UNIVERSITY OF CRAIOVA
DEPARTMENT: AUTOMATION, ELECTRONICS AND MECHATRONICS
MASTER: ADVANCED ELECTRONIC SYSTEMS

1-st year

1. The technology of microelectronic circuits
2. Data acquisition in industry
3. Wireless technologies and mobile networks
4. Flexible manufacturing systems in electronics
5. Radio wave identification systems
6. Radio wave identification systems -project
7. Advanced techniques for numerical signal processing
8. Intelligent sensors
9. Data acquisition in industry -project
10. Electronics for automobiles
11. Microcontrollers and integrated systems
12. Microcontrollers and integrated systems - project
13. The design of CMOS circuits

2-nd year

1. Active noise control
2. Software applications for mobile terminals
3. Medical information systems
4. Hardware description languages and FPGA design methodology
5. Hardware description languages and FPGA design methodology - project
6. Low noise analog integrated circuits
7. Scientific research activity
8. Dissertation paper elaboration and presentation

1-ST YEAR

SUBJECT: THE TECHNOLOGY OF MICROELECTRONIC CIRCUITS

NUMBER OF CREDIT POINTS: 6
SEMESTER: I
COURSE TYPE: specialty
COURSE OBJECTIVE: Knowing the technologies used to make integrated circuits.
COURSE CONTENT: Introduction. Integrated circuits classification and making. Technologies of making integrated circuits : bipolar, NMOS, CMOS, BICMOS, SOI, etc. Chip protection against electrostatic discharge (ESD). The structure of mixt integrated circuits (plan floor) and metal layers use. Clock distribution network on big CMOS chips. Integrated CMOS components, working regimes and their performances, short channel effects on CMOS transistors. Specific problems of the analog parts of CMOS integrated circuits. Specific problems of the digital parts of CMOS integrated circuits. CMOS circuits performance variation depending on temperature and process. Design centralizing and their wafer grouping. Manufacturers, costs.
TEACHING LANGUAGE: Romanian
EVALUATION: examination
BIBLIOGRAPHY:

P. Gray,…, R. Meyer, Analysis and design of analog integrated circuits, John Wiley & Sons 2001,
H. Veendrick, Deep-submicron CMOS Ics, Kluwer Academic Publisher, 2000,
J. Baker, CMOS design. Layout and Simulation, Wiley Interscience, 2005,
D. Johns, K. Martin, Analog integrated circuits design, 1997.
Design Manual MA-9 Family 0.35µm BiCMOS Mixed Signal ASIC, pe INTERNET,
J. P. Uyemura, Physical design of CMOS integrated circuits using L-EDIT, 1995,
Hastings, The art of analog layout, Pretince Hall, 2001
L. Jurcă, M. Ciugudean, Circuite integrate analogice, Editura Politehnica Timişoara, 2007,

SUBJECT: DATA ACQUISITION IN INDUSTRY

NUMBER OF CREDIT POINTS: 5
SEMESTER: I
COURSE TYPE: specialty
COURSE OBJECTIVE: The course aims at developing basic competences concerning the design of acquisition systems for industry and the efficient use of specialty reference sources, fundamental orientations and concepts of general sociology.
COURSE CONTENT: 1. Common elements in acquisition systems structure. The general form of acquisition systems for industry 2. Entry modules for nonelectrical measures. Sensors and traductors for acquisition systems. Analog and numerical sensors. General characterisation of sensors. Performance indexes. Temperature sensors. Position sensors. Sensors for linear and angular movement. Speed sensors. Vibration and acceleration sensors. Force and mechanic couple sensors. Mechanic power sensors. Pressure sensors. Discharge sensors. Intelligent traductors. 3. Entry modules for electrical measures. 4. Analog convertors for industrial acquisition systems. Convertors for synthetic values. 5. Mathematical fundamentals of the sampling process. Analog numerical conversion. The integration of analog-numerical convertors in numerical systems. 6. Special microcontrollers for data acquisition. 7. Industrial software for data acquisition. Specific software for data acquisition. 8. SCADA systems.
TEACHING LANGUAGE: Romanian
EVALUATION: written examinationination
BIBLIOGRAPHY:

Dabâcan M, Sisteme de conversie şi achiziţie de date, Casa Cărţii de Ştiinţă, 2001;
Kirianaki N V, Yurish S Y, Shpak N O, Deynega V P, Data acquisition and signal processing for smart sensors, John Wiley and Sons, 2002;
Park J, Mackay S, Practical data acquisition for instrumentation and control systems, Newnes, 2003;
Şerban T, Achiziţia datelor, Editura Universitaria Craiova, 2002;
Taylor H, Data acquisition for sensor systems, Chapman & Hall. London. 1997;

