The main language of instruction at Coimbra Institute of Engineering is Portuguese. However, some courses from degree and master programs can be offered in English and/or with a tutorial support in English.

The ECTS catalogue includes subject contents in English Language.
Students can choose subjects from this Catalogue to the study plan proposal (Learning Agreement) to be analyzed carefully by the Departmental Coordinators and to be adjusted, after student's arrival, if necessary.

This ECTS catalogue contains information that is valid for this academic year. ISEC reserves the right to adjust the courses offered during the academic year and is not responsible for typing errors or printing mistakes.

Prof. Luís Castro
International Relations Office Coordinator

Contact Person
Ms Dália Pires
Tel.: (+351) 239 790 206
E-mail: ri@isec.pt
Coimbra Institute of Engineering
Rua Pedro Nunes – Quinta da Nora
3030 – 199 Coimbra
PORTUGAL

Prof. Carlos Pereira
Informatics Engineering Department Coordinator

E-mail: cpereira@isec.pt
Coimbra Institute of Engineering
Rua Pedro Nunes – Quinta da Nora
3030 – 199 Coimbra
PORTUGAL

Polytechnic Institute of Coimbra (P COIMBRA 02)
Coimbra Institute of Engineering - ISEC
Informatics and Systems Engineering Department

ECTS CATALOGUE

BACHELOR European Computer Science

New Code	Title - Portuguese	Title - English	ECTS	Term
	1.º ano / 1st Year			
60027238	Análise Matemática I	Mathematical Analysis I	6	Winter
60027284	Sistemas Digitais	Digital Systems	5	Winter
60027315	Álgebra Linear	Linear Algebra	5	Winter
61001506	Alemão I	German I	2	Winter
61001517	Francês I	French I	2	Winter
60027798	Introdução à Programação	Introduction to Programming	5	Winter
61001498	Tecnologias Web	Web Technologies	5	Winter
60027996	Inglês I	English I	2	Winter
61000089	Alemão II	German II	3	Spring
61000095	Francês II	French II	3	Spring
60027436	Análise Matemática II	Mathematical Analysis II	6	Spring
60027831	Programação	Programming	5	Spring
60027875	Métodos Estatísticos	Statistical Methods	5	Spring
60028025	Inglês II	English II	2	Spring
60028070	Tecnologias e Arquiteturas de Computadores	Computer Technologies and Architectures	5	Spring
61001487	Linguagens Script	Script languages	4	Spring
	2.º ano / 2nd Year			
60027481	Introdução às Redes de Comunicação	Introduction to Data Networks	5	Winter
61000104	Alemão III	German III	3	Winter
61000110	Francês III	French III	3	Winter
61000582	Bases de Dados	Databases	5	Winter
60027820	Sistemas Operativos	Operative Systems	5	Winter
60027886	Introdução à Inteligência Artificial	Introduction to Artificial Intelligence	5	Winter
60028129	Inglês III	English III	2	Winter
60028081	Programação Orientada a Objetos	Object Oriented Programming	5	Winter
61000121	Alemão IV	German IV	3	Spring
61000132	Francês IV	French IV	3	Spring
60027578	Modelação e Design	Modeling and Design	5	Spring
60027759	Conhecimento e Raciocínio	Knowledge and Reasoning	5	Spring
60027910	Programação Avançada	Advanced Programming	5	Spring
60027921	Gestão	Management	5	Spring
60028154	Inglês IV	English IV	2	Spring
61001528	Módulo Europeu	European Module	5	Spring
	3.º ano / 3rd Year			
60027904	Programação WEB	Web Programming	6	Winter
60027932	Inteligência Computacional	Computacional Intelligence	6	Winter
60027979	Língua e Cultura Portuguesa	Language and Portuguese Culture	6	Winter
60028092	Sistemas de Informação	Information Systems	6	Winter
60028107	Metodologias de Otimização e Apoio à Decisão	Optimization and Decision Support Methodologies	6	Winter
60027985	Ética e Deontologia	Ethics and Deontology	3	Spring
61000593	Projeto	Project	27	Spring

Signature of Teacher: _____

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Licenciatura – BsC Engenharia Informática – Curso Europeu
(Português)

Licenciatura – BsC Informatics Engineering (European Computer Science) (Inglês)

Academic Year: **2018/2019**

Program Contents

Course Unit

FRENCH IV

Specialization (s)

Subject type Languages **Research Area** Humanities

Year 2 **Semester** 2 **ECTS** 4

Working Hours

Activity Type	Working Hours Per Week	Total Hours
Theoretical Lectures	1	14
Theoretical-Practical Lectures	2	28
Practical-Laboratoty Lectures		
Tutorial Orientation		
Project		
Total of Working Hours	107	

Unaccompanied Working Hours

Activity Type	Total Hours
Study	55
Works / Group Works	5
Project	
Evaluation	5
Additional	

Lecturer

Activity Type	Name	Qualifications	Category
Theoretical Lectures	Clotilde Rosa Nunes	Master	Assistant
Theoretical-Practical Lectures	Clotilde Rosa Nunes	Master	Assistant
Practical-Laboratoty Lectures			
Tutorial Orientation			
Project			

Responsible(s) Lecturer (s) Clotilde Rosa Nunes

Goals

Deepen competencies acquired previously and acquire new knowledge in the French language, beginning in an A2.2 level, based on the four basic skills.

Skills

- Understanding expressions and current used vocabulary, in the matter of personal and familiar situations;
- Producing simple and coherent oral texts about ourselves and others. Elaborate questions and answers. Providing information;
- Reading currently used language texts and highlight information regarding other people, places or activities;
- Writing simple texts: describing people, experiences, projects, spaces and justify one´s choices.

Signature of Teacher: _____

Instituto Superior de Engenharia de Coimbra
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Licenciatura – BsC em Engenharia Informática – Curso Europeu

Licenciatura – BsC European Computer Science

Academic Year: **2018/2019**

Program Contents

Course Unit COMPUTER TECHNOLOGIES AND ARCHITECTURES

Specialization (s)

Subject type **Research Area** Computer Science

Year 1 **Semester** 2 **ECTS** 5

Working Hours

Activity Type	Working Hours Per Week	Total Hours
Theoretical Lectures	2	
Theoretical-Practical Lectures		
Practical-Laboratory Lectures	2	
Tutorial Orientation		
Project		
Total of Working Hours		133,5

Unaccompanied Working Hours

Activity Type	Total Hours
Study	56
Works / Group Works	19
Project	
Evaluation	2,5
Additional	

Docentes

Activity Type	Name	Qualifications	Category
Theoretical Lectures	Francisco Duarte	Master	Associate professor
Theoretical-Practical Lectures			
Practical-Laboratory Lectures	Cristina Chuva	PhD	Associate professor
	Cristiana Areias	Master	Associate professor
	José Luis Nunes	Master	Assistant
Tutorial Orientation			
Project			

Docente Responsável Francisco Duarte

Signature of Teacher:_____

Goals

The Computer Technologies and Architectures course has the purpose, on the one hand, to give continuity to the discipline of Digital Systems explaining and concretizing the applicability of a set of technologies studied in said unit, progressing to more advanced concepts of which stand out for example programmable logic devices. On the other hand, the goal is to make known the main technologies underlying the various computational elements. The main performance measures of the various computational elements as well as the main computer architectures are also studied. It is studied not only the physical part, Hardware, but also the logical component, Software, necessary to communicate the various elements, using the Assembly language. It is also studied the whole process of digital representation of information (Numbering Systems).

Skills

Knowledge and Understanding
1. Identify the underlying concept of Programmable Logic Devices.
A.2. Identify the components of a computer.
A.3. Explain the technologies, composition, and performance measures of key components of a computer, including main memories, secondary memories, and processors.
A.4. Explain the reading and writing process in main memories and secondary memories.
A.5. Understand how a processor's instruction set affects the complexity of its construction and its performance.
A.6. Understand and interpret the process of digital representation of information - Numbering Systems.
A.7. Explain how the computer works at the lowest level, particularly how the processor processes, interprets, and executes instructions using the Assembly language.
A.8. Define the most important characteristics of a particular computational component.

Application of Knowledge
B.1. Analyze the elements of a PC, in order to exemplify the advantages and disadvantages of the technologies of each other.
B.2. Develop and test solutions in Assembly.

Grounded Decisions
C.1 Justify proposals for solutions regarding the components and respective technologies that should equip a given computer, against a set of existing features or desirable functionalities.

project evaluation
D.1. Evaluate solutions used in different computers, demonstrating critical attitude.

Communication
E.1. Prepare appropriate documentation, related to market studies, concerning various components of a computer.
E.2. Produce technical reports and user manuals for developed applications.
E.3. Present and explain the projects developed in a clear way.

