ECTS Information Package: Degree Programme

Bachelor's Degree in

INFORMATICS AND MULTIMEDIA TECHNOLOGIES

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A - General Description

Programme Title - Informática e Tecnologias Multimédia

Qualification awarded - Bachelor's Degree in Informatics and Multimedia Technologies

Level of qualification - First-Cycle degree, ISCED Level 5, EQF Level 6

Specific admission requirements

General

In order to be eligible to this bachelor's degree, students must hold the high-school diploma or legally equivalent qualification. Application can also be made through the following special entry routes:

- Students coming from the Portuguese education system through re-admission, degree change and transfer schemes;
- Holders of a Foundation Course Diploma (CET);
- Adults aged more than 23 who have passed tailor-made examinations intended to assess their ability to pursue higher education studies;
- Holders of Intermediary or Graduate degree diplomas;
- Students coming from foreign higher education.

Specific

Candidates who have passed one of the following national access examinations are accepted for direct entry in the Informatics and Multimedia Technology program: (16) Mathematics or (04) Economics and (16) Mathematics or (16) Mathematics and (18) Portuguese with a minimum score of 95 points out of 200.

Without prejudice to the general entry requirements and based on IPT's internal regulations, the following candidates may be admitted to the bachelor's degree in Informatics and Multimedia Technology subject to admission quotas:

- candidates from the following regions: Castelo Branco, Leiria, Portalegre and Santarém (50%);

- candidates who have completed level-4 Vocational Courses (20%).

- holders of a vocational higher education diploma (CTeSp)

Specific arrangements for recognition of prior learning (formal, non-formal and informal)

General
Procedures on the recognition of credits gained in previous learning are established in the regulations for the Recognition and Validation of Qualifications and Skills of ESTA-IPT available at http://webmanager.ipt.pt/mgallery/default.asp?obj=4226

Specific
Specific arrangements for the accreditation of prior learning are set out in the regulations on the Recognition, Validation and Accreditation of Qualifications and Skills of the Escola Superior de Tecnologia de Abrantes available at http://webmanager.ipt.pt/mgallery/default.asp?obj=4226

Qualification requirements and regulations:
180 ECTS credits distributed throughout 6 curricular semesters (3 years). Total study hours per year: 1620 (1 ECTS credit = 27 study hours).

Course structure comprises 5 compulsory modules per semester (except for the final semester) and third-year students can choose two modules (Option I and Option II) from fields such as Programming, Information Systems or Multimedia Technologies.

In addition, the course includes a Final Project or Professional Internship in Informatics and Multimedia Technology worth 20 ECTS credits.

Profile of the program:
The programme of study is practice-oriented in a range of computer science related areas:

- Multiplatform Software Development;
- Design, Installation and Management of Computer Systems;
- Web Project Development

Key learning outcomes:
Graduates in Informatics and Multimedia Technology are expected to be able to design, develop and manage computer-based systems as well as to assist with the automation of organisational processes and development of their respective information systems. They should also be able to implement internal communication networks (intranets) and effective and safe online presence of organisations on external networks (Internet) so as to communicate with clients and governmental authorities.

Occupational profiles of graduates with examples:
Considering the lack of computer professionals in the market, there is a growing demand for these experts, and demand is still higher than supply.

Generally, graduates from this course are prepared to work in organisations of all sectors designing, developing and managing computer-based systems. They will also be able to assist with the automation of organisational processes and development of their respective information systems. They should also be able to implement internal communication networks (intranets) and effective and safe online presence of organisations on external networks (Internet) so as to communicate with clients and governmental authorities.

Access to further studies:
The bachelor's degree in Informatics and Multimedia Technology allows pursuing to second-cycle and postgraduate programs according to applicable admission regulations.

Course structure diagram with credits

Course Title	Year	Semester	Credits
Discrete Mathematics	1	S1	6
Expression and Communication Techniques	1	S1	6
Information and Communication Technologies	1	S1	6
Programming and Algorithmics	1	S1	7
Technical English	1	S1	5
Calculus	1	S2	6
Computer Architecture	1	S2	6
Internet Technologies	1	S2	6
Linear Algebra and Analytical Geometry	1	S2	6
Programming Languages	1	S2	6
Advanced Development of Internet Applications I	2	S1	6
Databases	2	S1	6
Multimedia Content Creation	2	S1	6
Object-Oriented Programming	2	S1	6
Operating Systems	2	S1	6
Advanced Development of Internet Applications II	2	S2	6
Advanced Programming Techniques	2	S2	6
Computer Graphics	2	S2	6
Computer Networks and System Management	2	S2	6
Organisational Information Systems	2	S2	6
2D and 3D Animation	3	S1	6
Development of Applications for Mobile Devices	3	S1	6
ICT Quality Assurance	3	S1	6
Machine Learning	3	S1	6
Project Planning and Management	3	S1	6
(optional)	3	S2	
Digital Game Development (optional) (*)	3	S2	5
Digital Marketing and Social Media (optional) (*)	3	S2	5

(*) This course may not be available in certain academic years. Please confirm availability with the Erasmus coordinator.

Examination regulations, assessment and grading

General
General assessment rules are in line with the Portuguese law and described in the Academic Regulations of ESTA-IPT available at http://webmanager.ipt.pt/mgallery/default.asp?obj=4178.

The licenciado degree is awarded a final grade between 10 and 20 within a 0/20 scale as well as its equivalent in the European grading scale.