SUBJECT: WIRELESS TECHNOLOGIES AND MOBILE NETWORKS

NUMBER OF CREDIT POINTS: 6
SEMESTER: I
COURSE TYPE: specialty
COURSE OBJECTIVE: The course aims at introducing the basic concepts concerning wireless technologies, mobile networks and data security in such networks. There are presented concepts about intelligent client-applications and internet wireless applications.
COURSE CONTENT: 1. Introduction to mobile networks: Definitions, m-Commerce, m-Business, wireless medium components. 2. Mobile equipments: classifications of mobile equipment, mobil equipment manufacturers. 3. Wireless networks: Wireless Personal Area Networks (WPANs), Wireless Local Area Networks (WLANs), WWAN Operators, Systems based on communication satellites. 4. Mobile applications architectures: applications architecture, aspects regarding architecture selection. 5. Mobile and Wireless texting: basic notions; message types , 6. Data security in mobile and Wireless networks: security notions, WAP security, “Smart Client” security. 7. “Smart Client” applications design: general aspects on “Smart Client”, the development of “Smart Client”, data persistence with clients, 8. The Internet design of wireless applications: the client, client development, wireless languages, Internet wireless technologies, voice applications, 9. Data at the level of an organization: mobile information management, location-based services.
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
Mancaş D., Garniţă S. – Comunicaţii optice - principii, tehnici, tehnologii

SUBJECT: FLEXIBLE MANUFACTURING SYSTEMS IN ELECTRONICS

NUMBER OF CREDIT POINTS: 6
SEMESTER: I I

COURSE TYPE: specialty
COURSE OBJECTIVES: The course contributes to the development of students' knowledge in the domain of the design, construction, functional analysis and exploitation of flexible manufacturing systems in electronics.
COURSE CONTENT: 1. Introduction; definitions; classifications; material and informational processing in a SFF; 2. Concepts of organizing production and mathematical models: manufacturing time, production rate, production capacity, use and availability degree, unfinished production, case studies. 3. Economic aspects in SFF designing, investing and exploiting: methods of mathematical analysis, robot integration in SFF, case studies. 4. Automatized manufacturing systems: transfer methods in SFF, buffer store, constructive aspects of linear and circular transfer. 5. Automatized management systems analysis: the influence of bumper warehouses, bizonal and multizonal systems, feeder systems, construction principles, quantitative analysis of source systems,. 6. Assembly process and manufacturing process divisions: the method of the biggest candidate, Kilbridge & Wester method, the method of the positional importance row, comparative case studies, automate division software, mono- and multistation system analysis. 7 Methods of marking and automate identification; mechanical methods; optical methods; magnetic methods; 8. SFF functioning representation using the Grafcet method: description elements, level 1 and level 2, Grafcet evolution rules, stage sequencing, particular actions and receptivities, Sequences synchronizing and coupling, techniques for the simplification of ample Grafcet structures, the making of management systems with discrete events using Grafcet descriptions, case studies.
TEACHING LANGUAGE: Romanian
EVALUATION: examination
BIBLIOGRAPHY:

Groover, M., Automation, Production systems and Computer Integrated Manufacturing, Ed. Prentice-Hall, 1997.
Niţulescu, M., Sisteme flexibile de fabricaţie, Note de curs, Reprografia Universităţii din Craiova, 1997.
Niţulescu, M., Sisteme flexibile de fabricaţie, Ed. Sitech, 1997.
Niţulescu, M., Sisteme robotice educaţionale, Ed. Sitech, 1999.
Kovacs, Fr., Jarcă, R., Blaga, Fl., Tripe Vidican, A., Sisteme de fabricaţie flexibilă, Editura Universităţii din Oradea, 2000.
Kovacs Fr; sa., Fabrica viitorului, Ed. Multimedia internaţional, Arad 2000.
Bishop, R., The mechatronics Handbook, Ed. CRC Press, 2002

SUBJECT: RADIO WAVE IDENTIFICATION SYSTEMS

NUMBER OF CREDIT POINTS: 5
SEMESTER: I
COURSE TYPE: synthesis
COURSE OBJECTIVE: The course aims at introducing fundamental notions concerning the analysis and design of RFID systems used to identify products and intelligent cards. There are presented basic RFID systems notions for various frequency domains and the analysis and design with current industrial systems having applications in industry and services.
COURSE CONTENT: 1. RFID systems general characteristics. Automatic indentification systems. RFID system types. Transponders, frequency domains, types of information processed by the system. 2. Fundamental functioning principles for RFID systems. 1 bit transporters and more than one bit transporters. Half-duplex and sequential transfer procedures. Elecromagnetic waves and surface waves. 3. Frequency domains and standards. The domains of frequency used and national and international standards. The selection of a RFID system for a certain application. 4. Data encoding, modulation and integrity. Basic band encoding. Digital modulation procedures. Procedures of checking transmission correctness. Access procedures. Multiple-access procedures and anti-collision techniques. 5. Data security. Authentication through mutual symmetry and through transmission keys. Encrypted data transfer. 6. Passive label architecture. Labels with memory functions. HF and UHF interfaces. Memory architecture and types of memory used. 7. Types of readers. Component reader blocks. The HF interface. Antennae connection to inductive systems. Reader design. 8. Standardization according to application domains. Animal identification. Intelligent cards without contact. Product management systems. 9. Label types and industrial readers. Intelligent cards without contact. SIEMENS, TURK, INTERMEC labels and their corresponding readers. 10. Examinationples of applications for RFID technology. Intelligent cards without contact. Using them in 'tracking' production and products. Their use in public transportation. Access systems based on RFID cards.
TEACHING LANGUAGE: Romanian
EVALUATION: written examination
BIBLIOGRAPHY :

