

**UNIVERSITY OF CRAIOVA**  
**DEPARTMENT: DEPARTMENT OF COMPUTERS AND**  
**INFORMATION TECHNOLOGY**  
**BS SPECIALTY: COMPUTER ENGINEERING**

18. Software Engineering

**1-st year**

1. Mathematical Analysis
2. Linear Algebra and I Geometry
3. Computer Programming
4. Physics – General Elements
5. Logical Design of Digital Computers
6. Knowledge, Human Communication and Internet
7. English 1
8. Special Mathematics
9. Numerical Methods
10. Introduction to Electrical Engineering
11. Computer Programming – Programming Techniques
12. Computer Programming – Programming Techniques - Project
13. Digital Systems Design
14. Physics – Elements of Mechanical Engineering
15. English 2

**2-nd year**

1. Data Structures and Algorithms
2. Data Structures and Algorithms - Project
3. Electronics
4. Computer Architecture
5. Systems Theory and Automatic Control
6. Object Oriented Programming
7. Object Oriented Programming - Project
8. Project Management
9. English 1
10. Algorithm Complexity Analysis
11. Artificial Intelligence
12. Computer Graphics
13. Assembly Programming Languages
14. Measurement Techniques
15. General Economics and Accounting
16. English 2
17. Internship period

**3-rd year**

1. Digital Integrated Circuits
2. Databases
3. Operating Systems
4. Data Communication
5. Computer Structure and Organization
6. Computer Structure and Organization - Project
7. Visual Programming Environments
8. Visual Programming Environments - Project
9. Computer Networks
10. Database Design
11. Database Design - Project
12. Microprocessors System Design
13. Distributed Network Application Development
14. Distributed Network Application Development - Project
15. Computer Systems Verification and Testing
16. Computer Systems Verification and Testing of - Project
17. I/O Systems

19. Software Engineering – Project
20. Computer Systems Modelling
21. Internship period

**4-th year**

1. Real Time Computing Systems
2. Real Time Computing Systems – Project
3. Computer Networks Management
4. E-Commerce
5. E-Commerce – Project
6. Web Applications Design
7. Web Applications Design – Project
8. Data Security
9. Data Security – Project
10. Frameworks for Digital Systems Development
11. Models and Algorithms for Parallel Computing
12. Models and Algorithms for Parallel Computing – Project
13. Formal and Automatic Languages
14. Graduation Paper internship period – Project
15. Embedded Systems
16. Embedded Systems – Project
17. DSP in Communication
18. High Speed Networks
19. Information Systems Management
20. VLSI Environments
21. Compiler Design
22. Compiler Design – Project
23. Algorithms for Information Retrieval
24. Expert Systems
25. Graphical Systems
26. Multimedia Application Development

## 1-ST YEAR

### SUBJECT: MATHEMATICAL ANALYSIS

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** I

**TYPE OF COURSE:** CORE COURSE

**COURSE OBJECTIVES:** The course focuses on the introduction of the basic notions related to 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).

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** examination

#### 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

### SUBJECT: LINEAR ALGEBRA AND GEOMETRY

**NUMBER OF CREDIT POINTS:** 5

**SEMESTER:** I

**TYPE OF COURSE:** CORE COURSE

**COURSE OBJECTIVES:** The aim of the course is the introduction of the 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:** 1. Vector Spaces; 2. Linear Mappings; 3. Bilinear Forms. Quadratic Forms; 4. Euclidian Spaces; 5. Geometric Vectors; Geometric Vectors; 6. Straight Line and Plane; 7. Conics and Quadric Surfaces; 8. Curves in Plane and in Space; 9. Surfaces

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination / continuous assessment

#### 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 ingineresti, 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

### SUBJECT NAME: COMPUTER PROGRAMMING

**NUMBER OF CREDIT POINTS:** 6

**SEMESTER:** I

**TYPE OF COURSE:** CORE COURSE

**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:** 1. Introduction; 2. Algorithmic Design; 3. Data Structures; 4. Language Issues; 5. Programming in C.

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

#### 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

### SUBJECT: PHYSICS – GENERAL ELEMENTS

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** I

**TYPE OF COURSE:** CORE COURSE

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

**COURSE CONTENT:** 1. Classical Mechanics; 2. Analytical Mechanics; 3. Electrodynamics 4. Elements Of Quantum Physics

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**BIBLIOGRAPHY:**

Florea Uliu, Curs de fizica pentru facultatea de electrotehnica, vol.1 si 2, Reprgr.Univ.Craiova 1982, 1986. Reprgr.Univ.Craiova, 1991.

