SPECIAL MATHEMATICS FOR ENGINEERS
Course Code: EA 1202
Type of course: compulsory
Language of instruction: English tutoring available for Erasmus students
Name of lecturer: Dorin Wainberg, PhD
Seminar tutor: Dorin Wainberg, PhD
Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	56	4	Summer	Grade	4

COURSE AIMS:
Mathematics for Engineers is a single semester course introducing the student to a tools used in analyzing a range of problems arising in the modeling of engineering problems. A specified differential equation endeavors to match the known features of the application being modeled, as well as to be able to predict the systems behavior in other circumstances. The learning integrates theory and application using a problem-based approach. This will relieve the student of performing, by hand, many of the detailed calculations needed. This course prepares the student for future learning in relation to problem solving and decision-making; technical competence; teamwork and leadership; and reflection.

ENTRY REQUIREMENTS: Linear Algebra, Mathematical Analysis

COURSE CONTENTS:
CAP. I DIFFERENTIAL EQUATIONS
1. First order differential equations
2. Differential equations of higher order
3. Systems of linear differential equations; Systems of linear differential equations with constant coefficients
4. Partial differential equations of the first order linear; Partial differential equations of the second order - the equations of mathematical physics.
CAP. II ELEMENTS OF THE THEORY OF FIELDS
5. Scalar field; vector field
6. Divergence and rotor of a vector field; Hamilton's operator.
CAP. III FUNCTIONS OF A COMPLEX VARIABLE COMPLEX
7. Complex numbers. geometrical interpretation
8. Functions of a complex variable
9. Derivative of a complex function of a complex variable: Cauchy-Riemann conditions; analytical function
10. Advanced functions Elementary
CAP. IV PROBABILITY AND STATISTICS
11. Random variables; Field of probabilities, conditional probabilities
12. Laws classical probability
13. Functions distributions, probability density
14. Representations of statistical distributions

TEACHING METHODS:
Lecture, conversation, exemplification.

LEARNING OUTCOMES:
Modelling and solving some medium complexity level problems, using the mathematical and engeneering sciences knoweledges.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:
Written paper 50%; mid-term test 30%; seminar activities 20%.

RECOMMENDED READING:

- Peter V. O'Neil, *Advanced Engineering Mathematics*, Thomson, 2007
- Erwin Kreyszig, *Advanced Engineering Mathematics*, John Wiley & Sons Inc. 9th Edition, 2006.
- D. G. Zill, M.R. Cullen, *Differential Equations with Boundary Problems*, 6th Edition, Brooks/Cole Publishing Company, 2005.
- Lisei, H., Micula, S., Soos, A., *Probability Theory trough Problems and Applications*, Cluj University Press, 2006.
- Milton, J.S., Arnold, J. C., *Introduction to Probability and Statistics: Principles and Applications for Engineering and the Computing Sciences*, McGraw-Hill, New York, 1995.

ELEMENTS OF MECHANICS AND MECHANISMS

Course Code: EA 1206

Type of course: compulsory

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Elisabeta Mihaela Ciortea, PhD Eng.

Seminar tutor: Elisabeta Mihaela Ciortea, PhD Eng.

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	28	2	Summer	Grade	2

COURSE AIMS:

- Solving technological problems in the fields of electronics applied.
- The principles and methods underlying the manufacture, tuning, testing and servicing of appliances and equipment in the fields of applied electronics.
- Explanation and interpretation of production processes and maintenance activities of electronic devices, identifying areas for testing and measuring electrical quantities.
- Application of management principles for the organization of technologically production activities, mining and service in the fields of applied electronics.
- Using criteria and methods for evaluating the quality of production and service activities in the fields of applied electronics.

ENTRY REQUIREMENTS:

- Knowing the specifics of the main elements and mechanisms of the main methods used in mechanics.
- The skills training design and implement a concrete mechanical research.
- Knowing the geometric calculation mechanisms, gears.
- Understanding the operating principle of mechanisms, gears, the car balanced.
- Measurement of geometric elements of a gear, cam mechanism.
- Analysis and interpretation of the results of various tests.

COURSE CONTENTS:

- Static material point.
- Rigid stand.
- Dynamics of material point.
- Rigid body dynamics and lighting systems.
- Analytical Mechanics.
- The clashes.
- Structure mechanisms.
- Kinematic analysis of planar mechanisms bars.
- Analysis and Synthesis gear mechanisms.
- The movement mechanisms under the action of forces.
- Analysis and synthesis of cam mechanisms.

