

UNIVERSITATEA DIN CRAIOVA  
FACULTATEA DE  
AUTOMATICĂ, CALCULATOARE ȘI ELECTRONICĂ



*Atitudine  
+  
Competență  
=  
Excelență*



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Study programme in Computers and  
Information Technology taught in English



# CONTENTS

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RATIONALE.....	2
VISION .....	2
OBJECTIVES .....	2
CAREER OPPORTUNITIES.....	3
TARGET POPULATION.....	3
COMPETENCES.....	4
KNOWLEDGE .....	4
SKILLS .....	5
CURRICULUM.....	5
STRUCTURE OF ACADEMIC YEAR.....	11
ADMISSION PROCEDURE.....	11
GRADUATION EXAM .....	11
SYLLABI.....	11

## **RATIONALE**

The *Computers and Information Technology* Bachelor's programme (English-taught) is coordinated by the Department of Computers and Information Technology belonging to the Faculty of Automation, Computers and Electronics, University of Craiova.

The *Computers and Information Technology* Bachelor's falls within the field of Computers and Information Technology, pursuant to Government Decision 467/2007 and published in MONITORUL OFICIAL (OFFICIAL BULLETIN), issue no. 481 of 18 July 2007.

It complies with Government Decision 404 of 29 March 2006 on the organisation and development of Master's programmes, with Law of Education 84/1995, republished, with modifications, with Law 288/2004 regarding the organisation of higher education, as well as with the Regulation of the organisation and development of Bachelor's programmes at the University of Craiova.

## **VISION**

The Faculty of Automation, Computers and Electronics, University of Craiova provides high quality education and research so as to train specialists able to integrate to state-of-the-art production and research field at the national level and meeting the demands of the European market, securing, in their turn, the training of the next generation following the tradition of the University of Craiova, of the Romanian higher education, committedly-oriented.

The *Computers and Information Technology* Bachelor's programme basically aims at training engineers in this field through the development of scientific research skills.

The Faculty of Automation, Computers and Electronics, University of Craiova seeks excellence with regard to:

- competitive academic management in Romania;
- experience in higher education;
- quality of academic programmes and services.

## **OBJECTIVES**

The main objectives aim at the development of specific competences. The programme underlies students' introduction to subjects pertaining to the Bachelor's curriculum, as well as the development of of state-of-the-art computer-assisted research skills of immediate relevance. The content of the Bachelor's programme covers basic engineering competences.

The strategic objectives of the programme aim at the training of specialists through:

- the design, development, operation and maintenance of information systems;
- application of information systems to production;
- expertise, technical consultancy, service related to information systems;
- ethical conduct, accountability so as to maintain the prestige of the profession;
- identification, description and development of project management processes, underpinning division of labour and the accurate description of the outputs, both in Romanian and English;
- initiative and action orientation through the updating of professional, economic and corporate culture knowledge.

Obviously, the experience of the Faculty of Automation, Computers and Electronics, University of Craiova, the material and human resources available, correlated with the market demands, justify the need for and development of this English-taught programme.

One of the management objectives of the programme envisages the attraction of Romanian and international students paying tuition fees.

## **CAREER OPPORTUNITIES**

The career opportunities are manifold, in compliance with the Occupational Standards in Romania, issued by the National Management authority for Occupational Standards (please visit <http://www.anc.gov.ro>).

Based on the Bachelor's degree will allow the graduates to work in the industry of product development / information systems, computers, applications in the field of computers or various forms of technical education, except higher education, as: programmer, engineer / system administrator, computer network administrator, designer and developer of less complex systems / of medium complexity, software and hardware maintenance services, training, team member of IT project implementation, provision of quality products and IT services. The occupational standards related to this qualification are listed in the Occupational Standards in Romania (COR): Database Administrator - 252101, Computer Network Administrator - 252301; Analyst - 251201, IT Consultant - 251901, Software Engineer - 251205, Security Systems Engineer - 215222; High School/ Post- High School Teacher - 233001, Vocational School Teacher - 232001; Developer - 251202, Computer Systems Designer - 215214, Information Systems Designer- 251101, Specialist in Security Systems Procedures And Tools - 251402.

Proposed new occupations to be included in COR: Information and Computing Systems Administrator, Hardware Engineer, Application Developer, System Software Developer, System Computing Architect, Repair and Maintenance of Computer Systems Specialist, Computer Network Designer, Networking and Data Communications Systems Analyst, Software Quality Assurance and Testing Engineer, Website Administrator, Web Developer and Designer, Programmable Circuits Designer, Digital Microsystems Designer.

## **TARGET POPULATION**

Graduates from exact sciences, technical and technology high schools as well as university graduates.

## **COMPETENCES**

General competences:

- social: team working, valorisation of their knowledge and skills, personal growth-orientation;
- communicative: presentation, negotiation, field-related;
- administrative: team management, risk management, decision-making.

Specific competences:

- understading of concepts, principles and theories pertaining to computer engineering and science;
- modelling and design of software and hardware sub-systems in a cost-eeffective way;
- implementation of software and hardware systems;

- identification and analysis of specific problems and of problem solving strategies;
- analysis of the way in which a program meets the performance criteria and identification of remedial and development work;
- IT products and services quality assurance and adequate use of IT tools.

## **KNOWLEDGE**

Basic knowledge, including general and technical knowledge: social sciences and humanities, economics and management, foreign languages, specific scientific and computer engineering notions, project management and application development.

Specific knowledge relates to hardware (computers and peripheral systems), software (computer programs to acquire basic theoretical and applied knowledge), their applications to the development and building of computer systems.

Specific knowledge may be described as:

- Theoretical foundations of computers: algorithm, design and analysis, computability and complexity, formal and automated languages, computational logic;
- Structural components: analog and digital circuits, analysis and synthesis of digital circuits, functional units of computer systems;
- Programming languages: assembling languages, procedural languages, logic languages, hardware description languages, object-oriented programming;
- Management of hardware and software resources: operating systems, translators;
- Databases: relational databases, database management systems, database design;
- Application development: computer graphics, multimedia techniques, standards and applications, signal processing, image processing, knowledge processing-based applications, distributed applications in the Internet, Web services, artificial intelligence, information retrieval, enterprise-wide integrated systems, interactive applications design;
- Organization of computer systems: architecture and structure of computer systems, embedded systems, microprocessor-based systems, distributed systems;
- Data communication: media and communication technologies, communication protocols, computer networks (LAN, WAN), communications security;
- Systems design and development: software engineering, testing software and hardware systems, human-computer interface.

## **SKILLS**

With the acquisition of knowledge, graduates will acquire a number of specific cognitive abilities mainly in operating tools and techniques derived from computational theory. Due to the fast advancement of information technology, IT engineers must possess, in addition to general theoretical principles, independent, abstract and analytical thinking skills (algorithmic thinking, focused on procedures, precise and rigorous generalization and abstraction capacity), practical skills (operation, administration and programming). Training this mindset will secure the timely adjustment to the dynamic labour market.



				C	S	L	P	WE/ OE	C	S	L	P	WE/ OE	points
16	Sports	SC	10CTI18	-	2	-	-	OE	-	-	-	-		1
17	Sports	SC	10CTI18	-	-	-	-	-	-	2	-	-	OE	2
18	Labour Law	SC	10CTI90						2	-	2	-	OE	4
Total no. of elective hours/week				2					6				7	

No.	Compulsory subject	Type	Code	2nd YEAR											No. of credit points
				1st sem. (14 weeks)					2nd sem. (14 weeks)						
				C	S	L	P	WE/ OE	C	S	L	P	WE/ OE		
19	Data Structures and Algorithms	FS	10CTI31	2	-	2	-	WE							4
20	Data Structures and Algorithms - Project	FS	10CTI31-1	-	-	-	1	P							2
21	Electronics	FS	10CTI32	2	1	1	-	WE							4
22	Computer Architecture	FS	10CTI33	2	1	2	-	WE							6
23	Systems Theory and Control	FS	10CTI34	2	-	1	-	WE							4
24	Object Oriented Programming	FS	10CTI35	2	-	2	-	WE							4
25	Object Oriented Programming - Project	FS	10CTI35-1	-	-	-	1	P							1
26	Management	SC	10CTI36	2	-	2	-	OE							4
27	English	SC	10CTI37	1	1	-	-	OE							1
28	Algorithm Complexity Analysis	SS	10CTI38						2	-	2	-	WE		5
29	Artificial Intelligence	FS	10CTI41						2	1	1	-	WE		6
30	Computer Graphics	CS	10CTI42						2	-	2	-	WE		5
31	Assamby Programming Languages	CS	10CTI43						2	1	2	-	WE		5
32	Measurements Techniques	FS	10CTI44						2	1	1	-	WE		4
33	General Economics and Accounting	SC	10CTI45						2	2	-	-	OE		2
34	English	SC	10CTI46				OE		1	1	-	-	OE		1
35	Practical Training	FS	10CTI47	3 weeks					90 hours			OE		2	
Total no. of compulsory hours/week				13	3	10	2		13	6	8	-			

	28		27		60
No. of written exams (WE)/ No. of oral exams (OE)	5/4		5/3		

No.	Elective subject	Type	Code	2nd YEAR										No. of credit points	
				1st sem. (14 weeks)					2nd sem. (14 weeks)						
				L	P	L	P	L	P	L	P	L	P		
36	Labour Psychology		10CTI48	2	2										5
37	General Pedagogy		10CTI49							2	2				5
Total no. of elective hours/week				2	2					2	2				
				4					4					10	

No.	Compulsory subject	Type	Code	3rd YEAR										No. of credit points	
				1st sem. (14 weeks)					2nd sem. (14 weeks)						
				L	P	L	P	L	P	L	P	L	P		
38	Digital Integrated Circuits	FS	10CTI51	2	-	2	-	WE							4
39	Databases	FS	10CTI52	2	-	2	-	WE							6
40	Operating Systems	FS	10CTI53	2	1	2	-	WE							6
41	Data Communication	SS	10CTI54	2	-	2	-	WE							5
42	Computer Structure and Organization	FS	10CTI55	2	-	2	-	WE							4
43	Computer Structure and Organization - Project	FS	10CTI55-1	-	-	-	1	P							1
44	Visual Programming Environments	SS	10CTI56	2	-	2	-	OE							3
45	Visual Programming Environments - Project	SS	10CTI56-1	-	-	-	1	P							1
46	Computer Networks	FS	10CTI61						2	-	2	-	WE		6
47	Database Design	SS	10CTI62						2	-	2	-	WE		4
48	Database Design - Project	SS	10CTI62-1						-	-	-	1	P		1
49	Microprocessors System Design	FS	10CTI63						2	-	2		WE		5
50	Distributed Network Application Development	SS	10CTI64						2	-	2	-	WE		4
51	Distributed Network Application Development - Project	SS	10CTI64-1						-	-	-	1	P		1

52	Practical Training	FS	10CTI65	3 weeks	90 hours	OE	2
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Optional subject *													
53	Subject 1	FS						2	-	2	-	WE	3
54	Subject 1-1. Project	FS						-	-	-	1	P	1
55	Subject 2	FS						2	-	2	-	OE	3
Total no. of compulsory hours/week				12	1	12	2	12		12	3		
				27				27				60	
No. of written exams (WE)/ No. of oral exams (OE)				5/3				5/5					

No.	Compulsory subject	Type	Code	3rd YEAR										No. of credit points	
				1st sem. (14 weeks)					2nd sem. (14 weeks)						
				L	P	L	L	P	L	L	P	L	L		
56	Pedagogy	SC	10CTI70	2	2										5
57	Robotics	SC	10CTI91							3	-	2	-	WE	5
Total no. of elective hours/week				2	2					3		2			
				4					5					10	

\* Teaching package for:

- Option 1:
  - Subject 1: Verification and testing of computer systems (10CTI66a)
  - Subject 1-1: Verification and testing of computer systems – project (10CTI66a-1)
  - Subject 2: I/O Systems (10CTI67a)
- Option 2:
  - Subject 1: Software Engineering (10CTI69b)
  - Subject 1-1: Software Engineering – project (10CTI69b-1)
  - Subject 2: Computer Systems Modeling (10CTI68b)

No.	Compulsory subject	Type	Code	4th YEAR										No. of credit points	
				1st sem. (14 weeks)					2nd sem. (14 weeks)						
				L	P	L	L	P	L	L	P	L	L		
56	Real Time Computing Systems	SS	10CTI71	2	-	2	-	E							4
57	Real Time Computing Systems - Project	SS	10CTI71-1	-	-	-	1	P							1
58	Computer Networks Management	SS	10CTI72	2	-	2	-	E							5

59	E-Commerce	SS	10CTI73	2	-	2	-	E							4
60	E-Commerce - Project	SS	10CTI73-1	-	-	-	1	P							1
61	Web Applications' Design	SS	10CTI74a	2	-	2	-	C							4
62	Web Applications' Design - Project	SS	10CTI74a-1	-	-	-	1	P							1
63	Practical Stage for Graduation Project	SS	10CTI811	2 weeks					60 hours					C	6
Total no. of compulsory hours/week				8	-	8	3								
				19										26	
No.	Optional subject	Type	Code	4th YEAR											No. of credit points
				1st sem. (14 weeks)					2nd sem. (14 weeks)						
				L	P	L	L	P	L	L	P	L	L		
64	Subject 3	SS		2	-	2	-	WE							4
65	Subject 3-1. Project	SS		-	-	-	1	P							1
66	Subject 4	SS		2	0	2	-	WE							5
64	Subject 5	SS							2	-	2	-	WE		4
65	Subject 5-1. Project	SS							-	-	-	1	P		1
66	Subject 6	SS							2	-	2	-	WE		5
67	Subject 7	SS							2	-	2	-	WE		5
68	Subject 8	SS							2	-	2	-	OE		4
69	Subject 9	SS							2	-	2	-	OE		5
Total no. of optional hours/week				4	0	4	1		10	-	10	1			
				9					21					34	
Total				12	0	12	4		10		10	1			
				28					21						
No. of written exams (WE)/ No. of oral exams (OE)				5/5					3/4					60	
70	Graduation Exam	-		-					-					WE	10

\* Teaching package for:

- Option 1:
  - Subject 3: Data Security (10CTI75a)
  - Subject 3-1: Data Security - project (10CTI75a-1)
  - Subject 4: Frameworks for Digital Systems Development (10CTI76a)
  - Subject 5: Embedded Systems (10CTI81a)
  - Subject 5-1: Embedded Systems - project (10CTI81a-1)
  - Subject 6: DSP in communication (10CTI82a)

- Subject 7: High Speed Networks (10CTI83a)
- Subject 8: Information Systems Management (10CTI84a)
- Subject 9: VLSI Environments (10CTI85a)
- Option 2:
  - Subject 3: Models and Algorithms for Parallel Computing (10CTI77b)
  - Subject 3-1: Models and Algorithms for Parallel Computing - project (10CTI77b-1)
  - Subject 4: Formal Languages and Automata (10CTI78b)
  - Subject 5: Compiler Design (10CTI86b)
  - Subject 5-1: Compiler Design - project (10CTI86b-1)
  - Subject 6: Algorithms for Information Retrieval (10CTI87b)
  - Subject 7: Expert Systems (10CTI88b)
  - Subject 8: Graphical Systems (10CTI89b)
  - Subject 9: Multimedia Application Development (10CTI810b)

Note:

1. The courses related to the 8th semester, 4th year take place in the first 10 weeks. The rest of 4 weeks are allotted for exams and graduation paper drafting.
2. The curriculum was approved by the Council of the Faculty of Automation, Computers and Electronics at 26.09.2011
3. The Graduation paper is granted 10 credit points;
4. Subject type: CS – core subject; FS – field subject; SS – specialty; SC – complementary subject;
5. Evaluation: WE – written exam, OE – oral exam.