E. Luca si colaboratorii - Fizica, Editura Didactica si Pedagogica.

I.M. Popescu si colaboratorii - Probleme rezolvate de fizica, Editura Tehnica.

M. Puchin - Fizica, Editura Sitech.

**SUBJECT NAME: LOGICAL DESIGN OF DIGITAL COMPUTERS**

**NUMBER OF CREDIT POINTS: 5**

**SEMESTER: I**

**TYPE OF COURSE:** field-related

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

**COURSE CONTENT:** 1. Fundamental concepts related to Logical Design of Digital Computers (LDDC); 2. Boolean Algebra; 3. Switching functions; 4. Boolean forms; 5. Classes of Boolean functions. Complete functional systems; 6. Canonical representation of Switching functions; 7. Minimisation of Switching functions

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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

**SUBJECT: KNOWLEDGE, HUMAN COMMUNICATION AND INTERNET**

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER: I**

**TYPE OF COURSE:** complementary

**COURSE OBJECTIVES:** The course addresses first year students and intends to present an introduction to human knowledge, as a concept and the application tools in the real

life: reading efficiently, writing correctly, intelligent searching of information on the Internet; making different documents, etc.

**COURSE CONTENT:** 1. A study-tour of communication; 2. Internet and Web Searching; 3. FORUM: Community Standards-General Rules; 4. Efficient Reading; 5. Writing Guidelines for Engineering and Science Students;

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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.gcflearnfree.org/computer/topic.aspx?id=82>

Happy Fun Communication Land; TUTORIAL: A STUDY-TOUR OF COMMUNICATION;

<http://www.rdillman.com/HFCL/TUTOR/tutor0.html>

**SUBJECT: ENGLISH 1**

**NUMBER OF CREDIT POINTS: 2**

**SEMESTER: I**

**TYPE OF COURSE:** complementary

**COURSE OBJECTIVES:** The course focuses on teaching the grammatical structures of the English language as well as their correct use in conversation. Emphasis will also 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.

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** Colloquium

**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.

**SUBJECT: SPECIAL MATHEMATICS**

**NUMBER OF CREDIT POINTS: 5**

**SEMESTER: I**

**TYPE OF COURSE:** CORE COURSE

**COURSE OBJECTIVES:** The course represents several chapters of mathematics with respect to their relevance as instruments of investigation in engineering and regarding the specific language of the field. The seminar approaches the topics of the course.

**COURSE CONTENT:** 1. Elements of complex analysis; 2. Ordinary Differential Equations; 3. Elements of Fourier Analysis

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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

#### **SUBJECT NAME: NUMERICAL METHODS**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** II

**TYPE OF COURSE:** CORE COURSE

**COURSE OBJECTIVES:** The course is designed to present the main numerical methods and numerical algorithms. It also aims at enhancing 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:** 1 Numerical methods in algebra ; 2 Function approximation; 3 Numerical methods for integral approximation; 4 Numerical methods for differential equations and partial differential equations;

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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., București, 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.

#### **SUBJECT NAME: INTRODUCTION TO ELECTRICAL ENGINEERING**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** II

**TYPE OF COURSE:** specialty

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

**COURSE CONTENT:** 1. Electric circuits in permanent sinusoidal periodic regime (A.C. regime); 2. Electric circuits in D.C. regime; 3. Linear electric circuits in periodic non-sinusoidal permanent regime (PNSR) ("distorting regime"); 4. Electric circuits in transient regime; 5. Two-port networks and filters; 6. Three-phase power systems;

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**BIBLIOGRAPHY:**

Gregory Anne, Relațiile publice în practică, Editura All Beck, 2005.

Newsom D., Totul despre relații publice, Editura Polirom, 2003.

Miculescu Simona, Relații publice din perspectiva internațională, 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 topologică 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

#### **SUBJECT NAME: COMPUTER PROGRAMMING – PROGRAMMING TECHNIQUES**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** II

**TYPE OF COURSE:** CORE COURSE

**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:** 1. Introduction to algorithms and programming techniques; 2. Basic algorithms analysis. Testing and correctness; 3. Sorting algorithms; 4. Data types. Lists ; 5. Stacks and queues. Dynamic memory allocation; 6. Graphs and trees; 7. Dynamic programming; 8. Greedy algorithms; 9. Graph algorithms; 10. Backtracking; 11. Combinatorial algorithms; 12. Special algorithms.

