Compendio de Sumillas

Escuela Profesional de Ciencia de la Computación

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Equipo de trabajo

Comisión de Evaluación Curricular

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Índice general

1.1. CS1100. Introduction to Computer Science

This is the first course in the sequence of introductory courses to Computer Science. This course is intended to cover the concepts outlined by the Computing Curricula IEEE-CS/ACM 2013. Programming is one of the pillars of Computer Science; any professional of the area, will need to program to materialize their models and proposals. This course introduces participants to the fundamental concepts of this art. Topics include data types, control structures, functions, lists, recursion, and the mechanics of execution, testing, and debugging.

1.2. CS1D01. Discrete Structures I

Discrete structures provide the theoretical foundations necessary for computation. These fundamentals are not only useful to develop computation from a theoretical point of view as it happens in the course of computational theory, but also is useful for the practice of computing; In particular in applications such as verification, cryptography, formal methods, etc.

1.3. GH0005. Communication Laboratory I

Through this course, the student will improve and strengthen his abilities to communicate both oral and written in an academic context. To do this, the student will exercise in the composition of texts, taking into account the requirements of a formal academic language: characteristics of academic writing (rules of punctuation, spelling, grammatical lexical competence, normative) and correct use of information. In turn, the course promotes a comprehensive reading that is not limited to the descriptive level, but also encompasses the conceptual and metaphorical, because only in this way will the student develop his critical and analytical capacity. The student will take on academic readings and scientific outreach that will allow him to distinguish between the objectives set out in the different types of texts and to recognize the oral and written text as a coherent and cohesive unit in terms of form and content. Once these objectives have been achieved, the student will understand that oral and written communication skills are central competences of his / her university life and, later, his / her professional life.

1.4. EG0003. Mathematics I

The course aims to develop in students the skills to deal with models in science and engineering related to single variable differential calculus skills. In the course it is studied and applied concepts related to calculation limits, derivatives and integrals of real and vector functions of single real variables to be used as base and support for the study of new contents and subjects. Also seeks to achieve reasoning capabilities and applicability to interact with real-world problems by providing a mathematical basis for further professional development activities.

1.5.　EG0004. Global Challenges

During the plenary sessions, there will be lectures related to the methodology of Design Thinking as well as its use and importance in the creation processes. Also, during these sessions we will have presentations on entrepreneurships and startups related to engineering or technology. During lab sessions, students form teams that maintain during the cycle. With the guidance of the teacher and through the methodology of Design Thinking developed in the plenary sessions, students will have to present innovative solutions to real problems inspired by the United Nations "Global Challenges". The students will have a Digital Log which will be constantly reviewed by the teachers in charge. In it will be the advances, processes and referents of the group project. The course culminates with the presentations of the proposals put forward by the groups.

2.1.　CS1102. Objects oriented programming I

This is the second course in the sequence of introductory courses in computer science. The course will introduce students in the various topics of the area of computing such as: Algorithms, Data Structures, Software Engineering, etc.

2.2.　CS1D02. Discrete Structures II

In order to understand the advanced computational techniques, the students must have a strong knowledge of the Various discrete structures, structures that will be implemented and used in the laboratory in the programming language..

2.3.　ME0019. Physics I

This course is useful in this career so that the student learns to show a high degree of mastery of the laws of the movement of General Physics.

2.4.　GH0006. Communication Laboratory II

This laboratory is oriented to consolidate the student's communicative skills, both oral and written in the framework of the discipline under study. In particular, the student will strengthen his / her expositive abilities by exercising throughout the first part of the course in writing a type of text that will develop throughout his career as an engineer: laboratory reports. He will reflect on the rhetorical situation he faces when writing this type of text: who will be his reader, what is the communicative intention of that text and the subject on which he is writing. In a second part, the course is presented as a space for discussion about argumentative discourse and critical reading of argumentative texts, so that the student reflects, knows and uses the communicative tools to produce formal argumentative texts. In this sense, the course is oriented towards the production Permanent written and oral texts, so that the student will participate not only in discussion forums but is expected to be able to discuss with his colleagues on a topic proposed by the teacher. In short, the course seeks to

consolidate the skills of reading, analysis and preparation of written and oral texts, both expository and argumentative.