Specific
Assessment criteria for each individual course unit are specified in the respective programme specifications.

Graduation requirements:
Completion of the programme requires a pass in all its constituent course units including public defence of the final project/internship report in order to accumulate 180 ECTS credits.

Mode of study:
Full- or part-time.

Program director or equivalente

Director: Sandra Maria Gonçalves Vilas Boas Jardim
Erasmus coordinator: Hélder da Corte Pestana
ECTS coordinator: Sandra Maria Gonçalves Vilas Boas Jardim

B - Description of individual course units

Course unit title	Discrete Mathematics
Course unit code	81432
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	First Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Maria Isabel Vaz Pitacas
Learning outcomes of the course unit	Basics of logic with a view to eliminate reasoning errors. Based on Logic, Boolean Algebra will enable students to deal with the language used in electronic circuits. Students will be familiarised with the intuitive set theory.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Prior knowledge of Mathematics at secondary school level
Recommended optional programme componentes	Not applicable
Course contentes	1. Logic 2. Boolean Algebra 3. Set theory 4. Binary relations 5. Introduction to graph theory
Recommended or required Reading	- Rosen, K.(2009). *Matemática Discreta e suas Aplicações*. McGrawHill: McGrawHill - Biggs, N.(2005). *Discrete Mathematics*. Oxford: Oxford University Press - Rostami, M. e Cardoso, D. (2009). *Matemática Discreta*. Lisboa: Escolar Editora - Lipson, M. e Lipschutz, S. (1997). *Matemática Discreta*. Bookman: Colecção Schaum
Planned learning activities and teaching methods	Lectures supported by case studies and practical exercises. Tutorials.
Assessment Methods and criteria	Assessment -Midterm:2 written tests (0/20 grade points). Final mark: 0.5PE1+0.5PE2. Exam exemption: over 6 grade points in each midterm test and minimum mark of 10/20. -Final:Exam(written test: minimum mark 10/20)
Language of Instruction	Portuguese
Work placement(s)	Not applicable

B - Description of individual course units

Course unit title	Expression and Communication Techniques
Course unit code	81430
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	First Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Maria da Conceição Correia Salvado Pinto Pereira Barras Romana
Learning outcomes of the course unit	A-Develop comprehension and oral/writing skills. B-Produce texts using different methods and models. C-Be aware of the significance of adapting speech to a given communication context. D-Develop skills - comprehension - oral proficiency E-Acquire research methods and techniques
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable
Recommended optional programme componentes	Not applicable
Course contentes	1. communication and language 2. written expression - text 3. text composition 4. oral communication techniques - speech 5. conversation techniques 6. academic essay writing techniques
Recommended or required Reading	- Correia, J.(1978). *Introdução às técnicas de Comunicação e de Expressão*. (Vol. 1). (pp. 1---). Lisboa: Novidades Pedagógicas - Figueiredo, E.(2003). *Da língua ao Discurso*. (Vol. 1). (pp. 1---). Porto: Porto Editora
Planned learning activities and teaching methods	a) Lectures b) Laboratory classes involving practical exercises
Assessment Methods and criteria	Continuous assessment: written test (30%) + 2 written essays + oral presentation (25% + 25%) + class coursework. Final assessment: written exam. A minimum average mark of 10/20 is required to pass.
Language of Instruction	Portuguese
Work placement(s)	Not applicable

B - Description of individual course units

Course unit title	Information and Communication Technologies
Course unit code	81433
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	First Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Ricardo Nuno Taborda Campos
Learning outcomes of the course unit	On completion of this unit students should: 1) Learn how to use Word to support business activity; 2) Improve communication and disseminate knowledge through the use of presentation software development; 3) use Excel as a BI tool; 4)know how to automate routines using VB;
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Computer skills at user level
Recommended optional programme componentes	Not applicable.
Course contentes	1. Microsoft Word 2. Microsoft Powerpoint 3. Microsoft Excel
Recommended or required Reading	- Costa, N. e Marques, P. (2013). *Fundamental do Word 2013*. (Vol. 1). (pp. 1-360). Lisboa: FCA - Editora Informática
Planned learning activities and teaching methods	Theoretical/Practical Classes: Demonstration of the syllabus to the students using the demonstrative and the lecture method Practicals: Analysis and resolution of practical cases (adapted to the professional reality)
Assessment Methods and criteria	Continuous assessment: Test (60%) + Project I (10%) + Project II (10%) + Project III (20%) Final Assessment: Exam (100%)
Language of Instruction	Portuguese | **Mentoring in** English
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Programming and Algorithmics
Course unit code	81434
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	First Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	7
Name of Lecturer(s)	Sandra Maria Gonçalves Vilas Boas Jardim
Learning outcomes of the course unit	Students who successfully complete this module should be able to: 1. Analyse and build algorithms for solving various kinds of problems. 2. Be familiarised with and be able to apply different data structures and flow control structures. 3. Implement algorithms using the C programming language.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable
Recommended optional programme componentes	Not applicable
Course contentes	A. Basic concepts of computing and computers. B. Algorithms and languages: Flow Diagrams and Pseudocode. C. Information handling. D. Decision-making and repetition structures. E. Composite data structures (arrays; structures; strings). F. Modularity. G. Iterative and recursive algorithms. H. Dynamic memory management. I. Operations on files.
Recommended or required Reading	- Kochan, S.(2014). *Programming in C*. (Vol. 1). (pp. 1-552). USA: Addison-Wesley Professional - Pereira, A.(2017). *C e Algoritmos*. (Vol. 1). (pp. 1-264). Portugal: Edições Sílabo
Planned learning activities and teaching methods	Lectures providing key concepts. Tutorials based on practical cases that enable the application of acquired concepts to real-life situations.
Assessment Methods and criteria	In all assessment periods (mid- and end-of-term) assessment includes a written test (40%) and a project work consisting in the implementation of a computer program (60%)
Language of Instruction	Portuguese
Work placement(s)	Not applicable