TEACHING METHODS:

Lecture, conversation, exemplification.

LEARNING OUTCOMES:

- Capacity building and attitudes investigation mechanisms realities mechanical composition;
- Forming an open epistemic attitudes and innovative mechanisms of mechanical components.
- Knowledge of geometric calculation mechanisms, gears
- Understanding the operating principle of mechanisms, gears, the wheel balancers
- Measurement of geometric elements of a gear, cam mechanism
- Analysis and interpretation of the results of various tests.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Written paper – interpretative essay – 70%; continuous assessment – 30%.

RECOMMENDED READING:

- http://ocw.mit.edu/courses/mechanical-engineering/2-72-elements-of-mechanical-design-spring-2009/lecture-notes/ - 14.04.2016
- NEIL SCLATER, NICHOLAS P. CHIRONIS, *MECHANISMS AND MECHANICAL DEVICES SOURCEBOOK*, SBN-13: 978-0-07-146761-2, ISBN-10: 0-07-146761-0

INFORMATIONS TRANSMISSION AND ENCODING

Course Code: EA 2104
Type of course: compulsory
Language of instruction: English tutoring available for Erasmus students
Name of lecturer: Boca Maria Loredana, PhD
Seminar tutor: Boca Maria Loredana, PhD
Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	56	3	Autumn	Grade	4

COURSE AIMS:
- Representation of information acquisition, processing, transmission or storage
- Quantitative measure of information transmission systems raw, with or without loss
- Control error correction or detection
- Main types of binary codes or cyclic type non-binary
- Use of information theory and coding the current standards for storage or transmission

ENTRY REQUIREMENTS:
- Fundamental knowledge in coding theory.

COURSE CONTENTS:
The course covers the following main topics:
1. Course 1. Elements of probability theory and mathematical statistics with applications in information transmission theory. Transmitting information systems (ITS)
2. Course 2. Elements of the mathematical theory of information. Sources of information without memory. Information entropy. Flow of information. Sources of information to memory.
3. Course discrete transmission channels. Channel capacity given by the matrix of noise. Channel capacity and signal-band given by Shannon's formula
4. Course coding signals. Source coding, modulation impulses in code, lossless compression. Shannon's theorem I (lossless compression theorem). Compression algorithms.
5. Course channel coding. Theorem II's Shannon (coding of channels with interference).
Block codes: algebraic theory, determination and representation, control matrix and generators
6. Codes perfect and near-perfect course. Error syndrome. Hamming codes group.
7. Course cyclical codes: definition and representation, algebraic coding, coding and decoding circuits to achieve.
8. Course 8. Distance and ration code.
9. Course 9 Elements of Galois field theory for cyclic codes. BCH codes
10. Course 10. Convolution: definition and representation compared with block codes, algebraic coding, and implementation of feedback shift registers.
11. Course 11. Decoding convolution codes algorithms
12. Course 12. Differential Pulse code modulation, delta modulation linear, adaptive and others
13.Course 13. Signal Processing course. Modern compression algorithms; static and dynamic algorithms, coding with a fixed or variable pitch. Conclusions regarding the source coding.

Laboratory
S1. Information representation codes
S2. Source compression (lossless and loss)
S3. Procedure and Hamming codes
S4. Procedure and BCH codes
S5. Reed-Solomon codes and procedure
S6. Feedback shift register. Applications for encoding and decoding cyclic
S7. Convolution codes

TEACHING METHODS:
Lecture, conversation, exemplification, exercises.

LEARNING OUTCOMES:
C2 Application of basic methods for acquisition and signal processing.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:
Projects/Assignments –60%; continuous assessment – 40%.

RECOMMENDED READING:

- Monica Borda – *Information Theory and Coding*, Editura UT PRES, 2007
- G. Wade – *Signal coding and processing,* Palgrave-McMillan, 2000
- B. Sklar –*Digital communications,*Prentice Hall, 2001
- D. Salomon –*A guide to data compression methods*, Springer-Verlag, 2002

DIGITAL INTEGRATED CIRCUITS
Course Code: EA 2205
Type of course: compulsory
Language of instruction: English tutoring available for Erasmus students
Name of lecturer: Ioan Ileana, PhD
Seminar tutor: Gheorghe Marc, PhD
Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	56	4	Summer	Grade	4

COURSE AIMS:

- Knowing and understanding of the fundamentals of analyzing, designing and producing applications of bipolar and MOS digital integrated circuits (DIC).
- Knowledge of the most important digital integrated circuits starting with logic gates and continuing to memories, CPLD, FPGA.