2.5.   GH0007. Introduction to Business Development

This course aims to provide students with a real-life hands-on experience in the first steps within a business life cycle, through which an idea becomes a formal business model. It is the first of a set of three courses designed to accompany students as they transform an idea into a prospective business or business, from idea to review of current business strategy.

2.6.   GH1002. Art and Technology

The course seeks to give a global, historical and critical vision of the transformations and synergies of contemporary art. Where students approach two components of contemporary art and design: interdisciplinary practices and points of contact between the arts and the technological and engineering processes.

2.7.   GH1101. English I

A fundamental part of the integral formation of a professional is the ability to communicate in a foreign language in addition to the native language itself. It not only broadens its cultural horizon but also allows a more humane and comprehensive view of people's lives. In the case of foreign languages, English is undoubtedly the most pratical because it is spoken around the world. There is no country where it is not spoken. In careers related to tourist services English is perhaps the most important practical tool that the student must master from the outset as part of his comprehensive education.

2.8.   EG0005. Math II

The course develops in students the skills to deal with models of science and engineering skills. In the first part of the course a study of the functions of several variables, partial derivatives, multiple integrals and an introduction to vector fields is performed. Then the student will use the basic concepts of calculus to model and solve ordinary differential equations using techniques such as Laplace transforms and Fourier series.

3.1.   CS1103. Objects oriented programming II

This is the third course in the sequence of introductory courses in computer science. This course is intended to cover Concepts indicated by the Computing Curriculum IEEE (c) -ACM 2001, under the functional-first approach. The object-oriented paradigm allows us to combat complexity by making models

from abstractions of the problem elements and using techniques such as encapsulation, modularity, polymorphism and inheritance. The Dominion of these topics will enable participants to provide computational solutions to design problems simple of the real world.

3.2. CS2201. Computer Architecture

It is necessary that the professional in Computer Science has a solid knowledge of the organization and operation of the various computer systems in which the programming environment is installed. This will also know how to establish the scope and limits of the applications that are developed according to the platform being used.

The following topics will be addressed: basic digital logic components in a computer system, design of instruction sets, microarchitecture of the processor and execution in pipelining, organization of memory: cache and virtual memory, protection and sharing, system I / O and interrupts, super-scalar architectures and out-of-order execution, vector computers, multithreading architectures, symmetric multiprocessors, memory and synchronization models, integrated systems and parallel computers.

3.3. CS2B01. Platform Based Development

The world has changed due to the use of fabric and related technologies, rapid, timely and personalized access to the information, through web technology, ubiquitous and pervasive; they have changed the way we do things, how do we think? and how does the industry develop? Web technologies, ubiquitous and pervasive are based on the development of web services, web applications and mobile applications, which are necessary to understand the architecture, design, and implementation of web services, web applications and mobile applications.

3.4. EN0021. Physics II

Show a high degree of mastery of the laws of wave motion, the nature of fluids, and thermodynamics. Using properly the concepts of wave movement, fluids and thermodynamics in solving problems of daily life. Possess ability and ability in the interpretation of wave, fluid and thermodynamic phenomena, which contribute to the development of efficient and useful solutions in different areas of computer science.

3.5. GH0008. Business Management

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3.6. GH1102. English II

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3.7.   EG0006. Math III

This course introduces the first concepts of linear algebra as well as numerical methods with an emphasis on problem solving with the Scilab open source libe package. Mathematical theory is limited to fundamentals, while effective application for problem solving is privileged. In each subject, a few methods of relevance for engineering are taught. Knowledge of these methods prepares students for the search for more advanced alternatives, if required.

4.1.   CS2100. Algorithms and Data Structures

The theoretical foundation of all branches of computing rests on algorithms and data structures, this course will provide participants with an introduction to these topics, thus forming a basis that will serve for the following courses in the career.

4.2.   CS2101. Theory of Computation

This course emphasizes formal languages, computer models and computability, as well as the fundamentals of computational complexity and complete NP problems.

