management of the product portfolio in the provision of services
6 Pricing methods and policies. Alternative distribution strategies
7 Digital Marketing in Services
8 MARKETING Plan: Budget-Communication Plan - Marketing Mix
9 MARKETING Plan: Corporate Campaign - Media Performance Estimate - Final Plan
10 Digital Marketing Plan: Its basic building blocks
11 Positioning of the Company
12 Niche Marketing Opportunities
13 Methods to Extend Services to Existing Customers & New Customer Approach

**(4) TEACHING and LEARNING METHODS - EVALUATION**

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td>Face to face. Teaching methods for this course are based on lectures and presentation / discussion of case studies. Active student participation is essential and helps students understand the basic concepts and tools of the course. Furthermore, the presentation of case studies from the Greek and international business environment enables students to understand the complex processes in Services' Marketing and contributes to the critical evaluation of the various methods and approaches proposed and implemented.<br><br>The following teaching methods are applied:<br><br>• Lectures<br>• Presentation of case studies<br>• Team assignments<br>• Group Presentations</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td>Use of ICT in teaching<br>(slides and presentation of case studies via Youtube)</td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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>39</td></tr>
<tr><td>Study and Analysis of bibliography</td><td>20</td></tr>
<tr><td>Project work</td><td>20</td></tr>
<tr><td>Essay writing</td><td>28</td></tr>
<tr><td>Hours of non-directed study</td><td>30</td></tr>
<tr><td>Exams</td><td>3</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>140</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br><br>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</td><td>Language of evaluation: Greek<br>Student assessment is made as follows:<br>• Final exam: 70%<br>• Group Work Assignments: 30% (optional)<br><br>The work assignments aim to familiarize students with the theoretical issues discussed in the lectures and the case studies. The themes of the work assignments are defined in consultation with the instructor</td></tr>
</table>

| | |
|---|---|
| *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | |

**(5) ATTACHED BIBLIOGRAPHY**


1. JOCHEN WIRTZ, CHRISTOPHER LOVELOCK (2018) *Μάρκετινγκ Υπηρεσιών*, 1η Έκδοση, ISBN: 978-618-5242-29-9, ΕΚΔΟΣΕΙΣ ΔΙΣΙΓΜΑ ΙΚΕ
2. Αυλωνίτης Ι.Γ., Γούναρης Σ.,Τσιοτσου Η. Ρ. (2016), *Μάρκετινγκ Υπηρεσιών, Μάνατζμεντ, Στρατηγικές και Νέες Τεχνολογίες*, Αθήνα, Εκδόσεις Broken Hill Publishers LTD
3. Γούναρης Σ., Καραντινού Κ. (2014), *Μάρκετινγκ Υπηρεσιών*, Αθήνα, Εκδόσεις Rosili Εμπορική-Εκδοτική Μ. ΕΠΕ

## 10.8. Financial Scenarios Simulation

### (1) GENERAL

| | | | | |
|---|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FINANCIAL AND MANAGEMENT ENGINEERING | | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | | |
| **COURSE CODE** | **OI0115** | **SEMESTER** | **10** | |
| **COURSE TITLE** | FINANCIAL SCENARIOS SIMULATION | | | |
| **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** |
| | | | | |
| | | | 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:** | ● SIMULATION<br>● STOCHASTIC MODELS | | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK | | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | YES | | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/el/c/prosomoiose-khrematooikonomikon-senarion | | | |

### (2) LEARNING OUTCOMES

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>● *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>● *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>● *Guidelines for writing Learning Outcomes* |
| The course is addressed to undergraduate students of both tracks (Financial Engineering, Engineering Management). Its main objective is to provide the link between two very important parts of the curriculum: Simulation and Finance. More specifically, it aims to familiarize students with the basic algorithmic techniques used to simulate various important financial scenarios. The student upon the successful completion of the course will be able to:<br>● easily generate pseudo-random numbers from any continuous distribution, with emphasis on |

uniform and normal distributions.