Self-learning skills
F.1. To develop projects, with a high degree of autonomy, with the application of concepts beyond those learned in class.
F.2. To follow and understand the technological evolution of the various computational elements and especially of the processors

Program Contents

Theoretical Component:
I. Programmable Logic Devices (PLDs)
I.1. Main types and technologies. Characteristics. Structure and organization.
II. Primary Memory
II.1. Types.
II.2. Technologies.
II.3. Structure and composition.
II.4. Process of reading and writing information.
II.5. Operation.
II.6. Storage formats.
III. Secondary Memories
III.1. Types.
III.2. Technologies.
III.3. Structure and composition.

Signature of Teacher:_____

III.4. Process of reading and writing information.
III.5. Operation.
III.6. Storage formats.
IV. Processors
IV.1. Technologies.
IV.2. Structure and composition.
IV.3. Operation.
IV.4. The evolution of processors, main technologies, characteristics, differences and performance measures.
V. Computer Architectures

Practical Component:
I. Digital representation of information - Numbering Systems
I.1. Conversions Between Bases.
I.2. Binary Arithmetic.
I.3. Representation of negative numbers - Bipolar codes: Signal code and absolute value, Code of Complements of 1 and Code of Complements of 2.
I.4. ASCII code.
I.5. Decimal Number Format: Floating Point (IEEE Standard 754-185).
II. Levels of software representation
II.1. Programming Languages: Machine Languages, Assembly Languages and High Level Languages. Translators. Compilers and Linkers.
III. Assembly Language for the 8086
III.1. Organization of memory: Registries, Segments, Address Normalization and Addressing Modes.
III.2. Declaration of variables.
III.3. Instruction Set
III.4. MASM: Directives and Pseudo-Opcodes.
III.5. Procedures and Functions.
III.6. The video memory

Bibliography

[1] Tecnologias dos Equipamentos Informáticos, Monteiro, R., Neves, F., Pereira, J., Rodrigues, N. e Martinho, R., FCA, 2004, ISBN 972-722-419-9.

[2] Computer Organization & Design: the Hardware/Software Interface, Patterson, D. and Hennessy, J., 3ª edição, Morgan Kaufmann, 2004, ISBN 1558606041 (Cota 1A-2-90).

[3] Structured Computer Organization, Tanenbaum, A., New Jersey: Prentice-Hall, 1999, ISBN 0-13-020435-8 (Cota 1A-2-62).

[4] How Computer works, White, R., Indianapolis: QUE, 2002, ISBN 0-7897-2549-5 (Cota 1A-2-78).

[[5] Electrónica Digital 2 (Memórias, Interfaces e Dispositivos Lógicos Programáveis), Branco, E. e Silva, F., Dinalivro, 1995, ISBN 972-576-090-5 (Cota 1A-8-60).

[6] Programmable Logic Handbook – PLDs, CPLDs & FPGAs, Sharma, A., New York: McGraw-Hill, 1998. ISBN: 0-07-057852-4 (Cota 1A-8-41).

[7] The 80x86 IBM PC and Compatible Computers: Assembly Language, Design and Interfacing (Volumes I & II), Mazidi, M. A. and Mazidi , J. G., Upper Saddle River, NJ: Prentice Halll, 2000, ISBN 0-13-016568-9 (Cota 1A-2-66)

Access Conditions and Attendance Excuse

Not apply

Conditions for Exam Admission

In order to have access to the exam it is necessary to attend at least 2/3 of all practical classes

Signature of Teacher:

Evaluation Method

The course final grade is obtained by exam, weighing 12 values (7 values for the theoretical component and 5 values for the practical component) and a practical work with weight of 4 values and two intermediate tests with weight of 2 values each. 1st Test date: March 6, 2018; 2nd Test date: May 8, 2018; project deadline: July 1, 2018.
The exam grade is considered in its entirety and it is not possible to reserve partial marks between different examination periods. To obtain approval in the subject it is necessary to obtain at least 35% in each one of the exam components (theoretical and practical)
Students who have carried out practical work on Computer Technologies and Architectures in the academic year 2017/2018 will be able to keep their grade.

Conditions for Results Improvement

Those provided by law.

Date	Signature from the lecturer responsible for the course
21/01/2019	

Signature of Tea

Instituto Superior de Engenharia de Coimbra
www.isec.pt

Licenciatura – BsC Curso Europeu Informática

Licenciatura – BsC Informatics Engineering (European Computer Science)

Academic Year: **2018/2019**

Program Contents

Course Unit ENGLISH II

Specialization (s) -

Subject type Languages **Research Area** Humanities

Year 1º **Semester** 2º **ECTS** 2

Working Hours **Unaccompanied Working Hours** 25,5

Activity Type	Working Hours Per Week	Total Hours	Activity Type	Total Hours
Theoretical Lectures	1	14	Study	21,5
Theoretical-Practical Lectures	1	14	Works / Group Works	1
Practical-Laboratoty Lectures			Project	
Tutorial Orientation			Evaluation	3
Project			Additional	

Total of Working Hours 53,5

Lecturer

Activity Type	Name	Qualifications	Category
Theoretical Lectures	Deolinda Simões	PhD	Prof. Adjunto
Theoretical-Practical Lectures	Deolinda Simões	PhD	Prof. Adjunto
Practical-Laboratoty Lectures			
Tutorial Orientation			
Project			

Responsible(s) Lecturer (s) Deolinda Simões

Goals

The main objective of this subject is to improve students' communicative language skills to a B2 level, prepare students for Cambridge University First Certificate English exam, and to prepare them to study abroad.

Skills

Be able to distinguish formal and informal written texts and write both types of texts as in informal and formal letters
To develop several paragraphs into an essay
Express pros and cons in oral communication
Organize and develop a descriptive composition of a person, write a report and an abstract

Program Contents

1. **Grammar revision**

   Reported/direct speech; Giving opinions; Agreeing/disagreeing; Gerunds/infinitives; Giving advice; Present perfect; Used to/would; Modal verbs.

2. **Reading comprehension**

   Reading between the lines, multiple matching and gapped texts of paragraphs

3. **Vocabulary**

   Ways of talking; Relationships; Phrasal verbs (down); Education; Word formation; Entertainment; Clothes; Body and health

4. **Listening**

   Note taking, multiple matching, multiple choice, True/False, comprehension questions

5. **Writing**

   Writing an article, punctuation, writing a report, descriptive composition of a person, a formal letter

6. **Speaking**

   Comparison and contrast; discussion, role play, explaining

Bibliography

Material includes the teacher's notes and these can be acquired at the institute's photocopy centre

Access Conditions and Attendance Excuse

Only students covered by Law in effect can be excused from attending lessons. These include firefighters in Portugal or those with working status, among others defined in the Law.

Conditions for Exam Admission

Those defined in legislation and regulations in effect.

Evaluation Method

Continuous evaluation which includes two tests worth 70%, mandatory attendance and participation worth 15% and an oral presentation worth 15% of the total mark. These are all mandatory.

There are two exam periods at the end of the semester and these are the normal exam period and the retake exam period. Students who are unable to get a passing mark through continuous evaluation can take a final exam in these periods. This final exam covers all of the material of the subject and includes a written part, worth 80%, and an oral part, worth 20%. Both parts are mandatory.

Conditions for Results Improvement

Those defined in legislation and regulations in effect.

Date

January 12, 2019

Signature from the lecturer responsible for the course

Instituto Superior de Engenharia de Coimbra
www.isec.pt

Signature of Teacher:

Licenciatura – BsC em Engenharia Informática (Curso Europeu)

Licenciatura – BsC in Informatics Engineering (European Computer Science)

Academic Year: **2018/2019**

Program Contents

Course Unit STATISTICAL METHODS

Specialization (s)

Subject type Basic Science **Research Area** Mathematics

Year 1st **Semester** 2nd **ECTS** 5

Working Hours

Activity Type	Working Hours Per Week	Total Hours
Theoretical Lectures	2	28
Theoretical-Practical Lectures		
Practical-Laboratoty Lectures	2	28
Tutorial Orientation		
Project		
Total of Working Hours		133,5

Unaccompanied Working Hours

Activity Type	Total Hours
Study	74,5
Works / Group Works	
Project	
Evaluation	3
Additional	

Lecturer

Activity Type	Name	Qualifications	Category
Theoretical Lectures	Maria do Céu Lourenço Marques	PhD	Prof. Adjunto
Theoretical-Practical Lectures			
Practical-Laboratoty Lectures	Deolinda Dias Rasteiro	PhD	Prof. Adjunto
	João Ricardo de Oliveira Branco	PhD	Prof. Adjunto
	Maria do Céu Lourenço Marques		
Tutorial Orientation			
Project			

Responsible(s) Lecturer (s) Maria do Céu Lourenço Marques

Goals

The main goals of this course unit are: to supply students with fundamental knowledge in Probability Theory and Statistical Inference; to understand the statements and use the results of Probability Theory and Statistical Inference, according to the subjects of the study plan; to help students to develop their problem solving and critical reasoning skills and prepare them to further study in engineering.