B - Description of individual course units

Course unit title	Technical English
Course unit code	81431
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	First Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	5
Name of Lecturer(s)	Susana Isabel Caetano Domingos
Learning outcomes of the course unit	A good command of the English language is crucial for future ICT professionals. Upon completion of this course students should be able to use English in working contexts in the field of computer and multimedia technology.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable
Recommended optional programme componentes	Not applicable
Course contentes	A - Subject Contents 1. Company types and departments 2. Technology and Communication 3. Communication systems 4. Video games 5. New Trends B - English 1. Articles, determiners 2. Adjectives, Adverbs 3. Prepositions 4. Verb tenses and forms 5. Conditional sentences 6. Reported speech 7. Passive voice
Recommended or required Reading	- Esteras, S.(2013). *Infotech - English for Computer Users*. Cambridge: Cambridge University Press - Turner, R. e Hughes, J. e Grant, D. (2009). *Business Result*. Oxford: Oxford University Press
Planned learning activities and teaching methods	Develop written comprehension and expression abilities; Develop oral abilities with the help of simulation and multimedia.
Assessment Methods and criteria	Continuous assessment Continuous assessment (50%) - 25%: useful, active participation - 25%: classroom tasks End-of-semester test - 50% (minimum mark - 8 grade points out of 20) Exam and resit Written and oral exam - 100%
Language of Instruction	English | **Mentoring in** Portuguese
Work placement(s)	

B - Description of individual course units

Course unit title	Calculus
Course unit code	81435
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	First Year
Semester/Trimester when the course unit is delivered	Second Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Maria Helena Morgado Monteiro
Learning outcomes of the course unit	a) Know and apply basic mathematical procedures used in the degree programme; b) Interpret data, formulate and solve problems involving derivation and integration of functions of one variable; c) Represent functions as a power series and calculate approximate values
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Knowledge of secondary school Algebra and Functions is assumed.
Recommended optional programme componentes	Not applicable.
Course contentes	1.Real functions. 2.Differential calculus:definitions, differentiation formulas, differential, extreme values, extremum problems. 3.Integral calculus: indefinite integral, definite integral - applications; 4.Series: series of numbers and series of functions.
Recommended or required Reading	- Edwards, B. e Hostetler, R. e Larson, R. (2006). *Cálculo*. (Vol. I). São Paulo: McGraw-Hill - Monteiro, H.(2018). *Apontamentos de Cálculo*. (Vol.). Abrantes: ESTA - Stewart, J.(2002). *Cálculo*. (Vol. 1). São paulo: Pioneira Thomson Learning - Tavares, J.(0). *Temas de Matemática Elementar*.Acedido em30 de dezembro de 2015 em http://cmup.fc.up.pt/cmup/apoiomat/manual_apoiomat_v1.pdf
Planned learning activities and teaching methods	Lectures dealing with the fundamentals of Calculus and its applications. Practical classes involve practising with calculus techniques and the application of skills and knowledge.
Assessment Methods and criteria	Ongoing assessment: three written tests (0-20) with minimum mark of 5. Exam assessment: a written test (0-20). Minimum mark to pass the exam is 10. Pass mark for ongoing assessment is the weighted average of the 3 tests and must total 10.
Language of Instruction	Portuguese
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Computer Architecture
Course unit code	81437
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	First Year
Semester/Trimester when the course unit is delivered	Second Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Valter José Gonçalves Bouça
Learning outcomes of the course unit	1. An introduction to digital systems 2. Students are expected to know the basics of computer architecture, i.e. the physical structure that enables software execution. 3. They should be able to describe the basic structure and functioning of a computer.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable
Recommended optional programme componentes	Not applicable
Course contentes	1. Basics of numbering systems 2. Analogue and digital systems 3. Logic functions and logic circuits 4. Computer architecture: CPU, Bus, controllers; 5. Interrupt and Trap management, Multitasking and Multiprocessing 6. I/O system structure. Synchronous and asynchronous drivers. 7. Memory, records, cache memory, RAM, disks. 8. Operation Modes
Recommended or required Reading	
Planned learning activities and teaching methods	Theoretical/practical classes supported by problem-solving tasks. Laboratory classes include supervised practical application of previously acquired skills and knowledge.
Assessment Methods and criteria	- 20%: Classroom performance or oral assessment task - 40%: 4 practical assignments on an individual basis or as part of a group (min. 10 grade points out of 20) - 40%: Written test (min. 8 grade points)
Language of Instruction	Portuguese
Work placement(s)	Not applicable