## **STRUCTURE OF ACADEMIC YEAR**

- A. Teaching activities
  - 1st – 4th semester: 14 weeks
- B. Examinations
  - Winter sessions – 3 weeks at the end of the 1st and the 3rd semesters
  - Summer sessions – 3 weeks at the end of the 2nd and 4th semesters
  - Re-sitting exams: 1 week in the 4th semester
- C. Holidays
  - Winter holidays: 2 weeks
  - Post-winter session holidays: 1 week
  - Summer holiday: 8 weeks
- D. Number of weeks/semester

Year of study	1st semester	2nd semester
I	14	14
II	14	14
III	14	14
IV	14	10

- E. Number of credit points (ECTS)

The undergraduate programme is based on 60 credit points / year. Upon the successful completion of the programme (60 credits x 4 years of study = 240 credits), students are allowed to defend their Graduation paper, which is granted 10 credits.

## **ADMISSION PROCEDURE**

Prospective students of the *Computers and Information Technology* programme (English-taught) shall be assessed and recruited on account of their performance:

- 100% of the final grade is represented by the grade in the Baccalaureate examination.

## **GRADUATION EXAM**

Students shall be awarded the Bachelor's Degree upon the successful completion of the study programme and upon the defence of the Graduation paper.

The topic of the paper shall pertain to one of the compulsory subjects and have practical orientation

The topic proposals shall be announced at the end of the 3rd year and the Graduation papers shall be supervised by highly qualified specialists (teaching staff).

## **SYLLABI**

### **MATHEMATICAL ANALYSIS**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** I

**COURSE TYPE:** core

**COURSE OBJECTIVES:** The course focuses on the introduction of fundamental notions of differential and integral calculus.

**COURSE CONTENT:** Introduction to differential calculus (Fundamental streams; complete metric spaces; Contraction principle; Numerical series; Series of powers, developments in series; Limits and continuity for functions with several variables; Partial derivatives and differentiability; Local extremes for functions with several variables; Implicit defined functions; Conditioned extremes). Introduction to integral calculus (Right Riemann integral; improper integrals; Integrals with parameters; Curve-linear integrals; Double and triple integrals; Surface integrals).

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

#### **BIBLIOGRAPHY:**

- Predoi, M. , Balan, T. - Mathematical Analysis Vol I. Differential Calculus; Vol II.Integral Calculus, Ed. Universitaria, Craiova, 2005
- Predoi, M. - Analiza matematica, Ed. Universitaria, Craiova, 1994
- Predoi, M., Constantinescu, D., Racila, M. - Teme de calcul diferential, Ed.Sitech, Craiova, 2003
- Predoi, M., Constantinescu, D., Racila, M. - Teme de calcul integral, Ed.Sitech, Craiova, 2003

### **LINEAR ALGEBRA AND GEOMETRY**

**NUMBER OF CREDIT POINTS:** 5

**SEMESTER: I****COURSE TYPE:** core

**COURSE OBJECTIVES:** The aim of the course is the introduction of fundamental notions of linear algebra, analytic and differential geometry: vector spaces, linear mappings, quadratic forms, Euclidian spaces, geometric vectors, the straight line, the plane, conics and quadric surfaces, curves and surfaces. Tutorial classes allow to fix theoretical knowledge and to create calculus control by applications.

**COURSE CONTENT:** Vector Spaces. Linear Mappings. Bilinear Forms. Quadratic Forms. Euclidian Spaces. Geometric Vectors. Straight Line and Plane. Conics and Quadric Surfaces. Curves in Plane and in Space. Surfaces.

**LANGUAGE OF INSTRUCTION:** English**EVALUATION:** written exam / on-going examination**BIBLIOGRAPHY:**

- Vladimirescu, I., Munteanu, F., Algebră liniară, geometrie analitică și geometrie diferențială, Ed. Universitaria, Craiova, 2007
- Vladimirescu, I., Matematici aplicate, Repr. Univ. Craiova, 1987.
- Vladimirescu, I., Popescu, M., Algebră liniară și geometrie analitică, Ed. Univ. Craiova 1994
- Vladimirescu, I., Popescu, M., Alg. liniară, geom. n-dimensională, Ed. Radical, Craiova 1996
- Radu, C., Algebră liniară, geometrie analitică și diferențială, Ed. ALL, București, 1998
- Vladislav, T., Rașa, I., Matematici financiare și inginerești, Ed. Fair Partners, București, 2001
- Udriște, C. ș.a., Probleme de algebră, geometrie și ecuații diferențiale, EDP, București, 1981
- Stănășilă, O., Analiză liniară și geometrie, Ed. ALL, București, 2000
- Munteanu, F. ș.a., Probleme de alg. liniară, geom. analitică, difer., Ed. Universitaria, Craiova, 2006

**COMPUTER PROGRAMMING****NUMBER OF CREDIT POINTS:** 6**SEMESTER:** I**COURSE TYPE:** core

**COURSE OBJECTIVES:** The course overall objective is to provide the students with the knowledge required and to develop elementary programming skills using modern computer programming languages, C-like, such as C, C++, Java.

**COURSE CONTENT:** Introduction. Algorithmic Design. Data Structures. Language Issues. Programming in C.

**LANGUAGE OF INSTRUCTION:** English**EVALUATION:** written exam**BIBLIOGRAPHY:**

- [A] T.H.Cormen, C.E.Leierson, R.L.Rivest, Introduction To Algorithms, MIT Press, 1990 (also translated in Romanian, Computer Libris Agora, 2000)
- [A] N.Wirth, Algorithms + Data Structures = Programs, Prentice-Hall, Englewood Cliffs, 1976
- [B] D.E. Knuth, The Art of Computer Programming - vol.1: Fundamental Algorithms, 3rd ed., Addison Wesley Longman, 1997 (also translated in Romanian, Ed.Teora, 1999)

- [B] A.V.Aho, J.E.Hopcroft, J.D.Ullman, The Design And Analysis Of Computer Algorithms, Addison Wesley, 1974
- [C] J.P.Tremblay, P.G.Sorenson, An Introduction To Data Structures With Applications, McGraw-Hill, 1984
- [B] L.Livovschi, H.Georgescu, The Synthesis And Analysis Of Algorithms (in Romanian), Bucharest, 1986
- [B] E.Horowitz, S.Sahni. Fundamentals of Computer Algorithms, Computer Science Press, 1984
- [B] E.Horowitz, S.Sahni. Fundamentals of Data Structures, Computer Science Press, 1986
- [C] R.Skvarcius, Problem Solving Using Pascal - Algorithm Development and Programming Concepts, PWS Publishers, 1984
- [B] Herbert Schildt, C: The Complete Reference, McGraw-Hill Intl, 1995 (also in Romanian, Ed.Teora, 1998)
- [C] H. Schildt, C++: The Complete Reference, McGraw-Hill Intl, 1995 (also in Romanian, Ed.Teora, 1997)
- [B] M.Mocanu, C: A Programming Guide, Ed. Sitech, 2001 (in Romanian)
- [C] R.Lafore, Data Structures and Algorithms in Java, Waite Group Press, 1998 (also translated in Romanian, Ed.Teora, 2001)
- [C] J.F. Korsh, Data Structures, Algorithms and Program Style, PWS Computer Science, Boston, 1986

## **PHYSICS – GENERAL ELEMENTS**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** I

**TYPE OF COURSE:** core

**COURSE OBJECTIVES:** The course focuses on the review of fundamental knowledge in general physics and applications.

**COURSE CONTENT:** Classical Mechanics. Analytical Mechanics. Electrodynamics. Elements of Quantum Physics.

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY:**

- Florea Uliu, Curs de fizica pentru facultatea de electrotehnica, vol.1 si 2, Reprgr.Univ.Craiova 1982, 1986. Reprgr.Univ.Craiova, 1991.
- Luca și colaboratorii - Fizica, Editura Didactică și Pedagogică.
- I.M. Popescu si colaboratorii - Probleme rezolvate de fizica, Editura Tehnica.
- M. Puchin - Fizica, Editura Sitech.

## **LOGICAL DESIGN OF DIGITAL COMPUTERS**

**NUMBER OF CREDIT POINTS:** 5

**SEMESTER:** I

**COURSE TYPE:** field

**COURSE OBJECTIVES:** An introductory course on logical design methodology, forming the basis for future stream of hardware disciplines. It is treated extensively the mathematical foundation linked to analysis and synthesis of digital devices - Boolean algebra, Switching functions and forms, Minimization procedures, Canonical forms of representation

**COURSE CONTENT:** Fundamental concepts related to Logical Design of Digital Computers (LDDC). Boolean Algebra. Switching functions. Boolean forms. Classes of Boolean functions. Complete functional systems. Canonical representation of Switching functions. Minimisation of Switching functions.

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY :**

- Oleg Cernian, Logical Design of Digital Computers - Fundamentals, SITECH Craiova, 2005
- Oleg Cernian, Logical Design of Digital Computers - Minimization and Functional Decomposition, SITECH Craiova, 2008
- D. Lewin, D. Protheroe, Design of Logic Systems, Chapman & Hall, 1992
- Z. Kohavi, Switching and Finite Automata Theory, McGraw Hill, 1978
- V.P.Nelson, H.Troy Nagle, J.D. Irwin, B.D.Carroll, Digital Circuit Analysis & Design of Digital Systems, McGraw Hill, 1995
- S.C. Lee, Digital Circuits and Logic Design, Prentice Hall, 1976
- M.A. Harrison, Introduction to Switching and Automata Theory, McGraw Hill, 1965
- A.D. Friedman, P.R. Menon, Theory and Design of Switching Circuits, Pitman, 1975
- J. Hayes, Introduction to Digital Logic Design, Addison - Wesley, 1994
- E.J. McCluskey, Introduction to the Theory of Switching Circuits, Prentice Hall, 1965

## **KNOWLEDGE, HUMAN COMMUNICATION AND INTERNET**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** I

**COURSE TYPE:** complementary

**COURSE OBJECTIVES:** The course is addressed to the first year students and aims to present an introduction to human knowledge, as a concept and application tools in the real life: reading efficiently, writing correctly, intelligent search of information on the Internet; drafting different documents, etc.

**COURSE CONTENT:** A study-tour of communication. Internet and Web Searching. FORUM: Community Standards-General Rules. Efficient Reading. Writing Guidelines for Engineering and Science Students.

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY:**

- Susan Stellin : Resumes and Cover Letters; Burnes & Noble Publishing Inc., New York, 2004; ISBN: 0760737924;
- Writing Guidelines for Engineering and Science Students; <http://owl.English.purdue.edu/internet/resources/genre.html> ;
- <http://www.usd.edu/trio/tut/excel/10.html>;

- Microsoft EXCEL Links / Microsoft EXCEL Tips / EXCEL TUTORIAL ; [http://www.exceltip.com/exceltips.php?view=excel\\_links](http://www.exceltip.com/exceltips.php?view=excel_links)
- Tara Kuther, Ph.D., About.com; Prepare Your Curriculum Vitae; <http://gradschool.about.com/cs/curriculumvita/a/vitae.htm>
- PowerPoint 2002 (XP); <http://www.gcflernfree.org/computer/topic.aspx?id=82>
- Happy Fun Communication Land; TUTORIAL: A STUDY-TOUR OF COMMUNICATION; <http://www.rdillman.com/HFCL/TUTOR/tutor0.html>

## **ENGLISH 1**

**NUMBER OF CREDITS:** 2

**SEMESTER:** I

**COURSE TYPE:** complementary

**COURSE OBJECTIVES:** The course focuses on teaching the grammatical structures of the English language as well as on the correct use in conversation. Also, an emphasis will be placed on activating the four main language skills: listening, reading, speaking and writing.

**COURSE CONTENT:** Network and communication. Asking questions (wh-questions). If clauses. Thematic vocabulary. Databases. Prefixes and suffixes. Describing computer performances. Expressing results. Comparing and contrasting. Artificial intelligence. Synonyms and antonyms. Past tense simple vs. present perfect. Vocabulary practice. Managed and unmanaged endpoints. The degrees of comparison of adjectives and adverbs. Present perfect simple and continuous in use. Gadgets and devices- describing, comparing. Multimedia. The sequence of tenses. The active vs. the passive voice. Vocabulary in use conversation. Explaining and persuading. Future trends in computing. Means of expressing future time. Oral vs. written presentations. Complex noun phrases and the plural of nouns. Synonymy of sentences. Word order: rules and exceptions.

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** oral examination

**BIBLIOGRAPHY:**

- Brookes, M, Lagoutte, F, English For The Computer World; Teora, 2001.
- Vince, M, Advanced Language Practice; Macmillan Publishers, 2003;
- Otman, G, Engleza Pentru Internet, Teora, 2002.

## **SPECIAL MATHEMATICS**

**NUMBER OF CREDIT POINTS:** 5

**SEMESTER:** I

**COURSE TYPE:** core

**COURSE OBJECTIVES:** The course represents several chapters of mathematics in respect to their utility as instruments of investigation in engineering and specific language of the specific matter. The seminar follows the topics of the course.

**COURSE CONTENT:** Elements of complex analysis. Ordinary Differential Equations. Elements of Fourier Analysis.

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY:**

- Predoi M., Bălan T. Mathematical Analysis, Ed. Universitaria, Craiova, 2005
- Bălan T., Dăneț C., Ecuații diferențiale, Ed. SITECH, Craiova, 2007
- Bălan T., Șterbeți C., Analiză complexă, Ed. MJM, Craiova, 2003
- Bălan T., Șterbeți C., Analiză Fourier, Ed. SITECH, Craiova, 2001
- Bălan T., Matematici Speciale, Reprografia Universității din Craiova, 1980

## **NUMERICAL METHODS**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** II

**COURSE TYPE:** core

**COURSE OBJECTIVES:** The course is designed to present the main numerical methods and numerical algorithms. It also aims to enhance the ability of analysing different mathematical models in the engineering field, using the numerical techniques and to solve specific problems by turning the numerical methods into programming languages.

**COURSE CONTENT:** Numerical methods in algebra. Function approximation. Numerical methods for integral approximation. Numerical methods for differential equations and partial differential equations.

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY:**

- Burden R. L., Faires J. D., Numerical Analysis, Brooks Cole Ed., 2004.
- C de Boor, A practical guide to splines, 2nd ed. Springer, New York, 2000.
- Ciarlet P.G., Introduction à l'Analyse Numérique et l'Optimisation, Ed. Masson, Paris, 1990.
- Chatelin F., Spectral approximation of linear operators, Academic Press, New York, 1983.
- Demidovici B., Maron I., Éléments de Calcul Numérique, Ed. Mir Moscou, 1973.
- Ebâncă D., Metode numerice in algebră, Editura Sitech, Craiova, 2005.
- Mihoc Gh., Micu N., Teoria probabilităților și statistică matematică, E. D.P., Bucuresti, 1980.
- Militaru R., Méthodes Numériques. Théorie et Applications, Ed. Sitech, Craiova, 2008.
- Philips G., Taylor T., Theory and Applications of Numerical Analysis, Academic Press, 1999.
- Popa M., Militaru R., Analiză Numerică , Note de curs, Ed. Sitech, Craiova, 2003.
- Popa M., Militaru R., Metode numerice - algoritmi și aplicații, Ed. Sitech, Craiova, 2007.

## **INTRODUCTION TO ELECTRICAL ENGINEERING**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** II

**COURSE TYPE:** field

**COURSE OBJECTIVES:** The main objective of this discipline is to provide the students with the most important notions of electromagnetic fields and electric circuits (the most important laws and theorems and techniques to solve common problems in various operating regimes). The laboratory work has the role to help students to get practical abilities correlated to the theoretical notions presented at the course.

**COURSE CONTENT:** Electric circuits in permanent sinusoidal periodic regime (A.C. regime). Electric circuits in D.C. regime. Linear electric circuits in periodic non-sinusoidal permanent regime (PNSR) ("distorting regime"). Electric circuits in transient regime. Two-port networks and filters. Three-phase power systems.