Skills

At the end of this course unit the learner is expected to be able to: know and apply the main properties of a probability; know and use the main theoretical distributions (discrete and continuous); acquire skills in data analysis: data organization, statistical analysis, statistical inference.

Program Contents

1-Probabilities: Randomness, probability space, events, probability measure, conditional probability, independence, Bayes' theorem.
2-Discrete random variables and probability distributions: Probability mass and cumulative distribution functions, expected value, variance and standard deviation; Bernoulli, Binomial, Hypergeometric and Poisson distributions; Two discrete random variables: joint probability distributions, marginal probability distributions, conditional probability distributions, independence, covariance and correlation.
3-Continuous random variables and probability distributions: Probability density and cumulative distribution functions, expected value, variance and standard deviation; The continuous Uniform, Exponential, Normal, t- distribution and Chi-Square distributions.
4- Random sampling and sampling distributions. Random sample. Statistics. Sampling distribution of the mean. Sampling distribution of the variance.
5- Estimation: Fundamental concepts in point and interval estimation; Confidence intervals for population parameters.
6-Test of Hypotheses: Fundamental concepts; Test of hypotheses for population parameters.

Bibliography

- Acetatos e caderno de exercícios de apoio às aulas (in portuguese; available in *moodle*)
- GUIMARÃES, R.C., CABRAL, J.A.S – *Estatística*, *McGraw Hill*, 2007.
- MONTGOMERY, D., RUNGER, G. - Applied *Statistics and Probability for Engineers*, Wiley, 2003.
- MURTEIRA, B.J.F. – *Probabilidade e Estatística*, Volumes I e II, *McGraw Hill*, 1993.
- PEDROSA, A. C., GAMA, S. M.A. - *Introdução Computacional à Probabilidade e Estatística*, Porto Editora, 2004.
- REIS, Elizabeth *et al.* – *Estatística Aplicada*, Volumes I e II, Edições Sílabo, 2001.

Access Conditions and Attendance Excuse

Not applicable.

Conditions for Exam Admission
The student must be officially enrolled in the course unit and in the exam period as well (Secretaria Virtual). In addition, and when requested by the teacher, the student must be also enrolled in the evaluation in the moodle platform.

Evaluation Method

Evaluation can be either distributed or by a final exam.
Distributed evaluation consists of two written tests, each with a maximum score of 10.0 points. The first test,T1, is related with chapters 1 and 2 (date: March 27), and the second test, T2, is related with other chapters (date: 1st or 2nd exam period). The final mark of the distributed evaluation is equal to Fm = mark(T1) + mark(T2). The student is only approved if Fm ≥ 9.5 and mark(T1) ≥ 4 and mark(T2) ≥ 4. If mark (T1) <4, the student has to take a final exam; if mark(T1) ≥ 4, the student can perform T2 during the 1st and/or 2nd exam period.

Alternatively, or in the case the student did not succeed the distributed evaluation, the evaluation is made through a final written exam (100%), during the 1st or 2nd exam period.

Material and equipment for consultation: course unit form and calculating machine.

Conditions for Results Improvement

Rules of REACTA.

Date	**Signature from the lecturer responsible for the course**
21/01/2019	Maria do Céu Lourenço Tavares

Instituto Superior de Engenharia de Coimbra
www.isec.pt

Signature of Teacher:_____

Licenciatura – BSc Engenharia Informática (Português)
Licenciatura – BSc Engenharia Informática –Pós-laboral (Português)
Licenciatura–BSc Engenharia Informática–Curso Europeu (Português)

Licenciatura – BSc Informatics Engineering (Inglês)
Licenciatura – BSc Informatics Engineering (Evening Classes) (Inglês)
Licenciatura – BSc Informatics Engineering (European Computer Science) (Inglês)

Academic Year: **2018/2019**

Program Contents

Course Unit PROGRAMMING

Specialization (s)

Subject type Mandatory **Research Area** Informatics

Year 1 **Semester** 2 **ECTS** 5

Working Hours

Activity Type	Working Hours Per Week	Total Hours
Theoretical Lectures	2	28
Theoretical-Practical Lectures	0	0
Practical-Laboratoty Lectures	2	28
Tutorial Orientation	0	0
Project	0	0
Total of Working Hours		133.5

Unaccompanied Working Hours

Activity Type	Total Hours
Study	25
Works / Group Works	50
Project	0
Evaluation	2.5
Additional	0

Lecturer

Activity Type	Name	Qualifications	Category
Theoretical Lectures	Francisco Pereira	Ph.D.	Assistant Prof.
Theoretical-Practical Lectures			
Practical-Laboratory Lectures	Álvaro Santos	M.Sc.	Assistant Prof.
	Francisco Pereira	Ph.D.	Assistant Prof.
	Leonor Melo	M.Sc.	Teaching Assistant
Tutorial Orientation			
Project			

Responsible(s) Lecturer (s) Francisco Pereira

Signature of Teacher:_____

Goals

In this course the students learn how to implement complete programs in C. All main features of C are examined in order to give the students a comprehensive knowledge of this programming language. This knowledge is essential to develop programs that are able to solve real-world problems.
The most important topics discussed in this course are file manipulation and dynamic memory management. The students also learn how to develop programs that operate on fundamental data structures, such as queues, heaps, linked lists and binary trees.

Skills

Identify and select the best data structures for a given situation.
Create C programs dealing with files and dynamic structures.
Develop algorithms for non-trivial problems.

Program Contents

1. Pointers
1.1. Introduction. Pointers and addresses
1.2. Pointers and functions
1.3. Pointers and arrays
1.4. Pointer arithmetic

2. Header files
2.1. Dividing the source code into multiple files
2.2. Using header files

3. Structures
3.1. Definition
3.2. Arrays of structures
3.3. Unions and enumerations

4. Files
4.1. Text files and binary files
4.2. Standard operations
4.3. Non-sequential access to files

5. Dynamic structures
5.1. Dynamic storage allocation
5.2. Linked lists
5.3. Other dynamic structures

6. Recursive functions
6.1. Writing recursive functions
6.2. Binary trees

Bibliography

- K. N. King (2008). C Programming: A Modern Approach, second edition, W. W. Norton & Company.
- Pedro Guerreiro (2006). Elementos de Programação em C, 3ª edição, FCA- Editora de Informática
- R. Sedgewick (1997). Algorithms in C: Fundamentals, Data Structures, Sorting, Searching, Addison-Wesley.

Signature of Teacher:_____

Access Conditions and Attendance Excuse

No special conditions.

Conditions for Exam Admission
No special conditions.

Evaluation Method

Evaluation consists in:
- 1 written exam weighting 65% of the final grade (mandatory minimum of 35% of the grade);
- 1 individual practical assignment weighting 35% of the final grade:
    - The deadline for delivering the assignment is June 2, 2019 (tentative date). The presentation of the work is mandatory.

Conditions for Results Improvement

No special conditions.

Date	Signature from the lecturer responsible for the course
21/1/2019	

Signature of Tea

Instituto Superior de Engenharia de Coimbra
www.isec.pt

Licenciatura – BsC Curso Europeu Informática

Licenciatura – BsC Informatics Engineering (European Computer Science)

Academic Year: **2018/2019**

Program Contents

Course Unit EUROPEAN MODULE

Specialization (s) -

Subject type **Research Area** Humanities

Year 1º **Semester** 2º **ECTS** 4

Working Hours **Unaccompanied Working Hours** 65

Activity Type	Working Hours Per Week	Total Hours	Activity Type	Total Hours
Theoretical Lectures	1	14	Study	49
Theoretical-Practical Lectures	2	28	Works / Group Works	1
Practical-Laboratoty Lectures			Project	
Tutorial Orientation			Evaluation	15
Project			Additional	
Total of Working Hours		107		

Lecturer

Activity Type	Name	Qualifications	Category
Theoretical Lectures	Deolinda Simões	PhD	Prof. Adjunto
Theoretical-Practical Lectures	Deolinda Simões	PhD	Prof. Adjunto
Practical-Laboratoty Lectures			
Tutorial Orientation			
Project			

Responsible(s) Lecturer (s) Deolinda Simões

Goals

The main objective of this subject is to acquire notions of Europe and the world in which we live, the need to understand cultural differences especially in Europe and to understand the European political and social structures.