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**BIBLIOGRAPHY::**

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

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

**NUMBER OF CREDIT POINTS:** 2

**SEMESTER:** II

**TYPE OF COURSE:** CORE COURSE

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

**COURSE CONTENT:** 1. Recursive vs. Iterative programming; 2. Searching and sorting (sequential and binary search, selection and insertion sort; 3. Advanced sorting (merge sort, quick sort, ...); 4. List; 5. Stacks and queues; 6. Trees; 7. Greedy method; 8. Graphs: representation and traversal; 9. Dynamic programming; 10. Backtracking; 11. Combinatorial algorithms; 12. Files

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** project

**BIBLIOGRAPHY:**

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

**SUBJECT: DIGITAL SYSTEMS DESIGN**

**NUMBER OF CREDIT POINTS:** 6

**SEMESTER:** II

**TYPE OF COURSE:** field-related

**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:** 1. Combinational Logic Networks (CLN); 2. CLN implementation with Programmable Logic Device (PLD); 3. Introduction to Sequential logic Networks 4. Simplification of Sequential Logic Networks; 5. Sequential Logic Networks with PLDs; 6. Design of digital systems

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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.

**SUBJECT NAME: PHYSICS - ELEMENTS OF MECHANICAL ENGINEERING**

**NUMBER OF CREDIT POINTS :** 3

**SEMESTER:** II

**TYPE OF COURSE :** CORE COURSE

**COURSE OBJECTIVES:** The course focuses on the introduction of the basic concepts with respect to the problematics of 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 calculus examinationples 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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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.

**SUBJECT OF STUDY : ENGLISH 2**

**NUMBER OF CREDIT POINTS:** 2

**SEMESTER:** II

**TYPE OF COURSE:** complementary

**COURSE OBJECTIVES:** The course focuses on teaching the grammatical structures of the English language as well as their correct use in conversation. Emphasis will also 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 in 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.

**TEACHING LANGUAGE:** 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.

## 2-ND YEAR

### **SUBJECT NAME: DATA STRUCTURES AND ALGORITHMS**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** I

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** The main goal of the discipline is the development of the skills concerning the design and implementation of the various data structures that allow writing performant programs, improving the skills concerning 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 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;

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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"

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

**NUMBER OF CREDIT POINTS:** 2

**SEMESTER:** I

**TYPE OF COURSE:** field-related

**COURSE OBJECTIVES:** The project has the main goal of using the knowledge accumulated along the semester. The project deals with the management of a firm using data structures introduced during the laboratory classes.

**COURSE CONTENT:** The following operations have to be introduced:

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

**TEACHING LANGUAGE:** Romanian

**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"

### **SUBJECT: ELECTRONICS**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** I

**TYPE OF COURSE:** field-related

**COURSE OBJECTIVES:** The course covers the introduction to the analysis, design and simulation of building blocks and different analogue IC applications. This course includes laboratory practice and assignments on experiment modules and extensive use of industry-standard CAD tools, such as Analog Workbench. Using the knowledge acquired at the Electronics course, 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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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).

**SUBJECT: COMPUTER ARCHITECTURE**

**NUMBER OF CREDIT POINTS:** 5

**SEMESTER:** I

**TYPE OF COURSE:** field-related

**COURSE OBJECTIVES:** The course aims at the presentation of the 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/Output; 6 Memory hierarchy and Addressing Techniques; 7 Conventional machine level

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** oral examination

**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

**SUBJECT NAME: SYSTEMS THEORY AND CONTROL**

**NUMBER OF CREDIT POINTS:** 3

**SEMESTER:** I

**TYPE OF COURSE:** field-related

**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 the 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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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.