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY:**

- Gregory Anne, Relatiile publice in practica, Editura All Beck, 2005.
- Newsom D., Totul despre relatii publice,Editura Polirom, 2003.
- Miculescu Simona, Relatii publice din perspectiva internationala, Editura Polirom 2006.
- \*\*\*, Pachetul de programe OpenOffice
- Nicolae,P.M., Electromagnetics I, Ed. UNIVERSITARIA, Craiova, 1997
- Sora,C., Bazele electrotehnicii, EDP Buc.,'82
- Preda,M.,Cristea,P.,Bazele electrotehnicii, EDP Buc.,'82
- Mocanu,C. I., Teoria circuitelor electrice,EDP, Buc.'82
- Preda,M.,et al., Analiza topologica a circuitelor electrice, EDP Buc.
- Badea,M., Bazele electrotehnicii, Reprogr.Univ. Cv.,vol.I., (1977), vol II, (1979)
- Cook, D.M., The Theory of Electromagnetic field, New Jersey, Prentice Hall, 1975
- Marshall,S.V., Skitek,G.G., Electromagnetic Concepts and Applications, New Jersey, Prentice Hall, 1995
- Rao,N.N., Elements of Engineering Electromagnetics, New Jersey, Prentice Hall, 1993
- Kraus, A., Circuit Analysis, West Publishing Company, 1991

## **COMPUTER PROGRAMMING – PROGRAMMING TECHNIQUES**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** II

**TYPE OF COURSE:** core

**COURSE OBJECTIVES:** The aim of this course is to introduce students to basic algorithms and techniques of their systematic implementation and evaluation using usual programming languages (eg. C).

**COURSE CONTENT:** Introduction to algorithms and programming techniques. Basic algorithms analysis. Testing and correctness. Sorting algorithms. Data types. Lists. Stacks and queues. Dynamic memory allocation. Graphs and trees. Dynamic programming. Greedy algorithms. Graph algorithms. Backtracking. Combinatorial algorithms. Special algorithms.

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY::**

- Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein: Introduction to algorithms. MIT Press, 2001.

## **COMPUTER PROGRAMMING – PROGRAMMING TECHNIQUES - PROJECT**

**NUMBER OF CREDIT POINTS:** 2

**SEMESTER:** II

**COURSE TYPE:** core

**COURSE OBJECTIVES:** The project requires the development of a program for evaluation and experimentation with a subclass of algorithms. The focus will be on development of a clean implementation to allow the systematic testing and evaluation of the given algorithms. Special attention will be also given to readability, documentation, portability and robustness of the program.

**COURSE CONTENT:** Recursive vs. Iterative programming. Searching and sorting (sequential and binary search, selection and insertion sort. Advanced sorting (merge sort, quick sort, ...). List.Stacks and queues. Trees. Greedy method. Graphs: representation and traversal. Dynamic programming. Backtracking. Combinatorial algorithms. Files.

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** project

### **BIBLIOGRAPHY:**

- Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein: Introduction to algorithms. MIT Press, 2001.

## **DIGITAL SYSTEMS DESIGN**

**NUMBER OF CREDIT POINTS:** 6

**SEMESTER:** II

**COURSE TYPE:** field

**COURSE OBJECTIVES:** The fundamental mechanisms of designing and implementing digital devices at MSI level: ULMs, extension methods, structured realization of digital networks, programmable logic devices, sequential machines and networks, specification of sequential machines, state reduction, flip-flops, general synthesis procedure, analysis procedure, ASM charts, implementation of ASMs.

**COURSE CONTENT:** Combinational Logic Networks (CLN). CLN implementation with Programmable Logic Device (PLD;). Introduction to Sequential logic Networks. Simplification of Sequential Logic Networks. Sequential Logic Networks with PLDs. Design of digital systems

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

### **BIBLIOGRAPHY:**

- V.P.Nelson, H.Troy Nagle, J.D. Irwin, B.D.Carroll, Digital Circuit Analysis & Design of Digital Systems, McGraw Hill, 1995
- S.C. Lee, Modern Switching Theory and Digital Design, Prentice Hall, 1976
- D. Lewin, D. Protheroe, Design of Logic Systems, Chapman & Hall, 1992
- Z. Kohavi, Switching and Finite Automata Theory, McGraw Hill, 1978
- S. Lee, Design of Computers and other Complex Digital Devices, Prentice Hall, 2000
- M.D. Ercegovic, T.Lang, Digital Systems and Hardware/Firmware Algorithms, John Wiley & Sons, 1985

- J.P. Hayes, Introduction to Digital Logic Design, Addison - Wesley, 1994
- A.D. Friedman, P.R. Menon, Theory and Design of Switching Circuits, Pitman, 1975
- F.P. Prosser, D.E. Winkel, The Art of Digital Design, Prentice Hall, 1987
- D.J. Comer, Digital Logic and State Machine Design, Holt, Rinehart & Winston, 1984
- J.W. Carter, Digital Design with Programmable Logic Devices, Prentice Hall, 1997
- T.L. Floyd, Digital Fundamentals, Prentice Hall, 2000.

## **PHYSICS – ELEMENTS OF MECHANICAL ENGINEERING**

**NUMBER OF CREDIT POINTS:** 3

**SEMESTER:** II

**COURSE TYPE :** core

**COURSE OBJECTIVES:** The course focuses on the introduction of basic concepts with respect to the methods used to build mathematic models for the movement of mechanical systems with constant mass and a finite number of freedom degrees. Their analysis is accompanied by calculation examples and applications that reveal the studied methods.

**COURSE CONTENT:** 1 Slipping vectors' theory; 2 Geometry of masses; 3. The Kinematics of material points; 4 The Kinematics of rigid solid bodies and of rigid systems; 5 Dynamics

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

### **BIBLIOGRAPHY:**

- Bagnaru, D., Cataneanu, A., Mecanica-Mecanisme, Editura Sitech, Craiova, 19972.
- Buculei, M., Mecanica, vol. I, II, Reprografia Universitatii din Craiova, 19803.
- Cataneanu, A., Mecanica, vol. I,II, Editura Universitaria, Craiova, 2000, 20014.
- Cataneanu, A., Mecanica –Culegere de probleme Ed. Universitaria, Craiova, 20025.
- Ceausu, V, Enescu, N., Ceausu, F., Culegere de probleme, Mecanica, vol. I. Statica si cinematica, Ed. Printech, Bucuresti, 19976.
- Darabont, A., Vaiteanu, D., Munteanu, M., Mecanica tehnica. Culegere de probleme, Ed. Scrisul Romanesc, Craiova, 19837.
- Ispas, V., Aplicatiile cinematicii in constructia manipuloarelor si robotilor industriali, Ed. Academiei Romane, Bucuresti 19908.
- Mangeron, D., Irimiciuc, N., Mecanica rigidelor cu aplicatii in inginerie, Vol. I, II, III, Ed. Tehnica, Bucuresti, 1978, 1980, 19819.
- Merches, I., Burlacu, L., Applied Analytical Mechanics, The Voice of Bucovina Press, Iasi, 199510.
- Staicu, St., s.a, Probleme de mecanica teoretica. Mecanica analitica, Universitatea Politehnica Bucuresti, 199611.
- Voinea, R., Voiculescu, D., Simion, F. P., Introducere in mecanica solidului rigid cu aplicatii in inginerie, Ed. Academiei, Bucuresti, 1989.

## **ENGLISH 2**

**NUMBER OF CREDIT POINTS:** 2

**SEMESTER:** II

**COURSE TYPE:** complementary

**COURSE OBJECTIVES:** The course focuses on teaching the grammatical structures of the English language as well as on the correct use in conversation. Also an emphasis will be placed on activating the four main language skills: listening, reading, speaking and writing.

**COURSE CONTENT:** 1. Network and communication; Asking questions (why questions); If clauses; Thematic vocabulary; 2. Databases; Prefixes and suffixes; Describing computer performances; Expressing results; Comparing and contrasting; 3. Artificial intelligence; Synonyms and antonyms; Past tense simple vs. present perfect; Vocabulary practice; 4. Managed and unmanaged endpoints; 5. The degrees of comparison of adjectives and adverbs; Present perfect simple and continuous in use; Gadgets and devices- describing, comparing; 6. Multimedia; The sequence of tenses; The active vs. the passive voice; Vocabulary is use conversation; Explaining and persuading; 7. Future trends in computing; Means of expressing future time; Oral vs. written presentations; Complex noun phrases and the plural of nouns; Synonymy of sentences; Word order: rules and exceptions.

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** oral exam

**BIBLIOGRAPHY:**

- Brookes, M, Lagoutte, F, English For The Computer World; Teora, 2001.
- Vince, M, Advanced Language Practice; Macmillan Publishers, 2003;
- Otman, G, Engleza Pentru Internet, Teora, 2002.

## **DATA STRUCTURES AND ALGORITHMS**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** III

**COURSE TYPE:** field

**COURSE OBJECTIVES:** The main goal of the course is the development of skills regarding the design and implementation of various data structures that allow writing performing programs, improving the skills regarding the representation of static objects as well as working with dynamic objects. Another goal is learning how to control the performance of the program against to the ratio of consumed memory/execution Speed.

**COURSE CONTENT:** 1. Tree structures; 2. Search trees; 3. Optimal search trees; 4. Height balanced trees; 5. Multiway trees; 6. B trees; 7. Graf structures;

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY:**

- Burdescu D.D. - Algoritmi si structuri de date, Ed. Mirton, 1992.
- Burdescu D.D. - Structuri de date arborescente, Ed. Mirton, 1993.
- Burdescu D. D. - Structuri de date arborescente (curs) - Reprografia Universitatii din Craiova, 1993.
- Burdescu D.D., Brezovan M - Algoritmi si structuri de date in C si Pascal (indrumar de laborator), Reprografia Universitatii din Craiova, 1995.
- Burdescu D. D., Brezovan Marius, Cosulschi Mirel - Structuri de date arborescente in C si Pascal (indrumar de laborator), Reprografia Universitatii din Craiova, 2000.

- Burdescu D.D., Badica Costin - Structuri de date (culegere de probleme ) Reprografia Universitatii din Craiova, 1994.
- Tremblay, Jean Paul, Sorenson, Paul - An Introduction to Data Structures with Applications - Mc Graw-Hill, 1984.
- Weiss, Mark Allen - Data Structures and Algorithm Analysis, Benjamin - Cummings, Publishing Company 1992.
- Horowitz Ellis - Fundamentals of Data Structures in PASCAL, Computer Science Press 1983
- Cormen Thomas, Leiserson Charles, Rivest Ronald – Introduction to Algorithms, M.I.T. Press 1992

## **DATA STRUCTURES AND ALGORITHMS - PROJECT**

**NUMBER OF CREDIT POINTS:** 2

**SEMESTER:** III

**COURSE TYPE:** domain

**COURSE OBJECTIVES:** It has the main goal of covering the knowledge acquired along the semester. The project finalizes as a practical application.

**COURSE CONTENT:** The following operations have to be implemented: I) Basic operations: 1. Create the structure with input data read from a text file; 2. Insert a new record; 3. Update any field ; 4. Search a record by the key; 5. Delete a record by the key; 6. Display: a.tree fashion - only the keys; b. complete - there are displayed all data in a table

II) Specific operations: 1. Create a tree using other fields from the structure; 2. Append data from other file; 3. Present reports on stocks using different criteria; 4. Creation of scenarios for testing the correctness of the implemented operations; 5. Save data into a file

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** project

### **BIBLIOGRAPHY:**

- Burdescu D.D. - Algoritmi si structuri de date, Ed. Mirton, 1992.
- Burdescu D.D. - Structuri de date arborescente, Ed. Mirton, 1993.
- Burdescu D. D. - Structuri de date arborescente (curs) - Reprografia Universitatii din Craiova, 1993.
- Burdescu D.D. ,Brezovan M - Algoritmi si structuri de date in C si Pascal (indrumar de laborator), Reprografia Universitatii din Craiova, 1995.
- Burdescu D. D., Brezovan Marius, Cosulschi Mirel - Structuri de date arborescente in C si Pascal (indrumar de laborator), Reprografia Universitatii din Craiova, 2000.
- Burdescu D.D. ,Badica Costin - Structuri de date (culegere de probleme ) Reprografia Universitatii din Craiova, 1994.
- Tremblay, Jean Paul, Sorenson, Paul - An Introduction to Data Structures with Applications - Mc Graw-Hill, 1984.
- Weiss, Mark Allen - Data Structures and Algorithm Analysis, Benjamin - Cummings, Publishing Company 1992.
- Horowitz Ellis - Fundamentals of Data Structures in PASCAL, Computer Science Press 1983
- Cormen Thomas, Leiserson Charles, Rivest Ronald – Introduction to Algorithms, M.I.T. Press 1992

## **ELECTRONICS**

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER: III**

**COURSE TYPE: field**

**COURSE OBJECTIVES:** The course is an introduction to analysis, design and simulates building blocks and different analogue IC applications. It involves laboratory work and homework on experiment modules and extensive use of industry-standard CAD tools, such as Analog Workbench. Using the knowledge gained through Electronics, students will learn how to measure the characteristics of devices and circuits and the building of basic electronic circuits.

**COURSE CONTENT:** 1. Semiconductor diodes; 2. Junction Bipolar Transistors; 3. Field-Effect Transistors; 4. Amplifiers; 5. Signal generators; 6. Voltage regulators

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

### **BIBLIOGRAPHY**

- Niculescu E., Purcaru D.M., Electronic Devices and Circuits. Vol. I. Ed. Universitaria, Craiova, 2002 (in Romanian).
- Allen, P. and Holberg, D., CMOS Analog Circuit Design, 2nd Ed., Oxford, 2002.
- Niculescu E., Purcaru D.M., Maria, M., Electronics. Simulations, analysis, and experiments, Ed. Reprograph, Craiova, 2006 (in Romanian).
- Spânulescu, I., Semiconductor Devices and Analogue Integrated Circuits, Ed. Victor, Bucuresti, 1998 (in Romanian).
- Gray, P.E., Meyer, C.R., Analogue Integrated Circuits. Analysis and Design, Ed. Tehnica, Bucuresti, 1997 (in Romanian).
- Dascalu, D. s.a., Electronic Devices and Circuits. Problems. Ed. Didactica si Pedagogica, Bucuresti, 1982 (in Romanian).
- Manolesu, A., Manolescu, A., Linear Integrated Circuits. Problems. Ed. Stiintifica si Enciclopedica, Bucuresti, 1987 (in Romanian).

## **COMPUTER ARCHITECTURE**

**NUMBER OF CREDIT POINTS: 5**

**SEMESTER: III**

**COURSE TYPE: field**

**COURSE OBJECTIVES:** It aims at the presentation of basic concepts related to computer architecture: forms of information representation in digital computers, Von Neumann's principles and model, Instruction cycle, General organisation of the CPU, Elementary Educational Computer Classification of digital computers, Machine level language, System bus, Bus arbitration, Stacks, Interrupts, Memory addressing techniques.

**COURSE CONTENT:** 1 Number representation in digital computers; 2 Architecture – organisation correlation; 3 Von Neumann's principle, Instruction Cycle, CPU ; 4 Elementary Educational Computing; 5 Input/Ouput; 6 Memory hierarchy and Addressing Techniques; 7 Conventional machine level

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** oral exam

**BIBLIOGRAPHY:**

- Oleg Cernian, Computer Architecture, vol. 1, SITECH Craiova, 2005
- Oleg Cernian, Computer Architecture, vol. 2, SITECH Craiova, 2008
- W. Stallings, Computer Organisation and Architecture, Prentice Hall, 2000
- S.G. Shiva, Computer Design and Architecture, Marcel Dekker, 2000
- A.S. Tannenbaum, I.R. Goodman, Structured Computer Organisation, Prentice Hall, 1998
- M.M. Mano, Computer System Architecture, Prentice Hall, 1993
- J.P. Hayes, Computer Architecture and Organisation, McGraw Hill, 1998
- Oleg Cernian, Introduction to Computer Engineering, SITECH Craiova, 1997
- A.J. Goor, Computer Architecture and Design, Addison - Wesley, 1989
- M.R. Zargham, Computer Architecture, Single and Parallel Systems, Prentice Hall, 1995
- D.A. Patterson, J.L. Hennessey, Computer Organisation and Design, Hardware/Software Interface, Morgan Kaufmann, 1998
- xxx MCS - 80 Users Manual Santa Clara, INTEL Corporation, 1977

## **SYSTEMS THEORY AND CONTROL**

**NUMBER OF CREDIT POINTS:** 3

**SEMESTER:** III

**COURSE TYPE:** domain

**COURSE OBJECTIVES:** This course deals with the fundamental problems of systems theory, both continuous-time and discrete-time. There are presented theoretical and practical methods regarding analysis, design and implementation of control systems.