B - Description of individual course units

Course unit title	Internet Technologies
Course unit code	81438
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	First Year
Semester/Trimester when the course unit is delivered	Second Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Hélder da Corte Pestana
Learning outcomes of the course unit	The students will familiarise themselves with the different hypertext markup languages for developing websites: edit and code WebPages with the aid of specific applications (editors).
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable.
Recommended optional programme componentes	Not applicable.
Course contentes	1.The internet. 2.Hypertext markup language HTML and XHML. 3.Cascade Style Sheets. 4.Website Editors. 5.Producing dynamic pages using JavaScript. 6.Website edition.
Recommended or required Reading	- Coelho, P.(2012). *HTML 4 & XHTML - Curso Completo*. Lisboa: FCA - Coelho, P.(2012). *Javascript - Animação e Programação em Páginas Web*. Lisboa: FCA - Ughetto, V.(2012). *CSS – Criação Inovadora de Sites*. Lisboa: FCA - Oliveira, H.(2012). *Dreamweaver CS5 e CS5.5*. Lisboa: FCA
Planned learning activities and teaching methods	Theoretical-practical classes supported by case study analysis.
Assessment Methods and criteria	Normal Season: - 25% Participation - 25% Theoretical exam - 50% Final project Examination season and Make-up Season: - 50% Theoretical exam - 50% Final project
Language of Instruction	Portuguese | **Mentoring in** English
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Linear Algebra and Analytical Geometry
Course unit code	81436
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	First Year
Semester/Trimester when the course unit is delivered	Second Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Maria Isabel Vaz Pitacas
Learning outcomes of the course unit	1. Basic concepts of linear algebra and analytical geometry and its properties 2. Application of acquired concepts 3. Critical analysis 4. Communication skills 5. Learning skills
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Knowledge of secondary school Mathematics and Discrete Mathematics.
Recommended optional programme componentes	Not applicable
Course contentes	1. Matrices 2. Determinants 4. Analytical geometry
Recommended or required Reading	- Ferreira, M. e Amaral, I. (2008). *Álgebra Linear - Matrizes e determinantes*. (Vol. 1). (pp. 1---). Lisboa: IST Press - Ferreira, M. e Amaral, I. (2013). *Álgebra Linear - Espaços Vetoriais e Geometria Analítica*. (Vol. 2). (pp. 1---). Lisboa: IST Press
Planned learning activities and teaching methods	Lectures providing key concepts and foundations using practical cases. Laboratory sessions that enable the application of acquired concepts by means of practical exercises.
Assessment Methods and criteria	Assessment Mid-term assessment: three written tests (40%, 30%, 30%) with a minimum of 6 grade points out of 20. Exam exemption: more than 6 grade points in each written test. Final assessment: a written exam (0/20). Minimum pass grade is 10/20.
Language of Instruction	Portuguese | **Mentoring in** English
Work placement(s)	Not applicable

B - Description of individual course units

Course unit title	Programming Languages
Course unit code	81439
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	First Year
Semester/Trimester when the course unit is delivered	Second Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Fernando Sérgio Hortas Rodrigues Sandra Maria Gonçalves Vilas Boas Jardim
Learning outcomes of the course unit	1. Describe the more commonly used data structures and algorithms, its advantages, limitations and applications. 2. Use data structures to solve practical problems. 3. Design, develop, and test code to the resolution of medium- and large-scale problems.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Prior knowledge of Programming and Algorithms is advisable.
Recommended optional programme componentes	Not applicable
Course contentes	1. Algorithm design techniques 2. Sorting algorithms 3. Linear and non-linear data structures 4. Hierarchical data structures.
Recommended or required Reading	
Planned learning activities and teaching methods	Lectures. Laboratory classes dealing with problem-solving and computer-based practice.
Assessment Methods and criteria	Theoretical part (60%) - Closed-book written exam. 7 out of 20 is the minimum pass grade. Practical part (40%) - Final assignment 10 out of 20 is the minimum pass grade.
Language of Instruction	Portuguese
Work placement(s)	Not applicable

B - Description of individual course units

Course unit title	Advanced Development of Internet Applications I
Course unit code	814310
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	Second Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Hélder da Corte Pestana
Learning outcomes of the course unit	Provide technical knowledge for planning, production, management and dynamic user interaction using dynamic pages for the Internet. The students should be able to identify and use the concepts of client-side dynamics and server-side dynamics and use them to develop applications.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Basics of programming, HTML, CSS and Javascript
Recommended optional programme componentes	Web Scripting and Content Design
Course contentes	1.Dynamic and static webpages 2.Server-side languages and client-side languages 3.Web development using Hipertext Preprocessor (PHP) 4.Project
Recommended or required Reading	- Valade, J.(2006). *PHP & Mysql for Dummies*. EUA: Paperback - Marques, J. e Serrão, C. (2011). *Programação com PHP5*. Lisboa: FCA
Planned learning activities and teaching methods	Theoretical-practical classes supported by case study analysis and discussion.
Assessment Methods and criteria	Regular Season: - 25% Class performance - 75% Final assignment Exam Season and make-up Season: - 50% Theoretical exam - 50% Final assignment
Language of Instruction	Portuguese | **Mentoring in** English
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Databases
Course unit code	814311
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	Second Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Henrique Carlos dos Santos Mora
Learning outcomes of the course unit	1. Database fundamentals. 2. Students should be familiarised with related technologies and methodologies. 3. They should also be able to design, implement or follow-up projects involving large databases 4. Be familiarised with server-side programming, triggers and store procedures
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable
Recommended optional programme componentes	Not applicable
Course contentes	1. Fundamentals 2. Databases 3. Traditional drawing methods 4. Language for access to relational databases 5. Microsoft Sql Server 6. Structured Query Language 7. Modelling 8. Temporary Tables and Table Variables 9. Store Procedures and Functions 10. Triggers and Cursors
Recommended or required Reading	
Planned learning activities and teaching methods	Lectures providing key concepts. Tutorials based on practical cases that enable the application of acquired concepts.
Assessment Methods and criteria	Learning outcomes are assessed through a written test and practical assignments with pre-established submission dates. Assignments are undertaken as part of a group (but assessed individually) and includes final discussion.
Language of Instruction	Portuguese
Work placement(s)	Not applicable