**SUBJECT NAME: OBJECT ORIENTED PROGRAMMING**

**NUMBER OF CREDIT POINTS:** 4

**TYPE OF COURSE:** field-related

**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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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

**SUBJECT NAME: OBJECT ORIENTED PROGRAMMING - PROJECT**

**NUMBER OF CREDIT POINTS:** 2

**SEMESTER:** I

**TYPE OF COURSE:** field-related

**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

**TEACHING LANGUAGE:** Romanian

**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

**SUBJECT NAME: PROJECT MANAGEMENT**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** I

**TYPE OF COURSE:** complementary

**COURSE OBJECTIVES:** Introduction of notions from the „body of knowledge” corresponding to Projects Management; Understanding the differences between „program” and „software program” notions; Presentation of the general

concepts “team work” and “team building”: Acquiring the required managerial knowledge: Introduction of ethic and professional topics in software engineering; familiarization with traditional and modern work practices; Establishing the required abilities directly related to other specialty disciplines

**COURSE CONTENT:** 1. Software project. The general field-related 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 field-related.; 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;

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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
- Pfleger 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

**SUBJECT NAME: ENGLISH 1**

**NUMBER OF CREDIT POINTS:** 2

**SEMESTER:** I

**TYPE OF COURSE:** complementary

**COURSE OBJECTIVES:** : The course focuses on teaching the grammatical structures of the English language as well as on their correct use in conversation. Emphasis will also 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.

**TEACHING LANGUAGE:** 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.

**SUBJECT NAME: ALGORITHM COMPLEXITY ANALYSIS**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** II

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** The aim of the course is to provide the basics of computability theory and the 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 algorithms performance in terms of theoretical requirements; 3. To explain the use of various 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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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

**SUBJECT NAME: ARTIFICIAL INTELLIGENCE**

**NUMBER OF CREDIT POINTS:** 5

**SEMESTER:** II

**TYPE OF COURSE:** 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 course 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.

**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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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.

**SUBJECT: COMPUTER GRAPHICS**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** II

**TYPE OF COURSE:** core course

**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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**BIBLIOGRAPHY:**

Dorian Dogaru – Grafica pe calculator. Elemente de geometrie computacionala – vol.1., Editura didactica sipedagogica, Bucuresti, 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

**SUBJECT NAME: ASSEMBLY PROGRAMMING LANGUAGES**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** II

**TYPE OF COURSE :** core course

**COURSE OBJECTIVES:** The course is meant to introduce the instruction set architecture of Intel 80x86 microprocessors and the basic concepts of assembly language programming. The laboratory will give students 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

**TEACHING LANGUAGE:** Romanian

**ÉVALUATION :** written examination

**BIBLIOGRAPHY :**

P.S. Dandamuri, "Introduction to Assembly Language Programming, From 8086 to Pentium Processors", Springer-Verlag, New York, 1998

Gh. Musca, "Programare in limbaj de asamblare", Ed. Teora, 1998  
3. V. Lungu, "Procesoare Intel, "Programarea in 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. Somea, I. Vladut, "Programarea in Assembler", Ed. Tehnica, 1992

Gh. Marian, M. Marian, E. Dumitrascu , N. Enescu – Limbaje de asamblare – ghid

#### **SUBJECT NAME: MEASUREMENT TECHNIQUES**

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER: II**

**TYPE OF COURSE:** field-related

**COURSE OBJECTIVES:** The course presents the specific topics related to the 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.

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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.

A. van Putten, Electronic Meas. Systems, Prentice Hall, 1988.

F. Maloberti, Data Converters, Springer, 2007.

R. van der Plassche, Integrated A/D D/A Converters, Kluwer , '94.

#### **SUBJECT NAME: GENERAL ECONOMICS AND ACCOUNTING**

**NUMBER OF CREDIT POINTS: 3**

**SEMESTER : II**

**TYPE OF COURSE :** complementary

**COURSE OBJECTIVES:** The appropriation by the students of the fundamental notions in the field of accountancy, the knowledge and the understanding of the procedures specific to the accountancy method; The understanding of the terminology specific to the financial-accounting field; The

formation of a logical thinking in what concerns the transposition in accounting language of the main economical-financial operations that generates the activity developed by the firms; The understanding of the methodology and the working technique 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.

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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 IIa, Editura Mitron, 2002.

#### **SUBJECT NAME: ENGLISH 2**

**NUMBER OF CREDIT POINTS: 2**

**SEMESTER : II**

**TYPE OF COURSE :** complementary

**COURSE OBJECTIVES:** The course focuses on teaching the grammatical structures of the English language as well as on the correct use of such structures in conversation.

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.

