UNIVERSITY OF CRAIOVA
Faculty of Automation, Computers and Electronics
Department of Automatic Control and Electronics
Master degree program: INFORMATICS TECHNOLOGIES IN SYSTEMS ENGINEERING (TIS)

Curriculum 2018 – 2019

Year I		Year II	
Code	Study disciplines	**Code**	Study disciplines
D28TISM101	Operating Systems	D28TISM301	Networked control systems
D28TISM102	Embedded systems architectures	D28TISM302	Embedded systems design using Matlab-Simulink
D28TISM103	Advanced programming techniques	D28TISM303	Flight control systems
D28TISM104	Software for image processing	D28TISM304	Critical information systems
D28TISM105	Man-machine interfaces in automotive	D28TISM305	Quality standards in Computer Information Systems
D28TISM106	Research and design management	D28TISM306a	Design and Development Practice 3
D28TISM107a	Design and Development Practice 1	D28TISM306b	Research Practice 3
D28TISM107b	Research Practice 1		
D28TISM201	Software structures for real time applications	D28TISM401	Research Practice 4
D28TISM202	Automotive control	D28TISM402	Dissertation Practice
D28TISM203	Advanced techniques for digital signal processing	D28TISM403	Ethics and academic integrity
D28TISM204	Virtual Reality and Manufacturing		
D28TISM205	Communication systems and networks		
D28TISM206a	Design and Development Practice 2		
D28TISM206b	Research Practice 2		

DESCRIPTION

YEAR I

D28TISM101	Operating Systems

CREDIT POINTS (ECTS): 3
SEMESTER: I
DISCIPLINE TYPE: THOROUGHGOING STUDY
COURSE OBJECTIVES: The course objective is to achieve deep knowledge about the main components of the operating system, especially CPU scheduling, interprocess synchronization and communication, deadlocks avoidance, memory management and file systems. The lab's activities goals are to acquire practical skills needed to develop efficient software applications, using the most important systems calls available in Linux, Solaris, Windows and Java.
CONTENT: Introduction; CPU scheduling; Process synchronization; Virtual Memory; File systems implementation.
TEACHING LANGUAGE: Romanian
EVALUATION: Exam
BIBLIOGRAPHY:

1. Modern Operating Systems, Andrew S. Tanenbaum, Prentice Hall, 2001;
2. Operating Systems Design and Implementation, Andrew S Tanenbaum and Albert S Woodhull, Prentice Hall, 2006;
3. Distributed Operating Systems, Andrew S. Tanenbaum, Prentice Hall, 1995;
4. Operating System Concepts, Avi Silberschatz, Peter Baer Galvin and Greg Gagne, John Wiley & Sons, Inc., 2004;
5. Operating Systems Concepts with Java, Abraham Silberschatz, Peter Baer Galvin, Westminster College, 2004;
6. The Design of the UNIX Operating System, Maurice J. Bach, Prentice Hall, 1986.

D28TISM102	Embedded systems architectures

CREDIT POINTS (ECTS): 4
SEMESTER: I
DISCIPLINE TYPE: KNOWLEDGE
COURSE OBJECTIVES: Acquiring knowledge about:

- Architecture (hardware/software) and operation of typical embedded systems.
- Peripheral resources (I/O devices) architecture and operation for representative microcontrollers families
- Development environments used for application development (hardware, software, simulation, validation)

Development of abilities for selection and conditioning of a microcontroller (computing power, peripherals and other resources, software et.al.) as platform for an embedded system.
Home works and project used to illustrate the development of simple embedded systems applications with an 8 bit AVR microcontroller (Microchip) using an IDE with C programming language and co-simulation for validation.
CONTENT: Development environments: Integrated Development Environment (IDE), GCC Toolchains. (Re)Introduction to C programming for microcontrollers, coding standards. (Re)Introduction to computers architecture: Von Neumann, Harvard, RISC/CISC, microprocessors, microcontrollers, digital signal processors, memory systems, I/O devices management, Embedded systems architecture, hardware and software levels, microcontrollers, associated concepts: models, functions, benefits and constraints.
Other categories of embedded systems: PC controllers and COTS, ETX, COM, PC-104, SOC, etc..
Microcontrollers: introduction, applications, main characteristics, representative families.
Microchip 8 bit AVR family:

- Architecture, CPU, registers, instructions, program and data memories, fuses, clock generation system, reset generation system, I/O ports, timers and counters, analogue inputs, interrupt system, external interrupts.
- Serial communications, USART, USI, SPI, TWI (I2C)
- XMEGA sub-family
- IDEs and programming languages, starter kits and development systems, hardware and software for application programming.
- Introduction to the ARM microprocessor / microcontroller family.

