UNA
UNIVERSIDAD NACIONAL
COSTA RICA

Book of short descriptions by course

School of Informatics

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Task Force

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Contents

1.1   CS100. Computing Foundations

La Ciencia de la Computación es un campo de estudio enorme con muchas especialidades y aplicaciones. Este curso brindará a sus participantes, una visión panorámica de la informática y mostrará sus campos más representativos, como son: Algoritmos, Estructuras de de Datos, Sistemas Operativos, Bases de Datos, etc.

1.2   CS111. Computing Foundations

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.

1.3   CS1D1. 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.

1.4   MA100. Mathematics Foundations

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   EG001. General Studies I

Write justification for this course here ...

1.6   EG002. General Studies II

Write justification for this course here ...

2.1 CS112. 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 SE1R1. Requirements and interface design

Write justification for this course here ...

2.3 MA101. Calculus

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.

2.4 EG003. General Studies III

Write justification for this course here ...

2.5 EG004. General Studies IV

Write justification for this course here ...

3.1 CS113. 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 CS221. Computer Systems Architecture

A computer scientist must have a solid knowledge of the organization and design principles of diverse computer systems, by understanding the limitations of modern systems they could propose next-gen paradigms. This course teaches the basics and principles of Computer Architecture. This class addresses digital logic design, basics of Computer Architecture and processor design (Instruction Set architecture, microarchitecture, out-of-order execution, branch prediction),

execution paradigms (superscalar, dataflow, VLIW, SIMD, GPUs, systolic, multithreading) and memory system organization.

3.3 CS2B1. Platform Based Development I

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 SE1A1. Software Architecture and Design

Write justification for this course here ...

3.5 MA102. Linear Algebra

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 CS210. 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 CS2S1. Operating systems

An Operating System (OS) manages the computing resources to complete the execution of multiple applications and their associated processes. This course teaches the design of modern operating systems; and introduces their fundamental concepts covering multiple-program execution, scheduling, memory management, file systems, and security. Also, the course includes programming activities on a minimal operating system to solve problems and extend its functionality. Notice that these activities require much time to complete. However, working on them provides valuable insight into operating systems.

4.3 SE2C1. Software development

Write justification for this course here ...

4.4 MA203. 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.

5.1 CS212. 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 CS231. 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

5.3 CS271. 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.

5.4   CS3I2. Computer Security

Write justification for this course here ...

5.5   SE201. Elective I

Write justification for this course here ...

6.1   CS3I1. 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.

6.2   CS3P1. 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.

6.3   ID105. Technical and professional English V

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

6.4 DS371. Topics in Data Science

Write justification for this course here ...

6.5 SE302. Elective II

Write justification for this course here ...

7.1 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 carácteristicas 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.

7.2 CS3P2. 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.

7.3 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.

7.4 SE403. Elective III

Write justification for this course here ...

8.1   CS261. Intelligent Systems

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.

8.2   CS2H1. User Experience (UX)

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.

8.3   SE3E1. General and Professional Ethics

Write justification for this course here ...

8.4   SE3E2. Supervised professional practice

Write justification for this course here ...

8.5   SE404. Elective IV

Write justification for this course here ...