**TEACHING LANGUAGE:** 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.

#### **SUBJECT NAME: INTERNSHIP**

**NUMBER OF CREDIT POINTS:** 2

**SEMESTER :** II

**TYPE OF COURSE :** specialty

**COURSE OBJECTIVES:** Getting the student accustomed with the programming algorithms and techniques that are used for the concrete development of a software application. The internship activity will be done either at the "Development of Multimedia Applications" research centre of the Department of Software Engineering, or at a software company, with which the faculty has established a contract concerning the training.

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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** oral examination

**BIBLIOGRAPHY:**

N/A.

### 3-RD YEAR

#### **SUBJECT NAME: DIGITAL INTEGRATED CIRCUITS**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** I

**TYPE OF COURSE:** field-related

**COURSE OBJECTIVES:** It is one of the field-related disciplines in the syllabus. The aim of the course is the knowledge assimilation 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 classes allow the consolidation of the theoretical notions and their putting into practice in what concerns 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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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.

#### **SUBJECT NAME: DATABASES**

**NUMBER OF CREDIT POINTS:** 5

**SEMESTER:** I

**TYPE OF COURSE:** field-related

**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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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

#### **SUBJECT: OPERATING SYSTEMS**

**NUMBER OF CREDIT POINTS:** 5

**SEMESTER:** I

**TYPE OF COURSE:** field-related

**COURSE OBJECTIVES:** It is one of the so called "field-related disciplines" from the curriculum corresponding to this BS field-related. In the first courses one presents the basic notions and the classifications of the operating systems along with the describing of the main architectural types. Afterwards one introduces the most important concepts corresponding to the processes and threads management. Then one approaches the topic of memory management and the most important aspects of the input-output operations. In the end one presents the fundamental notions corresponding to files management. Laboratory classes are meant to help the understanding of the knowledge about 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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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

**SUBJECT NAME: DATA COMMUNICATION**

**NUMBER OF CREDIT POINTS:** 5

**SEMESTER:** I

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** It is one of the specialty disciplines. The course focuses on the introduction of basic concepts concerning data communication topics. One presents the communication environment, serial interfaces, and communication protocols at Data Link level. 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 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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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

**SUBJECT NAME: COMPUTER STRUCTURE AND ORGANIZATION**

**NUMBER OF CREDIT POINTS:** 4

**SEMESTER:** I

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** It is envisaged to familiarize students with the fundamentals of computer arithmetic, computer organization, 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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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

**SUBJECT NAME: COMPUTER STRUCTURE AND ORGANIZATION - PROJECT**

**NUMBER OF CREDIT POINTS:** 1

**SEMESTER:** I

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** It is envisaged to familiarize students with the fundamentals of computer arithmetic, computer organization, memory and input-output systems, computer system quality evaluation

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

**TEACHING LANGUAGE:** Romanian

**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

**SUBJECT NAME: VISUAL PROGRAMMING ENVIRONMENTS**

**NUMBER OF CREDIT POINTS:** 3

**SEMESTER:** I

**TYPE OF COURSE:** 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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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 Examination, McGraw-Hill, 2002

XILINX Corp. – VHDL Reference Guide

XILINX Corp. – SPARTAN Family Reference Guide

**SUBJECT NAME: VISUAL PROGRAMMING ENVIRONMENTS - PROJECT****NUMBER OF CREDIT POINTS:** 1**SEMESTER:** I**TYPE OF COURSE:** 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**TEACHING LANGUAGE:** Romanian**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 Examinationple, McGraw-Hill, 2002

XILINX Corp. – VHDL Reference Guide

XILINX Corp. – SPARTAN Family Reference Guide

**SUBJECT NAME: COMPUTER NETWORKS****NUMBER OF CREDIT POINTS:** 5**SEMESTER:** II**TYPE OF COURSE:** specialty**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**TEACHING LANGUAGE:** Romanian**EVALUATION:** written examination**BIBLIOGRAPHY:**

Marin Lungu – Retele de Calculatoare si Aplicatii, Editura Universitaria, 2002

Ed Tittel; Theory and Problems of Computer Neworking; McGRAW-HILL, 2002

<http://www.packetyzer.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.