Skills

Adapt to different cultures especially within Europe
Understand living abroad from witnesses
Aware of studying abroad from witnesses
Familiar with working abroad from witnesses

Program Contents

The three weekly hours are divided into three distinct sessions:

1. Lecture

a. Political, social, economic, professional and cultural aspects of Europe
b. The European Union and its countries
c. Differences within Europe and between the different regions and countries
d. National cultures and institutions
e. Education and work in Europe

2. Practical Component

a. Witnesses of those who have studied, lived and worked in different parts of Europe and the world
b. Students' individual oral presentations with a duration of 20 minutes on one of the following topics:
Description of an EU Member-State or of Europe;
Intercultural relations
Case studies
Studying in one of the ECS countries

3. A weekly test over 1. and 2.

Bibliography

Material is provided on the Moodle platform.

Access Conditions and Attendance Excuse

Only students covered by Law in effect can be excused from attending lessons. These include firefighters in Portugal or those with working status, among others defined in the Law.

Conditions for Exam Admission

Those defined in legislation and regulations in effect.

Evaluation Method

Continuous evaluation which includes weekly tests worth 65%, mandatory attendance and participation worth 15% and an oral presentation worth 20% of the total mark. All of these are mandatory.

There are two exam periods at the end of the semester and these are the normal exam period and the retake exam period. Students who are unable to get a passing mark through continuous evaluation can take a final exam in these periods. This final exam covers all of the material of the subject, which includes a written part worth 80% and a mandatory oral part, worth 20%.

Conditions for Results Improvement

Those defined in legislation and regulations in effect.

Date

January 14, 2019

Signature from the lecturer responsible for the course

Instituto Superior de Engenharia de Coimbra
www.isec.pt

Signature of T

Licenciatura – Engenharia Informática
(Curso Europeu)

Bachelor – BsC European Computer Science

Academic Year: **2018/2019**

Program Contents

Course Unit MATHEMATICAL ANALYSIS II

Specialization (s)

Subject type Basic Science **Research Area** Mathematics

Year 1st **Semester** 2nd **ECTS** 6

Working Hours

Activity Type	Working Hours Per Week	Total Hours
Theoretical Lectures	2	28
Theoretical-Practical Lectures	2	28
Practical-Laboratoty Lectures	1	14
Tutorial Orientation		
Project		
Total of Working Hours		160

Unaccompanied Working Hours

Activity Type	Total Hours
Study	60
Works / Group Works	25
Project	
Evaluation	5
Additional	

Lecturer

Activity Type	Name	Qualifications	Category
Theoretical Lectures	Arménio António da Silva Correia	Master	Adjunct Professor
Theoretical-Practical Lectures	Arménio António da Silva Correia Nuno Filipe Jorge Lavado Nuno Miguel dos Santos Baeta	PhD Master	Adjunct Professor Invited Assistant
Practical-Laboratoty Lectures	Arménio António da Silva Correia Nuno Filipe Jorge Lavado Nuno Miguel dos Santos Baeta		
Tutorial Orientation			
Project			

Responsible(s) Lecturer (s) Arménio António da Silva Correia

Goals

This course aims to teach:
- The role of mathematics as the fundamental science in engineering;
- The use of mathematical software, such as, Matlab, GeoGebra, Maple and MuPad;
- The use of mathematics as a tool for analytical reasoning in engineering.

Skills

At the end of this course, the student is expected to be able to:
- Develop skills of abstraction, demonstration, 3D visualization and representation, algorithm design and programming of numerical methods with Matlab;
- Understand and apply the studied topics of this course.

Program Contents

1st Part

Taylor polynomial and Lagrange's remainder: definition, applications and computational treatment in GeoGebra and Matlab. Introduction to Numerical Methods using Matlab. Brief reference to error theory: absolute and relative errors; rounding errors, truncations and others. Solutions of equations in one variable: the bisection method; Newton's method. Interpolation and Polynomial Approximation: divided differences. Numerical differentiation and integration: trapezoid rule and Simpson rule. Initial-Value Problems for Ordinary Differential Equations: Euler's Method and Runge-Kutta Methods.

2nd Part

Three-Dimensional Space. Rectangular coordinates in 3D-space; Magic Cube – viewport 3D; points; vectors; planes; spheres; cylindrical surfaces; quadric surfaces.
Real functions of two or more variables. Limits and continuity. Partial derivatives. Differentiability and chain rules. Tangent planes. Total Differentials. Directional derivatives and gradients. Maxima and minima of functions of two variables. Lagrange multipliers.

Multiple Integrals. Double integrals: double integrals over nonrectangular regions; double integrals in polar coordinates. Applications: area and surface area. Triple integrals. Applications: volume of solids; centroid; center of gravity. Triple integrals in cylindrical and spherical coordinates. Change of variables in multiple integrals..

Throughout the semester students learn to program in Matlab, including GUI's programming.

Bibliography

Correia, Arménio A. S., Sebenta de Análise Matemática II, ISEC, 2014
Glyn James, Modern Engineering Mathematics, Addison – Wesley
Stanley, J., An Introduction to Differential Equations and Their Applications. McGraw-Hill
Burden, Richard L., J. Douglas, Numerical Analysis, Pws-Kent Publishing Company
Fausett, L.V., Applied Numerical Analysis Using Matlab, Prentice Hall
Kreyszig, E., Advanced Engineering Mathematics, John Wiley & Sons

Access Conditions and Attendance Excuse

Not applicable. In addition to face-to-face classes, an e-Learning platform is used to provide content, discussion forums, training and evaluation lessons, as well as other activities and resources. The work developed complements the so-called "traditional" methods with the use of ICT: mathematical software, LMS platforms, cloud storage (e.g., box.net), GeogebraTube and ArmenioCorreia facebook page. Students are encouraged to use the available tools and collaborate actively and constructively in the MA2 learning community.

Conditions for Exam Admission

Access to the examination is allowed to all students enrolled in the curricular unit, according to the ISEC's rules of procedure (REACTA document).

Evaluation Method

There are two options:

First option: distributed assessment methodology
A midterm exam and/or a final written exam worth 60% of the final grade
Theoretical-Practical activities (written assignments and programming of mathematical methods) distributed over the semester worth 40% of the final grade

Second option: A midterm exam and/or a final written exam worth 100% of the final grade.

For purposes of calculating the final grade, weighted average of the tests and works, the student must have a minimum score of 6.0 (out of 20) on the exam. If students attend more than 70% of classes, 0.5 points are added to the final grade. If students attend office hours and/or participate in forums offered through e-learning platform more than 70% of classes, 0.5 points are added to the final grade. Students receiving a grade higher than 18 (on a grading scale of 1 to 20) are required to do an extra written and/or oral test. If students choose not to do this extra test, the final grade will remain 18.

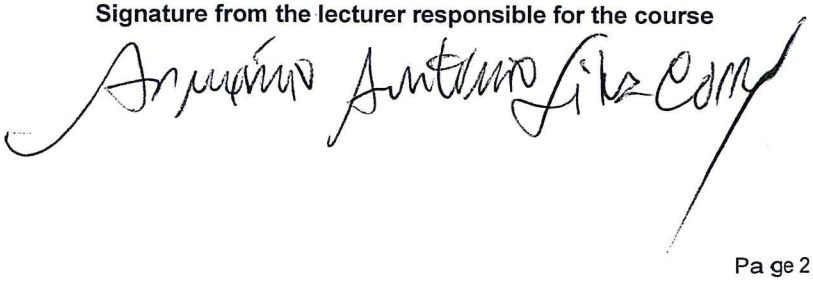
Conditions for Results Improvement

The conditions for results improvement are defined in the ISEC's REACTA document.

Date

21/01/2019

Signature from the lecturer responsible for the course



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www.isec.pt

Signature of Tea

Licenciatura – BsC *Engenharia Informática – Curso Europeu* **(Português)**

Licenciatura – BsC *Informatics Engineering - European Computer Science* **(Inglês)**

Academic Year: **2018/2019**

Program Contents

Course Unit **FOREIGN LANGUAGES II – FRENCH**

Specialization (s) COMMON CORE

Subject type Languages **Research Area** Socio-profissional / Humanities

Year 1 **Semester** 2 **ECTS** 3

Working Hours **Unaccompanied Working Hours** **24**

Activity Type	Working Hours Per Week	Total Hours	Activity Type	Total Hours
Theoretical Lectures	2	28	Study	20
Theoretical-Practical Lectures	2	28	Works / Group Works	1
Practical-Laboratoty Lectures			Project	
Tutorial Orientation			Evaluation	3
Project			Additional	
Total of Working Hours		80		

Lecturer

Activity Type	Name	Qualifications	Category
Theoretical Lectures			
Theoretical-Practical Lectures	Bruna Isabel Joaquim Plácido	Master	Guest Assistant
Practical-Laboratoty Lectures	Bruna Isabel Joaquim Plácido	Master	Guest Assistant
Tutorial Orientation			
Project			

Responsible(s) Lecturer (s)

Bruna Isabel Joaquim Plácido

Signature of Tea

Goals

To deepen already acquired skills and to acquire new knowledge in the **Foreign Languages II – French**, starting from an A1 level in the four basic skills and get to level A2 of the CEFR.