TEACHING LANGUAGE: Romanian
EVALUATION: Exam
BIBLIOGRAPHY:

1. Barrett, F.S, Pack, D. J. - Atmel AVR Microcontroller Primer: Programming and Interfacing, Second Edition, Synthesis Lectures on Digital Circuits and Systems, June 2012, Vol. 7, No. 2;
2. Barrett, F.S - Embedded Systems Design with the Atmel AVR Microcontroller: Part I, Synthesis Lectures on Digital Circuits and Systems, 2009;
3. Barrett, F.S- Embedded Systems Design with the Atmel AVR Microcontroller: Part II, Synthesis Lectures on Digital Circuits and Systems, 2009;
4. Dean A. G. - Embedded Systems Fundamentals with ARM Cortex-M based Microcontrollers: A Practical Approach, ARM Limited, 2017
5. Nicola, S., Microcontrolere. Aplicaţii in mecatronica, Ed. Universitaria , Craiova, 2005.

D28TISM103	Advanced programming Techniques

CREDIT POINTS (ECTS): 3
SEMESTER: I
DISCIPLINE TYPE: KNOWLEDGE

COURSE OBJECTIVES: The course presents advanced programming techniques useful to specialists in System Engineering. The main objectives of this course are:
- Study of advanced programming techniques
- Making use of technologies dependent on the problem to be solved;
- Developing the methodology of developing the applications specific to each technology.

The project has the role of fixing the theoretical knowledge.
CONTENT: Introduction to C # language. The principles of object-oriented programming. The structure of an object-oriented application in C #. Class Derivation (Inheritance). Polymorphism. Basic concepts of visual programming. Accessing and processing data through SQL Server.
TEACHING LANGUAGE: Romanian
EVALUATION: Exam
BIBLIOGRAPHY:

1. Herbert Schildt, C#: A Beginner's Guide, (2001);
2. Herbert Schildt, C#, Ed.Teora (traducere, 2002);
3. Karli Watson et al., Beginning Visual C#, Wrox Press Ltd. (2002);
4. Karli Watson, Beginning C# 2005 Databases, Wiley Publishing, Inc. (2006);
5. Bradley L. Jones, SAMS Teach Yourself the C# Language in 21 Days, (2004);
6. Philip Syme si Peter Aitken, SAMS Teach Yourself the C# Web Programming in 21 Days, (2002);
7. Kris Jamsa si Lars Klander, Totul despre C si C++ Manualul fundamental de programare in C si C++, Ed. Teora, (traducere 2007);
8. Şendrescu Dorin, Metode integrale pentru identificarea sistemelor continue, Editura Universitaria, ISBN 978-606-510-669-4, (177 pag.), Septembrie 2009.
9. Dr. Kris Jamsa & Lars Klander, Totul despre C şi C++ - Manualul fundamental de programare în C și C++ , Ed. Teora, 2006.

D28TISM104	Software for image processing

CREDIT POINTS (ECTS): 4
SEMESTER: I
DISCIPLINE TYPE: SYNTHESIS
COURSE OBJECTIVES: The course supports learning outcomes related to computer vision applications, representation and use of information from digital images.
CONTENT: Image acquisition: sensors, camera, frame grabbers. Geometrical transforms and camera calibration. Histograms. Image filtering in frequency domain. Image filtering in spatial domain. Convolution masks. Region labelling. Contour extraction, thinning and closing. Pattern descriptors. Pattern recognition. Minimum distance classifiers. Statistics classifiers. Computer vision applications. Integration of software and hardware components. Using Image Processing Module in MatLAB. Software techniques for image acquisition and processing.
TEACHING LANGUAGE: Romanian
EVALUATION: Exam
BIBLIOGRAPHY:

1. Peter Corke, Robotics, Vision & Control, Fundamental Algorithms in MatLab, Springer, 2017.
2. Richard Szeliski, Computer Vision: Algorithms and Applications, Springer; 2011.
3. Digital Image Processing and Analysis: Human and Computer Vision Applications with CVIPtools, Scott E Umbaugh, The CRC Press, 2010.
4. William K. Pratt, Digital Image Processing: PIKS Inside, John Wiley & Sons, Inc., 2007.
5. Răzvan Tudor Tănasie, Dorian Cojocaru, Fuzy Techniques in Computer Vision, Editura Universitaria, 2006.
6. Dorian Cojocaru, Achizitia, prelucrarea si recunoasterea imaginilor, Editura Universitaria, 2004.

D28TISM105	Man-machine interfaces in automotive

CREDIT NUMBER: 3
SEMESTER: I
DISCIPLINE TYPE: SYNTHESIS
COURSE OBJECTIVES: Study of multimodal man-machine interaction systems, through image, or through brain signals. The project has the role of fixing the theoretical knowledge.
CONTENT: A historical and architectural perspective. Principles, appearance and behavior. The life cycle of human-machine interfaces. Ergonomic criteria.
TEACHING LANGUAGE: Romanian
EVALUATION: Verification
BIBLIOGRAPHY:

1. Adil Timofeev, Alexander Nechaev, Igor Gulenko, Vasily Andreev,Svetlana Chernakova, Mikhail Litvinov, „MULTIMODAL MAN-MACHINE INTERFACE AND VIRTUAL REALITY FOR ASSISTIVE MEDICAL SYSTEMS", International Journal „Information Theories & Applications" Vol.14 / 2007, pp.133-138
2. Emil CEANGĂ, Iulian MUNTEANU, Antoneta BRATCU, Mihai CULEA, „Semnale circuite si sisteme", partea I: Analiza semnalelor", Editura Academica, Galati, 2001
3. Daniela Faur, Inge Gavat, Mihai Datcu , „Mutual Information Based Measures for Image Content Characterization",Current Topics in Artificial Intelligence, Lecture Notes in Computer Science Volume 4177, 2006, pp 342-349
4. James B. Pawley, „ Points, Pixels, and Gray Levels: Digitizing Image Data", University of Wisconsin, Madison, Wisconsin 53706, Handbook of Biological Confocal Microscopy, Third Edition, edited by James B. Pawley, Springer Science+Business Media, LLC, New York, 2006.

5. C. Vertan „ SISTEME DE CAUTARE A IMAGINILOR PRIN SIMILARITATEA CONTINUTULUI Content-based Image Retrieval (CBIR)".

D28TISM106	Research and design management

CREDIT NUMBER: 3
SEMESTER: I
DISCIPLINE TYPE: SYNTHESIS
COURSE OBJECTIVES: Research and development - introductory notions, classifications, importance. The basics of research. Management of scientific research. Research projects. Design management. EU framework programs for research. Design of complex systems.
CONTENT: Carrying out the research activity, research stages, research management. Developing design activities, design stages, design management.
TEACHING LANGUAGE: Romanian
EVALUATION: Exam
BIBLIOGRAPHY:

1. Vînătoru M., Managementul proiectelor, Ed. Universitaria, Craiova 2008
2. Vînătoru M., Conducerea proceselor industriale, Ed Universitaria Craiova, 2005
3. Vînătoru M., Fundamente de sisteme automate, Ed. SITECH Craiova 2011
4. Cănureci G, M. Vînătoru, C Maican, Detecţia şi localizarea defectelor în sistemele dinamice, Ed Sitech Craiova 2012
5. Maican C., M. Vînătoru, G. Cănureci, Conducerea în regim de defect a grupurilor termoenergetice, Ed. SITECH Craiova, 2011
6. Borza, A. et al., *Management*, Risoprint, Cluj-Napoca, 2005
7. Stăncioiu, I., Purcărea, A., Niculescu, C., *Management. Cercetare-Dezvoltare*, Mondero, Bucureşti, 1993.

D28TISM107a	Design and Development Practice 1

CREDIT POINTS (ECTS): 10
SEMESTER: I
DISCIPLINE TYPE: SYNTHESIS
COURSE OBJECTIVES: The students will learn to:
- Develop design and development activities
- Sketch a design plan
- Achieve an advanced individual documentation by using international indexed databases
- Achieve a preliminary study
- Use information applications for the achievement of complex projects for embedded systems
- Use modelling, simulation and design methods dedicated to control systems
- Implement and evaluate embedded control systems

CONTENT: as appropriate
TEACHING LANGUAGE: Romanian
EVALUATION: Verification
BIBLIOGRAPHY: as appropriate

D28TISM107b	Research Practice 1

CREDIT POINTS (ECTS): 10
SEMESTER: I
DISCIPLINE TYPE: SYNTHESIS
COURSE OBJECTIVES: The students will learn to:
- Develop design and development activities
- Sketch a design plan
- Achieve an advanced individual documentation by using international indexed databases
- Achieve a preliminary study
- Use information applications for the achievement of complex projects for embedded systems
- Use modelling, simulation and design methods dedicated to control systems
- Implement and evaluate embedded control systems

CONTENT: as appropriate
TEACHING LANGUAGE: Romanian
EVALUATION: Verification
BIBLIOGRAPHY: as appropriate

D28TISM201	Software structures for real time applications

CREDIT POINTS (ECTS): 4
SEMESTER: II
DISCIPLINE TYPE: SYNTHESIS
COURSE OBJECTIVES: The course presents the basic concepts regarding real-time management and control of processes in the following areas directions: methods and possibilities of development and implementation of a real-time executive, implementation of numerical algorithms for real time processes control, the applications architecture for processes control by using a real-time executive.
CONTENT: Real time computational systems. Basic concepts of real time programming. Primitives for real-time resources management. Implementation of numerical algorithms for processes control. Multitasking operating systems. Principles for achieving a streamlined multitasking executive intended for real time processes monitoring and control. An example of real-time kernel designed by using C++.
TEACHING LANGUAGE: Romanian
EVALUATION: Exam
BIBLIOGRAPHY:

1. Buhr R.J.A., Baileley D.L., An Introduction to Real-Time Systems, Prentice Hall, 1998.
2. Silberschatz A., G. Galvin, P. Gagne Operating System Concepts 7th Edition, Ed. Wiley, 2005.
3. Tanenbaum A., Modern Operating Systems, Ed. Pearson, 2009.
4. Mall R., Real-Time Systems: Theory and Practice, Pearson, 2007.
5. Liu J.W.S., Real-Time Systems, Integre Technical Publishing Co. Inc., Pearson, 2000.
6. Selişteanu, D., C. Ionete, E. Petre, Instrumentaţie virtuală. Aplicaţii de prelucrare numerică a semnalelor, Editura Matrix Rom, Bucureşti, 2010.