**SUBJECT: DATABASE DESIGN****NUMBER OF CREDIT POINTS:**4**SEMESTER:** II**TYPE OF COURSE:** 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**TEACHING LANGUAGE:** Romanian**FORMA DE EVALUATION:** written examination**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

**SUBJECT: DATABASE DESIGN - PROJECT****NUMBER OF CREDIT POINTS:** 1**SEMESTER:** II**TYPE OF COURSE:** specialty**COURSE OBJECTIVES:** The project underpins 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.**TEACHING LANGUAGE:** Romanian**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

**SUBJECT: MICROPROCESSORS SYSTEM DESIGN**

**NUMBER OF CREDIT POINTS: 5**

**SEMESTER: II**

**TYPE OF COURSE:** specialty

**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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** oral examination

**BIBLIOGRAPHY :**

INTEL – Embedded Microcontrollers, Intel Corporation, 1998

INTEL – Microprocessors and Peripheral Handbook, vol 2, Peripheral, Intel Corporation, 1988

Mohamed Rafiqzaman - Microprocessor and Microcomputer Based System Design, CRC Press 1990

**SUBJECT NAME: DISTRIBUTED NETWORK APPLICATION DEVELOPMENT**

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER: II**

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** The aim of this course is to introduce students to the basic elements for the 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. Examinationples in JADE; 9. Service-oriented middleware. SOA and Web services; 10. Transactions and replication in distributed systems; 11. Distributed algorithms

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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

**SUBJECT NAME: DISTRIBUTED NETWORK APPLICATION DEVELOPMENT - PROJECT**

**NUMBER OF CREDIT POINTS: 1**

**SEMESTER: II**

**TYPE OF COURSE:** 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 the 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. Examinationples in JADE; 9. Service-oriented middleware. SOA and Web services; 10. Transactions and replication in distributed systems; 11. Distributed algorithms

**TEACHING LANGUAGE:** Romanian

**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

**SUBJECT NAME: VERIFICATION AND TESTING OF COMPUTER SYSTEMS**

**NUMBER OF CREDIT POINTS: 3**

**SEMESTER: II**

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:**

**COURSE CONTENT:**

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**BIBLIOGRAPHY:**

**SUBJECT NAME: VERIFICATION AND TESTING OF COMPUTER SYSTEMS- PROJECT**

**NUMBER OF CREDIT POINTS: 2**

**SEMESTER: II**

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:**

**COURSE CONTENT:**

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** project

**BIBLIOGRAPHY:**

**SUBJECT NAME: I/O SYSTEMS**

**NUMBER OF CREDIT POINTS: 3**

**SEMESTER: II**

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** The discipline aims at introducing 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 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;

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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

**SUBJECT NAME: SOFTWARE ENGINEERING**

**NUMBER OF CREDIT POINTS: 3**

**SEMESTER: II**

**TYPE OF COURSE:** specialty

**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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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

**SUBJECT NAME: SOFTWARE ENGINEERING - PROJECT**

**NUMBER OF CREDIT POINTS: 2**

**SEMESTER: II**

**TYPE OF COURSE:** specialty

**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**

**TEACHING LANGUAGE:** Romanian

**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

**SUBJECT NAME: COMPUTER SYSTEMS MODELLING**

**NUMBER OF CREDIT POINTS: 3**

**SEMESTER: II**

**TYPE OF COURSE:** specialty

**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, the realization of a small project; 7. Students' familiarization with the traditional and modern working practices; 8. Establishing 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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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 & Aksent, 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

**SUBJECT NAME: INTERNSHIP PERIOD**

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER: II**

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** Familiarizing the student with the programming algorithms and techniques that are used for the concrete development of a software application. The

practice will be done either at the research centre of the Department of Computer Engineering, or at a software 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)

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** oral examination

**BIBLIOGRAPHY :**

N/A

4-th year

**SUBJECT NAME: REAL TIME COMPUTING SYSTEMS**

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER: I**

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** The primary goal of this course is to give the student the basics of real-time systems hardware structure, real-time I/O devices programming, real-time operating systems and task scheduling algorithms. The objective of this course, laboratory and project, is to provide the student with 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 Examinationples 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 examinationple 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.

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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.

**SUBJECT NAME: REAL TIME COMPUTING SYSTEMS - PROJECT**

**NUMBER OF CREDIT POINTS: 1**

**SEMESTER: I**

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** As a result of these project classes, 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:** 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.