Klaus Finkenzeller, "RFID Handbook: Fundamental and Applications in Contactless Smart Cards and Identification", Second edition, John Wiley and Sons, 2003
Syed Ahson, Mohammad Ilyas, "RFID Handbook: Applications, Technology and Privacy", CRC Press, 2008
Auto-ID Labs,"RFID Analog Front End Design Tutorial", University of Adelaide, 2004
Franck Thorton, Brad Haines, Anand M.Das, Hersh Bhargan, Anita Campbell, John Kleinschmidth, "RFID Security" Syngress Publishing, 2006
Oliver Gunther, Wolfhard Kletti, "RFID in Manufacturing", Springer, 2008
Daniel Dobkin, "The RF in RFID-Passive UHF RFID in Practice", Elsevier, 2008

SUBJECT: RADIO WAVE IDENTIFICATION SYSTEMS - PROJECT

NUMBER OF CREDIT POINTS: 2
SEMESTER: I
COURSE TYPE: synthesis
PROJECT OBJECTIVES: RFID systems design for various frequncy domains. The analysis and design with the existing industrial systems for applications to industry and services.
COURSE CONTENT: 1. RFID systems design for access Systems.
2. RFID Systems design for bookshop management.
3. RFID Systems design for medical care
4. RFID Systems design for public transportation.
TEACHING LANGUAGE: Romanian
EVALUATION: oral examination
BIBLIOGRAPHY:

Klaus Finkenzeller, "RFID Handbook: Fundamental and Applications in Contactless Smart Cards and Identification", Second edition, John Wiley and Sons, 2003

Syed Ahson, Mohammad Ilyas, “RFID Handbook: Applications, Technology and Privacy”, CRC Press, 2008
Auto-ID Labs,”RFID Analog Front End Design Tutorial”, University of Adelaide, 2004
Franck Thorton, Brad Haines, Anand M.Das, Hersh Bhargan, Anita Campbell, John Kleinschmidth, “RFID Security” Syngress Publishing, 2006
Oliver Gunther, Wolfhard Kletti, “RFID in Manufacturing”, Springer, 2008
Daniel Dobkin, “The RF in RFID-Passive UHF RFID in Practice”, Elsevier, 2008

SUBJECT: ADVANCED TECHNIQUES FOR NUMERICAL PROCESSING OF SIGNALS

NUMBER OF CREDIT POINTS: 6
SEMESTER: II
COURSE TYPE: specialty
COURSE OBJECTIVES: The course covers a large domain of theory and applications concerning the advanced processing of numeric signals in the communication and processing systems of multimedia, biomedical signals. The purpose is to obtain competences and practical abilities in design, modeling, implementing and numeric signal processing.
COURSE CONTENT: : 1. Introduction. Signal processing issues. The application domains of numeric processing of signals. 2. Sigma-delta modulation for CAN. Error quantifying in analog-numeric conversion. Oversampling and decimation. Sigma-delta modulation. Sigma-delta modulation analysis in Z domain. 3. Spectral estimation of signals. Random signals. Applications of the estimation theory, Methods of direct spectrum estimation, Methods of indirect spectrum estmation, Estimation theory. 4. Numeric filters. Filters with finite response to impulse (FFI), Filters with infinite response to impulse cu răspuns infinit la impuls (FII), Filters with various sampling rates, Adaptive filters 5. The applications of numeric processing of signals. Signal compression, Voice processing, recognition and synthesis. Applications in the domain of communication. 6. Numeric signal processors: architecture, interfacing, programming. Development systems with numeric signal processors. Applications of numeric signal processors.
TEACHING LANGUAGE: Romanian
EVALUATION: examination
BIBLIOGRAPHY:

Oppenheim A.V., Shafer R.W., Buck J.R., Discrete-Time Signal Processing (Second Edition), Prentice-Hall, 1999.
Lathi B.P., Signal Processing and Linear Systems, Berkeley Cambridge Press, 1998.
Haddad, R.A., Parsons T.W., Digital Signal Processing - Theory, Applications and Hardware, Computer Science Press, 1991.
Marin, C., Sisteme discrete în timp, Ed. Universitaria, Craiova, 2005.
Marin C., Popescu D., Teoria sistemelor şi reglare automata, Ed. Sitech, Craiova, 2007.
Smith S., The Scientist and Engineer's Guide to Digital Signal Processing, California Technical Publishing, 1999.
* * Matlab/Simulink Software.
* * Texas Instruments DSP.
* * Analoq Devices DSP.