4.3.   CS2701. Databases I

Information management (IM) plays a major role in almost all areas where computers are used. This area includes the capture, digitization, representation, organization, transformation and presentation of information; Algorithms to improve the efficiency and effectiveness of accessing and updating stored information, data modeling and abstraction, and physical file storage techniques.It also covers information security, privacy, integrity and protection in a shared environment. Students need to be able to develop conceptual and physical data models, determine which (IM) methods and techniques are appropriate for a given problem, and be able to select and implement an appropriate IM solution that reflects all applicable restrictions, including Scalability and usability.

4.4.   IN0054. Statistics and Probabilities

It provides an introduction to probability theory and statistical inference with applications, needs in data analysis, design of random models and decision making.

4.5.   GH2101. English II

A fundamental part of the integral formation of a professional is the ability to communicate in a foreign language in addition to the native language itself. It not only broadens its cultural horizon but also allows a more humane and comprehensive view of life. In the case of foreign languages, undoubtedly English is the most practical because it is spoken around the world. There is no country where it is not spoken. In careers related to tourist services, English is perhaps the most important practical tool that the student must master from the outset as part of his / her integral education

5.1.   CS2102. Analysis and Design of Algorithms

An algorithm is, essentially, a well-defined set of rules or instructions that allow solving a computational problem. The theoretical study of the performance of the algorithms and the resources used by them, usually time and space, allows us to evaluate if an algorithm is suitable for solving a specific problem, comparing it with other algorithms for the same problem or even delimiting the boundary between Viable and impossible. This matter is so important that even Donald E. Knuth defined Computer Science as the study of algorithms. This course will present the most common techniques used in the analysis and design of efficient algorithms, with the purpose of learning the fundamental principles of the design, implementation and analysis of algorithms for the solution of computational problems

5.2.   CS2702. Databases II

Information Management (IM) plays a leading role in almost every area where computers are used. This area includes the capture, digitization, representation, organization, transformation and presentation of information; Algorithms to improve the efficiency and effectiveness of access and update of stored information, data modeling and abstraction, and physical file storage techniques.

It also covers information security, privacy, integrity and protection in a shared environment. Students need to be able to develop conceptual and physical data models, determine which IM methods and techniques are appropriate for a given problem, and be able to select and implement an appropriate IM solution that reflects all applicable constraints, including scalability and Usability.

5.3.   CS2901. Software Engineering I

The aim of developing software, except for extremely simple applications, requires the execution of a well-defined development process. Professionals in this area require a high degree of knowledge of the different models and development process, so that they are able to choose the most suitable for each development project. On the other hand, the development of medium and large-scale systems requires the use of pattern and component libraries and the mastery of techniques related to component-based design

5.4.   CS2S01. Operating systems

An Operating System is a program that acts as an intermediary between the user and the machine.

The purpose of an operating system is to provide an environment in which the user can run their applications.

In this course the design of the core of the operating systems will be studied. In addition, the course includes practical activities in which problems of concurrency will be solved and the operation of a pseudo Operating System will be modified.

5.5.   CS3402. Compilers

That the student knows and understands the concepts and fundamental principles of the theory of compilation to realize the construction of a compiler

5.6.   GH0010. Ethics and Technology

This course seeks to provide students with certain frameworks with which to analyze the dilemmas that can be presented in their professional practice. The course puts in practice the critical and responsible reasoning of the students, being this a fundamental competence for the decision-making processes that we will assume as professionals and citizens.

5.7.   ID104. English IV

A fundamental part of the integral formation of a professional is the ability to communicate in a foreign language in addition to the native language itself. It not only broadens its cultural horizon but also allows a more humane and comprehensive view of life. In the case of foreign languages, English is undoubtedly the most practical because it is spoken around all the world. There is no country where it is not spoken. In addition to being vital to your professional career

6.1.   CS2301. Networking and Communication

The ever-growing development of communication and information technologies means that there is a marked tendency to establish more computer networks that allow better information management..

In this second course, participants will be introduced to the problems of communication between computers, through the study and implementation of communication protocols such as TCP / IP and the implementation of software on these protocols

6.2.   CS3101. Competitive Programming

Competitive Programming combines problem-solving challenges with the fun of competing with others. It teaches participants to think faster and develop problem-solving skills that are in high demand in the industry. This course will teach you to solve algorithmic problems quickly by combining theory of algorithms and data structures with practice solving problems.

