VLSI INTEGRATED CIRCUIT DESIGN

1. GENERAL

SCHOOL	ENGINEERING		
SECTION	INFORMATICS AND COMPUTER ENGINEERING		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE		**SEMESTER OF STUDY**	7th, 9th
COURSE TITLE	VLSI INTEGRATED CIRCUIT DESIGN		

INDEPENDENT TEACHING ACTIVITIES *in case the credits are awarded in distinct parts of the course e.g. Lectures, Laboratory Exercises, etc. If the credits are awarded uniformly for the entire course, indicate the weekly teaching hours and the total number of credits*	**WEEKLY HOURS TEACHING**	**CREDIT UNITS**
Lectures	2	
Practice exercises	1	
Laboratory exercises	1	
Add rows if needed. The organization of teaching and the teaching methods used are described In detail at 4.	**4**	**5**

COURSE TYPE *Background, General Knowledge, Scientific Area, Development Skill*	Scientific Area, Skills Development
PREREQUISITES COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATION:	Greek
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes (in English)
ONLINE COURSE PAGE (URL)	

2. LEARNING OUTCOMES

Learning Outcomes

The learning outcomes of the course are described, the *specific knowledge, skills and abilities* of *an appropriate level that students will acquire after the successful completion of the course.*

Consult Appendix A

- Description of the *Level of Learning Outcomes for each course* of *study according to the European Higher Education Area Qualifications Framework*
- *Descriptors of Levels 6, 7 & 8 of the European Qualifications Framework* for *Lifelong Learning and Annex B*
- *Summary Guide for writing Learning Outcomes*

The aim of the course is to complete the students' knowledge in the field of circuit design of very high scale integration (VLSI) technology.
Upon completion of the course students will be able to:

- They design combined circuits with MOS technology transistors
- Analyze the operation of the MOS transistor
- Design circuits using consumption reduction techniques
- They design integrated high-scale integration systems using hardware description languages.
- Check the correct operation of VLSI circuits

General Skills

Taking into account the *general competencies that* the *graduate must have acquired (as listed in* the *Diploma Supplement and listed below) which of them is the subject aimed at?*

Search, *analysis* and synthesis *of data and information, using the necessary technologies Adapting to new situations*	*Project planning and management Respect for diversity and multiculturalism Respect for the natural environment Demonstrate social, professional and ethical*
Decision making Autonomous work Teamwork Working in an international environment Working in an interdisciplinary environment Generating new research ideas	*responsibility and sensitivity to gender issues Criticism and self-criticism Promotion of free, creative and inductive thinking*
• Autonomous Work • Teamwork	

3. COURSE CONTENT

- Design of circuits at the transistor level
- VLSI integrated circuit manufacturing technologies
- Circuit design techniques for low consumption
- VLSI system control
- Introduction to the use of CAD drawing tools (MAGIC), Logic (IRSIM) and temporal (CaZm/H-SPICE) emulation of VLSI circuits
- Introduction to the use of CAD circuit drawing tools (Synopsys, Mentor Graphics, Cadence)

4. TEACHING AND LEARNING METHODS – ASSESSMENT

HOW TO DELIVER *Face-to-face, Remote education , etc.*	Face-to-face (in class)
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES *Use of ICT* in *Teaching, in Laboratory Training, in Communication with students*	Support of the learning process through the University's e-learning platform
TEACHING ORGANIZATION *The way and methods of teaching* are described *in detail.* *Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliography* Study & Analysis, *Tutorial, Practice (placement), Clinical Practicum, Art Workshop, Interactive teaching, Educational visits, Project preparation, Writing of work / assignments, Artistic creation, etc.* *The student's study hours for each learning activity as well as the hours of unguided study are listed so that the total workload at semester level corresponds to ECTS standards*	

Activity	Semester Workload
Lectures	26
Laboratory Exercises	13
Practice Exercises	13
Independent Study	73
Course Total (25 hours of load working per credit unit)	**125**

STUDENT EVALUATION *Description of the evaluation process* *Assessment Language, Assessment Methods, Formative or Inferential, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Clinical Patient Examination, Artistic Performance, Other / Other* *Explicitly defined assessment criteria are indicated and if and where they are accessible to students.*	I. Written final exam (80%) including : - Multiple choice questions - Short answer questions - Solving problems related to the design of VLSI systems II. Practice Exercises (10%) III. Laboratory exercises (10%) For successful completion, a grade of at least 5/10 in the Written Final Exam is required.

5. RECOMMENDED-BIBLIOGRAPHY

- Suggested teaching aids :

1. CMOS VLSI Integrated Circuit Design Edition: 4th ed./2010, Authors: Vest Neil H., Eshraghian Kamran, Dimitrios Sountris, K. Pekmestzi
2. Analysis and design of digital integrated circuits CMOS, Kang Sung - Mo (Steve),Leblebici Yusuf
3. DIGITAL INTEGRATED CIRCUITS: A DESIGN APPROACH, JAN MR. Rabaey, ANANTHA CHANDRAKASAN, BORIVOJE NIKOLIC
4. Analysis and design of digital integrated circuits, Hodges D., Jackson H.