7. Lungu, V., Procesoare INTEL, Programare în limbaj de asamblare, Ediţia a II-a, Teora, 2007.
8. Tschirhart D., Commande en temps reel, Dunod, France, 1990.
9. Auslander D., Tham C., Real-time software for control: program Exam ples in C, Prentice Hall, 1990.
10. Holzner S., Borland C++ Programming, Brady Books, New York, 1992.
11. Marin C., Sisteme numerice cu durată finită a regimului tranzitoriu, Editura SITECH Craiova, 2005.
12. Marin, C., Sisteme discrete în timp, Editura Universitaria, Craiova, 2005.
13. Mazidi, M., Mazidi, J.- AVR Microcontroller and Embedded Systems: Using Assembly and C, Pearson Custom Electronics Technology, Prentice Hall, 2010.
14. ***, https://www.ni.com/manuals/ - LabView / Labwindows User Manual – National Instruments.
15. ***, https://www.microchip.com – microcontroloare (familia PIC12/16/18).
16. ***, https://www.nxp.com/pages/demonstration-board:DEMO9S08AW60E.

D28TISM202	Automotive control

CREDIT POINTS (ECTS): 4
SEMESTER: II
DISCIPLINE TYPE: SYNTHESIS
COURSE OBJECTIVES: The course aims at introducing the basic concepts regarding the implementation of automotive control systems: general presentation of the main control systems, AUTOSAR as a design standard in the automotive industry, detailing AUTOSAR, Matlab / Simulink components for design and control of control systems, automatic code generation for electronic control units. The laboratory targets the consolidation of course concepts via modelling, simulation and practical applications.
CONTENT: Automotive control systems. Overview of automotive software architectures. Automotive Open System Architecture. Microcontroller Layer; role and functionality. ECU Abstraction Layer; role and functionality. Services Layer; role and functionality. RTE (Run Time Environment); application Layer. Implementation of control systems in automotive.
TEACHING LANGUAGE: Romanian
EVALUATION: Exam
BIBLIOGRAPHY:

1. Bonnick Allan W.M. – *Automotive computer controlled systems: diagnostic tools and techniques*, Elsevier Butterworth-Heinemann, 2001
2. Bonnick Allan W.M. – *Automotive Science and Mathematics*, Elsevier Butterworth-Heinemann, 2008
3. Denton, T. – *Automobile Electrical and Electronic Systems*, Elsevier Butterworth-Heinemann, 2004
4. Ionete C., Selişteanu D., *Echipamente de automatizare şi protecţie*, Reprografia Universităţii din Craiova, 2000.
5. Marin C., Petre E., Popescu D., Ionete C., Selişteanu D., *System Theory. Problems*, Sitech, Craiova, 2006.
6. AUTOSAR (AUTomotive Open System ARchitecture), http://autosar.org/.

D28TISM203	Advanced techniques for digital signal processing

CREDIT POINTS (ECTS): 4
SEMESTER: II
DISCIPLINE TYPE: KNOWLEDGE
COURSE OBJECTIVES: This course presents approaches, methods and techniques for digital processing of one- and two-dimensional signals with applications in automatic control, embedded systems, multimedia systems, critical systems, Artificial Intelligence, as well as for informatics systems used in different activity fields such as medicine, environment surveillance etc.
CONTENT: Introduction, Fourier analysis and synthesis, Principal Component Analysis (PCA), Adaptive systems for signal processing, Artificial Neural Networks for signal processing, Signal processing applications.
TEACHING LANGUAGE: Romanian
EVALUATION: Exam
BIBLIOGRAPHY:

1. R.W. Hamming (1989). *Digital filters*, 3r Edition, Dover.
2. R.G. Lyons (2004). *Understanding digital signal processing*, 2nd edition, Pearson Education.
3. S.V. Vaseghi (2007). *Multimedia signal processing. Theory and applications in speech, music and communications*, Wiley.
4. J.C. Principe, N.R. Euliano, W.C. Lefebvre (2000). *Neural and adaptive systems. Fundamentals through simulations*, Wiley.
5. D. Danciu (2008). *Software pentru sisteme multimedia*, Editura Universitaria.
6. D. Danciu (2010). *Reţele neuronale. Stabilitate, sincronizare, întârzieri.*, Seria Control Engineering, Editura Universitaria.
7. D. Danciu (2018). Tehnici avansate pentru prelucrarea numerică a semnalelor – course notes.