Skills

- In written and oral communication: maintain brief dialogues in the most frequent situations of daily life (ex. ask or give information, make and receive requests and invitations); write small personal notes, letters, e-mails and advice (current registration and informal style)

- In written and oral comprehension: brief information (advice, announcements ...) and some contemporary documents of the French-speaking world (small news, subtitled images)

Signature of Teac

Program Contents

1. **Learning modes**
   - the "passé composé"
   - the negation
   - express your reactions and emotions
   - the pronouns "COI"
   - to give an opinion
   - the expression of cause

2. **Real estate**
   - the comparatives
   - the superlatives
   - the pronoun "y"
   - the prepositions of place

3. **Testimonials**
   - the "imparfait"
   - the markers of the present and the past
   - the expressions of temporal continuity and discontinuity
   - the subordinate with "quand"
   - the adjectives and indefinite pronouns

4. **The stages of life**
   - the opposition "passé composé / imparfait"
   - the relative pronouns "qui", "que" and "où"

5. **Sports in fashion**
   - the "impératif" (reminder)
   - the "futur simple"
   - the markers of the future
   - the expression of the hypothesis
   - the degrees of certainty

6. **Behaviors**
   - the impersonal expressions of:
     - obligation
     - ban
     - advice
   - the "conditionnel présent"

7. **Ecology in all of this**
   - the qualifying adjectives
   - the place of the adjective
   - the demonstrative pronouns
   - the expression of "but"

8. **At work**
   - the expression of wish
   - the negation
   - the expression of hypothesis
   - the expression of opposition
   - the adverbs in "-ment"

Bibliography

COLLECTIF MAISON DES LANGUES. (2014). *La Grammaire du Français – Niveau A2*. Éditions Maison des Langues.

GRÉGOIRE, M. ; THIÉVENAZ, O. (2003) *Grammaire Progressive du Français – Niveau Intermédiaire*, Paris, CLE International.

LIRIA, P. ; SIGÉ, J.-P. (2006). *Les Clés du nouveau DELF – A2*. Presses Universitaires de Grenoble (PUG).

PRUVOST, N. et al. (2015). *Entre Nous 2*. Éditions Maison des Langues.

Signature of Teac

Access Conditions and Attendance Excuse

The student has to complete all the assessment tasks, which include 2 tests, minimum of 75% of attendance in classes, and an oral presentation to be able to have pass the subject.

The two tests and the oral presentation take place during lessons.

If the student fails to show up on one of the tests (tests and / or oral presentation), he/she can only make it up with a plausible justification, followed by the teacher's authorization.

Conditions for Exam Admission

Evaluation through final exam is only for those students who are covered by law and cannot be required to attend classes. This exam consists of a written exam and an oral presentation.

The final exams (in the final exam evaluation) are carried out on the day and time written on ISEC's academic exam calendar for the normal exam period and the retake exam period. The exam has the duration of approximately 3 hours.

Evaluation Method

The **Foreign Languages II – French** knowledge assessment system works with continuous assessment and consists of the mandatory completion of:

(1) two tests (70%)
(2) compulsory attendance in at least 75% of classes and participation in classes (15%).
(3) an oral presentation (15%).

Conditions for Results Improvement

Rules and regulations in effect.

Date	Signature from the lecturer responsible for the course
28.01.2019	Bruna Isabel Joaquim Plácido

Instituto Superior de Engenharia de Coimbra
www.isec.pt

Signature of Teacher:_____

Licenciatura – BsC Engenharia Informática – Curso Europeu

Licenciatura – BsC European Computer Science

Academic Year: **2018/ 2019**

Program Contents

Course Unit ETHICS AND DEONTOLOGY

Specialization (s) ALL

Subject type Speciality **Research Area** Informatics

Year 3 **Semester** 2 **ECTS** 3

Working Hours

Activity Type	Working Hours Per Week	Total Hours
Theoretical Lectures	3	42
Theoretical-Practical Lectures		
Practical-Laboratoty Lectures		
Tutorial Orientation		
Project		
Total of Working Hours		80

Unaccompanied Working Hours

Activity Type	Total Hours
Study	14
Works / Group Works	20
Project	
Evaluation	4
Additional	

Lecturer

Activity Type	Name	Qualifications	Category
Theoretical Lectures	Jorge Bernardino	PhD	Coordinator
Theoretical-Practical Lectures			
Practical-Laboratoty Lectures			
Tutorial Orientation			
Project			

Responsible(s) Lecturer (s) Jorge Bernardino

Goals

- To develop knowledge and comprehension skills in the field of Ethics and De
professor, seminars by guests and research in texts of the specialty carried ou
- Develop the ability to apply the knowledge acquired in solving specific proble
argument;
- To create the capacity to collect, select and interpret relevant information in t
for critical analysis, synthesis and formulation of opinions;
- To promote an ethical and deontological attitude in the development of their
capacity of critical understanding of its scope, applicability and opportunity in t
day.

Skills

Generic Skills:
1-Create and develop the ability to interpret and master basic concepts of Ethi
the area exposing ideas, problems, information and interconnection with the e
2-Develop personal skills that allow students to learn independently.
3-Provide students with the ability to work in groups, developing interpersonal
insertion in the job market
4-Promote the concern for the quality and rigor in the acquisition of the basic c
concepts that will allow the development of decision-making capacities in their

Specific Skills:
1-Develop knowledge and ability to understand in the field of Ethics and Deon
class, in the lectures of the guests, in texts of the specialty and in research co
2-Provide students with the ability to apply the knowledge acquired to solve sp
daily life, thus understanding the world in which they live.
3-Create the capacity to collect, select and interpret relevant information in the
analysis, synthesis and formulation of own opinions that will allow a more insig
knowledge.

Program Contents

1. Introduction
- Ethics (definitions)
- Ethics, Morals and Deontology
- Ethics and Deontology
- Engineering Ethics
- Engineering Case studies.

2 - Engineers at a Crossroads
- Engineering Ethics and Ethical dilemmas
- Challenger shuttle and other examples
- The Triangle of Doubts
- Professional Deontology
- Code of Ethics for engineers in Portugal
- Ethical Practice
- Case study

3 - The Seven "Deadly Sins" of a Male Culture
- Challenger Shuttle
- Group Think
- Greed, arrogance, and cowardice?
- The seven "mortal sins" of a "male" culture
- Need to revise "male" organizational cultures

4 - Ethical Leadership
- The 10 simple (but difficult) leadership lessons
- Building trust
- Group Thinking - What Can Leaders Do?
- Responsibilities of engineers or system responsibility?

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- Talks by

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- Ethically A
IEEE 2018,

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Conditions for Exam Admission

No prerequisites for access to the exam.
Those provided for in the legislation in force.
school achievement and to the correct unders

Evaluation Method

1) CONTINUOUS EVALUATION
In the continuous evaluation, the students are
classification method three evaluation elemen
The work should preferably be developed in g
will be small written assignments that are rele
The work must be delivered two weeks before

The final classification of the continuous asse

Classification = 0.5 x T + 0.1 x D + 0.4 x E

2) EVALUATION BY EXAMINATION AND RE
Students who do not wish to be evaluated on
a research paper (IT) in an area related to Eth
must be presented on the date of the exam or

The final classification of the evaluation metho
following formula:

Classification = 0.4 x TI + 0.6 x E

The objective of the research work (TI) is to gi
Deontology, after which it will be publicly pres

For any of the evaluation types 1) and 2) stude
do not obtain the minimum classification will be

Conditions for Results Improvement

Those provided for in the legislation, but canno

Date

17th January 2019

Instituto Superior de Engenharia de Coimbra
www.isec.pt

Signature of Teacher:_____

Licenciatura – BsC Informatics Engineering
Licenciatura – BsC Informatics Engineering – Evening Classes
Licenciatura – BsC Informatics Engineering – European Course

Academic Year: **2018/1019**

Program Contents

Course Unit ENTREPRENEURSHIP AND INNOVATION
Specialization (s) ALL

Subject type Specialization course **Research Area** Informatics Engineering

Year 2nd **Semester** 2nd **ECTS** 5,0

Working Hours

Activity Type	Working Hours Per Week	Total Hours
Theoretical Lectures	2	28
Theoretical-Practical Lectures	2	28
Practical-Laboratoty Lectures		
Tutorial Orientation		
Project		
Total of Working Hours		133,5

Unaccompanied Working Hours

Activity Type	Total Hours
Study	40
Works / Group Works	90
Project	
Evaluation	
Additional	3,5

Lecturer

Activity Type	Name	Qualifications	Category
Theoretical Lectures	Joaquim Macedo de Sousa	PhD	Inv. Adjunct Prof.
Theoretical-Practical Lectures	Elsa Pedroso / Joaquim Macedo de Sousa / Ricardo Ferraz	PhD	Inv. Adjunct Prof.
Practical-Laboratoty Lectures			
Tutorial Orientation			
Project			

Responsible(s) Lecturer(s) Joaquim Macedo de Sousa

Signature of Teacher:_____

Goals

To frame the dimension of innovation in the process of entrepreneurship and creation of value in organizations.
Encourage students to develop an entrepreneurial mind-set through case study, analysing crucial factors of success.
Reflect on the steps to be taken from the generation of a business idea and its economic-financial evaluation, to the creation of an innovative company, including aspects related to the nature and organization of the startup, the business model, the industrial property and, finally, to the go to market plan of a new service and / or product.
Present students entities and programs in support to entrepreneurship (ex. Poliempreende).