**COURSE CONTENT:** 1. Description and general properties of systems. Introduction; Abstract systems; Oriented systems; 2. Linear time-invariant systems (LTIS); 3. Discrete time systems (DTS); 4. Nonlinear dynamical systems; 5. Control systems; 6. Special topics on systems theory. Time variable linear systems. Distributed parameters systems. Optimal control systems. Stochastic control systems. Intelligent control systems. Fuzzy logic and neural network based control

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY:**

- Marin C., Lectures on System Theory, Editura SITECH Craiova, 2006, ISBN 978-973-746-362-3
- Marin C., Petre E., Popescu D, Ionete C., Selisteanu D. System theory, Problems,Editura SITECH Craiova, 2006, ISBN 978-973-746-437-8, 308 pg.
- Kailath T. Linear Systems, Prentice-Hall , 1980.
- Kuo, B., Automatic Control Systems, Prentice-Hall, 1991.
- Philips, Ch.; Nagle, T., Digital Control System Analysis and Design,Prentice-Hall, 1984.
- Bennett, S., Linkens, D.D., Computer Control of Industrial Processes, Peter Peregrinus, 82.
- Min, L.J., Schrage, J.J., Designing Analog and Digital Control Systems, John Wiley, 1988.

## **OBJECT ORIENTED PROGRAMMING**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** III

**COURSE TYPE:** field

**COURSE OBJECTIVES:** The objectives of the course are to introduce the main concepts of the object-oriented paradigm, and also to introduce the main characteristics and principles of the C++ language. The objectives for the applications are to allow students to write software programs using C++ as the first object-oriented language, and also to allow students to use the Visual C++ integrated framework in order to write small and medium software applications.

**COURSE CONTENT:** A. Introduction to Object Oriented Design: 1. Programming Paradigms; 2. The C Language Extensions in the C++ Language; 3. Defining and Using Classes; 4. Constructors and Destructors; 5. Namespaces; B. Basic Elements of Object Oriented Design: 6. Object Composition ; 7. Classes Hierarchies ; 8. Nested Classes. Friend Functions and Friend Classes; 9. Operator Overloading; C. Advanced Elements of Object Oriented Design: 10. Polymorphism and Virtual Functions; 11. Parameterized Functions and Classes. The Template Mechanism; 12. Exceptions; D. Standard Libraries of the C++ Language: 13. IOstreams; 14. Generic Programming. The STL Library

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY:**

- Thinking in C++, Bruce Eckel, Prentice Hall, 2000 (electronic free)
- The C++ Programming Language, Bjarne Stroustrup, Addison-Wesley, 1997
- Effective C++, Scott Meyers, Addison-Wesley, 1996
- C++ Primer, Stanley Lippman, Josee Lajoie, Addison-Wesley, 1998
- Andrei Alexandrescu, Programarea moderna în C++, Programare generica si modele de proiectare aplicate, Teora, 2002

## **OBJECT ORIENTED PROGRAMMING - PROJECT**

**NUMBER OF CREDIT POINTS:** 2

**SEMESTER:** III

**COURSE TYPE:** field

**COURSE OBJECTIVES** The objectives of the course are to introduce the main concepts of the object-oriented paradigm, and also to introduce the main characteristics and principles of the C++ language. The objectives for the applications are to allow students to write software programs using C++ as the first object-oriented language, and also to allow students to use the Visual C++ integrated framework in order to write small and medium software applications.

**COURSE CONTENT:** 1. Automated teller machine simulator; 2. Travel agency; 3. Personal CD library Management; 4. Evidence of books within a library; 5. C++ program analysis; 6. Administrator for owners association; 7. Search Electronic Library; 8. University employees; 9. Storage of materials; 10. Manager for a computer project; 11. Faculty admission; 12. Patients of a family doctor; 13. Invoice for payment of electricity; 14. Student Assessment; 15. Study of television programs; 16. Personal Agenda; 17. Calculator for interest / loan rates; 18. Puzzle game; 19. Track vehicles; 20. Track employees; 21. Airlines flights; 22. HTML tool; 23. C++ source browser; 24. Indentation of C/C++ source code; 25. Persistent abstract data types; 26. Evidence of the accommodation places; 27. Football championship; 28. Civil State Office; 29. Modern Santa Claus; 30. Estate agent; 31. Search in the telephone book; 32. Visit to the zoo; 33. Record company suppliers; 34. Presentation of the history book; 35. Menus / submenus; 36. Description of the relief a country

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** project

**BIBLIOGRAPHY:**

- Thinking in C++, Bruce Eckel, Prentice Hall, 2000 (electronic free)
- The C++ Programming Language, Bjarne Stroustrup, Addison-Wesley, 1997
- Effective C++, Scott Meyers, Addison-Wesley, 1996
- C++ Primer, Stanley Lippman, Josee Lajoie, Addison-Wesley, 1998
- Andrei Alexandrescu, Programarea moderna în C++, Programare generica si modele de proiectare aplicate, Teora, 2002

## **PROJECT MANAGEMENT**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** III

**COURSE TYPE:** complementary

**COURSE OBJECTIVES:** Introduction of notions from the „body of knowledge” corresponding to Projects Management; Understanding of the differences between „program” and „software program” notions; Presentation of the general concepts “team work” and “team building”: Acquiring of the required managerial knowledge: Introduction of ethic and professional themes in software engineering; familiarization with traditional and modern work practices; Establishing of the required abilities directly related to other specialty disciplines

**COURSE CONTENT:** 1. Software project. The general domain of projects management; 2. Software product (the program); 3. Software processes; 4. Project management within the general frame of software engineering; 5. Zones of knowledge and processes in the practice of managing software projects; 6. The management of project integration; 7. The management of project domain; 8. Time management; 9. Costs management; 10. Projects quality management; 11. Human resources management; 12. Communication management; 13. Management of material resources (purchasing); 14. Risk management in projects;

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY**

- Guide to the Project Management Body of Knowledge, 2004 (PMBOK)
- Cockburn, A., Surviving Object-Oriented Projects, Addison-Wesley, 1998.
- Roberson, S. and Robertson, R., Managing Requirements, Addison-Wesley, 1999
- Beck, K., Extreme Programming Explained, Addison-Wesley, 1999
- Mocanu M., Managementul proiectelor (curs)
- L. Landis, F. McGarry et al, Manager's Handbook for Software Development, Revision 1, SEL-84-101, November 1990
- IEEE-CS Press, Guide to the Software Engineering Body of Knowledge, trial version (1.00), A. Abran and J.W. Moore (ed.), 2001
- Pflieger S.L., Software Engineering. Theory and Practice, Prentice Hall, 1998
- Sommerville I., Software Engineering, 7th Ed., Pearson –Addison Wesley, 2004
- Schach S.R., Object-Oriented and Classical Software Engineering, 6<sup>th</sup> Ed., McGraw Hill, 2006

- Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides – Design Patterns: Elements of Reusable Object-Oriented Software, Addison Wesley, 1996
- Sinan Si Alhir - Learning UML, O'Reilly, 2003
- Tom Pender - UML Bible, John Wiley & Sons, 2003
- Joseph Schmuller - Teach Yourself UML in 24 Hours, Sams Publ. 2004

## **ENGLISH 1**

**NUMBER OF CREDIT POINTS:** 2

**SEMESTER:** III

**COURSE TYPE:** complementary

**COURSE OBJECTIVES:** : The course focuses on teaching the grammatical structures of the English language as well as on the correct use in conversation. Also, an emphasis will be placed on activating the four main language skills: listening, reading, speaking and writing.

**COURSE CONTENT:** 1. Network and communication; Asking questions (why questions); If clauses; Thematic vocabulary; 2. Databases; Prefixes and suffixes; Describing computer performances; Expressing results; Comparing and contrasting; 3. Artificial intelligence; Synonyms and antonyms; Past tense simple vs. present perfect; Vocabulary practice; 4. Managed and unmanaged endpoints; 5. The degrees of comparison of adjectives and adverbs; Present perfect simple and continuous in use; Gadgets and devices- describing, comparing; 6. Multimedia; The sequence of tenses; The active vs. the passive voice; Vocabulary is use conversation; Explaining and persuading; 7. Future trends in computing; Means of expressing future time; Oral vs. written presentations; Complex noun phrases and the plural of nouns; Synonymy of sentences; Word order: rules and exceptions.

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** oral exam

**BIBLIOGRAPHY:**

- Brookes, M, Lagoutte, F, English For The Computer World; Teora, 2001.
- Vince, M, Advanced Language Practice; Macmillan Publishers, 2003;
- Otman, G, Engleza Pentru Internet, Teora, 2002.

## **ALGORITHM COMPLEXITY ANALYSIS**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** IV

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The aim of the course is to provide a grounding of computability theory and classical methods of analysis and design techniques. The branch of computational complexity studied in this course is concerned with analyzing specific problems and specific algorithms. The objectives of the course are: 1. To consolidate the student's knowledge of algorithms and their complexity; 2. To enable the students to analyze performance of algorithms in terms of theoretical requirements; 3. To explain the use of various of data structures; 4. To consolidate the student's knowledge of optimal algorithms design.

**COURSE CONTENT:** 1. Introduction to Algorithms Analysis; 2. Automata, Calculus, Complexity; 3. Classes of Complexity; 4. Complexity of Optimization Problems; 5. Classes of Spatial Complexity; 6. Probabilistic Algorithms and Classes of Complexity

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY :**

- Burdescu D.D. - Analiza Complexitatii Algoritmilor, Ed. Albastra 1998;
- Burdescu D.D. - Analiza Complexitatii Algoritmilor (curs), 1997.
- Cormen, Th.; Leiserson, Ch.; Rivest, R. - Introducere in Algoritmi, Ed Agora 2000;
- Burdescu D.D.; Patriciu Alex. - Analiza algoritmilor (Indrumar de laborator); Reprografia Universitatii din Craiova 1996;
- Weiss, Mark Allen - Data Structures and Algorithm Analysis, Benjamin - Cummings;Publishing Company 1992;
- Bovet, Daniel Pierre; Crescenzi Pierluigi - Introduction to the Theory of Complexity,Prentice Hall 1994;
- Hofri Micha - Analysis of Algorithms, Oxford University Press 1995;
- Harel David - Algorithmics - The Spirit of Computing, Addison - Wesley 1994;
- Foster C. L. - Algorithms, Abstraction and Implementation, Academic Press 1992;
- Baase Sara - Computer Algorithms

## **ARTIFICIAL INTELLIGENCE**

**NUMBER OF CREDIT POINTS:** 5

**SEMESTER:** IV

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The aim of this course is to introduce students to the concepts and methods of artificial intelligence with a focus on representation and reasoning in classical logic. The cover will also cover an introduction to logic programming with Prolog. The objectives of the course are: 1. To introduce students to the concepts and methods of artificial intelligence with a focus on representation and reasoning; 2. To introduce students to logic and logic programming with Prolog The laboratory will allow students to program and experiment with Prolog programs and understand basic reasoning methods. The assignment requires the development.

**COURSE CONTENT:** Chapter 1. Introduction to artificial intelligence; 2. Representation and reasoning using definite clauses; 3. Proof with definite clauses; 4. Utilizing the representation and reasoning system of definite clauses; 5. Problem solving using state-space search; 6. Heuristic search; 7. Constraint satisfaction problems; 8. Knowledge representation; 9. Uncertainty in knowledge and reasoning; 10. Planning; 11. Machine learning

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY:**

- David Poole, Alan Mackworth, Randy Goebel : Computational Intelligence. A Logical Approach. Oxford University Press, 1998.
- Stuart Russell, Peter Norvig. Artificial Intelligence: A Modern Approach, Prentice Hall, 2002.
- Costin Badica, Inteligenta artificiala. Reprezentare si rationament, Editura Universitaria.

## **COMPUTER GRAPHICS**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** IV

**COURSE TYPE:** core

**COURSE OBJECTIVES:** The course will introduce the basic concepts regarding computer graphics, fundamental transformations, and the structure of a graphics engine and the operations that take place in this engine. The laboratory has the purpose of putting into practice the studied information and implement them in C++.

**COURSE CONTENT:** 1. Mathematical Aspects for Computer Graphics; 2. Geometrical Models ; 3. Geometrical Transformatios ; 4. Modeling and Simulation Transformation Chain; 5. Visualization Transformation Chain

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY:**

- Dorian Dogaru – Grafica pe calculator. Elemente de geometrie computatională – vol.1., Editura didactică sipedagogică, București, 1995
- James Foley, Andries van Dam, Steven Feiner, John Hughes – Computer Graphics: Principles and Practice – Addison Wesley, 1993
- Alan Watt – 3D Computer Graphics - Addison Wesley, 2000
- James Foley, Andries van Dam, Steven Feiner, John Hughes, Richard Philips – Introduction to ComputerGraphics – Addison Wesley, 1993

## **ASSEMBLY PROGRAMMING LANGUAGES**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** IV

**COURSE TYPE :** core

**COURSE OBJECTIVES:** The course aims to introduce the instruction set architecture of Intel 80x86 microprocessors and the basic concepts of assembly language programming. The laboratory work will provide students with the opportunity to practically improve their assembly language programming skills.

**COURSE CONTENT :** 1. Introduction to number systems ; 2. Architectural elements ; 3. Introduction to assembly language; 4. Instruction set ; 5. Strings ; 6. Procedures; 7. Macroinstructions and assembly directives; 8. Structures and bit records; 9. Mixed programming; 10. Interrupts

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION :** written exam

**BIBLIOGRAPHY :**

- P.S. Dandamuri, “Introduction to Assembly Language Programming, From 8086 to Pentium Processors”, Springer– Verlag, New York, 1998
- Gh. Musca, “Programare în limbaj de asamblare”, Ed. Teora, 1998 3. V. Lungu, “Procesoare Intel, “Programarea în limbaje de asamblare”, Ed. Teora, 2000
- Turbo Assembler, version 2.0, “User’s Guide”, Borland International, Inc. 1800 Green Hills Road Scotts Valley, 1998
- K.A. Lemone, “Assembly Language and Systems Programming for the IBM PC and Compatibles”, Little Brown & Company Canada Limited

- D. Somnea, I. Vladut, “Programarea in Assembler”, Ed. Tehnica, 1992
- Gh. Marian, M. Marian, E. Dumitrascu , N. Enescu – Limbaje de asamblare – ghid

## **MEASUREMENTS TECHNIQUES**

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER: IV**

**COURSE TYPE:** field

**COURSE OBJECTIVES:** The course presents specific matters related to fundamentals of the numerical techniques used to evaluate the physical quantities and the virtual instrumentation elements.

**COURSE CONTENT:** 1. Numerical and discrete descriptions of physical quantities evolution. 2. Numerical techniques for signals processing; 3. Numerical acquisition of temporal evolutions; 4. Virtual instrumentation elements.

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY:**

- F.Coulon, Théorie et traitement des signaux, P.P. Romandes, '90
- J.Proakis, D. Manolakis, Digital Signal Processing, P. Hall, 2005.
- S. Tumanski, Principles of Electrical Measurement, Taylor, 2006.
- P. Paratte, Ph., Systèmes de mesure, P. P. Romandes, 1986.
- van Putten, Electronic Meas. Systems, Prentice Hall, 1988.
- Maloberti, Data Converters, Springer, 2007.
- R. van der Plassche, Integrated A/D D/A Converters, Kluwer , '94.

## **GENERAL ECONOMICS AND ACCOUNTING**

**NUMBER OF CREDIT POINTS: 3**

**SEMESTER: IV**

**COURSE TYPE:** complementary

**COURSE OBJECTIVES:** Acquisition of the fundamental notions in the field of accountancy, knowledge and the understanding of the procedures specific to the accountancy method; understanding of the terminology specific to the financial-accounting field; training of logical thinking in what concerns the transposition in accounting language of the main economical-financial operations that generates the activity of economic agents; understanding of the methodology and techniques specific to accountancy.