D28TISM204	Virtual Reality and Manufacturing

CREDIT POINTS (ECTS): 4
SEMESTER: II
DISCIPLINE TYPE: SYNTHESIS
COURSE OBJECTIVES: The course aims to introduce virtual reality theory, 3D equipment and systems used in the field of virtual reality, modeling, designing and control of virtual processes, the use of virtual manufacturing. The lab and project have the role of fixing the theoretical knowledge and of

allowing virtual modeling and designing to be understood through practical applications.
CONTENT: Introduction to virtual reality. Basic concepts of VRML. Nodes. Prototypes and events processing. Applications of virtual reality. Equipment. Virtual manufacturing.
TEACHING LANGUAGE: Romanian
EVALUATION: Exam
BIBLIOGRAPHY:

1. Popescu, D., Sendrescu, D., *Realitate virtuală*, Ed. Universitaria, 2002.
2. Hartman J., s.a., *The VTML 2.0 Handbook*, Ed. Addison Wesley, 1996.
3. Ionescu F., *Grafica in realitatea virtuală*, Ed. Tehnica, 2000.
4. Diehl S., *Distributed Virtual Worlds*, Ed. Springer Verlag, 2001.
5. Pesce, *VRML and Java*, ViewSource, Netscape Communications, 1999.
6. Tittel E., *Building VRML Worlds*, Ed. McGraw-Hill, 1997.
7. Oliver Grau, *Virtual Art: From Illusion to Immersion* (Leonardo Book Series). Cambridge/Massachusetts: MIT-Press, 2003.
8. Burdea G., Coiffet P., *Virtual Reality Technology*, Wiley-IEEE Press, 2 edition, 2003.
9. Gerard Kim, *Designing Virtual Reality Systems: The Structured Approach*, Springer, 2005.
10. William R. Sherman, Alan B. Craig, *Understanding Virtual Reality: Interface, Application, and Design*, Morgan Kaufmann, 2002.
11. Ong, S.K., Nee, A.Y.C., *Virtual and Augmented Reality Applications in Manufacturing*, Springer, 2004.
12. Mihelj, Matjaž, Novak, Domen, Beguš, Samo, *Virtual Reality Technology and Applications*, Springer, 2014.

D28TISM205	Communication systems and networks

CREDIT POINTS (ECTS): 4
SEMESTER: II
DISCIPLINE TYPE: THOROUGHGOING STUDY
COURSE OBJECTIVES: Students will learn to:
- formulate the requirements imposed on a data transmission system in process control;
- use design, modeling and simulation methods for data transmission systems;
- evaluate the performance of structures used in data transmissions.
The laboratory and the project have the role to fix the theoretical knowledge and to understand the phenomena through practical applications.
CONTENT: Broadband transmission systems. Disturbance-resistant transmission systems. Transmissions into the baseband. Data compression techniques. Local networks for data transmission. Ethernet network. Wireless networks. Advanced communication systems.
TEACHING LANGUAGE: Romanian
EVALUATION: Exam
BIBLIOGRAPHY:

1. Dobrescu, R. - Transmiterea datelor, Ed. Academiei Române, 2005.
2. Feher K. - Comunicatii digitale avansate, vol. I-II, Ed. Tehnică Bucureşti 1993-1994.
3. Iancu, E. - Teoria transmisiei datelor, Ed. Universitaria Craiova, 2004.
4. Iancu, I., Moţa, M., Iancu, E. - Monitorizarea si diagnosticarea asistate de calculator la bolnavii cu diabet zaharat. Contributii la dezvoltarea sistemelor automate pentru controlul glicemiei, Ed. SITECH, 2010.
5. Odom W. - Primii paşi în reţele de calculatoare, Ed. Corint, Bucureşti, 2004.
6. Wilamowski, B., Irwin, J. D. - Industrial Communications Systems, CRC Press, 2011.

D28TISM206a	Design and Development Practice 2

CREDIT POINTS (ECTS): 10
SEMESTER: II
DISCIPLINE TYPE: SYNTHESIS
COURSE OBJECTIVES: The students will learn to:
- Develop design and development activities
- Sketch a design plan
- Achieve an advanced individual documentation by using international indexed databases
- Achieve a preliminary study
- Use information applications for the achievement of complex projects for embedded systems
- Use modelling, simulation and design methods dedicated to control systems
- Implement and evaluate embedded control systems

CONTENT: as appropriate
TEACHING LANGUAGE: Romanian
EVALUATION: Verification
BIBLIOGRAPHY: as appropriate

D28TISM206b	Research Practice 2

CREDIT POINTS (ECTS): 10
SEMESTER: II
DISCIPLINE TYPE: SYNTHESIS
COURSE OBJECTIVES: The students will learn to:
- Develop research activities
- Sketch a research plan
- Achieve an advanced individual documentation by using international indexed databases
- Achieve a preliminary study
- Use information applications for the achievement of complex projects for embedded systems
- Use modelling, simulation and design methods dedicated to control systems
- Implement and evaluate embedded control systems.