- simulate basic important stochastic processes that appear naturally in Finance (random walk, Brownian motion, Geometric Brownian motion).
- know how to simulate a stock's prices based on the Geometric Brown motion model.
- know about the different pricing techniques for European options, namely:
  - binomial option pricing model.
  - trinomial option pricing model
  - Black-Scholes model
- have understood the limiting relationship between the binomial option pricing model and the Black-Scholes model.
- apply alternative methods (finite difference methods: Explicit, Implicit, Crank-Nicolson) for option valuation, starting with the Black-Scholes partial differential equation.
- apply Monte-Carlo simulation methods to a wide range of financial problems with emphasis on option valuation (European and mainly Exotic options).
- know the basic variance reduction techniques of the Monte-Carlo method.
- know how to simulate the basic stochastic processes that describe the evolution of the volatility of stock prices (stochastic variability models).
- apply Monte Carlo option pricing techniques under stochastic volatility models.
- know how to simulate the basic stochastic processes that describe the evolution of the interest rates (stochastic interest rate models).
- apply Monte Carlo option pricing techniques under stochastic interest rate models.
- evaluate the risk of a portfolio (value-at-risk method).

**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
- 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
- Criticism and self-criticism
- Production of free, creative and inductive thinking

**(3) SYLLABUS**

Stochastic processes in finance: The need for simulation. Generating pseudo - random numbers from uniform and normal distributions. A model for the evolution of stock prices. The Black-Scholes equation: Introduction to financial option valuation. Monte Carlo simulation methods: Application to financial option valuation under the risk-neutral measure. Monte Carlo simulation methods: variance reduction techniques. Financial option valuation with the binomial and the trinomial option pricing models. Finite differences methods in financial option valuation. Valuation of Exotic options.

| |
|---|
| Simulation of stochastic interest rates models and stochastic volatility models: Application to financial option valuation. Evaluation of a portfolio's risk (value-at-risk method): Monte Carlo and empirical simulation techniques.<br>(Every part of the syllabus is accompanied by laboratory applications in R.) |
| |

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | **Use of ICT in teaching.**<br>**Use of ICT in laboratory education.** |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | <table><tr><th>*Activity*</th><th>*Semester workload*</th></tr><tr><td>Lectures/Laboratory practice</td><td>39</td></tr><tr><td>Study and analysis of the bibliography</td><td>90</td></tr><tr><td>Projects</td><td>18</td></tr><tr><td>Final exam</td><td>3</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>Course total</td><td>**150**</td></tr></table> |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Written examinations at the end of the semester, in Greek, which include questions of knowledge development and understanding of the content of the course, as well as problem solving.<br><br>Additional assessment of candidates on the basis of projects given on a regular basis. |

**(5) ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*


- Brandimarte, P., Numerical Methods in Finance. A MATLAB Based Introduction, Wiley, 2002.
- Glasserman, P., Monte Carlo Methods in Financial Engineering, Springer-Verlag, 2003.

- Higham, D., An Introduction to Financial Option Valuation, Cambridge, 2005.
- Hull, J., Options, Futures and other derivatives, Prentice Hall, 2014.
- Neftci, S., Introduction to the Mathematics of financial derivatives, Academic Press, 2000.

*- Related academic journals:*

- Journal of Financial Economics.
- The Review of Financial Studies.

## 10.9. E-Business and The Management Of The Networked Enterprise

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | FINANCIAL AND MANAGEMENT ENGINEERING DPT | | |
| **LEVEL OF STUDIES** | UNDER-GRADUATE (Elective Module) | | |
| **COURSE CODE** | ΔΕ0108 | **SEMESTER** | **10** |
| **COURSE TITLE** | E-BUSINESS AND THE MANAGEMENT OF THE NETWORKED ENTRERPRISE | | |

| **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** |
|---|---|---|
| | 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/Special background/Skills development |
| **PREREQUISITE COURSES:** | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek (teaching material in English) |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/el/c/dioikese-diktuakon-epikh-el-epikheirematikoteta |

**(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***

This course provides a set of fundamental concepts for understanding Digital Business and Electronic Commerce methods and techniques. It explores the potential of electronic transactions (including the thriving mobile applications) and how they affect the organization of the modern enterprise and the structure of supply chains.

On successful completion of the course, students will be able to:

Understand the organization principles of the Digital Enterprise and Electronic Commerce while acquiring sufficient theoretical and conceptual background.

Realize the growth potential of e-commerce.

Familiarize with the specific methods and techniques of e-commerce (including the mobile commerce), e-marketing and use of social media for business purposes.

Apply the acquired knowledge to problem-solving oriented project.

**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
- Adapting to new situations
- Technical understanding of business strategies
- Hands-on experience with the use of technical systems
- Working independently
- Team work
- Working in an international environment
- Working in an interdisciplinary environment
- Production of free, creative and inductive thinking

**(3) SYLLABUS**

Lectures 1: Introduction to Digital Business

Lectures 2-4: Fundamental concepts of e-business and e-commerce

Lectures 5-6: e-commerce in depth (current status and growth potential)

Lectures 7-8: Case Studies of e-commerce, e-marketing, m-commerce and mobile apps

Lectures 9-13: Working in a group project.