SUBJECT: INTELLIGENT SENSORS

NUMBER OF CREDIT POINTS: 4
SEMESTER: II
COURSE TYPE: specialty
COURSE OBJECTIVES*:* The course aims at ensuring the basic knowledge regarding intelligent sensors: characteristics, structural and functioning principles, representative types, applications, multi-sensory systems.
COURSE CONTENT: 1. Introduction: Intelligent sensors: definitions, classifications, characteristics, sensory systems, multisensory architectures and system generations, 2. Stress sensors: structural and functioning principles, applications. 3. Intelligent optical sensors: light- tension integrated sensors; light- frequency integrated sensors; applications. 4. Integrated/ intelligent temperature sensors; functioning principles, main types. Applications. 5. Acoustic locating/ proximity sensors: the acoustic phenomenon. Acoustic sensors of proximity. Locating acoustic sensors. Applications. 6. Pressure and acceleration intelligent sensors: structure and functions, applications. 7. Tactile sensory networks. Representative types, sensory information processing,. 8.Other types of sensors. 9. Errrors, uncertainty, hazard: probability calculus elements. Random variable. Hazard, error sources. Uncertainty analysis and influence. Uncertainty statistic basis.
TEACHING LANGUAGE: Romanian
EVALUATION: examinationen
BIBLIOGRAPHY:

Purcaru D.M., Senzori şi traductoare. Vol. I, Editura Reprograph, Craiova, 2001.
Purcaru D.M., 1997, Sisteme senzoriale. Metode şi algoritmi pentru recunoaşterea tactilă a formelor, Editura Sitech, Craiova, 1997.
Purcaru D., Măsurări electronice, Editura Universitaria, Craiova, 2004.
Dumitriu, A.,Bucsan, C. Damian, T. Sisteme senzoriale pentru roboţi, Ed. MEDRO, Bucureşti, 1996.
Kirianaki N., Yurish S., Shpak N., Deynega V, Data Acquisition and Signal Processing for Smart Sensors, Wiley, 2002.
Farden, I., Handbook of Modern Sensors, 3rd Edition, AIP PRESS Springer, Advanced Monitor Corporation, San Diego, USA, 2003.
Hesse, J, Garden, J. W., Sensors in Manufacturing, vol. I, II, Ed. Willy – VCH, Verlag GmbH, 2001.
Sinclair, I., Sensors and Transducers. Third edition, Newness, 2001.

SUBJECT: DATA ACQUISITION IN INDUSTRY - PROJECT

NUMBER OF CREDIT POINTS: 2
SEMESTER: II
COURSE TYPE: specialty
COURSE OBJECTIVES: Acquisition systems design for industry and developing abilities of using the literature efficiently.
COURSE CONTENT: 1. Project topic presentation: industrial data acquisition module. Design data, general indications. 2. Design algorithm presentation, the presentation of construction variants and of the basic design relations. 3. Computer-aided design calculus. Individual detailed tutoring. 4. Project presentation and grading.
TEACHING LANGUAGE: Romanian
EVALUATION: oral examination
BIBLIOGRAPHY:

Dabâcan M, Sisteme de conversie şi achiziţie de date, Casa Cărţii de Ştiinţă, 2001;
Kirianaki N V, Yurish S Y, Shpak N O, Deynega V P, Data acquisition and signal processing for smart sensors, John Wiley and Sons, 2002;

Park J, Mackay S, Practical data acquisition for instrumentation and control systems, Newnes, 2003;
Şerban T, Achiziţia datelor, Editura Universitaria Craiova, 2002;
Taylor H, Data acquisition for sensor systems, Chapman & Hall. London. 1997;

SUBJECT: ELECTRONICS FOR AUTOMOBILES

NUMBER OF CREDIT POINTS: 6
SEMESTER: II
COURSE TYPE: synthesis
COURSE OBJECTIVE: The course aims at preparing students in the field of automobile electronics, presenting the mian specific issues and the presentday variants of actualizing the complex systems, variants offered by analog and numerical electronics in order to ensure the vital functions of modern automobiles and to improve their functionality. It also gives support in order to interpret company specifications correctly.
COURSE CONTENT: 1. Automobile electronic circuits classification. The main components and functions of Motronic system. The components of a DI-Motronic control system in open loop. 2. The functioning of gas injection systems. Types of indirect injection. Direct gas injection. Impulse injectors command. Fuel mixture ignition. General considerations. Classical circuits, waveforms. 3. Ignition coil types. The classic and the compact coil. The compact and the thin coil. AAS diodes. The circuit of electronic ignition with distributor. Dwell angle, the adjustment diagram. 4. Numeric systems of programmed ignition with ECU. The logic diagram for the choice of the values of the ignition advance and of Dwell angle. The typical computer structure for ignition ((ECU). Ignition systems without distributor. 5. The electronic control of Diesel engines. 6. The system of stability ensurance during the movement. The generic structure. ABS system.- definition, functioning. The hydraulic modulator. ABS control loop. Braking features. 7. TCS system. The typical form for an automobile with front engine and back traction. ACC system. Principles, used sensors, entry measures. The generic structure of ACC systems. Principles of distance measuring. 8. Relative speed measuring by the Doppler effect. The lidar system with 4 channels. Sensors use in automobile electronics. Thermistors, measurement associated circuits. The inductive sensor with variable magnetic reluctance for the number of revolutions and angular position. 9. The accelerometer for detonation detection. Position rezistive traductors for the air collector. Tensiometers traductors for force and pressure. 10. Air flow meters. The oxygen sensor. 11. Communication networks. Basic typologies. Addressing methods. Access to the main. OSI reference model. Performance indexes for automobile mains. Classification. 12. CAN-B and CAN-C mains. Communication networks. Basic typologies. Addressing methods. The access. OIS reference model. Perofrmance indexes for automobile mains. Classification. 12. The mains. Networks nodes. Differential signals. Transfer rates. Hardware structures: elementary CAN and integral CAN. LIN main. High speed mains for media applications. 13. The electrical schema of a classic light system for automobiles. Litronic systems with gaseous-discharge lamps. Generic forms. 14. Unconventional illuminating systems: systems with a unique source, thermovision. Expert illuminating systems for automobiles.
TEACHING LANGUAGE: Romanian
EVALUATION: written examination
BIBLIOGRAPHY:

Denton Tom, Automobile Electrical and Electronic, Third Edition, Elsevier Butterworth-Heinemann, 2004, ISBN 0 7506 62190;
Kershaw John F., Halderman James D., Automotive Electrical and Electronic Systems, Classroom Manual, Fifth Edition Update, Pearson Prentice Hall™ , 2007, ISBN 0-13-238883-9;
J. Marek, H.-P. Trah, Y. Suzuki, I. Yokomori,, Sensors for Automotive Applications, WILEY-VCH Verlag GmbH & Co. KGaA, 2003, ISBN 3-527-29553-4;
Navet, N., Simonot-Lion,,F., Automotive Embedded Systems Handbook, CRC Press, Taylor & Francis Group, 2009, ISBN-13: 978-0-8493-8026-6;
Kiencke Uwe, Nielsen Lars, Automotive Control Systems For Engine, Driveline, and Vehicle, Second Edition, Springer, 2005, ISBN 3-540-23139-0;

SUBJECT: MICROCONTROLLERS AND INTEGRATED SYSTEMS

NUMBER OF CREDIT POINTS: 4
SEMESTER: II
COURSE TYPE: synthesis
COURSE OBJECTIVE: The course aims at understanding the concepts associated to the development of an integrated system (IS), oriented on control, from requirements to sedign and implementation. The knowledge of the necessary techniques for the software implementation of some control applications within an integrated system as part of an approach is both theoretical and practical. Understanding the important steps in designing an IS, of the dependencies between functionality and implementation, of design compromises. The use of the models for the system description and analysis (functions, software and hardware). The use of the main hardware and software means for IS development and analysis.
COURSE CONTENT: 1. Introductory notions: embedded systems and the control. Examinationples of real-time implementation of some applications. 2. 32 bit microcontrollers: the presentatoin of Atmel AVR32 microcontroler, CPU and I/O API, AVR32 Studio (Eclipse CDT) programming medium; embedded Linux operating systems 3. Real-time operating systems: generalities: independent tasks; interruptions, planning, priorities; task models; Time dimension, re-entering code. 4. Real-time operating systems: communication and synchronization: communication: message queues, global variables, mail boxes; synchronizing: traffic lights, signals; mutual exclusion, interblockage, priority reversing 5. IS design and modeling: requirements specification; functional models (including UML diagrams); structuring and mapping; temporal analysis; 6. Distributed systems: introduction to distributed control systems. Basic notions: OSI, CAN bus, Modbus, Fieldbus models; the structure and distribution of a distributed system; the temporal dimension with distributed systems. 7. Distributes systems and CAN main: the presentation of CiA CANopen, ODVA DeviceNEt.
TEACHING LANGUAGE: Romanian
EVALUATION: written examination
BIBLIOGRAPHY:

Nicola, S. Microcontrolere. Aplicaţii în mecatronică, Ed. Universitaria Craiova, 2005.
Popa, M. Microprocesoare şi microcontrolere, Editura Politehnica Timişoara, 2000
Ball,S. Embedded Microprocessor Systems: Real World Design, 3rd ed., Newness Elsevier Science, 2002
Janka, R. S., Specification and Design Methodology for Real-time Embedded Systems, Springer, 2002

Marwedel,P. Embedded System Design, Springer, 2003

SUBJECT: MICROCONTROLLERS AND INTEGRATED SYSTEMS - project

NUMBER OF CREDIT POINTS: 2
SEMESTER: II
COURSE TYPE: specialty
PROJECT OBJECTIVES: The design and realization of an integrated system with AVR ATMega8 controller, including ISP programmer.
COURSE CONTENT: Making up an integrated system with AVR ATMega8 controller, including ISP programmer, by a two student team. The particularizatoin at team level and the software application will prove the complete functioning of the hardware (numeric entries/ exits, analog entries, temporization/ counting). The software will have to integrate Free RTOS. The technical report will prove the personal contribution of each team member. Personal project topics can be proposed. They will be discussed and decided on during the first project meeting in the semester which corresponds to the work group the contributor is part of.
TEACHING LANGUAGE: Romanian
EVALUATION: oral examination
BIBLIOGRAPHY:

Nicola, S. Microcontrolere. Aplicaţii în mecatronică, Ed. Universitaria Craiova, 2005.
Popa, M. Microprocesoare şi microcontrolere, Editura Politehnica Timişoara, 2000
Ball,S. Embedded Microprocessor Systems: Real World Design, 3rd ed., Newness Elsevier Science, 2002
Janka, R. S., Specification and Design Methodology for Real-time Embedded Systems, Springer, 2002
Marwedel,P. Embedded System Design, Springer, 2003