ENTRY REQUIREMENTS:

Electronic devices.

COURSE CONTENTS:

- Boolean algebra. Logic function minimization.
- Elementary integrated structures. TTL gates
- Other technologic families.
- Logic circuits in unipolar (MOS) technology.
- Combinational logic circuits (CLC).
- CLC synthesis.
- Sequential logic circuits. Introduction
- Counters, registers.
- Memories
- Automata.
- Programmable logic circuits an devices
- Design and implementation considerations.
- Optoelectronic digital integrated circuits.

TEACHING METHODS:

Lecture, conversation, exemplification.

LEARNING OUTCOMES:

- Analyzing and constructive design of digital systems using CID.
- Using of specific software for analyzing and designing digital electronic devices.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Written exam - 40%; continuous assessment (laboratory) - 40%, final test - 20%.

RECOMMENDED READING:

- Bostan Ionel: *Metode clasice si moderne in studiul circuitelor digitale*, Ed. Matrix Rom, 2009.
- Burdia Danut, Popescu Gabriel Stefan: *Proiectarea asistată de calculator a circuitelor electronice Spice şi VHDL*, Ed. Matrix Rom, 2009.
- Rabaey Jan M., *Digital Integrated Circuits (2nd Edition)*, Prentice-Hall publication
- Toacşe Gheorghe, Nicula Dan: *Electronică digitală, vol I şi II*, Ed. Tehnică, 2005.

ANALOG INTEGRATED CIRCUITS

Course Code: EA 3103
Type of course: compulsory
Language of instruction: English tutoring available for Erasmus students
Name of lecturer: Ioan Ileana, PhD
Seminar tutor: Gheorghe Marc, PhD
Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	56	4	Autumn	Grade	4

COURSE AIMS:

- Knowledge of the main principles of analyzing, designing and producing of analog (linear) integrated circuits applications
- Knowing of analysis and functioning of main integrated sub circuits: current shunts and sources, current mirrors, amplification stages, output stages etc.
- Knowing the structure and applications of operational amplifiers.

ENTRY REQUIREMENTS:

Electronic devices, Fundamental electronic circuits.

COURSE CONTENTS:

- Microelectronics, definitions, taxonomies
- Analog integrated circuits technology.
- Analog integrated circuits, types and applications
- Operational amplifiers, parameters, linear and nonlinear applications.
- Sub circuits (current sources and mirrors, active loads, voltage references.
- Elementary amplification stages.
- Output stages (A class, B class, A-B class).
- Frequency behavior and stability of operational amplifiers applications.
- Nonlinear analogic integrated circuits.

TEACHING METHODS:

Lecture, conversation, exemplification.

LEARNING OUTCOMES:

- Analyzing and constructive design of analog systems using analog integrated circuits.
- Using of specific software for analyzing and designing analog electronic devices.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Written exam - 40%; continuous assessment (laboratory) - 40%, final test - 20%.

RECOMMENDED READING:

- Gray P. R., P.J. Hurst, S.H. Lewis, R.G. Meyer, “Analysis and Design of Analog Integrated Circuits”, John Wiley & Sons, 2003
- Gray P.R., R.G. Meyer, “Circuite integrate analogice. Analiza şi proiectare”, Ed. Tehnica,1997
- Manolescu A. M., A. Manolescu, C. Popa, “Analiza şi proiectarea circuitelor integrate VLSI CMOS. Culegere de probleme”, Printech, 2006

DIGITAL SIGNAL PROCESSING
Course Code: EA3203
Type of course: compulsory
Language of instruction: English tutoring available for Erasmus students
Name of lecturer: Boca Maria Loredana, PhD
Seminar tutor: Boca Maria Loredana, PhD
Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	42	3	Summer	Grade	4

COURSE AIMS:

- Principles of signal processing
- Getting on the types of signals and basic schemes
- Getting on Digital Signal Processing
- Theory of mathematical transformations applied signals
- Getting the signal filtering and aliasing phenomenon.

ENTRY REQUIREMENTS:

- Fundamental knowledge in signals.