**TEACHING LANGUAGE:** Romanian

**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.

**SUBJECT NAME: COMPUTER NETWORKS MANAGEMENT**

**NUMBER OF CREDIT POINTS: 5**

**SEMESTER: I**

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** It is one of the specialty disciplines. 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 belonging to this specialty: Data Communications, Computer Networks and Computer Networks Management. The laboratory is meant to consolidate the theoretical knowledge and to create abilities 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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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-Field-related 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

**SUBJECT NAME: E-COMMERCE**

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER: I**

**TYPE OF COURSE:** 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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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

**SUBJECT NAME: E-COMMERCE-PROJECT**

**NUMBER OF CREDIT POINTS: 1**

**SEMESTER: I**

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** The project concerns the development of an e-commerce application starting from a given set of specifications. This requires the use of the concepts and software technologies presented during the lectures and 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

**TEACHING LANGUAGE:** Romanian

**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

**SUBJECT NAME: WEB APPLICATIONS DESIGN**

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER: I**

**TYPE OF COURSE:** 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)

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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.

**SUBJECT NAME: WEB APPLICATIONS DESIGN - PROJECT**

**NUMBER OF CREDIT POINTS: 1**

**SEMESTER: I**

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** The project aims 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)

**TEACHING LANGUAGE:** Romanian

**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.

**SUBJECT NAME: DATA SECURITY**

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER: I**

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** The course 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. 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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination/ practical application

**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

**SUBJECT NAME: DATA SECURITY - PROJECT**

**NUMBER OF CREDIT POINTS: 1**

**SEMESTER: I**

**TYPE OF COURSE:** 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

**TEACHING LANGUAGE:** Romanian

**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-

**SUBJECT NAME: FRAMEWORKS FOR DIGITAL SYSTEMS DEVELOPMENT**

**NUMBER OF CREDIT POINTS: 5**

**SEMESTER: I**

**TYPE OF COURSE:** 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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** practical application

**BIBLIOGRAPHY :**

Bhasker J. – VHDL Primer, third edition, Prentice Hall, 1999

Perry D. – Vhdl Programming By Examinationple, McGraw-Hill, 2002

Skahill K. – VHDL for programmable logic, Addison-Wesley, 1996

XILINX Corp. – VHDL Reference Guide

XILINX Corp. – SPARTAN Family Reference Guide

**SUBJECT NAME: MODELS AND ALGORITHMS FOR PARALLEL COMPUTING**

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER: I**

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** Basic 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 with the 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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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

**SUBJECT NAME: MODELS AND ALGORITHMS FOR PARALLEL COMPUTING - PROJECT**

**NUMBER OF CREDIT POINTS: 1**

**SEMESTER: I**

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** The basic 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 with the 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

**TEACHING LANGUAGE:** Romanian

**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

**SUBJECT NAME: FORMAL LANGUAGES AND AUTOMATA**

**NUMBER OF CREDIT POINTS: 5**

**SEMESTER: I**

**TYPE OF COURSE:** specialization

**COURSE OBJECTIVES:** The main objective of the course is to introduce to the students the principles and basic notions concerning formal languages and automata. The objective of the 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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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

**SUBJECT NAME: INTERNSHIP - GRADUATION PAPER**

**NUMBER OF CREDIT POINTS: 6**

**SEMESTER: I**

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES**

**COURSE CONTENT:**

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** Oral examination

**BIBLIOGRAPHY :**

**SUBJECT NAME: EMBEDDED SYSTEMS**

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER: II**

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** The primary goal of this course is to offer the students the basic information for the design and development of embedded systems software. At the end of the course and laboratory classes, the student will have the knowledge and skills necessary to develop embedded systems software, 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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**BIBLIOGRAPHY :**

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

**SUBJECT NAME: EMBEDDED SYSTEMS- PROJECT**

**NUMBER OF CREDIT POINTS: 1**

**SEMESTER: II**

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** The primary goal of this course is to offer the student with the basic information for the design

and development of embedded systems software. At the end of the course and laboratory classes, the student will have the knowledge and skills necessary to develop embedded systems software, using technical specifications as well as specific methods of design and programming languages.