6.3.   CS3102. Advanced Data Structures

Algorithms and data structures are a fundamental part of computer science that allow us to organize information in a more efficient way, so it is important for every professional in the area to have a solid background in this regard.

In the course of advanced data structures our goal is for the student to know and analyze complex structures, such as Multidimensional Access Methods, Space-Time Access Methods and Metric Access Methods, etc.

6.4.   CS3903. Information systems

Analyze techniques for the correct implementation of scalable, robust, reliable and efficient information systems in organizations.

7.1.   CS2H01. Computer Human Interaction

Language has been one of the most significant creations of humanity. From body language and gesture, through verbal and written communication, to iconic symbolic codes and others, it has made possible complex interactions Among humans and facilitated considerably the communication of information. With the invention of automatic and semi-automatic devices, including computers, The need for languages or interfaces to be able to interact with them, has gained great importance. The utility of the software, coupled with user satisfaction and increased productivity, depends on the effectiveness of the User-Computer Interface. So much so, that often the interface is the most important factor in the success and failure of any computer system. The design and implementation of appropriate Human-Computer Interfaces, which in addition to complying with the technical requirements and the transactional logic of the application, consider the subtle psychological implications, sciences and user facilities, It consumes a good part of the life cycle of a software project, and requires specialized skills, both for the construction of the same, and for the performance of usability tests.

7.2.   CS341. Programming languages

Los lenguajes de programación son el medio a través del cual los programadores describen con precisión los conceptos, formulan algoritmos y representan sus soluciones. Un científico de la computación trabajará con diferentes lenguajes, por separado o en conjunto. Los científicos de la computación deben entender

los modelos de programación de los diferentes lenguajes, tomar decisiones de diseño basados en el lenguaje de programación y sus conceptos. El profesional a menudo necesitará aprender nuevos lenguajes y construcciones de programación y debe entender los fundamentos de como las características del lenguaje de programación estan definidas, compuestas e implementadas. El uso eficaz de los lenguajes de programación y la apreciación de sus limitaciones, también requiere un conocimiento básico de traducción de lenguajes de programación y su análisis de ambientes estáticos y dinámicos, así como los componentes de tiempo de ejecución tales como la gestión de memoria, entre otros detalles de relevancia.

7.3.   CS3P01. Parallel and Distributed Computing

The last decade has brought explosive growth in computing with multiprocessors, including Multi-core processors and distributed data centers. As a result, computing parallel and distributed has become a widely elective subject to be one of the main components in the mesh studies in computer science undergraduate. Both parallel and distributed computing the simultaneous execution of multiple processes, whose operations have the potential to intercalar in a complex way. Parallel and distributed computing builds on foundations in many areas, including understanding the fundamental concepts of systems, such as: concurrency and parallel execution, consistency in state / memory manipulation, and latency. The communication and coordination between processes has its foundations in the passage of messages and models of shared memory of computing and algorithmic concepts like atomicity, consensus and conditional waiting.Achieving acceleration in practice requires an understanding of parallel algorithms, strategies for decomposition problem, systems architecture, implementation strategies and analysis of performance. Distributed systems highlight the problems of security and tolerance to Failures, emphasize the maintenance of the replicated state and introduce additional problems in the field of computer networks.

7.4.   CS2501. Computer graphics

It offers an introduction to the area of Computer Graphics, which is an important part of Computer Science. The purpose of this course is to investigate the fundamental principles, techniques and tools for this area.

7.5.   CS2601. Artificial intelligence

Research in Artificial Intelligence has led to the development of numerous relevant tonic, aimed at the automation of human intelligence, giving a panoramic view of different algorithms that simulate the different aspects of the behavior and the intelligence of the human being.

7.6. CS2902. Software Engineering II

The topics of this course extend the ideas of software design and development from the introduction sequence to programming to encompass the problems encountered in large-scale projects. It is a broader and more complete view of Software Engineering appreciated from a Project point of view.

8.1. CS4002. Capstone Project I

This course aims to allow the student to carry out a study of the state of the art of a topic chosen by the student for his thesis.