COURSE CONTENTS:

The course covers the following main topics:
Lecture 1 - Introduction. Classification of signals. Communication signals used in audio / video / data.
Course 2 - Channels of communication. Parameters communications environments.
Course 3 - Sampling signals. Dithering signals. The phenomenon of aliasing.
Course 4 - Signal processing audio / video. Separation and synchronizing transmission.
Course 5 - correlation function, autocorrelation, amplitude-frequency spectra, power spectra.
Course 6 - transmission and data processing. Modulation and demodulation parameters.
Lecture 7 - modulation amplitude, phase, frequency, pulse.
Lecture 8 - demodulating modulated signals.
Lecture 9 - signal conversion. ADC.
Lecture 10 - signal conversion. Digital-analog converter.
Lecture 11 - dedicated digital information processing circuits.
Lecture 12 - Types of filters. Passive filters.
Lecture 13 - Procedures for filtering signals. Active filters.
Lecture 14 - Applications of fuzzy logic and neural networks in signal processing.
Laboratory
1. Introduction
2. Signals and systems in discrete time
3. Finite Impulse Response Filters
4. Response Filters Infinite Response
5. The signal conversion. A-D animation, YES. Convention with Univ. Paderborn / Germany
6. Change the sampling rate. Sampling signals in time and frequency domains
7. Design of digital filters.

TEACHING METHODS:

Lecture, conversation, exemplification, exercises.

LEARNING OUTCOMES:
C2 Application of basic methods for acquisition and signal processing.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Projects/Assignments –60%; continuous assessment – 40%.

RECOMMENDED READING:

- http://ocw.mit.edu/resources/res-6-008-digital-signal-processing-spring-2011/
- http://www.analog.com/en/design-center/landing-pages/001/beginners-guide-to-dsp.html
- S Salivahanan, A Vallavaraj, C Gnanapriya**, Digital Signal Processing, 2000**

INDUSTRIAL ELECTRONIC ENGINEERING AND IT

Course Code: EA 3205

Type of course: compulsory

Language of instruction: English tutoring available for Erasmus students

Name of lecturer: Elisabeta Mihaela Ciortea, PhD Eng.

Seminar tutor: Elisabeta Mihaela Ciortea, PhD Eng.

Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	56	4	Summer	Grade	4

COURSE AIMS:

- The design and use of hardware and software applications less complex specific applied electronics.
- Applying knowledge, concepts and basic methods: power electronics, automation systems, electrical power management.
- Defining specific elements identifying the devices and electronic circuits in the fields of power electronics, automation systems, energy management, medical electronics, automotive electronics, consumer goods.
- Qualitative and quantitative interpretation of the functioning circuits in the fields of power electronics, automation systems, energy management, medical electronics, automotive electronics, consumer goods; operation analysis in terms of electromagnetic compatibility.
- Development of specifications, installation and operation of equipment in the fields of applied electronics: power electronics, automation systems, energy management, medical electronics, automotive electronics, consumer goods.

ENTRY REQUIREMENTS:

- Using automated systems in manufacturing processes aimed at increasing performance, increasing efficiency in the use of resources (human, material, energy, etc.), improve product quality, eliminate physical work, especially work in hazardous environments (toxic, hazardous or of the accident) and avoiding monotonous and strenuous activities for humans.
- The material presented gather and promote information available on industrial electronics and electric power conversion so that future electronic engineer profile can have immediate access to the knowledge, concepts and methodologies based domain.

COURSE CONTENTS:

- Electronic devices
- Electronic circuits
- Converting alternative tensions
- Convert tensions continue
- Elements of control systems theory
- Electronic stabilizing
- Electronic generators
- Variable applications.
- Inverters, Manure
- Regulators, Stabilizers
- Surveillance and control circuits
- Modeling and control of manufacturing systems
- Petri Networks and Applications, Matlab, Visual Object Net ++
- Colored Petri nets, CPN

TEACHING METHODS:

Lecture, conversation, exemplification.

LEARNING OUTCOMES:

- The manifestation of a positive and responsible attitudes towards continuous training in industrial informatics taken as part of their professional development.
- Compliance with the rules specific prevention and firefighting and labor protection in industrial computing.
- Understanding the importance of correct and efficient tools for documentation and information in the art.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Written paper – interpretative essay – 50%; continuous assessment – 50%.