CONTENT: as appropriate
TEACHING LANGUAGE: Romanian
EVALUATION: Verification
BIBLIOGRAPHY: as appropriate

YEAR II

D28TISM301	Networked control systems

CREDIT POINTS (ECTS): 3
SEMESTER: I
DISCIPLINE TYPE: SYNTHESIS
COURSE OBJECTIVES: The course aims at introducing basic concepts for the implementation of distributed control systems in the network: general presentation of industrial networks, delays introduced by control networks, simultaneous design of the task scheduler and the controller.
CONTENT: Paradigms and Methods of Designing Network Control Systems. Sharing of multitasking resources. Sharing communication resources. Industrial networks. Sharing of computing and communication resources. Control distributed over the network.
TEACHING LANGUAGE: Romanian
EVALUATION: Exam
BIBLIOGRAPHY:

1. Matlab/Simulink/RTW şi xPC documentation.
2. Quanser documentation
3. TrueTime documentation
4. CAN, LIN networks documentation
5. CANoe software (http://vector.com/vi_canoe_en.html).
6. Ionete C., Selişteanu D., Şendrescu D., Popescu D., Roman M., Surlea D., "Simulation of Real-Time Distributed Networked Control of Rotational Quanser Experiments using True Time and Matlab", Trans. on Automatic Control and Comp. Sci., Scientific Bulletin of The "Politehnica" University of Timişoara, Tome 53(67), pp. 87-94, 2008.
7. Technical report project SICOTIR, director Cosmin Ionete.

D28TISM302	Embedded systems design using Matlab-Simulink

CREDIT POINTS (ECTS): 3
SEMESTER: I
DISCIPLINE TYPE: SYNTHESIS
COURSE OBJECTIVES: The course aims at introducing basic concepts regarding the implementation of embedded control systems using Matlab / Simulink: general presentation of Matlab / Simulink / Stateflow, Model-in-the-loop (MIL), Software-in-the-loop SIL), Hardware-in-the-loop (HIL) or Rapid prototyping.
CONTENT: Computing environment, modeling, simulation Matlab / Simulink / Stateflow. Computing environment, modeling, Matlab / Simulink / Stateflow simulation. Automatic Code Generators: TargetLink (dSpace) / RealTimeWorkshop (RTW) / EmbeddedCoder; MIL / SIL / PIL / HIL. Configuring code generators for specific microcontrollers.
TEACHING LANGUAGE: Romanian
EVALUATION: Exam
BIBLIOGRAPHY:

1. Documentaţie Matlab/Simulink/RTW
2. Documentaţie TargetLink (dSpace)
3. Documentaţie Quanser
4. Ionete, C., E. Petre, M. Roman, D. Selişteanu, „Simulation of Real-Time Control System susing TrueTimeLibrary and Matlab", Int. Conf. On Technical Informatics CONTI'2008, Vol. 3, pp. 45-50, 2008, Timişoara, Romania.
5. Raport tehnico-ştiinţific proiect parteneriate SICOTIR, director grant Cosmin Ionete.

D28TISM303	Flight control systems

CREDIT POINTS (ECTS): 5
SEMESTER: I
DISCIPLINE TYPE: SYNTHESIS
COURSE OBJECTIVES: Students will learn to:
- use specific flight control methods
- formulate an automated control problem with an aviation application
- use design, modeling and simulation methods for continuous and discrete automated systems with aviation applications
- evaluate the performance of automated structures

The laboratory has the role of fixing the theoretical knowledge and of understanding phenomena through practical applications.
CONTENT: Elements of flight dynamics. Flight with ceded commands. Helicopter. System structures for automatic control. The automatic pilot.
TEACHING LANGUAGE: Romanian
EVALUATION: Exam
BIBLIOGRAPHY:

1. Aron I., Lungu R. – Automate de stabilizare şi dirijare, Ed. Militară, Bucureşti, 1991
2. Costăchescu, T. – Tehnica zborului în aviaţie, Ed. Tehnică, Bucureşti, 1979
3. Costăchescu, T. – Defecte şi accidente în aviaţie. Măsuri de prevenire, Ed. Tehnică, Bucureşti, 1993
4. Etkin, B. – Dynamics of Atmospheric Flight, John Wiley & Sons, N.Y., 1972
5. Said D. Jenie, Agus Budiyono - Automatic Flight Control System. Classical approach and modern control perspective, Department of Aeronautics and Astronautics, ITB, 2006
6. Iancu, E., Vînătoru, M. – Detecţia şi localizarea defectelor în sistemele dinamice, Ed. Sitech, Craiova, 1999.