**COURSE CONTENT:** N/A

**TEACHING LANGUAGE:** Romanian

**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., Sisteme de calcul timp-real - note de curs, an IV C/CE

<http://www.agilemodeling.com>

**SUBJECT NAME: DSP IN COMMUNICATION**

**NUMBER OF CREDIT POINTS: 5**

**SEMESTER: II**

**TYPE OF COURSE:** specialty

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

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

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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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

I. Ahmed – Digital control applications with the TMS320 family, Texas Instruments, Dallas, 1991

\*\*\* TMS320C5x DSK Applications Guide, Texas Instruments Europe, 1997

**SUBJECT NAME: HIGH SPEED NETWORKS**

**NUMBER OF CREDIT POINTS: 5**

**SEMESTER: II**

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** The course will cover topics such as 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.

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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

E. 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

**SUBJECT NAME: INFORMATION SYSTEMS MANAGEMENT**

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER: II**

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** The course toggles with the most significant aspects of informational technology management and data security at informational system level. Special attention is paid to complex storage technologies and to the standards that are widely used today for informational systems management. One also presents the most relevant aspects concerning computational techniques and resources management using grid technologies. Laboratory classes themes focus on the workstations and systems management at local level, on the study of the various scenarios for providing data security in information systems and on the applications for SAN and grid management.

**COURSE CONTENT:** 1. Introductory notions; 2. Informational 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.

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**BIBLIOGRAPHY :**

<http://technet.microsoft.com/en-us/library/cc261852.aspx> (Office SharePoint Server 2007) , 2008

<http://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/simplesan.msp> (Solutii Microsoft pentru SAN) 2005

<http://www.microsoft.com/downloads/details.aspx?FamilyID=4cd29b01-eed8-45f5-ab1e-ff1e1aef7b22&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/psol>

<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/n\\_c11022.pdf](http://www.intel.com/technology/magazine/communications/n_c11022.pdf)  
<http://www.blade.org/index.html>  
<http://www.microsoft.com/technet/scriptcenter/preview/wsm/intro.mspix>  
[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

**SUBJECT NAME: VLSI ENVIRONMENTS**

**NUMBER OF CREDIT POINTS: 5**

**SEMESTER: II**

**TYPE OF COURSE:** 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 test benches

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** practical 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 Examinationple, McGraw-Hill, 2002

XILINX Corp. – VHDL Reference Guide

XILINX Corp. – SPARTAN Family Reference Guide

**SUBJECT NAME: COMPILER DESIGN**

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER: II**

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** The main objective of the course is to introduce to the students the specific notions and techniques concerning compilers and compiler design stages. The objective of the 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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination / 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

**SUBJECT NAME: COMPILER DESIGN - PROJECT**

**NUMBER OF CREDIT POINTS: 1**

**SEMESTER: II**

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** The main objective of the course is to introduce to the students the specific notions and techniques concerning compilers and compiler design stages. The objective of the 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;

**TEACHING LANGUAGE:** Romanian

**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

**SUBJECT NAME: ALGORITHMS FOR INFORMATIONAL RETRIEVAL**

**NUMBER OF CREDIT POINTS: 5**

**SEMESTER: II**

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** The general objective of Information retrieval course is to present a wide range of methods for locating the needed information in different sets of data. This means searching for information in documents, searching for the documents themselves, searching for metadata which describe documents. Search efficiency 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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**BIBLIOGRAPHY :**

Andoni, A., N. Immorlica, P. Indyk, and V. Mirrokni. 2007. Nearest Neighbor Methods in Learning and Vision: Theory and Practice. MIT Press

Baeza-Yates, Ricardo, and Berthier Ribeiro-Neto. 1999. Modern Information Retrieval. Harlow: Addison-Wesley

3. 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.

**SUBJECT NAME: EXPERT SYSTEMS**

**NUMBER OF CREDIT POINTS: 5**

**SEMESTER: II**

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** The main objective of the course is to introduce to the students the specific notions and techniques concerning knowledge representation and reasoning. The objective of the 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.

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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

**SUBJECT NAME: GRAPHICAL SYSTEMS**

**NUMBER OF CREDIT POINTS: 4**

**SEMESTER: II**

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** The course introduces 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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination

**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-Time Rendering. 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.

**SUBJECT NAME: MULTIMEDIA APPLICATION DEVELOPMENT**

**NUMBER OF CREDIT POINTS: 5**

**SEMESTER: II**

**TYPE OF COURSE:** specialty

**COURSE OBJECTIVES:** The course introduces basic concepts in the 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 as part of their homework 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

**TEACHING LANGUAGE:** Romanian

**EVALUATION:** written examination/ 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

Dean,  
Professor Eugen BOBAȘU, PhD