Skills

- To develop the empowerment and team working skills, in order to improve the integration of students in an organizational context;
- Create and develop an entrepreneurial attitude, aimed at innovation;
- To know and interpret in an appropriate way the concepts of entrepreneurship and innovation;
- Understand the value chain of innovation, adequately managing the process of generating and selecting ideas, planning their implementation, achieving innovative projects as well as their monitoring;
- Develop "hard" - and "soft" - skills that underpin the entrepreneurial mind-set;
- Develop a vision of organizational management that encompasses entrepreneurship and innovation as tools for generating value and gaining competitive advantage.

Program Contents

Theoretical lectures:

Anatomy of the entrepreneur
Generating business models
The market and its analysis
Investment and financing
Industrial property
Legal aspects of business constitution
Business organisation
Accounting and Taxation
Financial analysis and management
Internationalization
Entities and programs supporting of entrepreneurship
The "Elevator Pitch"
Communication
The program "Poliempreende"

Theoretical-Practical Lectures:

Structuring the Go-To-Market (G-T-M)
The Business Model Canvas
Preparing and developing the G-T-M plan:

- Executive summary
- Business opportunity
- Context
- Go to market strategy
- Milestones and action plan
- Investment and key financial indicators
- Major risks and mitigations strategies

The *Elevator Pitch*" in practice

Case study (Theoretical and Theoretical-Practical Lectures):

Seminars by invited speakers for the analysis and reflection on cases of business success and failure

Signature of Teacher:_____

Bibliography

• Costa, H. (2010). Criação & Gestão de Micro-Empresas & Pequenos Negócios (9ª Edição). Lisboa: Lidel-Edições Técnicas (ISBN: 978-972-757-677-7).

• Dantas, J., Moreira, A. (2011). O Processo de Inovação. Como potenciar a criatividade organizacional visando uma competitividade sustentável. Lisboa: Lidel-Edições Técnicas (ISBN: 978-

972-757-758-3).

• Duarte, C., Esperança, J. (2012). Empreendedorismo e Planeamento Financeiro. Transformar oportunidades em negócios. Criar micro, pequenas e medias empresas. Lisboa: Edições Sílabo (ISBN: 978-972-618-670-0).

• Sarkar, S. (2010). Empreendedorismo e Inovação (2ª Edição). Lisboa: Escolar Editora (ISBN 978-972-592-269-9).

Access Conditions and Attendance Excuse

Those foreseen by current legislation. Students are advised to systematically attend classes as a prerequisite to school achievement and to the correct understanding of the subjects.

Conditions for Exam Admission

All students regularly enrolled. For students who opt for the continuous evaluation regime, group work must have an evaluation of of 8/20 or more.

Evaluation Method

Students may choose one of the following evaluation schemes:

- **Continuous assessment scheme**

  It consists of a **group work** and a **written test**.

  The groups should consist of 5 students. The group work is composed of a written work to be delivered and an oral presentation that will take place in the theoretical-practical lectures.

  For the second theoretical-practical lecture, the students must already formed the groups and chosen the idea that they intend to develop in the work. Written works must be submitted by the 19th of May 2019. The oral presentations will take place hereafter.

  All evaluation elements (group work and written test) will be quoted to 20 (twenty) values, each with a 50% weighting, both of which shall have a grade equal to or greater than 8,0 (eight) values in order to allow students to pass.

  Final score will be calculated and followed:

  Final score = 0,5 Work group grade + 0,5 Written test grade

  Please note: only students who **attend a minimum of 10 theoretical-practical lectures** may opt for this scheme, except for students with worker-student status.

- **General assessment scheme**

  It consists of a **written test**.

  Students who opt for this evaluation scheme or who do not obtain the minimum classification in the group work should answer an additional set of development questions, which will correspond to 50% of the evaluation of the test.

In both schemes, the grades from the group works will be valid for all exam periods from the 2018/2019 academic year, and the written test corresponds to the final exam.

During the exams, the use of mobile phones and other equipment that allow communication with the exterior of the room is expressly prohibited. The elements of paper consultation to be used in the exams will be only those allowed in the scope of the course unit, and the students will be obligatorily informed previous to the exams.

Signature of Teacher:_____

Conditions for Results Improvement

Those foreseen by current legislation, and cannot be carried out in the Regular Season

Date	**Signature from the lecturer responsible for the course**
21/01/2019	

Signature of Tea

Instituto Superior de Engenharia de Coimbra
www.isec.pt

Licenciatura – BsC Curso Europeu Informática

Licenciatura – BsC Informatics Engineering (European Computer Science)

Academic Year: **2018/2019**

Program Contents

Course Unit ENGLISH IV

Specialization (s) -

Subject type Languages **Research Area** Humanities

Year 2º **Semester** 2º **ECTS** 2

Working Hours **Unaccompanied Working Hours** 25,5

Activity Type	Working Hours Per Week	Total Hours	Activity Type	Total Hours
Theoretical Lectures	1	14	Study	21,5
Theoretical-Practical Lectures	1	14	Works / Group Works	1
Practical-Laboratoty Lectures			Project	
Tutorial Orientation			Evaluation	3
Project			Additional	

Total of Working Hours 53,5

Lecturer

Activity Type	Name	Qualifications	Category
Theoretical Lectures	Deolinda Simões	PhD	Prof. Adjunto
Theoretical-Practical Lectures	Deolinda Simões	PhD	Prof. Adjunto
Practical-Laboratoty Lectures			
Tutorial Orientation			
Project			

Responsible(s) Lecturer (s) Deolinda Simões

Goals

The main objective of this subject is to improve students' communicative language skills to a B2 level, prepare students for Cambridge University First Certificate English exam, and to prepare them to study abroad.

Skills

To give a presentation of a technical topic
Organize and develop a report and an essay of a technical topic

Program Contents

1. **Grammar revision**

   Have to/don't have to/must/need; Modifiers/Intensifiers; Conditionals; Key word transformations; error correction; Make/let/allow; Passives; Expressing hypothetical meaning; To have something done.

2. **Reading comprehension**

   Gapped Text sentences; Question formation; Comprehension questions; Multiple Matching; Multiple Choice.

3. **Vocabulary**

   Media; Phrasal verbs (get), (out), (make); Animals; Places; Crime; Spoken and written language.

4. **Listening**

   Assessing effectiveness; Comprehension questions; True/False; Multiple Choice.

5. **Writing**

   A discursive composition; A descriptive composition of place; A report

6. **Speaking**

   Discussing; Roleplay; Describing; Ordering a picture story.

Bibliography

Material includes the teacher's notes and can be acquired at the institute's photocopy centre

Access Conditions and Attendance Excuse

Only students covered by Law in effect can be excused from attending lessons. These include firefighters in Portugal or those with working status, among others defined in the Law.

Conditions for Exam Admission

Those defined in legislation and regulations in effect.

Evaluation Method

Continuous evaluation which includes two tests worth 70%, mandatory attendance and participation worth 15% and an oral presentation worth 15% of the total mark. These are all mandatory.

There are two exam periods at the end of the semester and these are the normal exam period and the retake exam period. Students who are unable to get a passing mark through continuous evaluation can take a final exam in these periods. This final exam covers all of the material of the subject and includes a written part, worth 80%, and an oral part, worth 20%. Both parts are mandatory.

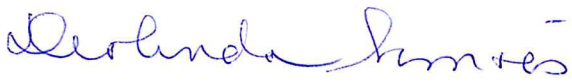
Conditions for Results Improvement

Those defined in legislation and regulations in effect.

