

Polytechnic Institute of Viseu

School of Technology and Management of Lamego

International Semesters for students

INFORMATICS AND TELECOMMUNICATIONS ENGINEERING

Spring Semester

Semester title	INFORMATICS AND TELECOMMUNICATIONS ENGINEERING	Semesters	Spring
Person responsible	Fernando Miguel Soares Mamede Santos Ricardo Luís da Costa Gama	E-mail address	fsantos@estgl.ipv.pt rgama@estgl.ipv.pt
Coordinator	Isabel Oliveira	E-mail address	ioliveira@estgl.ipv.pt
Language of instruction	English	ECTS points total	30
Course type	Course title	Name of the lecturer	ECTS points
Compulsory	Computer Systems Architecture	José Lopes	6
Compulsory	Probability and Statistics	Ricardo Gama	6
Compulsory	Telecommunications Fundamentals	Armando Cruz	6
Compulsory	Audio and Video Systems	Pedro Lopes	6
Compulsory	Distributed Systems	Carlos Costa	6

Course title	Computer Systems Architecture		
Teaching method	In the beginning it's made a diagnose of the knowledge of the students, the objectives and competences of the curricular unit are presented, and it's explained it's integration in the curse's curricula and professional profile. Then, the syllabus's contents are presented and explained by the lecturer, with examples, exercises and quizzes, in order to engage students in the learning process. Practical examples, exercises are presented and explained too, and activities to do outside of the sessions are proposed. Group activities are done as well, namely lab activities and practical works, in order to develop practical competences. To access the students, it will be accounted the participation of the students in the session's activities and outside of them, assiduity, group activities, and individual written tests.		
Person responsible for the course	José Lopes	E-mail address:	jlopes@estgl.ipv.pt
Language of instruction	English	ECTS points	6
Semester	Sping Semester	Type of course	compulsory
Hours per week	4h	Hours per semester	HT: 162 TP: 45 PL: 15
Objectives of the course	Objectives: Comprehension of computer's systems, in order to compare and chose them. Give the student concepts of organization and architecture of computers, to permit the identification and description of its constitution. Microprocessor's architecture analysis. Analysis of the conception of architectures in the performance point of view. Competences: Communication of information, ideas, problems and solutions to different publics. Learning autonomy, to permit following the technological evolution, and the development of new competences. Diagnose of problems and proposition of new solutions supported by the selection e interpretation of relevant information. Integration and team work, showing responsibility, initiative and tolerance. Innovation and experiment of new solutions and proposal of better ones. Maintenance and administration of computer systems.		
Entry requirements	There aren't any.		
Course contents	Theory: Basic computer architecture; Arithmetic and Logical Unit; Central Processing Unit; Control Unit; Memories; Input/Output; Parallel computing; Benchmarking; Assembly language. Practice: Exercises of number conversion to complement of two; Exercises of computer's performance; Benchmarking; Exercises of Assembly language.		
Assessment methods	Test(s) (70%) Work (30%)		
Recommended readings	Stallings W., Computer Organization and Architecture, Designing for Performance, 6th edition, Prentice Hall, 2003. Tanenbaum A., Structured Computer Organization, 4th edition, Prentice Hall, 1999. Patterson D. And Hennessy J., Computer Organization & Design, 2nd edition, Morgan Kaufman, 1997.		
Additional information			

Course title	Probability and Statistics		
Teaching method	The teaching methodology consists of the theoretical- practical classes, intercalated with practical sessions. In the theoretical classes the student is exposed to the basic foundations of the discipline, always accompanied by examples illustrating the applicability of the matter. In practical classes are proposed to students a set of exercises to solve, with the aim of applying the knowledge gained previously. The complete the student formation, are given three practical guides and a practical group work where students have to apply the knowledge acquired in class, studying and analyzing a set of problems, using simulation to solve them. The course evaluation is made through two tests and a practical group assignment, where the tests have a weight of 40% of the final grade and the work 20%.		
Person responsible for the course	Ricardo Gama	E-mail address:	rgama@estgl.ipv.pt
Language of instruction	English	ECTS points	6
Semester	Spring	Type of course	compulsory
Hours per week	4h	Hours per semester	HT: 162 TP: 60
Objectives of the course	It is intended that the curricular unit, be a working tool, enabling the analysis and interpretation of results in the context of other subjects of the course and during the professional life of the student. The course's main objectives are to instill in students the spirit of investigation and self-study, leading them to discover new ways of solving certain problems, using techniques from probability and statistics; In particular, the course aims to clarify students to which phenomena may be analyzed using statistical techniques, illustrating them with real life situations, emphasizing the role of Statistics in its description; develop capacity of treatment and representation of randomness and its incorporation into decision-making processes where uncertainty is present. It is also intended that the students acquire practice in solving problems using software.		
Entry requirements	There aren't any.		
Course contents	Probability: Counting rules, Probability definition, Conditional probability, Independent events, Bayes theorem. Random variables. Probability distributions, Random variable definition, Expected value and variance of a random variable, Discrete probability distributions: Binomial, Geometric, Poisson. Continuous probability distributions: Normal, Exponential. Introduction to the Poisson Process: Introduction to simulation (motivation and application examples), Random variables simulations Bidimension random variables : Random vector and joint distribution, Marginal distribution and conditional distributions, Independent variables, Correlation coefficiente.		
Assessment methods	Practical test(s) (80%) Practical work (20%)		
Recommended readings	A. Pedrosa e S. Gama. Introdução Computacional à probabilidade e Estatística, Porto Editora, Lda., 2004 Paul L. Meyer, Probabilidade. Aplicações à Estatística, Livros técnicos e científicos Editora, Lda., 1980 Intuitive Probability and Random Processes Using MATLAB, Springer, 2006 (http://www.ele.uri.edu/faculty/kay/New%20web/Books.htm)		
Additional information			