B - Description of individual course units

Course unit title	Multimedia Content Creation
Course unit code	814313
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	Second Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Horácio Hugo Ferreira Faria de Azevedo e Silva
Learning outcomes of the course unit	On completion of this course students should be proficient in image correction and restoration, photomontage, vectorial drawing and motion graphics.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable
Recommended optional programme componentes	Not applicable
Course contentes	Adobe Photoshop; Document creation; Colour mode; Layers; Selection; Brushes; Restoration and Photomontage; Vector drawing; After effects.
Recommended or required Reading	- , . e Fridsma, L. e Gyncild, B. (2017). *Adobe After Effects CC Classroom in a Book* . (Vol. 1). Estados Unidos: Peachpit - Chang, R. e Wallin, J. e Straub, P. e Bergkvist, L. (2004). *Digital Painting*. (Vol. 1). Estados Unidos: Ballistic Publishing - Tilbury, R. e Perrins, C. e Hargreaves, J. e Morse, S. e Greenway, T. (2011). *Photoshop for 3d artists*. (Vol. 1). Reino Unido: 3dtotal
Planned learning activities and teaching methods	Lectures providing key concepts. Tutorials based on practical cases that enable the application of acquired concepts.
Assessment Methods and criteria	Continuous assessment: - Student attendance (5%) - Tasks completed during class time (25%) - Test (70%) Midterm assessment: - Midterm test (100%) Final assessment: - End-of-term Exam (100%)
Language of Instruction	Portuguese
Work placement(s)	Not applicable

B - Description of individual course units

Course unit title	Object-Oriented Programming
Course unit code	814312
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	Second Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Henrique Carlos dos Santos Mora
Learning outcomes of the course unit	1. Apply the basic principles of problem solving using the object-oriented programming paradigm. 2. Create functional code through Java and its class libraries. 3. Handle error and exception conditions when designing software.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Prior knowledge of Programming and Algorithmics and Programming Languages is advisable.
Recommended optional programme componentes	Not applicable
Course contentes	1. Introduction to Object-Oriented Programming 1.1 Class definition: Attributes, constructors, methods, encapsulation. 1.2 Class definition by association and inheritance 1.3 Interfaces and Polymorphism 2. Visual Programming 2.1 Design of graphical interfaces (SWING) 3. Class programming 4. Library class definition 4.1 Creation of packages and class libraries
Recommended or required Reading	
Planned learning activities and teaching methods	Lectures. Laboratory classes dealing with problem-solving and computer-based practice.
Assessment Methods and criteria	Theoretical component (60%) assessed by a written test. Practical component (40%) assessed by two practical tests and one practical assignment.
Language of Instruction	Portuguese
Work placement(s)	Not applicable

B - Description of individual course units

Course unit title	Operating Systems
Course unit code	814314
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	Second Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Valter José Gonçalves Bouça
Learning outcomes of the course unit	1. On completion of this course students should be familiarised with the key concepts and structures of operating systems. 2. They should be able to use Windows Server 2008 operating systems. 3. Be acquainted with the its main applications. 4. Be able to install and configure the Windows Server
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable
Recommended optional programme componentes	Computer Architecture
Course contentes	1. An introduction to Operating Systems 2. Basic functions of an OS 3. Process management and scheduling 4. Memory management 5. Synchronisation and communication between processes 6. Windows Server 2008 operating system 6.1. User and computer management 6.2. Group management 6.3. Security 6.4. Server administration and monitoring
Recommended or required Reading	
Planned learning activities and teaching methods	Theoretical-practical classes supported by audiovisual resources, lab equipment and practical examples.
Assessment Methods and criteria	Midterm assessment End-of-term assignment (>= 10/20) (30%) Midterm test (>= 8/20) (50%) Average mark of the 4 practical assignments (>= 8/20) (20%) Final assessment: End-of-term assignment (>= 10/20) (30%) Exam (>= 8/20) (50%)
Language of Instruction	Portuguese
Work placement(s)	Not applicable

B - Description of individual course units

Course unit title	Advanced Development of Internet Applications II
Course unit code	814318
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	Second Year
Semester/Trimester when the course unit is delivered	Second Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Hélder da Corte Pestana
Learning outcomes of the course unit	The students should be able to create dynamic web applications, interact with databases and users, create and use XML, create and use web services, create advanced techniques for server-side and client-side languages integration (Ajax); study and analyse emerging techniques.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Knowledge of PHP, HTML, CSS and Javascript
Recommended optional programme componentes	Have attended the following modules: -Advanced Development of Internet Applications I -Internet Technologies -Web Scripting and Design
Course contentes	1) Dynamic web pages editing using Dreamweaver 2) Ajax – Asynchronous Javascript and XML 3) Javascript Frameworks 4) Use of XML and Webservices 5) Advanced CSS techniques 6) Study/debate of emergent technologies 7) Project
Recommended or required Reading	
Planned learning activities and teaching methods	Lectures and tutorials supported by case study analysis and discussion
Assessment Methods and criteria	Class Performance (25%) Workshop about an emergent technology(25%) Final project (50%)
Language of Instruction	Portuguese | **Mentoring in** English
Work placement(s)	Not applicable.