SUBJECT: THE DESIGN OF CMOS CIRCUITS

NUMBER OF CREDIT POINTS: 6
SEMESTER: II
COURSE TYPE: specialty
COURSE OBJECTIVE: The knowledge of the typical schemata used to make mixed integrated circuits, the knowledge of logic and analog block simulation, the estimation of their performances and their testing in corner conditions. Mastering the design technique of mixt CMOS circuit layout. Making a LVS comparison and interpreting performance changes appeared at the circuit extracted from the layout. The evaluation of the process deviations of the schemata design according to the corner test.
COURSE CONTENT: Introduction: the presentday level of development of CMOS integrated circuits used for telecommunication. The stages in designing a mixt integrated : specifications setting, the conception of the circuit block schema, setting the power tension and the choice of the technology, establishing the circuit „floor-plan", the use of metal layers and pads, adopting the electronic schemata of the blocks, examinationples. Block simulation in corner conditions and performance estimation, analog parts design : AO, OTA, Comparers, CC, DAC, ADC, reference sources used in mixt chips. The design of logic circuits, of in/ out circuits, registers, accounters, etc. Memory design. VLSI, ASIC circuits design. The design of „low power" integrated circuits. The design of the clock distribution network for VLSI and ASIC circuits. Proiectarea layout-ului circuitelor integrate mixte. LVS test. Checking the performances of the schema extracted from the layout. Circuit reliability and signal integrity in submicronic integrated circuits.
TEACHING LANGUAGE: Romanian
EVALUATION: written examination
BIBLIOGRAPHY:

P. Gray, … , R. Meyer, Analysis and design of analog integrated circuits, John Wiley & Sons 2001,
L. Jurcă, M. Ciugudean, Circuite integrate analogice, Editura Politehnica Timişoara, 2007,
H. Veendrick, Deep-submicron CMOS Ics, Kluwer Academic Publisher, 2000,
J. Baker, CMOS design. Layout and Simulation, Wiley Interscience, 2005,
D. Johns, K. Martin, Analog integrated circuits design, 1997, pe INTERNET,
S. Kang, Y. Leblebici, CMOS digital integrated circuits. Analysis and design, McGraw Hill, 1997,
B. Razavi, Design of analog CMOS integrated circuits, McGraw Hill, 2001,
R. Gregorian, Introduction to CMOS op-amps and comparators, Wiley & Sons 1999,
N.H.E. Weste, K. Eshraghian, Principles of CMOS VLSI design, Addison-Wesley Publ. Comp., 1993,
Hastings, The art of analog layout, Pretince Hall, 2001.

2-ND YEAR

SUBJECT: **ACTIVE CONTROL OF NOISE**

NUMBER OF CREDIT POINTS: 6
SEMESTER: I
COURSE TYPE : synthesis
COURSE OBJECTIVE: The course presents notions connected to: i) the theoretical bases of noise active control (ANC, Active Noise Control); ii) adaptive algorithms for numeric filters; iii) typical control applications for noise active control.
COURSE CONTENT: 1. Introduction to noise active control. The general concept, principle-based applications, performance evaluation. 2. FIR adaptive numeric filters. Adaptive criteria for numeric filters, LMS algorithm and its variants, adaptive FIR applications. 3. Mono and multichannel ANC structures with apriori information (feedforward): basic principles, secondary channel effects and correction techniques, FXLMS algorithm and its variants, FXLMS variants using the multichannel technique. 4. ANC technique applications: pipelines noise control, echo cancellation.
TEACHING LANGUAGE: Romanian
EVALUATION: written examination
BIBLIOGRAPHY

S. Kuo: Active Noise Control Systems, J.Wley, 1996.
S. Haykin: Adaptive Filter Theory, Prentice-Hall, 1991.
P.Nelson: Active Control of Sound, Academic Press, 1992.
S. Kuo: Real-Time digital signal Processing, J. Wiley, 2007.
L. Beranek: Noise and Vibration control Engineering, J.Wiley, 1992

SUBJECT: SOFTWARE APPLICATIONS FOR MOBILE TERMINALS

NUMBER OF CREDIT POINTS: 6
SEMESTER: I
COURSE TYPE: specialty
COURSE OBJECTIVE: The course aims at introducing the basic concepts concerning software development for mobile terminals, specific technologies and interfaces with various electronic pieces of equipment.
COURSE CONTENT: 1.Introduction: course structure, approaching methods. 2. Basic elements in mobile terminals software development. 3. The connection phone-microcontroller. AT commands. 4. WAP applications. 5. Dynamic generation of WAP pages. 6. Applications

concerning the access to data from a mobile phone. 7. SMS, MMS applications. 8. Introduction to J2ME (Java 2 Micro Edition). 9. Developing graphic interfaces in J2ME. 10. Mobile Databases 11. Mobile Web Services and Mobile Security 12. Developing applications for symbian OS. 13. Developing NET Compact Framework applications. 14. Final course- review of the basic topics approached.

TEACHING LANGUAGE – Romanian

EVALUATION: written examination

BIBLIOGRAPHY:

Michael Juntao Yuan ,Enterprise J2ME: Developing Mobile Java Applications, Prentice Hall PTR, ISBN : 0-13-140530-6, October 23, 2003

AndyWigley and Peter Roxburgh, Building Microsoft ASP.NET Applications for Mobile Devices, Second Edition, ISBN:073561914X Microsoft Press © 2003 (694 pages)

André N. Klingsheim, „J2ME Bluetooth Programming Master's Thesis, Department of Informatics", University of Bergen, 30 iunie 2004.