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face to face. Teaching methods for this course are based on lectures, discussion of case studies and code development. |

<table>
<tr><td></td><td>Active student participation is essential and helps students understanding the basic concepts and tools of the course.</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td>Use of ICT in teaching, process design and communication with students</td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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>39</td></tr>
<tr><td>Study and Analysis of Bibliography</td><td>39</td></tr>
<tr><td>Project</td><td>39</td></tr>
<tr><td>OneNote document for reporting work in the course</td><td>5</td></tr>
<tr><td>Sum-up</td><td>25</td></tr>
<tr><td>Exams</td><td>3</td></tr>
<tr><td>Course total</td><td>150</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br><br>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<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Student assessment is made as follows:<br>• Final verbal exam (focus areas: enterprise digitization, e-commerce and m-commerce): 30%<br>• Class Participation and Homework -- included the development of an OneNote document (20%)<br>• Project (50%)<br><br>A necessary prerequisite for taking into consideration the score of the Assignment in the final mark is that students should receive at least 4/10 in the final exams.</td></tr>
</table>

**(5) ATTACHED BIBLIOGRAPHY**

- Suggested bibliography:

Κ. Laudin & C.Guercio Travel, 2014, Ηλεκτρονικό Εμπόριο, Εκδόσεις Παπασωρηρίου

- Related academic journals:

Paper: Contextual Marketing, 2014, Springer
Paper: Understanding the determinants of electronic supply chain management system adoption: Using the technology–organization–environment framework, 2014, Elsevier
Paper: Mobile Commerce and the Internet of Things, 2017, Springer

## 10.10.Supply Chain Management II

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | DEPARTMENT OF FINANCIAL & MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | **ΔΕ0117** | **SEMESTER** | **10** |
| **COURSE TITLE** | SUPPLY CHAIN MANAGEMENT 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** |
| LECTURE | | **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* | Specialized course in stream II: Engineering Management) | | |
| **PREREQUISITE COURSES:** | - | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | YES | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/node/7171 | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| • Understanding the complexity of fundamental problems in supply chain design and management<br>• Understanding the contribution of quantitative methods in the analysis, design and management of supply chains<br>• Use of operational research methods in optimizing supply chain management systems<br>• Familiarization with supply chain management systems<br>• Understanding of performance assessment methods of supply chains and of the value od supply chain analytics<br>• Familiarization with the Greek supply chain industry: challenges and opportunities |

**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…* |
| | *…….* |

- Systems analysis and design
- Decision making in a complex environment
- Use of quantitative methods in problem solving
- Use of digital tools in problem solving

**(3) SYLLABUS**

This course will help undergraduate student to drill down to a) fundamental issues of supply chain design and operations, b) the use of advanced quantitative methods for solving related problems, c) how to deal with critical parameters of supply chain organization and management, and d) understanding the challenges and opportunities of the Greek supply chain

The specific course contents include:

I. Background

- Review of basic methods of operational research (Linear Programming, Integer and Mixed Integer Linear Programming)
- Review of key topics in supply chain management

II. Supply chain (SC) system design

- SC network design and optimization: Minimizing cost
- SC network design and optimization: Maximizing sustainability (via multi-objective methods)
- Warehouse science 1
- Warehouse science 2
- Warehouse science 3

III Distribution systems

- Distribution and the vehicle routing problem

IV Quantitative and qualitative data analytics

- Quantitative methods in procurement management
- Quantitative methods in forecasting
- Supply chain analytics 1
- Supply chain analytics 2

V The Greek Supply Chain

- Role, challenges and opportunities

**(4) TEACHING and LEARNING METHODS - EVALUATION**

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td>Live lectures</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td>Use of ICT in teaching, laboratory education, communication with students</td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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>39</td></tr>
<tr><td>Weekly Homework</td><td>44</td></tr>
<tr><td>Study</td><td>46</td></tr>
<tr><td>One Midterm Exam</td><td>3</td></tr>
<tr><td>Term Project</td><td>15</td></tr>
<tr><td>Final Exam</td><td>3</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>150</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br><br>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<br><br>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Assessment Methods:<br><br>- Homework 10%<br>- One intermediate exam 20%<br>- Term project 20%<br>- Final exam 50%</td></tr>
</table>

**(5) ATTACHED BIBLIOGRAPHY**

*Recommended references*


- Minis, I. and Arampantzi, C. Supply chain management II, lecture notes, , University of the Aegean, 2019
- Chopra Sunil - Meindl Peter, “Διοίκηση Εφοδιαστικής Αλυσίδας”, 2015, Εκδόσεις Α. ΤΖΙΟΛΑΣ & ΥΙΟΙ Α.Ε.
- Μαρινάκης, Ι., Μυγδαλάς, Α., 2018, “Σχεδιασμός Βελτιστοποίηση της Εφοδιαστικής Αλυσίδας”, Εκδόσεις Σοφία.