Course title	Telecommunications Fundamentals		
Teaching method	<p>Relating to teaching methodologies: theoretical topics are presented, followed by simulation experiments related to taught topics. This methodology it intended for the students to experiment several modulator and demodulator configurations, being able to acquire sensibility to different aspects, components, and configurations to use, allowing errors to be detected in the most complex configurations while knowing the signal path through the signal processing chain.</p> <p>Continuous Evaluation is composed by: Attendance (5%) Class evaluation (20%) Simulation work (40% min 9.5) Final test (35% min 9.5)</p> <p>Final and recourse evaluation is composed by: Practical test (60% min 9.5) Theoretical test (40% min 9.5)</p>		
Person responsible for the course	Armando Cruz	E-mail address:	acruz@estgl.ipv.pt
Language of instruction	English	ECTS points	6
Semester	Spring	Type of course	compulsory
Hours per week	4h	Hours per semester	<p>HT: 162</p> <p>TP: 60</p>
Objectives of the course	Identify analog signals. Grasp modulation and demodulation concepts. Know and distinguish different analog modulations. Being capable of performing simulations of modulators and demodulators.		
Entry requirements	There aren't any.		
Course contents	<p>1) Signal a) Introduction to ScicosLab simulation environment b) Simple signal work</p> <p>2) Filters a) Applications of filters to signals b) Filter in a chain c) Analog filter configuration d) Digital filter configuration</p> <p>3) Amplitude Modulation a) Amplitude modulation b) DSBSC c) SSB</p> <p>4) Phase modulation a) Frequency modulation b) FM demodulation c) Bandwidth analysis through Bessel function</p>		
Assessment methods	<p>Two practical works (20%)</p> <p>Individual written test(s) (80%)</p>		
Recommended readings	<p>Haykin S., Communication systems, 4th edition, John Wiley & Sons, 2001</p> <p>Carlson B., Communication Systems, 4th edition, McGraw-Hill, 2002</p> <p>Schwartz M., Information Transmission, Modulation, and Noise, 4th edition, McGraw-Hill, 1990</p> <p>Proakis J.G., Salehi M., Communication Systems Engineering, 2nd edition, Prentice-Hall, 2002</p>		
Additional information			

