ETY709 - Applications of informatics

COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	ETY709	**SEMESTER**	6
COURSE TITLE	Applications of 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**
Lectures	3	3
Add rows if necessary. The organization of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialized general knowledge, skills development*	Special background, *skills development*
PREREQUISITE COURSES:	NO
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK
IS THE COURSE OFFERED TO ERASMUS STUDENTS	NO
COURSE WEBSITE (URL)	http://www.materials.uoi.gr/en/0,02,01.html

(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 primary objective of the course is to educate the student in well-known computational packages for the static and dynamic visualization of atomic and molecular structures using basic principles of crystallography and atomic structure.

The second part introduces the student to a technical computing system (such as mathematica), which extends to all areas of computational techniques (such as non-neural networks, machine learning, image processing, geometry, science data, visualizations) and is used in many technical, scientific, engineering, mathematical, and computing fields.

In the third part of the course, the students learns the basic stages of organizing and preparing a successful and effective oral presentation (creating chapters of effective slides and performing a 3-minutes talk).

At the end of the lesson the student should be able to:

- Plots simple or complex atomic structures of a crystal or a molecule with beautiful graphics on the PC.

• Uses the knowledge he/she has achieved in the course of Atomic and Electronic Structure Materials for designing large periodic crystals (up to 1000 atoms)

• Calculate distances, angles of a particular structure through the computer's software

• Actively involved in the teaching-learning process

• Calculates differential equations, integrals, solving systems of equations and other mathematical equations or problems useful to an engineer.

• Draws three-dimensional graphs and performs simple calculations simultaneously.

• Organized and designs the structure of an effective presentation.

• Build the presentation with chapters, effective slides (each having a role, appropriate font size / color, smart images, readable graphics).

• Present a 3-minute talk related to Material Science having state of the art, open questions, methodology, analysis, conclusions, future study topics, bibliography and answers the possible questions.

The active participation of students in relevant exercises throughout the semester and the final presentation plays an important role.

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
- Criticism and self-criticism
- Production of free, creative and inductive thinking
- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Team work

(3) SYLLABUS

The Applications of Informatics course contains three main chapters:

1. Static and Dynamic visualization Software of Atomic and Molecular Structures.
   Free packages available online (eg xcrysden and vmd). Creating / recognizing data files (eg xyz, xsf, pdb). Training in the computer laboratory.
2. Introduction to Mathematica and solutions to simple problems :
   integrals, differential equations, curve fitting to experimental data, 2D, 3D and contour plots, optimization.
3. Basic stages of organizing and preparing a successful oral presentation.
   From theory to practice. Creating effective slides. Performance and presentation. Answering questions.

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY Face-to-face, Distance learning, etc.</td><td>In class, lectures</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Electronic platform e-course</td></tr>
<tr><td>TEACHING METHODS
The manner and methods of teaching are described in detail.
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.
The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>27</td></tr>
<tr><td>Fieldwork/Laboratory practice</td><td>12</td></tr>
<tr><td>Self-study/ project/essay writing</td><td>23</td></tr>
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<tr><td>Course total</td><td>75</td></tr>
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<tr><td>STUDENT PERFORMANCE EVALUATION
Description of the evaluation procedure
Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other
Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>LANGUAGE OF EVALUATION: Greek

METHOD OF EVALUATION:

(i) Final written examination
(ii) Public presentation</td></tr>
</table>

(5) ATTACHED BIBLIOGRAPHY

-Suggested bibliography:

- Schaum's mathematica theory and problems 960-209-961-5, Eugene don, Kleidarithmos press, 2006, Athens
- Learn matlab 7, Duane Hanselman, Bruce Littlefield, Kleidarithmos press, 2006, Athens
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Related academic journals