8.2. ET201. Entrerpreneurship I

Este es el primer curso dentro del área de formación de empresas de base tecnológica, tiene como objetivo dotar al futuro profesional de conocimientos, actitudes y aptitudes que le permitan elaborar un plan de negocio para una empresa de base tecnológica. El curso está dividido en las siguientes unidades: Introducción, Creatividad, De la idea a la oportunidad, el modelo Canvas, Customer Development y Lean Startup, Aspectos Legales y Marketing, Finanzas de la empresa y Presentación.

Se busca aprovechar el potencial creativo e innovador y el esfuerzo de los alumnos en la creación de nuevas empresas.

9.1. CS3700. Big Data

Nowadays, knowing scalable approaches to processing and storing large volumes of information (terabytes, petabytes and even exabytes) is fundamental in computer science courses. Every day, every hour, every minute generates a large amount of information which needs to be processed, stored, analyzed.

9.2. CS3I01. Computer Security

Nowadays, information is one of the most valuable assets in any organization. This course is oriented to be able to provide the student with the security elements oriented to protect the Information of the organization and mainly to be able to foresee the possible problems related to this heading. This subject involves the development of a preventive attitude on the part of the student in all areas related to software development.

9.3. CS4003. Final Project II

This course aims at the student to conclude his thesis project.

9.4.   CS3501. Topics in Computer Graphics

In this course you can delve into any of the topics Mentioned in the area of Graphics Computing (Graphics and Visual Computing - GV).

This course is designed to perform some advanced course suggested by the ACM / IEEE curriculum. [**?**, **?**]

9.5.   CS3602. Robotics

That the student knows and understands the concepts and fundamental principles of control, road planning and the definition of strategies in robotics as well as concepts of robotic perception in a way that understands the potential of robotic systems

9.6.   CS3901. Software Engineering III

Software development requires the use of best development practices, IT project management, equipment management And efficient and rational use of quality assurance frameworks, these elements are key and transversal during the whole productive process. The construction of software contemplates the implementation and use of processes, methods, models and tools that allow to achieve the realization of the quality attributes of a product.

9.7.   BI0021. Bioinformatics and Biostatistics

The use of computational methods in the biological sciences has become one of the key tools for the field of molecular biology, being a fundamental part of research in this area.

In Molecular Biology, there are several applications that involve both DNA, protein analysis or sequencing of the human genome, which depend on computational methods. Many of these problems are really complex and deal with large data sets.

This course can be used to see concrete use cases of several areas of knowledge of Computer Science such as Programming Languages (PL), Algorithms and Complexity (AL), Probabilities and Statistics, Information Management (IM), Intelligent Systems (IS).

9.8.   ET301. Entrerpreneurship II

Este curso tiene como objetivo dotar al futuro profesional de conocimientos, actitudes y aptitudes que le permitan formar su propia empresa de desarrollo de software y/o consultoría en informática. El curso está dividido en tres unidades: Valorización de Proyectos, Marketing de Servicios y Negociaciones. En la primera unidad se busca que el alumno pueda analizar y tomar decisiones en relación a la viabilidad de un proyecto y/o negocio.

En la segunda unidad se busca preparar al alumno para que este pueda llevar a cabo un plan de marketing satisfactorio del bien o servicio que su empresa

pueda ofrecer al mercado. La tercera unidad busca desarrollar la capacidad negociadora de los participantes a través del entrenamiento vivencial y práctico y de los conocimientos teóricos que le permitan cerrar contrataciones donde tanto el cliente como el proveedor resulten ganadores. Consideramos estos temas sumamente críticos en las etapas de lanzamiento, consolidación y eventual relanzamiento de una empresa de base tecnológica.

10.1. CS3P02. Cloud Computing

In order to understand the advanced computational techniques, the students must have a strong knowledge of the various discrete structures, structures that will be implemented and used in the laboratory in the programming language.

10.2. CS3P03. Internet of Things

The last decade has an explosive growth in multiprocessor computing, including multi-core processors and distributed data centers. As a result, parallel and distributed computing has evolved from a broadly elective subject to be one of the major components in mesh studies in undergraduate computer science. Both parallel computing and distribution involve the simultaneous execution of multiple processes on different devices that change position.

10.3. CS4004. Final Project III

This course aims to enable students to complete properly their draft of thesis.