RECOMMENDED READING:

- Mohammad Ayoub Khan (Centre for Development of Advanced Computing, India) and Abdul Quaiyum Ansari (Jamia Millia Islamia, India), *Handbook of Research on Industrial Informatics and Manufacturing Intelligence: Innovations and Solutions*, ISBN13: 9781466602946|ISBN10: 1466602945|EISBN13: 9781466602953|DOI: 10.4018/978-1-4666-0294-6

VIRTUAL INSTRUMENTATION FOR ELECTRONIC SYSTEMS
Course Code: EA 3209
Type of course: optional
Language of instruction: English tutoring available for Erasmus students
Name of lecturer: Marc Gheorghe, PhD
Seminar tutor: Marc Gheorghe, PhD
Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	56	4	Summer	Grade	3

COURSE AIMS:

- The main objective is to know, understand and use specific knowledge acquisition, storage, processing and interpretation of signals
- General principles of instrumentation;
- Principles of measurement, interpretation, storage and processing of data;
- Virtual Instrumentation Technologies

ENTRY REQUIREMENTS:

- Fundamental knowledge in electronics.

COURSE CONTENTS:

1. 1. Getting Started
2. Presentation LabView graphical programming environment
3. Types of data used in LabView
4. Structures programs
5. Structures programs
6. Mathematical calculations
7. Mathematical calculations
8. Functions vector values - matrices
9. Data type clauster
10. Representations graphics
11. File operations
12. Creating a Sub VI
13. The "Electronics Workbench Multisim"
14. The "Electronics Workbench Multisim"

2. TEACHING METHODS:

Lecture, conversation, exemplification, exercises.

LEARNING OUTCOMES:

C1.1 Description electronic functionality of devices and circuits and fundamental methods of measuring electrical quantities
C1.2 Analysis of complex circuits and electronic systems for small / medium in order to design and measure them
C2.1 Temporal characterization, spectral and statistical signals
C2.2 Explanation and interpretation methods of acquisition and signal processing
C2.3 Simulation environments for analysis and signal processing

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Write examn 40%, Projects/Assignments –40%; continuous assessment – 20%.

RECOMMENDED READING:

- National Instruments, LabVIEW Tutorial Manual, LabVIEW User Manual vol. I, II, LabVIEW Data Acquisition Manual
- Jeffrey Travis, Internet Applications in LabVIEW, Prentice-Hall670 pp. Paper. ISBN 0-13- 014144
- National Instruments Corp – LabVIEW Core 1 Course Manual, Part Number 325290A-01, October 2009 Edition
- National Instruments Corp – LabVIEW Core 2 Course Manual, Part Number 325292A-01, October 2009 Edition

PROGRAMMABLE ELECTRONIC SYSTEMS
Course Code: E4101
Type of course: compulsory
Language of instruction: English tutoring available for Erasmus students
Name of lecturer: Marc Gheorghe, PhD
Seminar tutor: Marc Gheorghe, PhD
Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	56	4	Autumn	Grade	4

COURSE AIMS:
- Knowledge of programmable electronic devices, development and programming
- Skills of microprocessor assembly language level, development of PLC programming

ENTRY REQUIREMENTS:
- Fundamental knowledge in electronics.

COURSE CONTENTS:

1. 1. Getting Started
2. Logic Circuits
3. Design with Programmable Logic
4. Microprocessors and Microcontrollers
5. Structure of a microprocessor
6. Family of PIC microcontrollers
7. The family of microcontrollers ATMEL
8. MPLAB programming package
9. Digital relays and PLCs (PLC)
10. Programming in LADDER
11. FX family PLC Mitsubishi Electric MESLEC
12. Programming PLC Siemens SIMATIC S7- 1200
13. Industrial communications protocols
14. Programming and controlling the frequency converters

2. TEACHING METHODS:
Lecture, conversation, exemplification, exercises.

LEARNING OUTCOMES:
C4.1 Definition of concepts, principles and methods used in the fields of computer programming, high-level languages and specific CAD techniques for achieving electronic modules, microcontrollers, computer systems architecture, electronic programmable graphics hardware reconfigurable architectures
C4.2 explanation and interpretation of the structures specific hardware and software requirements in the fields of computer programming, high level languages and specific CAD techniques for achieving electronic modules, microcontrollers, computer systems architecture, electronic programmable graphics hardware reconfigurable architectures
C4.4 Use appropriate criteria for evaluating performance, including simulation, hardware and software systems dedicated services or activities that use microcontrollers or computers of low to medium complexity

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:
Write examn 40%, Projects/Assignments –40%; continuous assessment – 20%.

