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FACULTAD DE INGENIERIA

SYLLABUS

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FACULTAD DE INGENIERÍA

Maestría en Ciencias de la
Información y las Comunicaciones

Software Engineering

Émphasis:

<p>NAME OF THE SUBJECT: Software Engineering I</p> <ul style="list-style-type: none"> • Obligatory (X): Basic (X) Complementary () • Elective (): Intrinsic () Extrinsic ()
<p>NUMBER OF ACADEMIC CREDITS: Four (4).</p>
<p>COURSE TYPE: THEORETICAL: ___ PRACTICAL: ___ THEORETICAL-PRACTICAL: <u>X</u></p> <p>Methodological alternatives: Master Class (X), Seminar (), Seminar - Workshop (X), Workshop (), Practice (X), Tutored projects (X), Other: _____</p>

Justification

SYNOPSIS OF THE SUBJECT:

Software engineering as a discipline that has reached a significant degree of maturity provides a solid body of knowledge to raise and solve problems on computer systems, study the different areas of this body of knowledge to formally address problems involving information management in this order of ideas, concepts such as software processes, methodologies, requirements engineering and design are essential to address software projects in their early stages.

JUSTIFICATION

Software Engineering I seeks to address the problems mentioned above that also allows create a line that continues in Patterns and Software architectures, which seeks to cover the spectrum of knowledge of the area at least in its most relevant concepts.

PREREQUISITES: For the good development of the course it is considered necessary that the student has wide knowledge in computer science, information systems, data bases, programming among others.

Content

Software engineering is essential for the functioning of knowledge society, national and international enterprises and institutions. Today, there are many different types of software systems, ranging from simple embedded systems to complex adaptive systems of systems.

OVERARCHING GOAL:

- To offer the tools that allow to approach software projects, especially in its initial stages, this



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through different processes, methodologies and models in which it will be emphasized specially in the phase of requirements and design. A space of prospective that allows make a continuous revision of areas in the discipline Software Engineering.

SPECIFIC GOALS

- To provide conceptual tools around the importance of software development as a result of a series of social and cultural transformations that have impacted society. Propitiate the adequate use of standards, techniques and modeling tools that allow efficient work and the capacity to analyze, evaluate and propose them as alternative solutions.
- To provide the methods focused on the choice of requirements that facilitate this phase within the development of the software and that allow making a reliable specification.
- - Make conceptual models that can be translated into artefacts mainly modelled in UML.

SYNTHETIC PROGRAMA

CHAPTER 1 Introduction to Software Engineering
CHAPTER 2 Traditional and Standard Software Process Models, Swebok
CHAPTER 3 Modern Software Process Models
CHAPTER 4 Introduction to requirements
CHAPTER 5 Software Projects at 4p of the Software Engineering
CHAPTER 6 Software development methodologies

DETAILED CONTENT:

CHAPTER 1 INTRODUCTION TO SOFTWARE ENGINEERING

- It presents an overview of the evolution of the software and its main features. Additionally, it provides an introduction to the concept of Software Engineering and its main study components.

CHAPTER 2 TRADITIONAL SOFTWARE PROCESS MODELS

- It presents the different types of traditional software development process models, establishing their strengths, characteristics and work strategies with each of them. Among them, we will work: CVC - Classic Life Cycle, CP - Construction by Prototypes, RAD - Rapid Application Development, Iterative Methods such as Incremental and Spiral.

CHAPTER 3 MODERN SOFTWARE PROCESS MODELS

- It presents the different types of modern software development process models, in which we have MA - Agile models such as XP (Extreme Programming) and FDD (Feature Driving Programming), RUP - Rational Unified Process (Introduction to UML modeling) and MSF - Microsoft Solution Framework.



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CHAPTER 4 PROJECT MANAGEMENT

- It emphasizes methods and techniques for Software Project Management.
- The 4 P's of software development
- Importance of the software architect

CHAPTER 5 INTRODUCTION TO SOFTWARE ARCHITECTURE

- Introduction to software architecture
- It presents an overview of the evolution of the ASW characteristics it has. Additionally, it provides an introduction to the types of software architecture.

CHAPTER 6 INTRODUCTION TO THE REQUIREMENTS

- Introduction to the requirements, their characteristic evolution, classification and importance in the development of a software development projects.
- Driving Programming), RUP - Rational Unified Process (Introduction to UML modeling) and MSF - Microsoft Solution Framework.