Bruce Hopkins and Ranjith Antony, Bluetooth for Java, ISBN:1590590783 Apress, 2003.

Martyn Mallick, "Mobile and Wireless Design Essentials", John Wiley & Sons, 2003, ISBN0471214191.

James White, David Hemphill, "Java 2 Micro Edition - Java in Small Things", byManning Publications, 2002, ISBN 1-930110-33-2.

John W. Muchow, "Core J2ME™ Technology& MIDP", Publisher : Prentice Hall PTR, Pub Date : 21 decembrie, 2001, ISBN: 0-13-066911-3.

SUBJECT: MEDICAL INFORMATION SYSTEMS

NUMBER OF CREDIT POINTS: 6

SEMESTER: I

COURSE TYPE: synthesis

COURSE OBJECTIVE: The course gets the future specialist accustomed to to information technologies applied to the medical field, it allows the acquiring of the technical knowledge in the field of biological signals acquisition, transmission and processing, physiological systems modeling and simulation, computer-assisted diagnosis and monitorization. Tele-medicine application (e-Health).

COURSE CONTENT: 1. Biological signals acquisition : biological signals specificity, their acquisition and registering, perturbances affecting them. Numeric filters design. 2. Physiological systems modeling and simulation: an interdisciplinary field; case studies: modeling the system of regulating blood pressure, modeling and simulating glycemia regulating system. 3. Biomedical images acquisition and processing: diagnosis based on medical imaging, computerised echography, computer tomography, magnetic resonance imagery. 4. Computer-assisted diagnosis and monitorization: expert systems, expert systems in medicine, mathematical models based diagnosis, case studies. 5. Tele-medicine application (e-Health) Communication networks applied to medicine (e-Health): using information and communicatoin technologies to make applications in order to monitor patients in intensive therapy units and at home. Developing information systems in order to identify,collect, stock and analyse the data datelor use d in medical care centers. Architectures for networks used on medical purposes. The protection of personal medical information.

TEACHING LANGUAGE: Romanian

EVALUATION: written examination

BIBLIOGRAPHY

Armitage P., Berry G. Statistical methods in medical research (2nd Ed.). Blackwell Scientific Publications, Oxford, 1987.

Iancu Ionela, Iancu E., Modelare şi simulare în fiziologie Editura Universitaria, Craiova, 2003

Lungeanu D, Mihalas G. I. Informatica medicală şi biostatistica(Editia a 2-a), Eurobit, Timisoara, 2008.

Popescu O., Enătescu V., Farcaş D., Mihalas G. I., Petrescu O.,Popa S. - Informatica Medicală, Ed. Medicală, Bucuresti, 1988.

Shortliffe E. H., Perreault L. E. Medical Informatics. Computer Applications in HealthCare and Biomedicine (2nd Edition), Springer-Verlag, 2001.

Van Bemmel J.H., Musen M.A. Handbook of Medical Informatics, Springer-Verlag, Heidelberg, 1997.

J.Wiley, 1992

SUBJECT: HARDWARE DESCRIPTION LANGUAGES AND FPGA DESIGN METHODOLOGY

NUMBER OF CREDIT POINTS: 4

SEMESTER: I

COURSE TYPE: synthesis

COURSE OBJECTIVE: : The knowledge of: the structure and characteristics of programmable numeric circuits; manners of describing numeric structures by using specific hardware description languages VHDL language; developing the competence of using VHDL in designing and simulating combinational and sequential devices. Introduction to the procedures used for the hierarchical design of complex digital structures.

COURSE CONTENT: 1. The constructive principles of programmable logic structures. CPLD and FPGA circuits. Circuits. The implementation of digital systems using programmable structures. Programming interfaces. 2. Hardware description languages (HDL). Introduction to VHDL and Verilog. The development environment structure for HDL projects. 3. Identifiers, classes and types of data, operators, logic entities, ports, signals, modes, architectures, types of instructions, strategies of describing arhitectures 4. Combinational structures description. Boolean equations, simultaneous/competing instructions, sequential instructions. Processes, signals, sensitivity process, bidirectional and three-state exits. Examinationples. 5. Sequential structures description. Fundamental sequential structures, initiations. Automata description, behaviour description, Moore and Mealy automata. Examinationples. 6. Hierarchical design of complex systems. Libraries, packages, reusable components, generic parametres and generalization. Examinationples. Cycles and subprograms. Functions and procedures: predefined and defined by the user. 8. The synthesis and implementation of the designs made using VHDL, restrictions imposed by the programmable integrated circuit, architecture optimization, synthesis directives, iterative design, other optimizations. 9. The simulation of the structures designed using VHDL. Simulation media and software, test programs, stimulus files, stimuli generators.