RECOMMENDED READING:

- Thomas W. Schultz- C and the 8051, Programming for multitasking, Prentice Hall,
- Intel – Microsystem Components Handbook
- Ted Van Sickle- Programming Microcontrollers in C, LLH Technology Publishing, 2000
- Sit-uri: www.intel.com, www.philips.com, www.atmel.com;

FUNDAMENTALS OF ROBOTICS
Course Code: EA 4102
Type of course: compulsory
Language of instruction: English tutoring available for Erasmus students
Name of lecturer: Elisabeta Mihaela Ciortea, PhD Eng.
Seminar tutor: Elisabeta Mihaela Ciortea, PhD Eng.
Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	42	3	Autumn	Grade	4

COURSE AIMS:

- Solving technological problems in the fields of electronics applied.
- The principles and methods underlying the manufacture, tuning, testing and servicing of appliances and equipment in the fields of applied electronics.
- Explanation and interpretation of production processes and maintenance activities of electronic devices, identifying areas for testing and measuring electrical quantities.
- Application of management principles for the organization of technologically production activities, mining and service in the fields of applied electronics.
- Using criteria and methods for evaluating the quality of production and service activities in the fields of applied electronics.
- Designing technology manufacturing and maintenance (specifying the necessary components and operations) of low and medium complexity products in the fields of applied electronics.

ENTRY REQUIREMENTS:

- Proper description paradigm programming language and specific mechanisms and identifying the difference between semantic and syntactic aspects of order.
- Develop appropriate source code and unit testing of components in a programming language known, based on the design specification data.

COURSE CONTENTS:

1. Industrial Robots
- Definitions, characteristics and classification parameters robots
- Robots in industrial processes
- The characteristics of the main types of industrial robots
2. Kinematic and dynamic geometric patterns
- Coordinate Systems
- Kinematic Models
- Position Control
- Control differential kinematic
- Dynamic Model
3. Structure of industrial robots
- Main subassembly to achieve rotation around a vertical axis Oz
- Guidance system
- Device grip
- Information systems of industrial robots
- Principles and methods of measurement sensors and transducers
- Sensors and transducers travel
- Sensors and transducers
- Sensors and transducers moment
- Constructive solutions for the location of sensors and transducers systems
4. Operators
- Hydraulic drive
- Electric
- Pneumatic
5. The motion control systems
- Election issue
- System performance adjustment
- The analysis of the typical mechanical configuration of the adjustment

- Management Systems laws regulating complex
- Compensation disruptive direct effect of lower elements
- The design of the control system by means of frequency

6. Control Systems
- Wired logic
- Logic flexible
- With automatic
- Multiprocessor

7. Information Processing Systems
- Processing System
- The processing of information for recognizing parts

TEACHING METHODS:

Lecture, conversation, exemplification.

LEARNING OUTCOMES:

- This discipline is dedicated to knowledge of architecture, industrial and non-industrial applications and programming of robots.
- Information on the application of robots in various fields, industrial (exploration, healthcare ....).
- Presentation of industrial robots: constructive elements, cinematic.
- Knowing the parameters of the industrial robots.
- Developing practical knowledge of computer methods to analyze and program robots.
- Understanding data sheets, commercial leaflets showing industrial robots.
- Knowledge of accessories available industrial robots ability to configure inputs / outputs a robot preparing students for specific applications programming and use of industrial robots, industrial robots effective programming.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Written paper – interpretative essay – 70%; continuous assessment – 30%.

RECOMMENDED READING:

- Jorge Angeles , Fundamentals of Robotic Mechanical Systems: Theory, Methods, and Algorithms, Second Edition, Springer, ISBN 0-387-95368-X

ELECTRONICS AND MEDICAL INFORMATICS
Course Code: EA 4103
Type of course: compulsory
Language of instruction: English tutoring available for Erasmus students
Name of lecturer: Marc Gheorghe, PhD
Seminar tutor: Marc Gheorghe, PhD
Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	56	4	Autumn	Grade	4

COURSE AIMS:
Bioelectrical measurements are introduced and magnetic key in vivo, the processing of extracting the noise and extract specific features, and electrical stimulation of tissues, knowledge of basic principles of physiology biosignals, medical signal measurement principles.