**COURSE CONTENT :** 1. The object and the method of accountancy; 2. The accounting representation of the patrimony and of the financial results; 3. The accounting evaluation of the patrimonial structures; 4. Justificative documents and accounting bookkeepings; 5. The account and the double registering in accountancy; 6. The inventory of the patrimony; 7. The verification balance; 8. The annual financial statement.

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY:**

- Brabete Valeriu, Dragan Cristian – Bazele contabilitatii conforme cu directivele europene, Editura Universitaria, Craiova, 2007.

- Staicu Constantin – Bazele contabilitatii moderne, vol.1, Editura Scrisul Românesc, Craiova, 2003.
- Staicu Constantin (coordonator) – Bazele contabilitatii moderne, vol.2, Editura Universitaria Craiova, 2004.
- Sandu Maria (coordonator) – Bazele contabilitatii, Editura Scrisul Românesc, Craiova, 2005.
- Calin Oprea, Ristea Mihai – Bazele contabilitatii, Editura National, Bucuresti, 2001.
- Epuran M., Babai\_a V. - Teoria generala a contabilitatii, Editia a Ila, Editura Mitron, 2002.

## **ENGLISH 2**

**NUMBER OF CREDIT POINTS: 2**

**SEMESTER: IV**

**COURSE TYPE:** complementary

**COURSE OBJECTIVES:** The course focuses on teaching the grammatical structures of the English language as well as on the correct use in conversation. Also, an emphasis will be placed on activating the four main language skills: listening, reading, speaking and writing.

**COURSE CONTENT :** 1. Network and communication; Asking questions (why questions); If clauses; Thematic vocabulary; 2. Databases; Prefixes and suffixes; Describing computer performances; Expressing results; Comparing and contrasting; 3. Artificial intelligence; Synonyms and antonyms; Past tense simple vs. present perfect; Vocabulary practice; 4. Managed and unmanaged endpoints; 5. The degrees of comparison of adjectives and adverbs; Present perfect simple and continuous in use; Gadgets and devices- describing, comparing; 6. Multimedia; The sequence of tenses; The active vs. the passive voice; Vocabulary is use conversation; Explaining and persuading; 7. Future trends in computing; Means of expressing future time; Oral vs. written presentations; Complex noun phrases and the plural of nouns; Synonymy of sentences; Word order: rules and exceptions.

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** colloquy

**BIBLIOGRAPHY:**

- Brookes, M, Lagoutte, F, English For The Computer World; Teora, 2001.
- Vince, M, Advanced Language Practice; Macmillan Publishers, 2003;
- Otman, G, Engleza Pentru Internet, Teora, 2002.

## **PRACTICAL TRAINING**

**NUMBER OF CREDIT POINTS: 2**

**SEMESTER: IV**

**COURSE TYPE :** field

**COURSE OBJECTIVES:** Familiarizing students with the programming algorithms and techniques that are used for the concrete development of a software application. The practice will take place either in the research centre “Development of Multimedia Applications” of the department of Software Engineering, or in a software oriented company, with which the faculty has established a partnership.

**COURSE CONTENT:** 1. Introductory elements concerning the object oriented programming; 2. Data structures; 3. Essential elements about the object oriented programming; 4. Advanced notions o object oriented programming; 5. Software applications design using the UML formalism; 6. Project management

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** oral examination

**BIBLIOGRAPHY:** N/A.

## **DIGITAL INTEGRATED CIRCUITS**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** V

**COURSE TYPE:** field

**COURSE OBJECTIVES:** The aim of the course is knowledge acquisition that students need in understanding the operation of the basic types of digital integrated circuits as well as the analysis and synthesis of logical combinational and sequential circuits methods. The laboratory work allows the consolidation of the theoretical notions and the application of digital circuits designing and use.

**COURSE CONTENT:** 1. Commutation drive for semiconductor devices; 2. Basic logical circuits; 3. Combinational logical circuits; 4. Sequential logical circuits

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY :**

- Filipescu, V., Circuite electronice digitale, Editura UNIVERSITARIA Craiova, 2002;
- Filipescu, V., Garaiman, D., Circuite electronice digitale – Indrumar de laborator, Reprografia Universitatii din Craiova, 1997;
- Maican, S., Sisteme numerice cu circuite integrate - culegere de probleme, Editura TEHNICA, Buc., 1980;
- Millman, J., Grabel, A., Microelectronique, McGraw-Hill, 1991;
- Stefan, Gh., Circuite integrate digitale, Editura DENIX, Bucuresti, 1993;
- Sztojanov, I., s.a., De la poarta TTL la microprocesor, Seria Electronica aplicata, Editura TEHNICA, Buc., 1987;
- Toacse, Gh., Nicula, D., Electronica digitala, Editura TEORA, 1996;
- Toacse, Gh., Nicula, D., Electronica digitala. Dispozitive – circuite – proiectare, Editura Tehnica, Bucuresti, 2005;
- Wakerly, J. F., Circuite digitale. Principiile si practicile folosite in proiectare, Editura Teora, Bucuresti, 2000.

## **DATABASES**

**NUMBER OF CREDIT POINTS:** 5

**SEMESTER:** V

**COURSE TYPE:** field

**COURSE OBJECTIVES:** The course introduces fundamental topics in the field of databases: users, data models, entity-relationship model, relational model, relational algebra, file and index organization, distributed databases concepts. The labs consolidate the theoretical concepts and create working skills in MS Access 2000 and MS SQL Server 2000.

**COURSE CONTENT:** 1.Databases and Database Users; 2.Database System Concepts and Architecture; 3. Data Modelling Using the Entity-Relationship Model; 4. Record Storage and Primary File

Organisation; 5. Index Structures for Files; 6. The Relational Data Model and Relational Algebra; 7. SQL - A Relational Database Language; 8. Distributed Databases

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY:**

- Fundamentals Of Database Systems , Ramez Elmasri, Shamkant B. Navathe, Addison-Wesley Publishing Company 1994
- Principles of Database and Knowledge-Base Systems vol I, J.D. Ullman , Computer Science Press 1989
- Baze de date, Burdescu D., Ionescu A., Stanescu L., Editura Universitaria, Craiova, 2004
- Ghid pentru lucrari de laborator la baze de date, Ionescu A., Tipografia Universitatii din Craiova, 2004

## **OPEARATING SYSTEMS**

**NUMBER OF CREDIT POINTS:** 5

**SEMESTER:** V

**COURSE TYPE:** field

**COURSE OBJECTIVES:** In the first Chapters one presents the primary notions and the classifications of operating systems along with the describing of the main architectural types. Afterward one introduces the most important concepts corresponding to the processes and threads management. Then one treats the problematic of memory management and of the most important aspects of the input-output operations. In the end one presents the fundamental notions corresponding to files' management. The laboratory is meant to help the understanding of knowledge on operating with Linux and on working with threads/processes and pipes in Linux. In the second part the students will study some aspects concerning the work with the memory manager, with the I/O system, with file systems and files and with the registry in Windows. At the seminar one toggles with the case studies Windows/Linux corresponding to the notions presented at the course classes.

**COURSE CONTENT:** 1. Primary notions; 2. Operating systems classification. Types of os; 3. Operating Systems' Architecture; 4. Notions about processes management; 5. Memory management ; 6. I/o devices management ; 7. Files management

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY:**

- Bovet, D., Cesati, M., Understanding the Linux kernel, 2-nd Ed., O'Reilly, 2003
- David S., Russinovich M., Andreas P., Windows Operating System Internals Resource Kit , 2006
- Johnson M., H., Win32 System Programming: A Windows® 2000 Application Developer's Guide, 2<sup>nd</sup> Edition, Addison-Wesley, 2000.
- Musatescu, C. , Sisteme de operare, Editura Radical, 1999
- Nicolae, I.D., Sisteme de operare, Tipografia Universitatii din Craiova, 2004
- Nicolae, I.D., Sisteme de operare I, Arhitecturi. Procese. Memorie. Dispozitive, Ed. Universitaria, 2007.
- Tanenbaum , A., Modern Operating Systems – Prentice Hall, 2001

## **DATA COMMUNICATION**

**NUMBER OF CREDIT POINTS: 5**

**SEMESTER: V**

**COURSE TYPE: field**

**COURSE OBJECTIVES:** The course focuses on the introduction of basic concepts concerning data communication matters. One presents the communications environment, serial interfaces, and communication protocols at the level Data Link. The course presents the necessary basic skills for the upcoming courses of Computer Networks and Computer Networks Management. The laboratory is meant to consolidate the theoretical knowledge and to create abilities in what is concerning the serial interfaces programming through practical applications, exercises and problems.

**COURSE CONTENT:** 1. Distributed systems architecture; 2. Electrical interface; 3. Data transmission; 4. Communication protocols at the level at data link; 5. Ieee 802.3 csma/cd

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY:**

- Chow, W. (1983), Computer Communications, Vol. I: Principles, Prentice-Hall
- Cooper, E. (1986), Broadband Network Technology, Sytek- Prentice-Hall
- Davies, D. W. and Barber, D.L.A. (1973), Communication Networks for Computers, Wiley
- Halsall, F. (1988), Data Communications, Computer Networks and OSI, Addison Wesley
- IEEE (1985), Logical Link Control – IEEE 802.2
- Peebles, P. Z. (1987), Digital Communication Systems, Prentice- Hall
- Peterson, W. W. (1961), Error Correcting Codes, MIT Press
- Schwartz, M. (1987), Telecommunication Networks: Protocols, Modelling and Analysis, Addison-Wesley
- Sloman, M. and Kramer, J. (1987), Distributed Systems and Computer Networks, Prentice-Hall
- Stallings, W. (1985), Data and Computer Communications

## **COMPUTER STRUCTURE AND ORGANIZATION**

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER: V**

**COURSE TYPE: field**

**COURSE OBJECTIVES:** to familiarize students with fundamentals of computer arithmetic, computer organisation, memory and input-output systems, computer system quality evaluation.

**COURSE CONTENT:** 1. Fundamentals of computer arithmetic; 2. Organization and structure of a RISC processor; 3. Hierarchical structure of the computer memory; 4. Input/Output blocks; 5. Computer system performance analysis

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY:**

- David A. Patterson, John L. Hennessy – Computer Organization and Design – third edition revisited, Elsevier Inc., 2007
- Sivarama P. Dandamudi – Guide to RISC Processors for Programmers and Engineers – Springer Science+Business Media Inc.

- Andrew S. Tanenbaum - Structured Computer Organization – Fourth Edition, Prentice-Hall, Inc. 2001
- Mostafa Abd-El-Barr, Hesham El-Rewini – Fundamentals of Computer Organization and Architecture - John Wiley & Sons, 2005
- Hesham El-Rewini, Mostafa Abd-El-Barr – Advanced Computer Architecture and Parallel Processing - John Wiley & Sons, 2005

## **COMPUTER STRUCTURE AND ORGANIZATION - PROJECT**

**NUMBER OF CREDIT POINTS: 1**

**SEMESTER: V**

**COURSE TYPE:** field

**COURSE OBJECTIVES:** to familiarize students with fundamentals of computer arithmetic, computer organisation, memory and input-output systems, computer system quality evaluation

**COURSE CONTENT:** Design and simulation of a simplified processor.

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** project

**BIBLIOGRAPHY:**

- David A. Patterson, John L. Hennessy – Computer Organization and Design – third edition revisited, Elsevier Inc., 2007
- Sivarama P. Dandamudi – Guide to RISC Processors for Programmers and Engineers – Springer Science+Business Media Inc.
- Andrew S. Tanenbaum - Structured Computer Organization – Fourth Edition, Prentice-Hall, Inc. 2001
- Mostafa Abd-El-Barr, Hesham El-Rewini – Fundamentals of Computer Organization and Architecture - John Wiley & Sons, 2005
- Hesham El-Rewini, Mostafa Abd-El-Barr – Advanced Computer Architecture and Parallel Processing - John Wiley & Sons, 2005

## **VISUAL PROGRAMMING ENVIRONMENTS**

**NUMBER OF CREDIT POINTS: 3**

**SEMESTER: V**

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** This course introduces the necessary concepts and tools of verification and then it describes a process for planning and carrying out an effective functional verification of a design. It also introduces the concept of coverage models that can be used in a coverage driven verification process.

**COURSE CONTENT:** 1. What is verification? ; 2. Verifications tools; 3. The verification plan; 4. Architecting testbenches

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY :**

- Bergeron J. – Writing Testbenches: Functional Verification of HDL Models, Second Edition, Kluwer Academic Publishers, 2003
- Bhasker J. – VHDL Primer, third edition, Prentice Hall, 1999
- Perry D. – VHDL Programming By Example, McGraw-Hill, 2002
- XILINX Corp. – VHDL Reference Guide
- XILINX Corp. – SPARTAN Family Reference Guide

## **VISUAL PROGRAMMING ENVIRONMENTS - PROJECT**

**NUMBER OF CREDIT POINTS:** 1

**SEMESTER:** V

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** This project introduces the necessary concepts and tools of verification and then it describes a process for planning and carrying out an effective functional verification of a design. It also introduces the concept of coverage models that can be used in a coverage driven verification process.

**COURSE CONTENT:** N/A

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** project

**BIBLIOGRAPHY :**

- Bergeron J. – Writing Testbench: Functional Verification of HDL Models, Second Edition, Kluwer Academic Publishers, 2003
- Bhasker J. – VHDL Primer, third edition, Prentice Hall, 1999
- Perry D. – VHDL Programming By Example, McGraw-Hill, 2002
- XILINX Corp. – VHDL Reference Guide
- XILINX Corp. – SPARTAN Family Reference Guide

## **COMPUTER NETWORKS**

**NUMBER OF CREDIT POINTS:** 5

**SEMESTER:** VI

**COURSE TYPE:** field

**COURSE OBJECTIVES:** The main goal of the course „Computer Networks” is to introduce the basic terminology and concepts in networking: these range from simple, limited streams of bits used to ferry data from a sender to a receiver, to various schemes for identifying, addressing, routing, and handling messages as they travel across various types of networking media. Likewise, protocols also play a crucial role in data transmission across a network. The laboratory activities give to the students the real feeling of the network applications.

**COURSE CONTENT:** 1. Data Communications; 2. Communications Networks; 3. Network Technologies; 4. Multiple Access; 5. Switching; 6. Naming and Addressing; 7. Routing; 8. Services and Applications; 9. Security

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY:**

- Marin Lungu – Retele de Calculatoare si Aplicatii, Editura Universitaria, 2002
- Ed Tittel; Theory and Problems of Computer Networking; McGRAW-HILL, 2002

- <http://www.packetizer.com>
- <http://msdn.microsoft.com>
- Berners-Lee, T., "WWW: Present, Past, and Future," IEEE Computer Magazine, October 1996, pp. 69—77.
- Bradley Mitchell: "Introduction to VPN"; "Introduction to Hubs Part 1"; "The MAC Address An Introduction to MAC Addressing"; <http://compnetworking.about.com>
- Cisco Systems; "Technology Brief Introduction to Gigabit Ethernet"
- Chappell, D., "Understanding OLE and ActiveX", Microsoft Press, 1996.
- Tim Donaldson: „A Comparative Analysis of High-Speed Switching for Backbone LANs: Fast Ethernet, FDDI, and Fibre Channel; Ancor Communications.
- RFC2460: "Internet Protocol, Version 6 (IPv6) Specification"; December 1998
- Lance Spitzner; "Configuring Network Interface Cards", August, 1999 <http://www.enteract.com/~lspitz/pubs.html>
- Lantronix Tutorials- "Network SwitChing";<http://www.lantronix.com/learning/tutorials/index.html>
- Laura Cohen:"Understanding the World Wide Web"; University of Albany; <http://www.albany.edu/library/>
- Lewis, T., "Where is Client/Server Software Headed," IEEE Computer Magazine, April 1995, pp. 49—55.

## **DATABASE DESIGN**

**NUMBER OF CREDIT POINTS:**4

**SEMESTER:** VI

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The course introduces fundamental topics in the field of databases design: the enhanced entity-relationship model, EER-relational mapping, the theory of normalization and transactions processing concepts. The labs consolidate the theoretical concepts and create working skills in Oracle DBMS.