D28TISM304	Critical information systems

CREDIT POINTS (ECTS): 3
SEMESTER: I
DISCIPLINE TYPE: KNOWLEDGE

COURSE OBJECTIVES: The course presents an introduction to the critical information systems and the standards used for software development, with Exam ples in aerospace.
CONTENT: An introduction to critical information systems. The software development process. ESA Standards for software development. The MIL-STD-498 software development standard. Standards for safety critical systems: DO-178B and ARP 4754
TEACHING LANGUAGE: Romanian
EVALUATION: Exam
BIBLIOGRAPHY:

1. Critical Information Systems Engineering: note de curs; Lucian-Florentin Barbulescu, octombrie 2017;
2. ESA software engineering standards, European Space Agency / Agence Spatiale Européenne, 2008
3. Software Development and Documentation Standard, MIL-STD-498, US Department of Defence, Washington DC, December, 1994.
4. DO-178B/ED-12B, Software Considerations in Airborne Systems and Equipment Certification, RTCA/EUROCAE
5. Software Engineering (8h Edition); Ian Sommerville; Addison Wesley; 2004 (biblioteca universitatii).

D28TISM305	Quality standards in Computer Information Systems

CREDIT POINTS (ECTS): 5
SEMESTER: I
DISCIPLINE TYPE: KNOWLEDGE
COURSE OBJECTIVES: The programme aims at introducing and assimilating the basic concepts, methods and tools in the field of software quality assurance required for assuming leadership roles in the development, management and software maintenance processes.
CONTENT: Why do we need quality standards in Computer Information Systems? Customer Perspective. Supplier's perspective. The cost of quality. The cost of lacking quality. Some important quality features of Computer Information Systems. The quality of a computer information system as an indicator of maturity. Materialising quality standards in Computer Information Systems. Basic concepts of the quality of Computer Information Systems. Review of standards: ISO 9001; ISO/IEC 25000:2014; IEEE 1012-2012; ISO 9000; CMM and CMMI; SPICE ISO 15504 and ISO/IEC 33001:2015; SWEBOK v3.0 2014. The McCall Quality Model. The Boehm Quality Model. The Dromey quality model. ISO / IEC 9126 Quality Model. ISO/IEC 25010 SQuaRE Systems and Software Quality Models. The engineering process of software quality. Extracting, identifying and defining quality requirements. Switching from a requirement to a metric. Establish software quality requirements. Designing software quality. Practical aspects of designing quality in a computer information system.
TEACHING LANGUAGE: Romanian
EVALUATION: Exam
BIBLIOGRAPHY:

1. ***, *Software Quality. Assurance In Large Scale and Complex Software-Intensive Systems,* Mistrik, I., Soley, R., Ali, N., Grundy, J., Tekinerdogan, B. (eds.), Morgan Kaufman Elsevier, 2016.
2. Spohrer, K., *Collaborative Quality Assurance in Information Systems Development, The Interaction of Software Development Techniques and Team Cognition*, Springer, Switzerland, 2016.
3. Suryn, W., *Software Quality Engineering, A Practitioner's Approach*, John Wiley & Sons, Inc., Hoboken, New Jersey, 2014.
4. Wieczorek, M., Vos, D., Bons, H., *Systems and Software Quality. The next step for industrialisation*, Springer-Verlag, Berlin Heidelberg, 2014.
5. Vance, S., *Quality Code, Software Testing Principles, Practices, and Patterns*, Addison Wesley, Pearson Education, 2014.
6. O'Regan, G., *Introduction to Software Quality*, Springer, Switzerland, 2014.
7. Wagner, S., *Software Product Quality Control*, Springer-Verlag, Berlin Heidelberg, 2013.
8. Jones, C., Bonsignour, O., *The Economics of Software Quality*, Addison-Wesley, Pearson Education, Boston, 2012.
9. Chemuturi, M., *Mastering software. Quality Assurance Best Practices, Tools and Techniques for Software Developers*, J. Ross Publishing, 2011.
10. Chrissis, M., B., Konrad, M., Shrum, S., *CMMI® for Development. Guidelines for Process Integration and Product Improvement*, 3rd ed., Addison-Wesley, Pearson Education, Boston, 2011.

D28SAIM306a	Design and Development Practice 3

CREDIT POINTS (ECTS): 10
SEMESTER: I
DISCIPLINE TYPE: SYNTHESIS
COURSE OBJECTIVES: The students will learn to:
- Develop design and development activities
- Sketch a design plan
- Achieve an advanced individual documentation by using international indexed databases
- Achieve a preliminary study
- Use information applications for the achievement of complex projects for embedded systems
- Use modelling, simulation and design methods dedicated to control systems
- Implement and evaluate embedded control systems

CONTENT: as appropriate
TEACHING LANGUAGE: Romanian
EVALUATION: Verification

BIBLIOGRAPHY: as appropriate

D28SAIM306b	Research Practice 3

CREDIT POINTS (ECTS): 10
SEMESTER: I
DISCIPLINE TYPE: SYNTHESIS
COURSE OBJECTIVES: The students will learn to:
- Develop research activities
- Sketch a research plan
- Achieve an advanced individual documentation by using international indexed databases
- Achieve a preliminary study
- Use information applications for the achievement of complex projects for embedded systems
- Use modelling, simulation and design methods dedicated to control systems
- Implement and evaluate embedded control systems

CONTENT: as appropriate
TEACHING LANGUAGE: Romanian
EVALUATION: Verification
BIBLIOGRAPHY: as appropriate

D28TISM401	Research Practice 4

CREDIT POINTS (ECTS): 15
SEMESTER: II
DISCIPLINE TYPE: SYNTHESIS
COURSE OBJECTIVES: Students will learn to:
- Develop research activities
- Sketch a research plan
- Achieve an advanced individual documentation by using international indexed databases
- Achieve a preliminary study
- Use information applications for the achievement of complex projects for embedded systems
- Use modelling, simulation and design methods dedicated to control systems.