*Relevant Scientific Journals*

European Journal of Operations Research
Networks
International Journal of Logistics Management
International Journal of Supply Chain Management
International Journal of Production Research

## 10.11.Quality Systems

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | SCHOOL OF ENGINEERING | | |
| **ACADEMIC UNIT** | FINANCIAL AND MANAGEMENT ENGINEERING | | |
| **LEVEL OF STUDIES** | UNDERGRADUATE | | |
| **COURSE CODE** | ΔΕ0107 | **SEMESTER** | **10** |
| **COURSE TITLE** | QUALITY SYSTEMS | | |
| **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** |
| | | 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* | Track Compulsory | | |
| **PREREQUISITE COURSES:** | - | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | NO | | |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/en/undergraduate-programme | | |

**(2) LEARNING OUTCOMES**

| |
|---|
| **Learning outcomes**<br>*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.*<br>*Consult Appendix A*<br>• *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*<br>• *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*<br>• *Guidelines for writing Learning Outcomes* |
| Upon successful completion of the course the student should be confident about the following:<br><br>(1) Understanding of basic concepts referring to Quality Systems, and especially of the ISO 9001:2000,<br>(2) Understanding of Quality Tools and Methods<br>(3) Understanding of Statistical Process Control methods and tools,<br>(4) Understanding of the concept of SIX-SIGMA for improvement of the business operations.<br>(5) Handling problems for selecting the proper statistical method for the Quality Surveillance, |

(6) Understanding the nature of real-world quality systems.
(7) Using typical quality methods in solving real-world case studies.
(8) Adopting proper tools for quality improvement and quality systems analysis.

**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*

*Adapting to new situations*

*Decision-making*

*Working independently*

*Working in an interdisciplinary environment*

*Production of new research ideas*

*Criticism and self-criticism*

*Production of free, creative and inductive thinking*

**(3) SYLLABUS**

Description

The course introduces students to the principles of quality control for engineers. Topics further examined include statistical modeling and sampling techniques. The course includes analysis of the following: (a) corporate strategic planning, (b) employee involvement & empowerment, (c) continuous improvement, and the role of quality assurance, (d) the cost of quality the ISO 9000 series registration/certification process, (e) understanding and implementing ISO 14001 team building, (f) self-directed work teams, problem solving, systems & process improvement, (g) world-class manufacturing systems how to lead a business process improvement effort, (h) Total quality management or TQM, (i) theory of the six Sigma, (j) managing the customer satisfaction process,(k) analysis of case studies in quality, (l) Taguchi & Shainin Techniques in Quality Management

Module Contents (Syllabus)

Introduction to Quality Systems and Statistical Tools

Corporate strategic planning, employee involvement & empowerment, continuous improvement, and the role of quality assurance

Team building, self directed work teams, problem solving, systems & process improvement, world-class manufacturing systems

The cost of Quality

Presentation of ISO 9001:2000 sections

Statistical Methods Useful in Quality control & Improvement

Lot-by-Lot Acceptance Sampling, Simple, Double, & Multiple Sampling, the OC Curve

Dodge-Romig tables, Rectifying Inspection, AOQL Plans, LTDP Plans, Estiimation of the process average.

Process Control and Control Charts for Variables , Control Charts for x and R

Charts Based on Standard Values, Interpretation of x and R Charts, the Effect of Nonnormality on x and R Charts, the Operating-Characteristic Function, he Average Run Length

Control Charts for Attributes , The Control Chart for Fraction Nonconforming, Development and Operation of the Control Chart, Variable Sample Size, Nonmanufacturing Applications, the Operating-Characteristic Function and Average Run Length Calculations

The SIX-SIGMA method

Factorial and Fractional Factorial Experiments for Process Design and Improvement, Examples of Designed Experiments In Process Improvement, Guidelines for Designing Experiments, Factorial Experiments