**COURSE CONTENT:** 1.Enhanced Entity-Relationship and Object Modelling; 2. ER- and EER-to-Relational Mapping; 3. Functional Dependencies and Normalization for Relational Databases; 4. Practical Database Design and Tuning; 5. Transaction Processing Concepts; 6. Concurrency Control Techniques; 7. Database Recovery Techniques; 8. Database Security and Authorization

**LANGUAGE OF INSTRUCTION:** English

**FORMA DE EVALUATION:** written exam

**BIBLIOGRAPHY:**

- Fundamentals Of Database Systems , Ramez Elmasri, Shamkant B. Navathe, Addison-Wesley Publishing Company 1994
- Principles of Database and Knowledge-Base Systems vol I, J.D. Ullman , Computer Science Press 1989
- Baze de date, Burdescu D., Ionescu A., Stanescu L., Editura Universitaria, Craiova, 2004
- Ghid pentru lucrari de laborator la baze de date, Ionescu A., Tipografia Universitatii din Craiova, 2004

## **DATABASE DESIGN - PROJECT**

**NUMBER OF CREDIT POINTS:** 1

**SEMESTER:** VI

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The project focuses on the design of a complex database and its implementation using Oracle DBMS. As a result, the students get the practical skills in the field of database design.

**COURSE CONTENT:** 1. Design the Entity-connection model; 2. Design the associated relational model; 3. The database should include: primary and foreign keys, Update/ delete on cascade rules; 4. Verify the quality of the database using normal forms; 5. Create an index for the database; 6. Implement a series of operations (queries, a function, a procedure) The database and the operations will be implemented in Oracle.

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** project

### **BIBLIOGRAPHY:**

- Fundamentals Of Database Systems , Ramez Elmasri, Shamkant B. Navathe, Addison-Wesley Publishing Company 1994
- Principles of Database and Knowledge-Base Systems vol I, J.D. Ullman , Computer Science Press 1989
- Baze de date, Burdescu D., Ionescu A., Stanescu L., Editura Universitaria, Craiova, 2004
- Ghid pentru lucrari de laborator la baze de date, Ionescu A., Tipografia Universitatii din Craiova, 2004

## **MICROPROCESSORS SYSTEM DESIGN**

**NUMBER OF CREDIT POINTS:** 5

**SEMESTER:** VI

**COURSE TYPE:** field

**COURSE OBJECTIVES:** The course develops the students' skills necessary to work with microprocessors and microcontrollers.

**COURSE CONTENT:** 1. VLSI Modules; 2. 8051 Microcontroller; 3. Dialog level; 4. Data transfer level

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** oral exam

### **BIBLIOGRAPHY :**

- INTEL – Embedded Microcontrollers, Intel Corporation, 1998
- INTEL – Microprocessors and Peripheral Handbook, vol 2, Peripheral, Intel Corporation, 1988
- Mohamed Rafiquzzaman - Microprocessor and Microcomputer Based System Design, CRC Press 1990

## **DISTRIBUTED NETWORK APPLICATION DEVELOPMENT**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** VI

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The aim of this course is to introduce students to the basic elements for creation of distributed applications in computer networks, with a special focus on the middleware layer in Internet-based distributed systems.

**COURSE CONTENT** 1. Distributed systems. Definitions and features; 2. Architectures, models and networks of distributed systems; 3. Concurrent programming. Threads; 4. Inter-process communication in distributed systems; 5. Communication protocols for distributed systems; 6. Name and directory services; 7. Object-oriented distributed systems and remote method invocation. Java RMI; 8. Agent-oriented middleware. FIPA standards. Examples in JADE; 9. Service-oriented middleware. SOA and Web services; 10. Transactions and replication in distributed systems; 11. Distributed algorithms

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

### **BIBLIOGRAPHY:**

- George Coulouris, Jean Dollimore and Tim Kindberg, Distributed Systems. Concepts and Design, Addison-Wesley, 2001
- Andrew S. Tanenbaum, Maarten van Steen, Distributed Systems: Principles and Paradigms, Prentice Hall, 2002
- Sukumar Ghosh, Distributed Systems: An Algorithmic Approach, Chapman & Hall/CRC, 2007
- Ajay D. Kshemkalyani, Mukesh Singhal: Distributed Computing: Principles, Algorithms, and Systems, Cambridge University Press, 2008

## **DISTRIBUTED NETWORK APPLICATION DEVELOPMENT - PROJECT**

**NUMBER OF CREDIT POINTS:** 1

**SEMESTER:** VI

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The project will allow students to design and implement distributed applications for computer networks. The project concerns the development of a distributed application according to a given set of specifications. This requires utilization of middleware software technologies for distributed systems that were presented during the lectures and that were experimented in the lab.

**COURSE CONTENT:** 1. Distributed systems. Definitions and features; 2. Architectures, models and networks of distributed systems; 3. Concurrent programming. Threads; 4. Inter-process communication in distributed systems; 5. Communication protocols for distributed systems; 6. Name and directory services; 7. Object-oriented distributed systems and remote method invocation. Java RMI; 8. Agent-oriented middleware. FIPA standards. Examples in JADE; 9. Service-oriented middleware. SOA and Web services; 10. Transactions and replication in distributed systems; 11. Distributed algorithms

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** project

### **BIBLIOGRAPHY :**

- George Coulouris, Jean Dollimore and Tim Kindberg, Distributed Systems. Concepts and Design, Addison-Wesley, 2001
- Andrew S. Tanenbaum, Maarten van Steen, Distributed Systems: Principles and Paradigms, Prentice Hall, 2002
- Sukumar Ghosh, Distributed Systems: An Algorithmic Approach, Chapman & Hall/CRC, 2007
- Ajay D. Kshemkalyani, Mukesh Singhal: Distributed Computing: Principles, Algorithms, and Systems, Cambridge University Press, 2008

## **VERIFICATION AND TESTING OF COMPUTER SYSTEMS**

**NUMBER OF CREDIT POINTS: 3**

**SEMESTER: VI**

**COURSE TYPE:** field

**COURSE OBJECTIVES:**

**COURSE CONTENT:**

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY:** N/A

## **VERIFICATION AND TESTING OF COMPUTER SYSTEMS- PROJECT**

**NUMBER OF CREDIT POINTS: 2**

**SEMESTER: VI**

**COURSE TYPE:** field

**COURSE OBJECTIVES:**

**COURSE CONTENT:**

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** project

**BIBLIOGRAPHY:**

## **I/O SYSTEMS**

**NUMBER OF CREDIT POINTS: 3**

**SEMESTER: VI**

**COURSE TYPE:** field

**COURSE OBJECTIVES:** It aims to introduce basic notions related to the structure of a personal computer as well as to the structure and operation modality of IO equipment attached to numerical computers and to the interfaces attached to them. One presents to the students various structures, characteristics and problems related to the input/output systems, the main peripheral equipment of the computation systems. The students learn how to program a peripheral equipment and to design interfaces for various IO systems.

**COURSE CONTENT:** 1. Personal Computers Structure; 2 Data input devices; 3. Floppy disk units; 4. Hard disk drives;

5. Optical disk drives; 6. Equipments for information visualization; 7. Printing equipments;

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY :**

- Scott Mueller, Craig Zacker: PC - depanare si modernizare, editia a IV-a, Editura Teora 2005
- Troubleshooting, Maintaining & Repairing Personal Computers – Stephen J. Bigelow, Editura McGraw-Hill 1996
- Constantin Patrascu - Sisteme de intrare-iesire, Universitatea din Craiova 1996
- Constantin Patrascu - Echipamente periferice, Editura Sitech, 2006

## **SOFTWARE ENGINEERING**

**NUMBER OF CREDIT POINTS: 3**

**SEMESTER: VI**

**COURSE TYPE:** field

**COURSE OBJECTIVES:** The main objective of the course is to introduce students to the concepts and techniques required to build large software systems. The main objective for applications is to provide an opportunity to obtain practical experience applying the techniques on an actual development effort.

**COURSE CONTENT:** 1. Introduction to Software Engineering; 2. Requirements engineering; 3. Development of software systems; 4. Verification and validation of software systems; 5. Evolution of software systems

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY :**

- Ian Sommerville, Software Engineering, Addison Wesley, 6th Edition, 2001
- Roger Pressman, Software Engineering: a practitioner's approach, Addison Wesley, 5th Edition, 2001
- James F. Peters and Witold Pedrycz, Software Engineering: an engineering approach, John-Wiely, 2000

## **SOFTWARE ENGINEERING - PROJECT**

**NUMBER OF CREDIT POINTS: 2**

**SEMESTER: VI**

**COURSE TYPE:** field

**COURSE OBJECTIVES:** The main objective of the course is to introduce students to the concepts and techniques required to build large software systems. The main objective for applications is to provide an opportunity to obtain practical experience applying the techniques on an actual development effort.

**COURSE CONTENT:** N/A

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** project

**BIBLIOGRAPHY :**

- Ian Sommerville, Software Engineering, Addison Wesley, 6th Edition, 2001
- Roger Pressman, Software Engineering: a practitioner's approach, Addison Wesley, 5th Edition, 2001
- James F. Peters and Witold Pedrycz, Software Engineering: an engineering approach, John-Wiely, 2000

**COMPUTER SYSTEMS MODELLING**

**NUMBER OF CREDIT POINTS:** 3

**SEMESTER:** VI

**COURSE TYPE:** field

**COURSE OBJECTIVES:** 1. Introducing the basic concepts for modeling and discrete simulation; 2. Learning the analytical methods for modeling systems with waiting queues and networks of queues; 3. Introducing of techniques for the modeling, simulation and performances analysis at systems with complex discrete events; 4. Identification of possibilities and limits of mathematic models, their extension through simulation; 5. Using of packages and libraries of specialized programs for modeling and simulation; 6. Developing the abilities for the modeling/simulation of a system through exercises and problems, realization of a small project; 7. Students familiarization with the traditional and modern working practices; 8. Establishing of the required abilities directly related to other specialty disciplines.

**COURSE CONTENT:** 1.Introduction. Dynamic discrete systems (with events); 2.Systemic models for dynamic discrete systems (with events); 3. Operational models for dynamic discrete systems (with events); 4. Simulation of dynamic discrete systems (with events); 5. Specialized instruments (systems of programs) for discrete modeling and simulation

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY :**

- Banks J., Carson J.S., Nelson A., Nicol D., Discrete-Event System Simulation, 3rd Ed., Prentice-Hall, 2000
- Cassandras C.G., Discrete Event Systems: Modeling and Performance Analysis, Irwin & Aksen, Boston, 1993
- Lazowska E.D., Zahorjan J., Scott-Graham G., Sevcik K. C.: Quantitative System Performance - Computer System Analysis Using Queueing Network Models
- Mocanu M., Principii, concepte și instrumente de modelare și simulare în studiul sistemelor dinamice discrete, Ed. Sitech, 2004
- Bertsekas D., Gallager R., Data Networks, Prentice-Hall, 1989
- Dodescu Gh., Simularea sistemelor, Ed. Militara, 1986
- Radaceanu E., Limbaje de simulare, Ed. Militara, 1981
- Mihoc Gh., Ciucu G., Introducere în teoria asteptarii, Ed. Tehnica, 1967
- Mihoc Gh., Ciucu G., Muja A., Modele matematice ale asteptarii, Editura Academiei, Bucuresti, 1973
- Mihoc Gh., Micu N., Teoria probabilitatilor si statistica matematica, E.D.P., Bucuresti, 1980
- Misra J., Distributed Discrete-Event Simulation, ACM Computing Surveys, 18 (1), March 1986, pp. 39-65

- Zomaya A. (ed.), Parallel and Distributed Computing Handbook, McGraw-Hill, 1996
- Ho Y.C. (Ed.), Proceedings IEEE 77-1 (Special Issue on Dynamics of Discrete Event Systems), 1989
- Fujimoto R., Parallel Discrete Event Simulation, Comm.ACM, 33 (10), oct.1990, pp.31-53
- Ho Y.C., Cao X.R., Perturbation Analysis of Discrete Event Dynamic Systems, Kluwer Academic, 1991
- Nelson R.D., The Mathematics of Product Form Queueing Networks, ACM Computing Surveys, 25(3), 1993, pp.339-369

## **PRACTICAL TRAINING**

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER: VI**

**COURSE TYPE:** field

**COURSE OBJECTIVES:** Familiarizing students with the programming algorithms and techniques that are used for the concrete development of a software application. The practice will take place either in the research centre of the department of Computer Engineering, or in a software oriented company, with which the faculty has established a contract for realizing the training.

**COURSE CONTENT:** 1. Computer Networks (40 hours); 2. Database Design (40 hours); 3. Operating Systems (40 hours)

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** oral exam

**BIBLIOGRAPHY :** N/A

## **REAL TIME COMPUTING SYSTEMS**

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER: VII**

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The primary goal of this course is to meet the student with basics of real-time systems hardware structure, real-time I/O devices programming, real-time operating systems and task scheduling algorithms. At the conclusion of this course, laboratory and project, the student will have the knowledge and skills necessary to develop software for Real-Time Data Acquisition and Control Systems, using a general purpose PC 104 embedded system and real-time kernels / operating systems.

**COURSE CONTENT:** 1. Introduction to Real-Time Systems Examples of RTCS, Definitions and classifications, Elements of a RT Computer Control System, Classification of RTCS, Classification of programs; 2. RTCS for Process Control Systems Categories of processes, Computers activities related to RTCS for processes control, Structures of computer systems for real-time processes control; 3. Computer hardware requirements for RTCS General hardware structure, Input/output signals from/to real world, Functional blocks of a Data Acquisition and Control System; 4. Programming the I/O devices in real-time applications Communicating methods with external devices, Programming using hardware interrupts, Counter/Timer devices, An example of Data Acquisition and Control System; 5. Real-time operating multi-tasking systems Introduction, Task management in real-time applications, A case study: RTOS QNX ; 6. Scheduling algorithms for Hard Real Time Systems Introduction, Rate-Monotonic Scheduling

Algorithm, Preemptive Earliest Deadline First Algorithm, A case study: A mixed RM-EDF scheduling algorithm; 7. Real-time data communication Introduction, Real-time data communication protocols, Deadline based protocols.

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY :**

- Grosu, M.: Course notes – basic text
- Cooling, J.E.: Real-time software Systems – An introduction to structured and OO design, PWS Publishing Company, 1998.
- Krishna, C.M., K.G. Shin: Real Time Systems, McGraw-Hill Book CO., 1997.
- Stuart, B.: Real Time Computer Control, 1988
- Tannenbau, A. S.: Modern Operating Systems, Prentice-Hall, 1993.

## **REAL TIME COMPUTING SYSTEMS - PROJECT**

**NUMBER OF CREDIT POINTS: 1**

**SEMESTER: VII**

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** Upon the completion of the project, the students will have the knowledge and skills necessary to develop software for Real-Time Data Acquisition and Control Systems, using a general purpose PC 104 embedded system and real-time kernels / operating systems.

**COURSE CONTENT:** Each student gets a set of specifications describing the requirements of a real-time data acquisition and control system, in order to elaborate a software application using the PC104 systems existing at laboratory.

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** project

**BIBLIOGRAPHY :**

- Grosu, M.: Course notes – basic text
- Cooling, J.E.: Real-time software Systems – An introduction to structured and OO design, PWS Publishing Company, 1998.
- Krishna, C.M., K.G. Shin: Real Time Systems, McGraw-Hill Book CO., 1997.
- Stuart, B.: Real Time Computer Control, 1988
- Tannenbau, A. S.: Modern Operating Systems, Prentice-Hall, 1993.

## **COMPUTER NETWORKS MANAGEMENT**

**NUMBER OF CREDIT POINTS: 5**

**SEMESTER: VII**

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The course focuses on the introduction of basic concepts concerning the management of computer networks. One presents the operation principles of a switch and of a router, the ISO-OSI model, the static routing, the dynamic routing algorithms. The course is ending a cycle of

courses from this domain: Data Communications, Computer Networks and Computer Networks Management. The laboratory is meant to consolidate the theoretical knowledge and to create abilities in what is concerning the configuration and repairing computer networks through practical applications, exercises and problems.