ENTRY REQUIREMENTS:
- Fundamental knowledge in electronics.

COURSE CONTENTS:
3. Getting electrophysiology and cellular bio-signs
   2. The acquisition of electrophysiological signals
   3. Investigation of the cardiovascular system
   4. Electrocardiography
   5. Investigate the nervous system and muscular
   6. Electroencephalography
   7. Investigation and treatment of respiratory
   8. electrotherapy and Electrochirugie
   9. electronic equipment for clinical laboratory
   10. The use of laser radiation therapy investigation
   11. The use of ultrasound in the investigation and treatment
   12. Medical Imaging
   13. Techniques investigation by computed tomography
   14. magnetic resonance imaging

TEACHING METHODS:
Lecture, conversation, exemplification, exercises.

LEARNING OUTCOMES:
C1.1 Description electronic functionality of devices and circuits and fundamental methods of measuring electrical quantities
C2.1 Characterization temporal, spectral and statistical signals
C2.2 Explanation and interpretation methods of acquisition and signal processing
C5.1 Defining specific elements identifying the areas of electronic devices and circuits:
power electronics, automation systems, energy management, medical electronics, automotive electronics, consumer goods
C6.1 Defining principles and methods underlying the manufacture, tuning, testing and servicing of appliances and equipment in the fields of applied electronics

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:
Write examn 40%, Projects/Assignments –40%; continuous assessment – 20%.

RECOMMENDED READING:

- S.M. Sze, Semiconductor Sensors, John Wiley & Sons, Inc., 1994;
- Steven W. Smith, The Scientist and Engineer's Guide to Digital Signal Processing, California Technical Publishing, 1997;
- 3.John G. Webster(editor), John W., Jr Clark, Michael R. Neuman, Medical Instrumentation: Application and Design, John Wiley&Sons, 1997;
- JOHNSON, Garry W. – "LabVIEW 7.1 Graphical Programming – Practical Applications in Istrumentation and Control", McGraw-Hill, Inc., 1994;

ARTIFICIAL INTELLIGENCE
Course Code: EA 4108
Type of course: compulsory
Language of instruction: English tutoring available for Erasmus students
Name of lecturer: Ioan Ileana, PhD
Seminar tutor: Maria Muntean, PhD
Full time studies

Form of instruction	Number of teaching hours per semester	Number of teaching hours per week	Semester	Form of receiving a credit for a course	Number of ECTS credits allocated
Class	42	3	Autumn	Grade	4

COURSE AIMS:

- The course is a coherent introduction in Artificial Intelligence area, including theoretical and practical approaches.
- The identification of appropriate models and methods for solving real-life problems.
- The use of methodologies, specification mechanisms and development environments for the development of computer applications.
- The use of computer and mathematical models and tools to solve specific problems in the application field.

ENTRY REQUIREMENTS:

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COURSE CONTENTS:

- Introduction. Ai definitions. Short hystory of ai. Ai components
- Problem solving. Solving problems by searching. Uninformed search strategies. Informed (heuristic) search strategies
- Other problem solving strategies. Constraint satisfaction problems. Adversarial search (games)
- Knowledge representation
- Knowledge representation by rules
- Structured knowledge
- Uncertain knowledge and reasoning (fuzzy)
- Planning and learning in AI systems
- Artificial neural networks (ANN) foundations
- ANNs applications
- Expert Systems foundations
- Intelligent agents and robots.

TEACHING METHODS:

Lecture, conversation, exemplification.

LEARNING OUTCOMES:

- The use of methodologies, specification mechanisms and development environments for the development of computer applications.
- The identification and explanation of base computer models that are suitable for the application domain.
- The use of computer and mathematical models and tools to solve specific problems in the application field.
- The identification of appropriate models and methods for solving real-life problems.

LEARNING OUTCOMES VERIFICATION AND ASSESSMENT CRITERIA:

Written exam - 40%; continuous assessment (laboratory) - 40%, final test - 20%.

RECOMMENDED READING:

- Ioan Ileană, Corina Rotar, Maria Muntean, *Inteligenţă artificială*, Editura Aeternitas, 2009.
- RUSSELL, Stuart J., NORVIG, Peter, *Artificial Intelligence: a modern approach, 3rd ed*., Upper Saddle River, NJ: Pearson Education, 2010,
- NILSON, N. J. - *Artificial Intelligence*. A New Synthesis, Kaufmann Pbs., 1998