TEACHING LANGUAGE – Romanian

EVALUATION: written examination

BIBLIOGRAPHY:

Nicola, S., Circuite Integrate Numerice. Aplicaţii in mecatronică, Ed.Universitaria , Craiova, 2005

Wakerly, J. F., Circuite digitale; Principiile si practicile folosite in proiectare, Editura Teora, 2002

Skahill, K. – VHDL for Programmable Logic, Addison-Wesley, London, 2001

P. Ashenden, ”The VHDL Cookbook”, 2000

SUBJECT: HARDWARE DESCRIPTION LANGUAGES AND FPGA DESIGN METHODOLOGY project

NUMBER OF CREDIT POINTS: 2
SEMESTER: I
COURSE TYPE: core course
COURSE OBJECTIVE: : Making a complex project using Digilent 2E and D2E I/O development system.
COURSE CONTENT: Making a complex project using Digilent 2E and D2E I/O development system. The students are organised in pairs. The particularization at pair level will prove the integral functioning of the hardware implemented on the development system. It is required the integral simulation of the functioning process by using Modelsim MXE. The progress is assessed in two weeks' time. The technical report will show the personal contribution of each student. Students can propose their own topics to be discussed in the first meeting at the beginning of the semester.
TEACHING LANGUAGE – Romanian
EVALUATION: written examination
BIBLIOGRAPHY:

Nicola, S., Circuite Integrate Numerice. Aplicaţii in mecatronică, Ed.Universitaria , Craiova, 2005
Wakerly, J. F., Circuite digitale; Principiile si practicile folosite in proiectare, Editura Teora, 2002
Skahill, K. – VHDL for Programmable Logic, Addison-Wesley, London, 2001
P. Ashenden, ”The VHDL Cookbook”, 2000
Marwedel,P. Embedded System Design, Springer, 2003

SUBJECT: ANALOG INTEGRATED CIRCUITS FOR LOW NOISE

NUMBER OF CREDIT POINTS: 6
SEMESTER: I
COURSE TYPE: specialty
COURSE OBJECTIVE: The course aims at broadening the knowledge about the noise nature in analog integrated circuits, acquiring analysis techniques concerning the noise performances of integrated circuits and the design methods for little noise circuits.
COURSE CONTENT: 1. Electric noise: general aspects, the nature of electric noise, the noise of semiconductor devices, noise models used in simulating the functioning of semiconductor devices, the specification of the noise performances of electronic circuits. 2. Noise performances of some constructive and functional block circuits: the noise of elementary levels, cascod levels, the differential pair, the noise performances of mirrors, differential amplifier, the noise analysis of the amplifier with two-level transconductance, the noise analysis of the amplifier with Miller transconductance, the noise analysis of the amplifier with folded cascode transconductance, the noise of the circuits with oerational amplifiers. 3. Little noise amplifiers: general aspects, the influence of the negative reaction on noise performances, FALBJT (Field-aided lateral BJT), little noise amplifiers using chopper stabilization. 4. Little noise amplifiers Amplificatoare de zgomot mic cu sursă de semnal rezistivă: Amplificatoare transimpedanţă de zgomot mic, Amplificatoare cu reacţie serie de tensiune, Exemple de implementare a amplificatorului cu reacţie serie de tensiune cu etaj de intrare diferenţial, 5. Little noise amplifiers with inductive signal source: transimpedance amplifiers with inductive signal source, little noise amplifiers with inductive source made using bipolar or CMOS technology. 6. Little noise amplifiers with capacitive signal source: CMOS technology implementation, little noise amplifiers with wide band and capacitive source imlemented in BICMOS, wide band amplifiers for SW receivers.
TEACHING LANGUAGE: Romanian
EVALUATION: examination
BIBLIOGRAPHY:

Doicaru, E., Dispozitive electronice, Editura Universitaria, Craiova, 2002.
Doicaru, E. şi M. Bodea., Proiectarea circuitelor integrate analogice orientate către performanţele de zgomot, Editura Universitaria, Craiova, 2008.
Z.Z. Chang, W. Sansen, *Low-noise wide-band amplifiers in bipolar and CMOS technologies*, Kluwer Academic Publishers, Boston, 1991.
D. Johns, K. Martin, *Analog Integrated Circuit Design*, John Wiley & Sons, New York, 1997

SUBJECT: SCIENTIFIC RESEARCH ACTIVITY

NUMBER OF CREDIT POINTS: 15
SEMESTER: II
COURSE TYPE: specialty
COURSE OBJECTIVES: The student at master courses should elaborate a written material on a topic selected together with the professor advisor and which is in accordance with the specialization of the master courses. .
TEACHING LANGUAGE: Romanian/ English
EVALUATION: oral examination
BIBLIOGRAPHY: containing the references specific to the studied subject matters during the two year of study.

SUBJECT: DISSERTATION PAPER ELABORATION AND PRESENTATION

NUMBER OF CREDIT POINTS: 15
SEMESTER: II
COURSE TYPE: specialty
COURSE OBJECTIVES: The master student will choose a dissertation topic from the list proposed.
COURSE CONTENT:
Introduction. Prezentation of the presentday stage in the development of the field. The comparative analysis of the presented solutions in literature. The choice of the block schema and the design of the electronic schemata of all electronic parts. Technological design : that of the circuit, of the mechanicla parts, of the connection schemata. 5. Technical-economic analysis. Production price estimation. 5.1. The list with the electronic, electric or mechanic components and their corresponding prices. 5.2. The list with the labor costs to make the project. 5.3. Overall project price 6. Conclusions 7. Bibliography