**COURSE CONTENT:** 1. Introduction in computer networks management; 2. Bridging and Switching: fundamentals; 3. Routing: fundamentals; 4. Routing protocols

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY :**

- Radia Perlman: Interconnections Bridges, Routers, Switches, and Internetworking Protocols
- Larry L. Peterson, Bruce S. Davie: Computer Networks A Systems Approach
- Christian Huitema: IPv6: The New Internet Protocol
- Craig Hunt: Networking Personal Computers with TCP/IP 5. John W. Stewart III: BGP4 Inter-Domain Routing in the Internet
- George Varghese: Network Algorithmics - An Interdisciplinary Approach to Designing Fast Networked Devices
- Gary R. Wright, W. Richard Stevens: TCP/IP Illustrated, Volume 2 The Implementation

## **E-COMMERCE**

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER: VII**

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The aim of this course is to introduce students to the basic elements for creation of e-commerce applications, including concepts, techniques, algorithms and technologies. The laboratory work concerns the experimentation with various e-commerce technologies and techniques that are needed for the development of a sample e-commerce application.

**COURSE CONTENT:** 1. Introduction to e-commerce; 2. Business models for e-commerce; 3. E-commerce infrastructure; 4. E-commerce marketing; 5. Security and payment; 6. Negotiation; 7. Trust and reputation; 8. Middle-agents; 9. Social networks; 10. Online content and media; 11. B2B e-commerce: supply chain and collaboration

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY :**

- Kenneth C. Laudon, Carol Guercio Traver, E-Commerce: Business, Technology, Society, 4/e, Prentice Hall, 2008
- Maria Fasli, Agent Technology for E-Commerce, Wiley, 2007

## **E-COMMERCE-PROJECT**

**NUMBER OF CREDIT POINTS: 1**

**SEMESTER: VII**

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The project concerns the development of an e-commerce application starting according to a given set of specifications. This requires utilization of concepts and software technologies that were presented during the lectures and that were experimented in the lab.

**COURSE CONTENT:** 1. Introduction to e-commerce; 2. Business models for e-commerce; 3. E-commerce infrastructure; 4. E-commerce marketing; 5. Security and payment; 6. Negotiation; 7. Trust and reputation; 8. Middle-agents; 9. Social networks; 10. Online content and media; 11. B2B e-commerce: supply chain and collaboration

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** project

**BIBLIOGRAPHY :**

- Kenneth C. Laudon, Carol Guercio Traver, E-Commerce: Business, Technology, Society, 4/e, Prentice Hall, 2008
- Maria Fasli, Agent Technology for E-Commerce, Wiley, 2007

## **WEB APPLICATIONS' DESIGN**

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER: VII**

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The course covers aspects related to Web application architecture, Web application modelling, Web engineering, semantic and participative Web. The laboratory sessions and the project themes deal with Java-based Web technologies and frameworks.

**COURSE CONTENT:** 1. Introduction to Web applications' design; 2. Requirements engineering for Web applications; 3. Modelling Web applications; 4. Web application architectures; 5. Technologies for Web applications; 6. Testing Web applications; 7. Operation and maintenance of Web applications; 8. Web project management ; 9. The Web application development process; 10. Usability of Web applications; 11. Performance of Web application. 12. Security for Web applications; 13. Semantic Web; 14. Participative Web (Web 2.0)

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY :**

- Gerti Kappel, Birgit Pröll, Siegfried Reich, Werner Retschitzegger (Eds.): Web engineering: the discipline of systematic development of web applications. Wiley, 2006 (main textbook)
- Stefano Ceri, Piero Fraternali, Aldo Bongio, Marco Brambilla, Sara Comai, Maristella Matera: Designing Data-Intensive Web Applications. Morgan Kaufmann, 2002
- Cal Henderson: Building Scalable Web Sites. O'Reilly, 2006.
- Eric van der Vlist, Danny Ayers, Erik Bruchez, Joe Fawcett, Alessandro Vernet: Professional Web 2.0 Programming. Wrox Professional Series, 2006.
- Susan Fowler, Victor Stanwick: Web Application Design Handbook. Best Practices for Web-Based Software. Morgan Kaufmann, 2004.
- T. O'Reilly: What Is Web 2.0. Design Patterns and Business Models for the Next Generation of Software, 2005.

- Stefan Tanasa, Cristian Olaru: Dezvoltarea aplicatiilor Web folosind Java. Polirom, 2005.
- Sabin Buraga: Proiectarea siturilor Web. Design si functionalitate. Polirom, 2005.

## **WEB APPLICATIONS' DESIGN - PROJECT**

**NUMBER OF CREDIT POINTS: 1**

**SEMESTER: VII**

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The project is aimed at designing and implementing a Web application, using Java-based technologies (servlets, JSP, JSF, JavaScript & Ajax) and frameworks (Struts, Spring, Hibernate). The project themes are assigned at the beginning of the semester and can be done either individually or in teams; Design stage + preparing intermediary report; Realizing practical project + preparing final report

**COURSE CONTENT:** 1. Introduction to Web applications' design; 2. Requirements engineering for Web applications; 3. Modelling Web applications; 4. Web application architectures; 5. Technologies for Web applications; 6. Testing Web applications; 7. Operation and maintenance of Web applications; 8. Web project management ; 9. The Web application development process; 10. Usability of Web applications; 11. Performance of Web application. 12. Security for Web applications; 13. Semantic Web; 14. Participative Web (Web 2.0)

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** project

**BIBLIOGRAPHY :**

- Gerti Kappel, Birgit Pröll, Siegfried Reich, Werner Retschitzegger (Eds.): Web engineering: the discipline of systematic development of web applications. Wiley, 2006 (main textbook)
- Stefano Ceri, Piero Fraternali, Aldo Bongio, Marco Brambilla, Sara Comai, Maristella Matera: Designing Data-Intensive Web Applications. Morgan Kaufmann, 2002
- Cal Henderson: Building Scalable Web Sites. O'Reilly, 2006.
- Eric van der Vlist, Danny Ayers, Erik Bruchez, Joe Fawcett, Alessandro Vernet: Professional Web 2.0 Programming. Wrox Professional Series, 2006.
- Susan Fowler, Victor Stanwick: Web Application Design Handbook. Best Practices for Web-Based Software. Morgan Kaufmann, 2004.
- T. O'Reilly: What Is Web 2.0. Design Patterns and Business Models for the Next Generation of Software, 2005.
- Stefan Tanasa, Cristian Olaru: Dezvoltarea aplicatiilor Web folosind Java. Polirom, 2005.
- Sabin Buraga: Proiectarea siturilor Web. Design si functionalitate. Polirom, 2005.

## **DATA SECURITY**

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER: VII**

**COURSE TYPE :** specialty

**COURSE OBJECTIVES:** The course aims to introduce the concepts of information security. The laboratory will give students the opportunity to practically improve their programming skills from a security point of view and also to apprehend the importance of security in internetworked environments.

**COURSE CONTENT:** 1. Introduction to information security; 2. Cryptographic tools; 3. Authentication; 4. Access control mechanisms; 5. Databases; 6. Intrusion detection; 7. Malicious software; 8. Denial of service; 9. Firewall and intrusion prevention systems; 10. Multilevel security; trust models; 11. Buffer overflow; 12. Physical and infrastructure security; 13. Security management and risk assessment; 14. Legal and ethical issues

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam/ project

**BIBLIOGRAPHY :**

- W. Stallings, L. Brown, “Computer Security: Principles and Practice”, Prentice-Hall, 2008, ISBN-13: 9780136004240
- W. Stallings, “Network Security Essentials: Applications and Standards”, Prentice-Hall, 2007, ISBN-13: 9780132380331
- B. Schneier, “Applied Cryptography: Protocols, Algorithms and Source Code in C”, Wiley, 1996, ISBN-13: 978-0471117094

### **DATA SECURITY - PROJECT**

**NUMBER OF CREDIT POINTS: 1**

**SEMESTER: VII**

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The project is meant to introduce the concepts of information security. The laboratory will give students the opportunity to practically improve their programming skills from a security point of view and also to apprehend the importance of security in internetworked environments.

**COURSE CONTENT:** 1. Cryptographic instruments; 2. Authentication mechanisms; 3. Mechanisms for access control; 4. Databases security; 5. Intrusion detection; 6. Malign software; 7. Security in programs: “buffer overflow” attacks; 8. Attacks to information services availability / denial of services; 9. Firewall systems and intruders prevention; 10. Multi-level security; models for trust in information security; 11. Physical infrastructure and security; 12. Managing the information security and risks identification; 13. Legal and ethical aspects

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** project

**BIBLIOGRAPHY :**

- W. Stallings, L. Brown, “Computer Security: Principles and Practice”, Prentice-Hall, 2008, ISBN-13: 9780136004240
- W. Stallings, “Network Security Essentials: Applications and Standards”, Prentice-Hall, 2007, ISBN-13: 9780132380331
- B. Schneier, “Applied Cryptography: Protocols, Algorithms and Source Code in C”, Wiley, 1996, ISBN-13: 978-0471117094

### **FRAMEWORKS FOR DIGITAL SYSTEMS DEVELOPMENT**

**NUMBER OF CREDITS: 5**

**SEMESTER: VII**

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The students will learn a hardware description language and its usage in order to implement in a FPGA most of the classic logic blocks.

**COURSE CONTENT:** 1. Programmable logic; 2. Introduction to VHDL; 3. Basic VHDL language elements; 4. Dataflow Modeling; 5. Behavioral Modeling; 6. State Machine Description; 7. Subprograms

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** project

**BIBLIOGRAPHY :**

- Bhasker J. – VHDL Primer, third edition, Prentice Hall, 1999
- Perry D. – Vhdl Programming By Example, McGraw-Hill, 2002
- Skahill K. – VHDL for programmable logic, Addison-Wesley, 1996
- XILINX Corp. – VHDL Reference Guide
- XILINX Corp. – SPARTAN Family Reference Guide

## **MODELS AND ALGORITHMS FOR PARALLEL COMPUTING**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** VII

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The main objectives of this course include, but are not limited, to the following: 1. To introduce the basic models of parallel computing; 2. To enable the student to apply a systematic methodology for designing parallel algorithms; 3. To provide the student basic knowledge for the analysis of parallel algorithms; 4. To enable the student to efficiently use the parallel constructs of parallel programming languages.

**COURSE CONTENT:** 1. The Architecture of Parallel Systems; 2. Parallel Computing Models; 3. Brief Introduction to Parallel Programming of Multiprocessors; 4. The General Theory of Parallel Algorithms; 5. Basic Numerical and Non-numerical Parallel Algorithms; 6. Parallel Languages

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY :**

- [A] V. Kumar, A. Grama, A. Gupta, G. Kyrypis - Introduction to Parallel Computing Benjamin/Cummings 2003
- [A] R. W. Hockney, C.R. Jesshope , Parallel Computers - Architecture, Programming, Algorithms, Ed. Tehnica, Bucuresti, 1991
- [A] D. Grigoras – Parallel Computing. From Systems to Applications, Computer Libris Agora, 2000
- [A] M.Mocanu, Parallel Processing Algorithms and Languages (textbook, Reprografia Univ. Craiova, 1995)
- [A] M.Mocanu, A.Patriciu, Parallel computing in the C language on transputer-based systems, Unix and Windows NT networks (Reprografia Universitatii din Craiova, 1998)
- [B] Akl S., The Design and Analysis of Parallel Algorithms (Prentice-Hall, 1989)
- [B] Chaudhuri P., Parallel Algorithms Design and Analysis (Prentice-Hall, 1992)

- [B] JaJa J., An Introduction to Parallel Algorithms (Addison Wesley, 1992)
- [B] Christofer H. Nevison et al. - Laboratories for Parallel Computing, Jones and Bartlett, 1994
- [C] Galea D., Brudaru O., An Introduction to Systolic Computation (Ed. Academiei, Bucuresti, 1994)
- [C] Hoare C.A.R., Communicating Sequential Processes, Prentice-Hall 1985

## **MODELS AND ALGORITHMS FOR PARALLEL COMPUTING - PROJECT**

**NUMBER OF CREDIT POINTS: 1**

**SEMESTER: VII**

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The main objectives of this course include, but are not limited, to the following: 1. To introduce the basic models of parallel computing; 2. To enable the student to apply a systematic methodology for designing parallel algorithms; 3. To provide the student basic knowledge for the analysis of parallel algorithms; 4. To enable the student to efficiently use the parallel constructs of parallel programming languages.

**COURSE CONTENT:** 1. Synchronization problems for processes in distributed environments; 2. Numerical processing algorithms; 3. The game X-0; 4. Algorithms for text processing; 5. Algorithms for pipeline processing; 6. Sorting algorithms; 7. Algorithms for computational geometry; 8. Algorithms for graphs; 9. Algorithms for matrix processing; 10. Images processing; 11. Meta-search (search with existing search engines); 12. Algorithms for differential equations solving; 13. Algorithms for linear equations solving; 14. Designing 3D objects in more viewports; 15. Visual information retrieval in a database using color criterium.; 16. Algorithms for trees

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** project

**BIBLIOGRAPHY:**

- [A] V. Kumar, A. Grama, A. Gupta, G. Kyrypis - Introduction to Parallel Computing Benjamin/Cummings 2003
- [A] R. W. Hockney, C.R. Jesshope , Parallel Computers - Architecture, Programming, Algorithms, Ed. Tehnica, Bucuresti, 1991
- [A] D. Grigoras – Parallel Computing. From Systems to Applications, Computer Libris Agora, 2000
- [A] M.Mocanu, Parallel Processing Algorithms and Languages (textbook, Reprografia Univ. Craiova, 1995)
- [A] M.Mocanu, A.Patriciu, Parallel computing in the C language on transputer-based systems, Unix and Windows NT networks (Reprografia Universitatii din Craiova, 1998)
- [B] Akl S., The Design and Analysis of Parallel Algorithms (Prentice-Hall, 1989)
- [B] Chaudhuri P., Parallel Algorithms Design and Analysis (Prentice-Hall, 1992)
- [B] JaJa J., An Introduction to Parallel Algorithms (Addison Wesley, 1992)
- [B] Christofer H. Nevison et al. - Laboratories for Parallel Computing, Jones and Bartlett, 1994
- [C] Galea D., Brudaru O., An Introduction to Systolic Computation (Ed. Academiei, Bucuresti, 1994)
- [C] Hoare C.A.R., Communicating Sequential Processes, Prentice-Hall 1985

## **FORMAL LANGUAGES AND AUTOMATA**

**NUMBER OF CREDITS: 5**

**SEMESTER: VII**

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The main objective of the course is to introduce the students the principles and the basic notions concerning formal languages and automata. The objective of applications is to enable the students to use the properties of regular languages and context-free languages in the area of computers.

**COURSE CONTENT:** 1. Abstract language representation 2. Regular sets and right linear grammars; 3. Finite state automata; 4. Properties of finite state automata and regular sets; 5. Context-free languages ; 6. Push-down automata

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY :**

- J.E. Hopcroft, J.D. Ullman, Introduction to Automata Theory, Languages and Computation, Addison-Wesley, 1979
- A.V. Aho, J.D. Ullman, The Theory of Parsing, Translation, and Compiling, Prentice-Hall, 1972
- T. Jucan, Limbaje formale si automate, Ed. MatrixRom, 1999
- L.D. Șerbănați, Limbaje de programare și compilatoare, Editura Academiei, 1987

## **PRACTICAL STAGE FOR GRADUATION PROJECT**

**NUMBER OF CREDITS: 6**

**SEMESTER: I**

**COURSE TYPE:** specialty

**COURSE OBJECTIVES**

**COURSE CONTENT:**

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** Colloquy

**BIBLIOGRAPHY :**

## **EMBEDDED SYSTEMS**

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER: VIII**

**COURSE TYPE:** specialization

**COURSE OBJECTIVES:** The primary goal of this course is to provide the student with basic information for the design and software development for embedded systems. At the conclusion of the course and laboratory, the student will have the knowledge and skills necessary to develop software for embedded systems, using technical specifications as well as specific methods of design and programming languages.