Training skills

GENERIC

- Recognize the body of knowledge in software engineering
- To reflect on issues related to software engineering. 0

SPECIFICS

Cognitive (Know):

- Ability to discern which knowledge and technological tools to appropriate for the resolution of particular problems, in the development of software.
- To represent solutions of problems applying the modeling of the same one by means of the abstraction of logic of the business.
- Identify the various components of an information system to distinguish the scope of its solution.

Procedural / Instrumental (Know-how):

- Model, implement and evaluate problems whose solution requires the use of the different



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structures handled by software engineering.

- Model, implement and evaluate problems by breaking them down into sub-problems that allow a simpler solution or the reuse of solutions.
- Model, implement and evaluate mechanisms for the management of software architecture, standards and metrics, among others.
- Historically locate the different moments in the evolution of software engineering, architecture, patterns, metrics and standards, among others.
- Use computer systems as a tool for possible solutions to specific problems.

Attitudinal (Being):

- To act strategically within a working group for the development of projects
- Act ethically committed to the development of the activities of the subject.
- Communicate strategically using technology.
- Act in academic and professional contexts, with a cultured, ethical and humanistic approach.
- Interpret reality and propose new arguments, to develop innovative solutions in social contexts.
- To present the work in an aesthetic and ergonomic way, according to the socio-cultural context to which it is destined.

Strategies

METHODOLOGY

The methodological strategy pursues the objective of developing the module by generating participation and integration with the instructors. Therefore, the teacher will create an environment conducive to the teaching-learning process, in which the software development process plays a preponderant role for the development of each class session.

At the beginning of the module, the teacher will present to the students the detailed course of the subject. The sessions of each subject will be combined with the following strategies.

As well as the module proposes readings, elaboration and presentation of essays, discussion of case studies: and a Final Project of the subject.

For each session, the student will be previously informed about the topic to be discussed, which will allow him/her to document the subject. The teacher will make the initial presentation of each of the



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topics, highlighting the most relevant points, from which he/she will open the discussion of the topics.

The lecturers will also carry out research and presentations on some of the topics and their application to the company where they work.

Type of course	Hours			Teacher hours/ week	Student hours/ week	Total Hours Student/ semester	Academic credits
	DW	CW	AW	(DW + CW)	(DW + CW +AW)	X 18 weeks	
	3	1	8	4	12	192	4

Direct Presential Work (DW): classroom work in plenary session with all students.

Mediated-Cooperative Work (CW): Teacher tutoring work to small groups or individually to students.

Autonomous Work (AW): Student work without the presence of the teacher, which can be done in different instances: in work groups or individually, at home or in a library, laboratory, etc.)

Resources

PHYSICAL RESOURCES REQUIRED:

Means and aids:

- Normal classroom with blackboard for teaching sessions and discussion and group work sessions - Technological support Multimedia projector, virtual classroom.
- Physical material such as documents, books, magazines, among others.
- Virtual material: web conferences, virtual documents.

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BIBLIOGRAPHIC RESOURCES:

- IEEE Database
- SPRINGER Database
- ELSEVIER Database

Course Schedue

It is recommended to work one unit every four weeks, work in small groups of students, use the Internet to communicate with students for progress reviews and question solving (this should be considered between hours of cooperative work).

Week/Unit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.	X															
2.					x											
3.									x							
4.													X			



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Evaluation

ASPECTS TO EVALUATE

Evaluation moments	<ul style="list-style-type: none"> - Entry test - Process test - Departure from each class - Final course evaluation
Evaluation instruments	<ul style="list-style-type: none"> - Written test - Oral test - Reports, testing, analysis
Ongoing evaluation	<ul style="list-style-type: none"> - Oral interventions - Qualified practices - Research work - Tests, exhibitions and others

The evaluation will be carried out taking into account:

	EVALUATION TYPE	DATE	PERCENTAGE
FIRST NOTE	Tests and Workshops	Continue during the module	20
	Written cognitive workshop	4 week	20
THIRD NOTE	Written test and essays	12 week	25
FINAL EXAM	Delivery and support of the final project of matter	16 week	35

ASPECTS OF THE COURSE TO BE EVALUATED.

The teacher explains and describes the criteria to be taken into account when evaluating.



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For example:

- Evaluation of teaching performance by students (PIN, Positive, Interesting, Negative-improvement)
- Evaluation of student learning in its dimensions: individual/group, theoretical/practical, oral/written.
- Self-evaluation:
- Co-evaluation of the course: orally and in writing between students and teacher.

TEACHER INFORMATION:

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