CONTENT: as appropriate
TEACHING LANGUAGE: Romanian
EVALUATION: Verification
BIBLIOGRAPHY: as appropriate

D28TISM402	Dissertation Practice

CREDIT POINTS (ECTS): 14
SEMESTER: II
DISCIPLINE TYPE: SINTEZĂ
COURSE OBJECTIVES: Students will learn to:
- Carries out research, design and writing of a professional / scientific work in the field of System Engineering.
- Perform advanced individual documentation using an internationally indexed database
- Perform a preliminary study
- Use computer technologies for the practical application of the dissertation thesis.
- Use design, modeling and simulation methods for complex systems.
- Carry out the documentation of the dissertation paper.

CONTENT: as appropriate
TEACHING LANGUAGE: Romanian
EVALUATION: Verification
BIBLIOGRAPHY: as appropriate

D28TISM403	Ethics and academic integrity

CREDIT POINTS (ECTS): 2
SEMESTER: II
DISCIPLINE TYPE: SINTHESYS
COURSE OBIECTIVES:
- Initiating the students in the field of ethics and academic integrity
- Quantitative and qualitative analysis of the elements specific to ethics and academic integrity
- The integration of the knowledge acquired from other disciplines in the training process of the students in the development of their reports and case studies.

CONTENT: Defining academics deviations – sanctions. Problems of ethics in the academic research. The issues of academic plagiarism. Ethics in teaching in the academic environment. University policies that affect the academic environment.
TEACHING LANGUAGE: Romanian
EVALUATION: verification
BIBLIOGRAPHY:

1. Bertram Gallant T., Academic Integrity in the 21st Century: A Teaching and Learning Imperative, Jossey-Bass, 2008.
2. Burlea Şchiopoiu A. (coordonator), *De la Responsabilitatea Socială a Întreprinderii la Responsabilitatea Socială Deschisă*, Editura SITECH, 2009.
3. Macfarlane, B., Zhang J., Pun A., Academic integrity: a review of the literature, Studies in Higher Education, 39:2, 339-358, DOI: 10.1080/03075079.2012.709495. 2012.
4. Macfarlane B., Researching with integrity: the ethics of academic enquiry, Routledge, 2009.
5. Stachowicz-Stanusch A., Academic ethos management: building the foundation for integrity in management education. Business Expert Press, 2012.
6. Sutherland-Smith W., Plagiarism, the Internet, and Student Learning: Improving Academic Integrity, Routledge, 2008.Milton C.L. Ethics and Academic Integrity. Nursing Science Quarterly. Vol. 28 (1), pp. 18-20. doi: 10.1177/0894318414558620. 2014.
7. American Association of University Professors. Policy documents and reports. Washington, DC: American Association of University Professors. (1994).
8. Baca, M. C. & Stein, R. H. (Eds.). Ethical principles, practices and problems in higher

education. Springfield, IL: Charles C. Thomas, Publisher. (1983).
9. Burlea Şchiopoiu A., 2012, *The Ethical Issue in Internet Communication*, in *Internet Communication Management. International Week*, edited by M. Pankowska and W. Dyduch, published by University Publisher Office Poland.
10. Burlea Şchiopoiu A., 2013, *An Aristotelian approach to sustainable management*, in *Encyclopedia of Corporate Social Responsibility* – PART - *Sustainability/Sustainable Development*, ed. Samuel Idowu.

The European Credit Transfer and accumulation System (ECTS) is basically academic credit system based on the student workload required to achieve the objectives and learning outcomes of a module or programme of study. It is designed to enable academic recognition for periods of study, to facilitate student mobility and credit accumulation and transfer. The ECTS credit system is recommended for higher education across the Europe.Â Another benefit is your degree will have the same number of credits no matter what academic discipline you pursue. 2. Where is ECTS credit system used?Â Every ECTS credit point represents the amount of workload. Few examples of ECTS credits assigned as per degree type includes The credit system of ETH Zurich is based on the European Credit Transfer System (ECTS) and 1 ECTS corresponds to an average workload of 30 hours. 30 ECTS are equivalent to one semester of full-time study. Credit points are assigned to each learning unit according to the expected student workload. Courses are indicated in the Course Catalogue with credit points as well as hours. In general, courses at Masterâ€™s level at D-MAVT correspond to 4 ECTS (3-4 hours a week). Credit points are only awarded for successfully completed assessments. Partial awarding of credit points is not permitted.