B - Description of individual course units

Course unit title	Advanced Programming Techniques
Course unit code	814315
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	Second Year
Semester/Trimester when the course unit is delivered	Second Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Ricardo Nuno Taborda Campos
Learning outcomes of the course unit	This course aims to introduce students to computer programming using the Python language.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable
Recommended optional programme componentes	Not applicable
Course contentes	1. Algorithm design 2. Introduction to Python 3. Libray Use 4. Input and output of information 5. Variables 6. Arithmetic Operations 7. Data Types 8. Data Structures: arrays; lists; dictionaries; tuples; sets 9. Control structures 10. File reading and writing 11. Functions 12. Recursion 13. Exceptions 14. Introduction to OOP
Recommended or required Reading	- Liang, D.(2012). *Introducing to Programming using Python*. NA: NA - Costa, E. e , . (2016). *Programação em Python - Fundamentos e Resolução de Problemas* . Lisboa: FCA - Severance, C.(0). *Python for Everybody - Exploring Data Using Python 3*.Acedido em16 de fevereiro de 2018 em http://do1.dr-chuck.com/pythonlearn/EN_us/pythonlearn.pdf - Downey, A.(0). *Think Python - How to Think Like a Computer Scientist*.Acedido em16 de fevereiro de 2018 em http://greenteapress.com/wp/think-python
Planned learning activities and teaching methods	Lectures providing key concepts. Tutorials based on practical cases that enable the application of acquired concepts.
Assessment Methods and criteria	Midterm assessment: Midterm test (60%) + Mini test I (10%) + Mini test II (15%) + Mini test III (15%) Final assessment: Exam (100%)
Language of Instruction	Portuguese
Work placement(s)	Not applicable

B - Description of individual course units

Course unit title	Computer Graphics
Course unit code	814316
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	Second Year
Semester/Trimester when the course unit is delivered	Second Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Sandra Maria Gonçalves Vilas Boas Jardim
Learning outcomes of the course unit	1. Basic techniques of computer graphics. 2. Apply the concepts of linear algebra and analytic geometry in the definition and construction of applications and graphics systems 2. Create OpenGL programs with graphical interface, interactivity and animation
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Pre-knowledge of Discrete Mathematics, Linear Algebra and Analytical Geometry, Programming and Algorithmics and Programming Languages.
Recommended optional programme componentes	Not applicable
Course contentes	I. Rasterization; 2D drawing (lines, circles, and polygons); Fill algorithms II. Translation, rotation and scale; Homogeneous Coordinates; Composition of transformations III. Geometric Modelling IV. Colour, shading and lighting: local and global reflection models; ray tracing V. Projection: Virtual camera paradigm; Types of projection (parallel, oblique) VI. Using the OpenGL API
Recommended or required Reading	- Lengyel, E.(2011). *Mathematics for 3D Game Programming and Computer Graphics*. (Vol. 1). (pp. 1-576). USA: Cengage Learning PTR - Sklar, D. e Feiner, S. e Akeley, K. (2013). *Computer Graphics: Principles and Practice* . (Vol. 1). (pp. 1-1264). USA: Addison-Wesley Professional
Planned learning activities and teaching methods	Classes include topic presentation and practical cases. The main topics are explored through practical work to develop small programs, for example, 2D rasterization and lighting.
Assessment Methods and criteria	Written test (end-of-term test/exam) - 50% Final practical assignment - 50%
Language of Instruction	Portuguese
Work placement(s)	Not applicable

B - Description of individual course units

Course unit title	Computer Networks and System Management
Course unit code	814319
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	Second Year
Semester/Trimester when the course unit is delivered	Second Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Valter José Gonçalves Bouça
Learning outcomes of the course unit	1. On completion of this course students should be able to use protocols of each layer of TCP/IP stack to access network services. 2. Design, set up and configure local network equipment. 3. Apply good practices in the administration and maintenance of computer systems. 4. Identify critical ser
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not Applicable
Recommended optional programme componentes	Not applicable
Course contentes	1. Introduction to Computer Networks 2. OSI model and TCP/IP protocol stack 3. Layers of application, transport, network, and physics 4. The standard architecture of a local data network 5. Introduction to integrated management; Functional management model; SNMP protocol. 6. Installation, configuration, administration and maintenance of servers and authentication systems.
Recommended or required Reading	
Planned learning activities and teaching methods	Theoretical/practical classes supported by problem-solving tasks. Laboratory classes include supervised practical application of previously acquired skills and knowledge.
Assessment Methods and criteria	- 20%: Classroom performance or oral assessment task - 40%: 4 practical assignments on an individual basis or as part of a group (min. 10 grade points out of 20) - 40%: Written test (min. 8 grade points out of 20)
Language of Instruction	Portuguese
Work placement(s)	Not applicable

