DATA AND INFORMATION VISUALIZATION SYSTEMS

COURSE OUTLINE

Responsible: Nikolaos Vidakis

1. GENERAL			
SCHOOL	School of Engineering		
ACADEMIC UNIT	Department of Electrical and Computer Engineering		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	0811.7.027.0	**SEMESTER**	1st
COURSE TITLE	Data and Information Visualization Systems		

INDEPENDENT TEACHING ACTIVITIES if credits are awarded for separate components of the course	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	4	4
Total	**4**	**4**

COURSE TYPE general background, special background, specialised general knowledge, skills development	Deepening / Consolidation of specialty knowledge
PREREQUISITE COURSES	Procedural Programming (1.004: 1st semester course), Object Oriented Programming (2.003: 2nd semester course) Introduction to data Bases (3.005: 3nd semester course)
LANGUAGE OF INSTRUCTION and EXAMINATIONS	Greek
OFFERED TO ERASMUS STUDENTS	Yes (in English) — Winter Semester
COURSE WEBSITE (URL)	https://eclass.hmu.gr/courses/ECE176/

2. LEARNING OUTCOMES

Learning outcomes

The main goal of the course is to understand and learn techniques for creating and editing visualizations, reports and graphics.

The course teaches and uses two basic different environments: JasperSoft Studio and D3. At the same time, Gephi and Refuse are presented and used.

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

- Understand basic concepts of visualizations and graphics
- Know basic concepts of techniques for creating and editing visualizations, reports and graphics
- Analyse, designs and implements simple graphics
- Know and apply methods and tools of visualizations, reports and graphics
- Evaluate and ensure the quality of visualizations, reports and graphics

General Competences

- Autonomous & Independent work
- Teamwork
- Search, analysis and synthesis of data and information, using the necessary technologies

- Decision making
- Promoting liberal, creative and inductive/deductive thinking
- Work in an interdisciplinary environment
- Adapt to new situations
- Project Planning and Management

3. SYLLABUS

Theoretical Lecture Units

- Introduction to data and information visualization
- Report Generators

1. Data connection
2. Design Principles
3. Design elements

- Data Sources

1. XML, JSON, CSV, Databases

- Types of Reports

1. aPrints
2. Graphs
3. Grouping

- Patterns and their relationship with visualization

1. Outlines
2. Textures
3. Formulation Principles

- The colors and their role

1. Processing, design and placement of colors in the space

- Mind - Recognition - Conception

1. Principles of visual intellect
2. Highlights of the image
3. Understanding scene
4. Long Term Memory

- Interaction I.

1. Overview & Details
2. Zoom in
3. Focus & Content

- Interaction II

1. Dynamic Questions
2. Movement
3. Off-the-Desktop Interaction.

- Visualization applications (In art, science, etc.)

- Maps
- Trees & Visualization Networks
- Visualization Tools (Prefuse, JfreeChart, Gephi etc).

Laboratory Exercises

- In the laboratory part of the course students have the opportunity to practice the concepts of theory by using exercises that cover the material extensively and cultivate correct skills for the development of visualizations, reports and graphics.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY Face-to-face, Distance learning, etc.	In-Class Face-to-Face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY Use of ICT in teaching, laboratory education, communication with students	• Use of ICTs in lecturing • Specialized Software for analysis, design and implementation of software such as Gephi & Prefuse. • Use of ICTs for the communication with students via the e-class platform
TEACHING METHODS The manner and methods of teaching are described in detail.	
STUDENT PERFORMANCE EVALUATION Description of the evaluation procedure	Assessment Language: Greek All announcements for the course regulations and complementary reading material are permanently posted in the course web page. The course grade incorporates the following evaluation procedures: Theory: Final written examination in the whole material (100%). The exam includes theory questions (from 3 to 5) and practice exercises (from 1 to 2). Laboratory: The final grade consists of written laboratory work (30%), project preparation (50%) and final exam (20%) The evaluation criteria are announced to the students at the beginning of each semester and are posted on the course website in the open e-class LMS.

Activity	**Semester workload**
Lectures	45
Small individual exercises	30
Non-guided personal study	40
Written Final Exam	5
Course total	**120**

5. ATTACHED BIBLIOGRAPHY

Recommended Bibliography:

- Few, Stephen (2009): Now You See It: Simple Visualization Techniques for Quantitative Analysis. Analytics Press
- Ware, Colin (2008): Visual Thinking: for Design. Morgan Kaufmann
- Card, Stuart K., Mackinlay, Jock D. and Shneiderman, Ben (eds.) (1999): Readings in Information Visualization: Using Vision to Think. Academic Press
- Tufte, Edward R. (1983): The Visual Display of Quantitative Information. Cheshire, CT, Graphics Press

Relevant Scientific Journals:

- Journal: Information Visualization Journal, published quarterly by Palgrave Macmillan,

- Conferences:

1. ο IEEE's VisWeek, η οποία περιέχει τις InfoVis και VAST (Visual Analytics Science and Technology)
2. ο CHI (Computer-Human Interaction), SIGGRAPH.