**(4) TEACHING and LEARNING METHODS - EVALUATION**

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td>Face to face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td>Use of web sources for elaboration of projects</td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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>Scheduled Lectures</td><td>39 hrs</td></tr>
<tr><td>Partial (mid-semester) exams</td><td>46 hrs</td></tr>
<tr><td>Preparation for the final exam</td><td>50 hrs</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>135 hrs</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION</td><td></td></tr>
</table>

| | |
|---|---|
| *Description of the evaluation procedure*<br><br>*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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | Final exam on course notes for 100% of the final mark of the student.<br><br>Mid-semester exams offer up to 20% bonus in the final mark. |

**(5) ATTACHED BIBLIOGRAPHY**

| |
|---|
| - *Suggested bibliography:*<br><br>A) Course Notes<br><br>B) Additional Reading<br>(1) P. Zalimidis and G. Dounias (2006), Quality Management Systems, Pyxida Editions, (in Greek)<br>(2) S. Avlonitis, Elements of Quality Control and Quality Assurance, Ellin Ed. (in Greek)<br>(3) J. Bank, Total Quality Management (Greek Translation, Giourdas Editions)<br>(4) Joseph M. Juran, 2000, Juran's Quality Handbook, McGraw-Hill, New York, USA<br>(5) Thomas Pyzdek, Paul A. Keller, (2003), Quality engineering handbook, 2nd Ed. Publisher Marcel Dekker<br>- *Related academic journals:* |
| |

## 10.12.Company Evaluation, Acquisitions and Mergers

**(1) GENERAL**

| | | | | |
|---|---|---|---|---|
| **SCHOOL** | ENGINEERING | | | |
| **ACADEMIC UNIT** | FINANCIAL AND MANAGEMENT ENGINEERING | | | |
| **LEVEL OF STUDIES** | GRADUATE | | | |
| **COURSE CODE** | **ΔΕ0105** | **SEMESTER** | **10** | |
| **COURSE TITLE** | COMPANY EVALUATION, ACQUISITIONS AND MERGERS | | | |
| **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** |
| | | | 3 | 3 |
| | | | | |
| | | | | |
| *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* | SPECIALIZED GENERAL KNOWLEDGE | | | |
| **PREREQUISITE COURSES:** | | | | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | GREEK | | | |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | NO | | | |
| **COURSE WEBSITE (URL)** | | | | |

**(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 this subject is to introduce and familiarize the students with the core concepts of mergers and acquisitions as well as all other types of company cooperation and investment that can lead to successful mergers and acquisitions.
The learning outcomes which the students acquire after successful completion of the course are:

- search and understand the main concepts and categories of mergers and acquisitions
- decide on the most suitable company evaluation types

- work interdisciplinary company cooperation types and how they lead to mergers and acquisitions in local and international environments
- decide on change management and implementation projects of mergers and acquisitions

Skills

Students are expected to apply the concepts and theories learned during the lectures in real life case studies in the projects they have selected and would be working on during the whole semester. Case studies are also presented during the lectures.

Abilities

The subject provides the basic abilities for students to perform company evaluations which will help them in investment and loan provision decision making. These abilities can be used in financial and investment firms as well as in banking and thus providing them with a wide variety of future prospects in securing a place in these types of industries.

**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…* |
| | *…….* |

1. Ability to explain the rationale of successful mergers and acquisitions by a firm's managers, the key pitfalls and recommendations for maximising the chances for long-term success.
2. Develop integrative, adaptive planning frameworks for use before, during and after a negotiation by applying a thorough understanding of negotiation concepts, theories and principles.
3. Critically compare the concepts and principles of financial valuation and negotiation in relation to managerial decision-making.
4. Apply industry-accepted valuation methods (DCF, relative valuation, and precedent transactions) to analyse international merger, acquisition and related transactions, including those with a cross-border and international context.
5. Utilise appropriate negotiation and persuasion techniques for a given negotiation situation to achieve desired outcomes.
6. Ability to prepare or analyze a financial valuation or investment plan.
7. Ability to implement mergers and acquisition as financial and management engineers.

**(3) SYLLABUS**

The syllabus is composed of 13 presentations.