B - Description of individual course units

Course unit title	Organisational Information Systems
Course unit code	814317
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	Second Year
Semester/Trimester when the course unit is delivered	Second Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Nuno José Valente Lopes Madeira
Learning outcomes of the course unit	1. Students should understand the concepts of information, information systems and information technologies. 2. Understand the strategic role of OIS. 3. Be acquainted with the role of IT in an organisation as well as related functions and processes.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable
Recommended optional programme componentes	Not applicable
Course contentes	1. Organisational Information Systems: Processes - value chain; Evolution of information systems. 2. Solutions map; Content and Flow of Information; Existing tools in the market; IS/IT strategy. 3. Organizing an IT Department; Investment in IT assessment; Computer Audit and Security; Risk analysis; COBIT alignment, ITIL and Security; Legislation.
Recommended or required Reading	
Planned learning activities and teaching methods	Lectures, tutorials and group work. Workshops using desktop applications.
Assessment Methods and criteria	Continuous assessment (50%); Midterm test/Exam/Resit exam (50%)
Language of Instruction	Portuguese
Work placement(s)	Not applicable

B - Description of individual course units

Course unit title	2D and 3D Animation
Course unit code	814324
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	Third Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Horácio Hugo Ferreira Faria de Azevedo e Silva
Learning outcomes of the course unit	On completion of this course students should be able to model simple objects, apply shaders and textures, light sets and create basic animation and 3D effects.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable
Recommended optional programme componentes	Not applicable
Course contentes	Modelling; Textures; Basics of 3D animation; Object export; Lighting; Basics of 2D animation.
Recommended or required Reading	- Derakhshani, R. e Derakhshani, D. (2013). *Autodesk 3ds Max 2014 Essentials*. Indiana: Wiley - Greenway, T. e Morse, S. e Hargreaves, J. e Perrins, C. e Tilbury, R. (2011). *Photoshop for 3d artists*. (Vol. 1). Reino Unido: 3dtotal - Gyncild, B. e Fridsma, L. (2017). *Adobe After Effects CC Classroom in a Book* . (Vol. 1). Estados Unidos: Peachpit
Planned learning activities and teaching methods	Lectures providing key concepts. Practical sessions based on practical cases that enable the application of acquired concepts.
Assessment Methods and criteria	Continuous assessment: - Student attendance (5%) - Tasks completed during class time (25%) - Final Project (70%) Midterm assessment: - Final Project (100%) Final assessment: - Final Project (100%)
Language of Instruction	Portuguese
Work placement(s)	Not applicable

B - Description of individual course units

Course unit title	Development of Applications for Mobile Devices
Course unit code	814321
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	Third Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Vasco Renato Marques Gestosa da Silva
Learning outcomes of the course unit	An introduction to mobile computing. Students will learn how to design, manage and develop software solutions for mobile devices, services and networks using a multidisciplinary approach.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Prior knowledge of Discrete Mathematics, Programming and Algorithmics, Programming Languages, POO and Multimedia Contents.
Recommended optional programme componentes	Not applicable
Course contentes	1. Fundamentals of Mobile Computing 2. Anatomy and architecture of an application 3. Graphic interface, navigation and interaction 4. Data management and persistence 5. Use of multimedia and animation 6. Messaging and Networking 7. Maps and location 8. Sensors 9. App Publication
Recommended or required Reading	
Planned learning activities and teaching methods	Face-to-face lectures and laboratory classes. Tutorials.
Assessment Methods and criteria	Assessment is based on practical coursework (50%) and one written test (50%).
Language of Instruction	Portuguese
Work placement(s)	Not applicable

B - Description of individual course units

Course unit title	ICT Quality Assurance
Course unit code	814323
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	Third Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Henrique Carlos dos Santos Mora
Learning outcomes of the course unit	1. Be familiarised with concepts, problems and contexts for the application of quality systems in information and communication technologies. 2. Be acquainted with the standards and methodologies for the implementation of quality systems in the context of information and communication technologies.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable
Recommended optional programme componentes	Not applicable
Course contentes	1. General concepts of quality assurance concerning information systems and information technologies 2. Classification of information systems 3. Quality standards 4. Implementation of a quality assurance plan
Recommended or required Reading	
Planned learning activities and teaching methods	Lectures. Tutorials involving problem solving and assessed coursework.
Assessment Methods and criteria	Written test (40%) and practical assignments (60%) with pre-established dates for report submission. Assignments are undertaken as part of a group but assessed individually and includes final discussion.
Language of Instruction	Portuguese
Work placement(s)	Not applicable

B - Description of individual course units

Course unit title	Machine Learning
Course unit code	814320
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	Third Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Sandra Maria Gonçalves Vilas Boas Jardim
Learning outcomes of the course unit	1. Basic principles, mathematical foundations and technical applications of machine learning. 2. The strengths and weaknesses of different algorithms for different domains of application. 3. The overlearning phenomenon.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	The course builds on the knowledge acquired in Calculus, Discrete Mathematics, Programming and Algorithmics and Programming Languages.
Recommended optional programme componentes	Not applicable
Course contentes	I. Introduction II. Parametric regression III. Fundamentals IV. MV method and regression models V. Classification concepts VI. Bayes Theory VII. Linear discriminant classification VIII. Gradient descent methods IX. Classification with logistic discriminants and neuronal networks X. Non-supervised methods XI. Decision trees
Recommended or required Reading	- Stork, D. e Hart, P. e O. Duda, R. (2000). *Pattern Classification*. (Vol. 1). (pp. 1-635). USA: Wiley-Interscience - Jensen, F. e Nielsen, T. (2007). *Bayesian Networks and Decision Graphs (Information Science and Statistics)*. (Vol. 1). (pp. 1-448). USA: Springer - Marques, J.(2005). *Reconhecimento de Padrões - Métodos Estatísticos e Neuronais*. (Vol. 1). (pp. 1-284). Lisboa: IST Press
Planned learning activities and teaching methods	Classes include topic presentation and practical cases. Key topics are supported by exercises and computer-based practical coursework.
Assessment Methods and criteria	Written test worth 40% of the final mark. Battery of problem solving tasks worth 60% of the final mark.
Language of Instruction	Portuguese
Work placement(s)	Not applicable