Course title	Audio and Video Systems		
Teaching method	Practical and application classes. Students will be encouraged to explore different environments and applications for editing, production and post-production audio and video.		
Person responsible for the course	Pedro Lopes	E-mail address:	plopes@estgl.ipv.pt
Language of instruction	English	ECTS points	6
Semester	Spring	Type of course	compulsory
Hours per week	4h	Hours per semester	HT: 162 TP: 30 PL: 30
Objectives of the course	<p>Know the means, techniques and applications of audio and video in communication systems, using the internet.</p> <p>Capture audio and video from various sources</p> <p>Know how to convert audio and video files for the purposes they are intended for</p> <p>Know the theoretical and practical fundamentals of audio and video editing</p> <p>Operate audiovisual equipment, recording and storage media for analogue and digital audio and video</p> <p>Using your computer for capturing, editing, and broadcasting audio and video</p> <p>Edit audio and video in specific software</p> <p>Embed streaming audio and video over the Internet.</p>		
Entry requirements	There aren't any.		
Course contents	<p>1. Audio</p> <p>Audio applications in the area of communication; Basic sound concepts; Analog audio and digital audio: sound equipment; audio connection cables; recording and storage media; Audio on the computer: Audio inputs and outputs; connections from external audio sources to the computer; volume control of audio sources; Audio Formats; Analog to digital audio conversion; Digital audio editing and editing; Preparation of audio contents to be inserted in streaming, audiovisual and multimedia applications.</p> <p>2. Video</p> <p>The various applications of video in the area of communication; Standards, equipment and interfaces, cables and video signals; Record media, formats and video storage; Video cameras; Image composition rules; Techniques of video realization; Authorship and medium supports; preparing videos to be included in streaming, audiovisual and multimedia applications.</p> <p>3. Broadcasting Digital Audio and Video</p> <p>Podcasts / Webcasts; Real-time digital video and audio transmission (TDT) and interactive television; Broadcasting of audio and video by cable and satellite; IP TV; Streaming of audio and video over the web.</p>		
Assessment methods	<p>Written test(s) (50%)</p> <p>Final work (50%)</p>		
Recommended readings	<p>Abe Elletronic SPA. (2004). Digital TV broadcasting handbook. Electronics World, 54. Retrieved from http://www.csa.com/partners/viewrecord.php?requester=gs&collection=TRD&amp;recid=61229AN</p> <p>Akramullah, S. (2014). Digital Video Concepts, Methods, and Metrics: Quality, Compression, Performance, and Power Trade-off Analysis. APRESS.</p> <p>Basics, T. (2009). The Digital TV Transition :, (June 2008), 1–7.</p> <p>Charles Poynton. (2003). Digital Video and Hdtv Algorithms and Interfaces (p. 701). doi:10.1016/B978-155860792-7/50087-2</p> <p>Macdonald, M. (2010). Add Audio and Video to Your Site : The Mini Missing Manual</p>		

	Nothing spices up a website like a cool sound. Online. Orlebar, J. (2002). Digital Television Production: A Handbook. Journalism and Mass Communication Quarterly, 81, 294.
Additional information	

Course title	Distributed Systems		
Teaching method	Initially it is make a diagnosis of knowledge of each student. There are identified needs for support. To raise the motivation is made awareness of the importance of the course in the professional field. Contents are presented, defined objectives, skills to acquire, the integration on the curriculum and conformity with the professional profile. During the semester, the contents are developed, giving rise to the active, reflective and critical student participation, consolidated with practical exercises, debates, summaries, individual and group work. As a way of monitoring, the activities are the subject of formative and summative assessment, enabling targeting for support. The assessment is individual, continuous and summative, allowing the measurement of the level of knowledge by demonstration of the developed applied skills. Along the way it is possible to detect support needs and implement appropriate measures to promote success.		
Person responsible for the course	Carlos Costa	E-mail address:	ccosta@estgl.ipv.pt
Language of instruction	English	ECTS points	6
Semester	Spring	Type of course	compulsory
Hours per week	4h	Hours per semester	HT: 162 TP: 30 PL:30
Objectives of the course	Address the key concepts and characteristics of systems, consisting of computers network, influencing the development and implementation of distributed systems and explore the technologies, to support the development and implementation of distributed systems. Specifically it is intended to: understand the aspects of distribution, architectural and fundamental system models that enable the development and implementation of distributed systems; identify, describe and use communication systems between processes in a computer network, and the major middleware platforms to support the development of distributed applications. The student should be able to: identify and characterize communications APIs and middleware platforms; design and implement distributed solutions based on communication API and middleware platforms, integrate hardware and software solutions, in the face of a problem try new solutions solution.		
Entry requirements	There aren't any.		
Course contents	Overview of distributed systems: definition, examples, advantages and disadvantages, terminology, goals, challenges of design, characterization of the Internet environment, security aspects. Architectures of distributed systems: monolithic, 2-tier, 3-tier, n-tier, peer-to-peer; based communication API, RPC-based, distributed object architectures. Preparation for development of distributed applications in Java aspects: technology; object-oriented programming; packages and encapsulation; interfaces and polymorphism; errors and exceptions, multithreading		

	and synchronization. Name system: general; DNS system; features of the DNS; replication and caching; server types; the DNS API for Java. Programming with sockets: protocols; UDP; Multicast; TCP; applications development. CORBA: Object Management Architecture; CORBA implementation; interface definition language; IDL file; IDL to Java mapping; naming service; application development.
Assessment methods	Theoretical-practical test (40%) Individual works (30%) Group work (30%)
Recommended readings	Tanenbaum, A. e Van Steen, M. (2007). Distributed Systems: Principles and Paradigms (2/E). Prentice Hall Cardoso, J. (2008). Programação de Sistemas Distribuídos em Java. Editora FCA Coulouris, G., et. al. (2005). Distributed Systems: Concepts and Design (Fourth Edition). Addison Wesley/Pearson Education Martins, F. (2010). JAVA6 e Programação Orientada pelos Objectos. Editora FCA
Additional information	