1. Introduction to company cooperation types

2. Basic concepts of mergers and acquisitions
3. Mergers' and acquisitions' types
4. Company evaluation
5. Strategic Alliances
6. Clusters and networks
7. Joint Ventures and Investment Capital
8. Franchising
9. Subcontracting and Outsourcing
10. Vertical and horizontal integration
11. Post merger and acquisition integration
12. Change management and implementation
13. Case studies

**(4) TEACHING and LEARNING METHODS - EVALUATION**

<table>
<tr><td>DELIVERY<br>Face-to-face, Distance learning, etc.</td><td>The subjects is taught in classroom with distance learning techniques being utilized in cases of emergence (e.g covid-19)</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY<br>Use of ICT in teaching, laboratory education, communication with students</td><td>The use of ICT supported teaching is used during lectures and all course material is uploaded in the eclass platform of the University of the Aegean.</td></tr>
<tr><td>TEACHING METHODS<br>The manner and methods of teaching are described in detail.<br>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.<br><br>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>39</td></tr>
<tr><td>Online Case Studies</td><td>9</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>48</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION<br>Description of the evaluation procedure<br><br>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</td><td>Final exams in Greek that determine the final mark.</td></tr>
</table>

| | |
|---|---|
| *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | |

**ATTACHED BIBLIOGRAPHY**

*- Suggested bibliography:*

*In Greek*

Δ. ΚΥΡΙΑΖΗΣ. ΣΥΓΧΩΝΕΥΣΕΙΣ ΚΑΙ ΕΞΑΓΟΡΕΣ. Εκδόσεις ΚΟΝΤΟΥ ΑΓΓΕΛΙΚΗ, ISBN: 978-618-5198-09-1, 2016.

Σ. ΑΘΙΑΝΟΣ. ΑΠΟΤΙΜΗΣΗ ΚΑΙ ΧΡΗΜΑΤΟΔΟΤΗΣΗ, Εκδόσεις ΧΑΡΙΣ Μ.Ε.Π.Ε., ISBN: 978-618-81985-1-7, 2015.

*In English*

Galpin Timothy J. The Complete Guide to Mergers and Acquisitions. John Wiley & Sons Inc, ISBN: 9781118827239, 2014.

*- Related academic journals:*

Mergers and Acquisitions. Journal.
Advances in Mergers and Acquisitions. Journal and Book Series.

# Diploma Thesis

# Diploma Thesis

**(1) GENERAL**

| | | | |
|---|---|---|---|
| **SCHOOL** | School of Engineering | | |
| **ACADEMIC UNIT** | Department of Financial and Management Engineering | | |
| **LEVEL OF STUDIES** | Undergraduate | | |
| **COURSE CODE** | | **SEMESTER** | **9th and 10th** |
| **COURSE TITLE** | | | |

| **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** |
|---|---|---|
| | | (9th :5 + 10th :25) = 30 |
| *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* | |
| **PREREQUISITE COURSES:** | |
| **LANGUAGE OF INSTRUCTION and EXAMINATIONS:** | Greek, English |
| **IS THE COURSE OFFERED TO ERASMUS STUDENTS** | Yes |
| **COURSE WEBSITE (URL)** | http://www.fme.aegean.gr/el/diplomatiki-ergasia |

**(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 diploma thesis is a scientific thesis prepared by students in the last year of their studies (starting from the 9th and continuing in the 10th semester) in a subject of their choice under the supervision of a member of the teaching staff of the department. It aims to help them on the one hand to systematize and apply the knowledge acquired in their studies so far and on the other hand to deepen their knowledge in a specific subject. For the choice of the topic, the student consults with the supervisor, who presents the topics to him and if the student is interested, assigns a topic to him. Students prepare their dissertation by developing their own initiative, while at the same time they are guided by the supervising Professor.

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

**(7) SYLLABUS**

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| |

**(4) TEACHING and LEARNING METHODS - EVALUATION**

| | |
|---|---|
| **DELIVERY**<br>*Face-to-face, Distance learning, etc.* | Face-to-face |
| **USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY**<br>*Use of ICT in teaching, laboratory education, communication with students* | |
| **TEACHING METHODS**<br>*The manner and methods of teaching are described in detail.*<br>*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.*<br><br>*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* | <table><tr><th>***Activity***</th><th>***Semester workload***</th></tr><tr><td>*Study and analysis of bibliography*</td><td>200</td></tr><tr><td>*Non-directed study*</td><td>250</td></tr><tr><td>*Essay writing*</td><td>150</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>Course total</td><td>***600***</td></tr></table> |
| **STUDENT PERFORMANCE EVALUATION**<br>*Description of the evaluation procedure* | *Oral Examination* |

| | |
|---|---|
| *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*<br><br>*Specifically-defined evaluation criteria are given, and if and where they are accessible to students.* | |

**(5) ATTACHED BIBLIOGRAPHY**

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|---|
| *- Suggested bibliography:*<br><br>*- Related academic journals:* |