Date

January 13, 2019

Signature from the lecturer responsible for the course



Instituto Superior de Engenharia de Coimbra
www.isec.pt

Signature of Teacher: _____

Licenciatura – BsC Engenharia Informática
Licenciatura – BsC Informatics Engineering

Licenciatura – BsC Engenharia Informática (Pós-Laboral)
Licenciatura – BsC Informatics Engineering (Evening Classes)

Licenciatura – BsC Engenharia Informática –Curso Europeu
Licenciatura – BsC European Computer Science

Academic Year: **2018/2019**

Program Contents

Course Unit ADVANCED PROGRAMMING

Specialization (s) Applications Development

Subject type Speciality sciences **Research Area** Informatics Engineering

Year 2 **Semester** 2 **ECTS** 5

Working Hours

Activity Type	Working Hours Per Week	Total Hours
Theoretical Lectures	1	14
Theoretical-Practical Lectures		
Practical-Laboratoty Lectures	4	56
Tutorial Orientation		2
Project		
Total of Working Hours		133,5

Unaccompanied Working Hours

Activity Type	Total Hours
Study	26
Works / Group Works	31,5
Project	
Evaluation	4
Additional	

Lecturer

Activity Type	Name	Qualifications	Category
Theoretical Lectures	Maria Armanda Correia	Master	Prof. Adjunta
Theoretical-Practical Lectures			
Practical-Laboratoty Lectures			
	João Costa	PhD	Prof. Adjunto
	João Durães	PhD	Prof. Adjunto
	José Marinho	PhD	Prof. Adjunto
	Maria Armanda Correia	Master	Prof. Adjunta
Tutorial Orientation			
Project			

Responsible(s) Lecturer (s) Maria Armanda Correia

Signature of Teacher: _____

Goals

Theoretical component

Learning object oriented programming in Java language and application of design patterns.
Students must acquire the ability to develop autonomous applications, for console, and also for graphic environment, based in events. It is also intended that students evolve in the ability to organize data structures and be able to correctly implement medium-sized applications by structuring them in an extensible and rational way. For this purpose, paradigms such as the MVC standard (model-view-control) and object oriented state machine are explored.

Laboratory component

It is intended that students acquire skills in the development of Java applications, for console and graphics interface, applying the subject taught in the theoretical component.

Skills

- Knowledge and understanding
  - A1. Define classes and create objects in Java.
  - A2. Define and create arrays.
  - A3. Know the concept of package.
  - A4. Know the concepts related to inheritance and polymorphism in Java.
  - A5. Know the meaning of exceptions.
  - A6. To demonstrate basic knowledge about the use of files.
  - A7. Demonstrate knowledge about the use of design patterns.
  - A8. Demonstrate knowledge about the organization of an application in graphic environment and concepts involved.
- Knowledge Application
  - B1. Develop applications in Java, in a graphical environment, defining classes and relating them to each other using the composition and inheritance mechanisms. Classes that represents the problem logic must be independent of the classes that are responsible for visual representation.
- Decision Making
  - C1. Justify the classes defined under an application and their relationships.
- Evaluating a Solution
  - D1. Evaluate the class structure proposed to a problem, demonstrating critical attitude.
- Communication
  - E. 1. Produce technical and user manual reports for the developed applications.
  - E. 2. To present and explain the projects developed in a clear way.
- Self-learning skills
  - F1. Explore unteached aspects related to the development of practical work.
  - F2. Develop new applications from incomplete information.

Program Contents

Introduction
- Java Bytecode and virtual machine
- Java Applications and applets
- Key features of Java language
- A simple Java application

C/C++ transition to Java
- Primitive types
- Arrays of primitive types
- Operators
- Execution Control Instructions

Classes
- Objects and references
- Scope of objects and references
- Garbage collector
- Overloaded methods

Signature of Teacher: _____

- Constructors
- The keyword this
- Static members
- The Finalize () method
- Initialization
- Object arrays
- Interior Classes

Packages
Composition and Inheritance
- Composition
- Inheritance
- The super keyword
- The final keyword

Polymorphism
- Upcasting
- The Object class
- Abstract Classes
- Interfaces

Collections
- Some Interfaces derived from Collection
- Some concrete implementations

Exceptions
Files
Graphical Interface
- The Swing Library
- Applets
- Applications with graphical interface
- Components, events, and listeners
- Layout managers
- Some Swing components
- Draw geometric shapes
- Images
- Sounds
- Threads
- The Timer class

Model View Control
Object-oriented state machine design pattern
Factory Method design pattern
Command design pattern

Bibliography

- ECKEL, B. – *Thinking in Java, 4/e*, Prentice Hall, 2006. ISBN: 9780131872486
- DEITEL, H.;DEITEL, P. - Java™ How to Program, 7/e, Prentice Hall, 2007. ISBN-10: 0132222205
- SAVITCH, W.; CARRANO, F.- *Java: An Introduction to Problem Solving and Programming 5/e*, Prentice Hall, 2008, ISBN #0-13-149202-0
- ARNOLD, K.; GOSLING, J.; HOLMES, D. - *The Java™ Programming Language, 4/e*, Addison-Wesley, 2005, ISBN #0-32134980-6
- HORSTMANN, C. - *Java Concepts 5e*, John Wiley and Sons, 2007, ISBN #0470105550
- GAMMA, E.; HELM, R.; JOHNSON, R.; VLISSIDES, J. – *Design Patterns: Elements of Reusable Object Oriented Software*, Addison-Wesley, 1995, ISBN-13: 978-0-201-63361-0
- GRAND, M. – *Patterns in Java Volume 1*, John Wiley and Sons, 1998, ISBN 0-471-25839-3
- FREEMAN, E., FREEMAN, E., Head First Design Patterns, O'Reilly Media, 2004, ISBN: 978-0-596-00712-6.

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Signature of Teacher:

Licenciatura – BsC Engenharia Informática
Licenciatura em Engenharia Informática Pós-Laboral
Licenciatura em Engenharia Informática Curso Europeu

Licenciatura – BsC Informatics Engineering
Informatics Engineering - post-work
European Computer Science

Academic Year: **2018/2019**

Program Contents

Course Unit KNOWLDGE AND REASONING

Specialization (s) 1) APPLICATION DEVELOPMENT 2) INFORMATION SYSTEMS

Subject type Speciality **Research Area** Informatics

Year 2nd **Semester** 2nd **ECTS** 5

Working Hours

Activity Type	Working Hours Per Week	Total Hours
Theoretical Lectures		
Theoretical-Practical Lectures	2	28
Practical-Laboratoty Lectures		
Tutorial Orientation	2	28
Project		
Total of Working Hours		56

Unaccompanied Working Hours

Activity Type	Total Hours
Study	28
Works / Group Works	46
Project	
Evaluation	3.5
Additional	
	77.5

Lecturer

Activity Type	Name	Qualifications	Category
Theoretical Lectures	Viriato Marques	PhD	Coordinator Prof.
Theoretical-Practical Lectures			
Practical-Laboratoty Lectures	Anabela Simões	PhD	Auxiliary Prof.
Tutorial Orientation	Inês C.M.S. Domingues	MsC	Invited Prof.
Project			

Responsible(s) Lecturer (s) Viriato Marques

Goals

To know and understand the tools for developing expert systems, case based reasoning, uncertainty representation, neural and Bayesian networks. To implement systems based on these models.

Skills

Capacity for using the tools above described within a short time period. Capacity for identifying problems that can be solved with these kind of systems in real situations. Knowledge acquisition. Understanding the application of expert systems, case based reasoning, fuzzy systems, probability based systems, neural and Bayesian networks.

Signature of Teacher:_____

Program Contents

Neural Networks
- Perceptron, Linear, sigmoid and hyperbolic tangent activation functions
- Training Rule, Gradient Descent and Delta-Rule
- Neural networks (feedforward)
- BackPropagation
- Application examples

Introduction to ES's
- Basic Principles
- Block Diagram
- Inference Engine
- Forward and Backward Chaining
- RETE
- WHY and HOW modules

Case Based Reasoning
- Paradigm and Aamodt & Plaza cicle
- Case representation and memory models
- Similarity functions
- Relevance and learning
- Case adaptation
- Some prototypes

Uncertainty I
- Certainty factors and MYCIN
- Introduction to Dempster-Shaffer
- Fuzzy sets and fuzzy numbers
- Computing with words
- Mamdani inference

Development tools
- NASA CLIPS, ExSys Corvid, MyCBR, MatLab

Bayesian Networks
- Bayes Theorem
- Project of Bayesian networks
- Application examples (GENIE)

Uncertainty II
- Introduction to Bayesian decision trees
- Introduction to Markov chains
- Introduction to Dempster-Schaffer theory

Knowledge Representation
- OAV, semantic nets, frames, classic logic, rules, cases and others
- Experts and knowledge acquisition. Methodologies.