B - Description of individual course units

Course unit title	Project Planning and Management
Course unit code	814322
Type of course unit	Compulsory
Level of Course unit	First Cycle
Year of Study	Third Year
Semester/Trimester when the course unit is delivered	First Semester
Number of ECTS credits allocated	6
Name of Lecturer(s)	Nuno José Valente Lopes Madeira Sandra Maria Gonçalves Vilas Boas Jardim
Learning outcomes of the course unit	1 - Master planning concepts, methods and techniques; 2 - Understand the lifecycle of a project; 3 - Estimate the budget and the actual cost of a project; 4 - Use appropriate software to solve practical PGP problems.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable
Recommended optional programme componentes	Not applicable
Course contentes	1. Project 2. Project lifecycle. 3. Project planning 4. Budgeting and cost estimating 5. Project execution 6. Development of an application in Microsoft Project
Recommended or required Reading	- Miguel, A.(2012). *Gestão de Projetos de Software*. (Vol. 1). Portugal: FCA
Planned learning activities and teaching methods	Lectures; theoretical-practical classes with practical exercises and case studies.
Assessment Methods and criteria	Continuous assessment Classroom performance (10%) End-of-term assignment (>= 10/20) (70%) Midterm test (>= 8/20) (20%) Final assessment: End-of-term assignment (>= 10/20) (70%) Midterm test (>= 8/20) (30%)
Language of Instruction	Portuguese
Work placement(s)	Not applicable

B - Description of individual course units

Course unit title	Digital Game Development (*)
Course unit code	814330
Type of course unit	Optional
Level of Course unit	First Cycle
Year of Study	Third Year
Semester/Trimester when the course unit is delivered	Second Semester
Number of ECTS credits allocated	5
Name of Lecturer(s)	Henrique Carlos dos Santos Mora
Learning outcomes of the course unit	1. A general overview of the various types of digital games 2. Students should become acquainted with the several steps for creating a digital game, the purpose and the actors involved in each step 3. They should also become familiar with the main supporting documents for the development of a dig
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable
Recommended optional programme componentes	Not applicable
Course contentes	1. A general overview of the various types of digital games 2. Students should become acquainted with the several steps for creating a digital game, the purpose and the actors involved in each step 3. They should also become familiar with the main supporting documents for the development of a digital game 4. Creating a digital game
Recommended or required Reading	
Planned learning activities and teaching methods	Theoretical/practical classes supported by problem-solving tasks; Laboratory classes including supervised practical application of previously acquired skills and knowledge.
Assessment Methods and criteria	Continuous assessment - class participation (20%); Individual or group assignment (70%); Oral presentation (10%). Midterm assessment: Individual or group assessment (70%); Oral presentation (30%).
Language of Instruction	Portuguese | **Mentoring in** English
Work placement(s)	Not applicable

(*) This course may not be available in certain academic years. Please confirm availability with the Erasmus coordinator.

B - Description of individual course units

Course unit title	Digital Marketing and Social Media (*)
Course unit code	814331
Type of course unit	Optional
Level of Course unit	First Cycle
Year of Study	Third Year
Semester/Trimester when the course unit is delivered	Second Semester
Number of ECTS credits allocated	5
Name of Lecturer(s)	Luís Alberto de Jesus Gaio Curvelo
Learning outcomes of the course unit	On completion of the course students should be able to develop a Digital Marketing Plan on social media that will allow them to apply acquired knowledge and skills.
Mode of delivery	Face-to-face
Prerequisites and co-requisites	Not applicable
Recommended optional programme componentes	Not applicable
Course contentes	Introduction to Marketing - "Analog Marketing" and "Digital Marketing" Analogue and Digital Media, "eBranding" Brand and E-Content, Social Media, Consumer Behaviours Digital Customer Journey, Digital Marketing Plan Diagnosis, SWOT Analysis, Objectives, Options Strategic Plan, Operational Plan, Action Plans, Review and Return.
Recommended or required Reading	- Ellis-Chadwic, F. e Chaffey, D. (2012). *Digital Marketing - Strategy, Implementation and Practice*. (Vol. 1). (pp. 1-728). UK: Pearson - Carrera, F.(2012). *Filipe, Marketing Digital na versão 2.0 - o que não pode ignorar*. (Vol. 1). (pp. 1---). Portugal: Silabo
Planned learning activities and teaching methods	Face-to-face - theoretical and practical classes, case studies, oral and written presentations.
Assessment Methods and criteria	Continuous assessment: Class participation and performance in the analysis of practical cases (25%). Final assignment - presentation and discussion (75%). Final assessment: Written exam (100%).
Language of Instruction	Portuguese | **Mentoring in** English
Work placement(s)	Not applicable

(*) This course may not be available in certain academic years. Please confirm availability with the Erasmus coordinator.