**COURSE CONTENT:** 1. Introduction; 2. Specifications ES; 3. Embedded Operating Systems, Middleware and Scheduling

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY :**

- Marwedel, P., Embedded System Design, Kluwer Academic Publishers, textbook
- Marwedel, P., Embedded System Design, Univ Dortmund (<http://ls12www.cs.uni-dortmund.de/%7Emarwedel/kluwer-es-book/slides.html>)
- Grosu, M., Systeme de calcul timp-real - note de curs, an IV C/CE
- <http://www.agilemodeling.com>

## **EMBEDDED SYSTEMS- PROJECT**

**NUMBER OF CREDIT POINTS: 1**

**SEMESTER:** VIII

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The primary goal of this course is to meet the student with basic information for the design and software development for embedded systems. At the conclusion of the course and laboratory, the student will have the knowledge and skills necessary to develop software for embedded systems, using technical specifications as well as specific methods of design and programming languages.

**COURSE CONTENT:** N/A

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** project

**BIBLIOGRAPHY :**

- Marwedel, P., Embedded System Design, Kluwer Academic Publishers, textbook
- Marwedel, P., Embedded System Design, Univ Dortmund (<http://ls12www.cs.uni-dortmund.de/%7Emarwedel/kluwer-es-book/slides.html>)
- Grosu, M., Systeme de calcul timp-real - note de curs, an IV C/CE
- <http://www.agilemodeling.com>

## **DSP IN COMMUNICATION**

**NUMBER OF CREDIT POINTS: 5**

**SEMESTER:** VIII

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The main goal of the discipline is development of skills regarding the architecture of a signal processor, implementation of signal processing algorithms, using of the DSP based equipment in communications.

**COURSE CONTENT:** 1. Digital signal processing; 2. Filtering; 3. Transforming signals into the frequency domain;

4. Encoding of Waveforms; 5. Design of DSP systems;

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY :**

- C. Marven, G. Ewers – A simple approach to digital signal processing, John Willey & Sons, Inc. 1996
- R. Chassaing, D. Horning – Digital signal processing with the TMS320C25, John Willey & Sons, Inc. 1990
- Ahmed – Digital control applications with the TMS320 family, Texas Instruments, Dallas, 1991
- \*\*\* TMS320C5x DSK Applications Guide, Texas Instruments Europe, 1997

## **HIGH SPEED NETWORKS**

**NUMBER OF CREDIT POINTS: 5**

**SEMESTER:** VIII

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The course will cover topics from current research literature in networking, with emphasis on switching and traffic management. It will also introduce the new developments in modern networking systems, multimedia communications and high speed networks.

**COURSE CONTENT: BACKGROUND.** 1. Introduction. High-Speed LANs; high-speed networks. 2. Frame relay. 3. Asynchronous transfer mode (atm). Performance modeling and estimation. 4. Queuing analysis. 5. Self-similar traffic. Congestion and traffic management. 6. Congestion control in data networks and internets. 7. Link-level flow and error control; tcp traffic control. 8. Traffic and congestion control in atm networks. Internet routing, quality of service in ip networks. 9. Exterior Routing Protocols and Multicast; Integrated and Differentiated Services; 10. Protocols for QOS Support.

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY :**

- Stallings W. – High-Speed Networks and Internets Performance and Quality of Service, Second Edition, Prentice Hall, 2002
- Tanenbaum T.S. – Computer Networks, 4th edition, Prentice Hall, 2003
- Ramos, A. Schoroeder and A. Beheler – Computer Networking Concepts, Macmillan, 1996
- Gallo & Hancock – Computer Comm. And networking Technologies, Thomson Learning. 2001
- C. Siva Ram Murthy and Mohan Gurusamy – WDM Optical Networks: Concepts, Design, and Algorithms, Prentice Hall PTR, November 2001

## **INFORMATION SYSTEMS MANAGEMENT**

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER:** VIII

**COURSE COURSE:** specialty

**COURSE OBJECTIVES:** The course tackles the most significant aspects of the informational technology management and of data security at informational system level. Special attention is paid to the complex storage technologies and to the standards that are widely used today for the informational systems management. It also presents the most relevant aspects concerning the computational techniques and resources management using grid technologies. The laboratory work focuses on the workstations and

systems management at the local level, on the study of various scenarios for data security providing in information systems and on applications for SAN and grid management.

**COURSE CONTENT:** 1. Introductory notions; 2. Information technology management. Classifications. Terminology. Case studies; 3. Data security at informational system level; 4. Enterprise content management ; 5 . Complex storage technologies ; 6. Standards for informational systems management; 7. Computational techniques and resources management using grid technologies.

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY :**

- <http://technet.microsoft.com/en-us/library/cc261852.aspx> (Office SharePoint Server 2007) , 2008
- <ftp://ftp.software.ibm.com/common/ssi/pm/br/n/tsb00089usen/TSB00089USEN.PDF> (SAN IBM - IBMSystems and Tech. Group, IBMSystemStorage: The future of your business is already here), 2007
- <http://www.redbooks.ibm.com/redbooks/pdfs/sg245470.pdf> (IBMSystems and Technology Group, Introduction to Storage Area Networks), 2007
- <http://www.microsoft.com/windowsserversystem/storage/simplestan.mspx> (Solutii Microsoft pentru SAN) 2005
- <http://www.microsoft.com/downloads/details.aspx?FamilyID=4cd29b01-eed8-45f5-ab1e-ffe1e1aef7b22&DisplayLang=en> (White papers pentru securitate)
- ICT Infrastructure Management, ed.. itSMF SUA, 2002
- Security Management, ed.. itSMF SUA, 2002
- Introduction to ITIL, ed. itSMF SUA, 2005
- <http://www.disasterrecoveryworld.com/>
- <http://www.intel.com/design/servers/ipmi/ipmi.htm>
- <http://www.microsoft.com/management>
- <http://www.redbooks.ibm.com/redbooks/SG245470/wwhelp/wwhimpl/js/html/wwhelp.htm>
- <http://www-03.ibm.com/servers/eserver/zseries/ps/>
- <http://www.oasis-open.org>
- <http://www.tmforum.com>
- <http://www.globus.org/ogsa/>
- <http://www.dmtf.org>
- <http://www.iks.inf.ethz.ch/publications/publications/ccgrid06.html>
- <http://www.intel.com/technology/magazine/communications/nc11022.pdf>
- <http://www.blade.org/index.html>
- <http://www.microsoft.com/technet/scriptcenter/preview/wsm/intro.mspx>
- [http://www.ggf.org/About/ggf\\_abt\\_overview.php](http://www.ggf.org/About/ggf_abt_overview.php)
- <http://www.grid.org/>
- <http://home.aisnet.org> (pag. Association for Information Systems)
- Critical Reflections on Information Systems: A Systemic Approach , Jeimy J. Cano, IGI Publishing, SUA, 2003
- Advances in Enterprise Information Systems Book Series, editate de Univ. of Massachusetts, 2006
- Cases on Information Technology Planning, Designing and Implementation: Part of the Cases on Information Technology Series , ed. IGI Publishing, 2006
- Cases on Telecommunications and Networking: Part of the Cases on Information Technology Series , ed. IGI Publishing, , ed. IGI Publishing, 2006
- Information Security Management Handbook , Harold F. Tipton, Micki Krause, CRC Press, 2008

## VLSI ENVIRONMENTS

**NUMBER OF CREDIT POINTS: 5**

**SEMESTER: VIII**

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** This course introduces the necessary concepts and tools of verification and it describes a process for planning and carrying out an effective functional verification of a design. It also introduces the concept of coverage models that can be used in a coverage driven verification process.

**COURSE CONTENT:** 1. What is verification? ; 2. Verifications tools; 3. The verification plan;  
4. Architecting test benches

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** project

**BIBLIOGRAPHY :**

- Bergeron J. – Writing Testbenches: Functional Verification of HDL Models, Second Edition, Kluwer Academic Publishers, 2003
- Bhasker J. – VHDL Primer, third edition, Prentice Hall, 1999
- Perry D. – VHDL Programming By Example, McGraw-Hill, 2002
- XILINX Corp. – VHDL Reference Guide
- XILINX Corp. – SPARTAN Family Reference Guide

## COMPILER DESIGN

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER: VIII**

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The main objective of the course is to introduce the students the specific notions and techniques concerning compilers and compiler design stages. The objective of applications is to enable the students to implement some translators for small languages.

**COURSE CONTENT:** 1. Introduction to Compiler; 2. Lexical analysis; 3. Syntax analysis; 4. Syntax-directed translation; 5. Type checking; 6. Run-Time Environments; 7. Intermediate code generation

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam / practical test

**BIBLIOGRAPHY :**

- Compilers: Principles, Techniques, and Tools, Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman, ISBN: 0-201-10088-6, Addison Wesley, 1986
- Crafting a Compiler with C, Charles Fischer, Richard LeBlanc, Addison Wesley, 1991
- Limbaje de programare si compilatoare, Luca Dan Serbanati, Ed. Academiei, 1987
- Compiler Construction, Niklaus Wirth, Addison-Wesley, 1996, ISBN 0-201-40353-6
- The Theory of Parsing, Translation and Compiling, Alfred V. Aho, Jeffrey D. Ullman, Prentice-Hall, Englewood Cliffs, 1973

## **COMPILER DESIGN - PROJECT**

**NUMBER OF CREDIT POINTS: 1**

**SEMESTER: VIII**

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The main objective of the course is to introduce the students the specific notions and techniques concerning compilers and compiler design stages. The objective of applications is to enable the students to implement some translators for small languages.

**COURSE CONTENT:** 1. Standard Compiler Design projects (compilers for some simplified programming languages), which involve the main phases of the compiling process (scanning, parsing, semantic analysis, code generation); 2. Processors for programming languages, used to determine some quantitative information of the input programs; 3. Processors for some languages used in Web programming, used to validate the input documents and to determine their structure;

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** project

**BIBLIOGRAPHY :**

- Compilers: Principles, Techniques, and Tools, Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman, ISBN: 0-201-10088-6, Addison Wesley, 1986
- Crafting a Compiler with C, Charles Fischer, Richard LeBlanc, Addison Wesley, 1991
- Limbaje de programare si compilatoare, Luca Dan Serbanati, Ed. Academiei, 1987
- Compiler Construction, Niklaus Wirth, Addison-Wesley, 1996, ISBN 0-201-40353-6
- The Theory of Parsing, Translation and Compiling, Alfred V. Aho, Jeffrey D. Ullman, Prentice-Hall, Englewood Cliffs, 1973

## **ALGORITHMS FOR INFORMATIONAL RETRIEVAL**

**NUMBER OF CREDIT POINTS: 5**

**SEMESTER: VIII**

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The general objective is to present a wide range of methods for locating needed information in different sets of data. This means searching for information in documents, searching for documents themselves, searching for metadata which describe documents. The efficiency of the search is the key issue. There are addressed problems regarding query generation, query execution, data structures, indexing, employed algorithms and evaluation techniques.

**COURSE CONTENT:** 1. Introduction to informations storage and retrieval systems; 2. Introduction to data structures and algorithms related to information retrieval; 3. Inverted files; 4. Information retrieval using the Boolean model; 5. Index construction; 6. Modifications and enhancements to the basic indexing and search processes; 7. Vector space retrieval; 8: Evaluation in information retrieval

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY :**

- Andoni, A., N. Immorlica, P. Indyk, and V.Mirrokn. 2007 Nearest NeighborMethods in Learning and Vision: Theory and Practice. MIT Press

- Baeza-Yates, Ricardo, and Berthier Ribeiro-Neto. 1999. Modern Information Retrieval. Harlow: Addison-Wesley
- Bishop, Christopher M. 2006. Pattern Recognition and Machine Learning. Springer
- Cormen, Thomas H., Charles Eric Leiserson, and Ronald L. Rivest. 1990. Introduction to Algorithms. Cambridge MA: MIT Press
- Duda, Richard O., Peter E. Hart, and David G. Stork. 2000. Pattern Classification (2<sup>nd</sup> Edition). Wiley-Interscience
- Hastie, Trevor, Robert Tibshirani, and Jerome H. Friedman. 2001. The Elements of Statistical Learning: Data Mining, Inference, and Prediction. New York: Springer Verlag
- Korfhage, Robert R. 1997. Information Storage and Retrieval. Wiley
- Panos Pardalos James Abello and Mauricio Resende (eds.), 2002. Handbook of Massive Data Sets, chapter 2. Kluwer Academic Publishers.

## **EXPERT SYSTEMS**

**NUMBER OF CREDIT POINTS: 5**

**SEMESTER: VIII**

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The main objective of the course is to introduce the students the specific notions and techniques concerning knowledge representation and reasoning. The objective of applications is to enable the students to use the CLIPS environment and CLIPS, COOL and FuzzyClips languages for expert systems development.

**COURSE CONTENT:** 1. An introduction to Expert Systems. 2. Rule-Based Systems. 3. Frame-Based Systems. 4. Reasoning with uncertainty. 5. Building Expert Systems.

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

**BIBLIOGRAPHY :**

- Giarratano J., Riley G. : Expert Systems. Principles and Programming, PWS Kent, 1989
- Lucas O., Van Der Gaag L. : Principles of Expert Systems, Addison Wesley, 1991
- Brezovan M. : Sisteme expert, Ed. Certi, 2001

## **GRAPHICAL SYSTEMS**

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER: VIII**

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The course wishes to introduce the concept of graphic processing system. General concepts and exemplifications, the widely used graphic processing libraries – OpenGL and DirectX are presented. The laboratory has the role of improving the studied information and of implementing them in C++ using DirectX libraries.

**COURSE CONTENT:** 1. Direct 3D Rendering Chain; 2. Drawing in Direct 3D; 3. Colours; 4. Lights; 5. Textures; 6. Blending; 7. Meshes

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam

## **BIBLIOGRAPHY :**

- Frank D. Luna - Introduction to 3D Game Programming with DirectX 9.0 - Wordware Publishing, Inc., Plano - Texas, 2003
- Tomas Möller, and Eric Haines. Real-TimeRendering. 2nd ed. Natick, Mass.: A K Peters, Ltd., 2002.
- Wendy Jones - An Introduction to 3D Computer Graphics - Course Technology PTR, 2004
- Kelly Murdock – 3ds Max Bible 9 – Wiley, 2007.
- Dave Shreiner, Mason Woo, Jackie Neider, Tom Davis - OpenGL(R) Programming Guide: The Official Guide to Learning OpenGL(R), 5th edition, Addison-Wesley Professional, 2005.

## **MULTIMEDIA APPLICATION DEVELOPMENT**

**NUMBER OF CREDIT POINTS: 5**

**SEMESTER: VIII**

**COURSE TYPE:** specialty

**COURSE OBJECTIVES:** The course introduces basic concepts in multimedia field: multimedia technologies, multimedia data types (image, sound, video), compression algorithms, specific methods for multimedia data querying and two important multimedia applications: for e-learning and on multimedia databases. The lab presents the working way in some very popular authoring tools (Flash, Fireworks). During the labs and with homeworks the students must design and implement multimedia applications that combine all multimedia data types using the presented authoring tools.

**COURSE CONTENT:** 1.Introduction; 2. Multimedia Authoring; 3.Multimedia technologies; 4. Sound 5. Video; 6. Images; 7. Compression methods; 8. Content-based visual query; 9. Applications on multimedia databases; 10. Multimedia applications of e-learning type

**LANGUAGE OF INSTRUCTION:** English

**EVALUATION:** written exam/ practical test

## **BIBLIOGRAPHY :**

- Multimedia Systems Concepts Standards and Practice, Ramesh Yerraballi,
- <http://data.uta.edu/~ramesh/book/MultimediaSystems/index.html>
- Baze de date multimedia-studiu asupra unor metode de regasire a informatiei vizuale, Liana Stanescu, Ed. Universitaria 2004
- Networked Multimedia Systems, S.V. Raghavan, Satish K. Tripathi, Pearson Education Ltd., 1997
- Multimedia Systems and Content-Based Retrieval, Sagarmay Deb , Idea Group Publishing, 2004
- Multimedia Applications, Ralf Steinmetz, Klara Nahrstedt, Springer, 2004
- Macromedia Flash 5, Phillip Kerman, Ed. Teora 2004