Practical Classes: Problems about all the subjects

Labs: Practical works woth Matlab, Drools and GENIE
Final Practical evaluation work

Bibliography

Classes Powerpoint slides (Viriato Marques)

Solved Problems (Viriato Marques)

Solved past exams resolvidos (Viriato Marques)

Artificial Intelligence – A Modern Approach, 2nd edition
Russel & Norvig, 2002

Machine Learning
Tom Mitchel, 2001

Expert Systems Principles and Programming, 3rd edition
Giarratano & Riley
1998

Introduction to Expert Systems, 3rd edition
Peter Jackson, 1998

Applying Case Based Reasoning
Ian Watson, 1997

Signature of Teacher:_____

Fuzzy Set Theory and Its Applications, 4th edition
Zimmerman, 2001

Access Conditions and Attendance Excuse

According to law

Conditions for Exam Admission

No restricitons

Evaluation Method

Final Exam – 10 points
Final Practical Work – 10 points DEAD LINE for FINAL VERSION PRESENTATION: 1 week before 1st call exam

Conditions for Results Improvement

Access to 2nd exam call for improvement of classification of the 1st exam call

The final practical exam is unique, i.e., we can accept a single version of the work without possibility of improvement. For special epoch exams there is the possibility of a new practical work, but with a theme different from that used in the normal epoch(s).

Date **Signature from the lecturer responsible for the course**

2019/11/4

Instituto Superior de Engenharia de Coimbra
www.isec.pt

Signature of Teacher: _____

Licenciatura – *Engenharia Informática (Diurno, Pós-Laboral e Curso Europeu)*

Licenciatura – BsC *Informatics Engineering, Informatics Engineering – evening classes, European Computer Science*

Academic Year: **18/19**

Program Contents

Course Unit MODELING AND DESIGN

Specialization (s) APPLICATIONS DEVELOPMENT; INFORMATION SYSTEMS

Subject type Specialization **Research Area** Software Engineering

Year 2 **Semester** 2 **ECTS** 5

Working Hours

Activity Type	Working Hours Per Week	Total Hours
Theoretical Lectures	2	28
Theoretical-Practical Lectures		
Practical-Laboratory Lectures	2	28
Tutorial Orientation		
Project		
Total of Working Hours		133,5

Unaccompanied Working Hours

Activity Type	Total Hours
Study	40
Works / Group Works	30,5
Project	
Evaluation	2
Additional	

Lecturer

Activity Type	Name	Qualifications	Category
Theoretical Lectures	Carlos Pereira	Phd	Coordinator Professor
Theoretical-Practical Lectures			
Practical-Laboratory Lectures	Maria Armanda Correia Francisco Leite	MSc MsC	Adjoint Professor Assistant Professor
Tutorial Orientation			
Project			

Responsible(s) Lecturer (s) Carlos Pereira

Goals

This curricular unit focus on the various paradigms of programming and analysis, in particular object-oriented analysis represented through appropriate diagrams and documents. Students should learn how to model the organization business requirements, information system and its functional and non-functional requirements, using the UML modeling language.

Skills

I. Describe and understand the evolution of paradigms of software analysis and construction using the UML diagrams - to describe organizations, processes, static structure of software and dynamic behavior of the system.
II. Correctly interpret UML diagrams
III. Perform an object-oriented analysis of a system
IV. Identify and correctly represent the requirements of an organization using appropriate diagrams.
V. Construct UML diagrams suitable for the detailed description of a software solution.
VI. Evaluate the implications of architectural options in software development.
VII. Creating UML diagrams suitable for general analysis of a system
VIII. Develop innovative projects with a reasonable degree of autonomy.

Signature of Teacher:_____

Program Contents

1. Introduction to Software Engineering
   - Software Development Processes
   - Requirements Engineering
   - Development
   - Verification and Validation
   - Object Oriented Analysis
2. Introduction to the UML
3. Use Cases Diagrams
4. Activity Diagrams
5. Class Diagrams
6. Object Diagrams
7. Sequence Diagrams
8. Communication Diagrams
9. Component Diagrams
10. Installation Diagrams
11. Software Patterns

Bibliography

- UML Distilled, Martin Fowler, 3ª Edição, 2004;
- UML - Metodologias e Ferramentas CASE, A. Silva, C. Videira, 2ª edição, 2008;
- Fundamental de UML / Mauro Nunes, Henrique O'Neill, 5º edição, Lisboa : FCA - Editora de Informática, 2004;
- UML : guia do usuário / Grady Booch, James Rumbaugh, Ivar Jacobson, Editora Campus, 2000;
- Patterns in Java : a catalog of reusable design patterns illustrated with UML / Mark Grand, New York : John Wiley, 1998;
- Slides das aulas teóricas e laboratoriais.

Access Conditions and Attendance Excuse

Without special conditions

Conditions for Exam Admission

Without special conditions

Evaluation Method

Theoretical component– 10 values
(Written examination)
Practical Component – 10 values
(Software Project)

Conditions for Results Improvement

Without special conditions

Date 24/1/19

Signature from the lecturer responsible for the course

Instituto Superior de Engenharia de Coimbra
www.isec.pt

Lecturer's signature:_____

Licenciatura – BsC Curso Europeu Informática(Português)

Licenciatura – BsC European Computer Science(Inglês)

2018/2019

Program Contents

Course Unit FOREIGN LANGUAGES IV (GERMAN)

Specialization (s) SOCIO-PROFESSIONAL CONTEXT

Subject type Languages **Research Area** Humanities

Year 2 **Semester** 2 **ECTS** 3

Working Hours

Activity Type	Working Hours Per Week	Total Hours
Theoretical Lectures	1	14
Theoretical-Practical Lectures	2	28
Practical-Laboratoty Lectures		
Tutorial Orientation		
Project		
Total of Working Hours		80

Unaccompanied Working Hours

Activity Type	Total Hours
Study	35
Works / Group Works	
Project	
Evaluation	3
Additional	

Lecturer

Activity Type	Name	Qualifications	Category
Theoretical Lectures	Marina Pires	German/English Degree	Guest Assistant
Theoretical-Practical Lectures	Marina Pires	German/English Degree	Guest Assistant
Practical-Laboratoty Lectures			
Tutorial Orientation			
Project			

Responsible(s) Lecturer (s) Marina Pires

Goals

The purpose of the German IV course is to provide students with an improvement in German language skills in order to improve the communicative skills of writing, listening and listening, as well as speaking skills, facilitating the student's insertion in an academic environment abroad.

Skills

The student will learn to express himself / herself in everyday life in a polite way, both at the linguistic level and also on cultural aspects; the student will be able to express his opinion, make a small presentation, make and understand comments. In a debate, you will be able to argue about current issues. You will also be able to write texts related to your personal interests, as well as personal and semiformal letters.

Lecturer's signature:_____

Program Contents

Situations
- Understand and formulate requests, advice and orders
- Ask politely, ask and respond
- Talk about clothing, its colors and materials
- Make and respond to invitations
- Understand written texts about tourist attractions
- Ask, understand and give directions
- Give opinions about images
- Ask and ask for suggestions
- Book in a restaurant
- Talk about food and drink preferences
- Simulate a conversation in a restaurant
- Understand a prescription

Grammar
- Formal imperative with "Sie"
- Informal imperative
- Suggestions with "wir"
- Suggestions with "Sollen / Wollen wir ...?", "Soll ich ...?"
- Modalpartikeln: "doch", "mal", "doch mal"
- Places with Akk. and Dat.
- Indefinite Pronouns
- Nouns originating from adjectives
- Nouns with origin in verbs
- Gender of nouns
- Nom. and Akk. of adjectives preceded by definite article, negative and possessive

Bibliography

The materials used are distributed throughout the course.
¬ Sander, I .; Braun, B., et al. "DaF Kompakt A1 - Deutsch als Fremdsprache für Erwachsene, Kurs- und Übungsbuch". Ernest Klett Sprachen. Stuttgart, 2011
¬ Langenscheidts Taschenwörterbuch Deutsch Englisch - Portugiesisch Deutsch, Langescheidt KG, 2008

Access Conditions and Attendance Excuse

None.

Lecturer's signature:

Conditions for Exam Admission

None.

Evaluation Method

The German - Foreign Language Assessment Scheme IV works with continuous assessment and consists of the mandatory completion of:

(1) 2 tests (80%)

March 20th and May 22nd 2019

(2) Oral Participation / Presentation (20%)

The student is required to complete all the elements, these being: 2 tests and a minimum of 75% attendance in classes in order to pass the course.

If the student fails one of the tests, he can only compensate for it with plausible justification, followed by the teacher's authorization. In this event, you will be charged 1 note value in the respective test.

The evaluation by final exam only covers those students who, by virtue of the law, can not be required to attend classes and consists of a written A1 level examination and an oral presentation.

Conditions for Results Improvement

Those defined in legislation and regulations in effect.

Date	Signature from the lecturer responsible for the course
January 18th, 2019	Marina Pires