



**National University of Engineering (UNI)**  
School of Computer Science  
Syllabus 2023-I

**1. COURSE**

CS281. Computing in Society (Mandatory)

**2. GENERAL INFORMATION**

<b>2.1 Course</b>	:	CS281. Computing in Society
<b>2.2 Semester</b>	:	8 <sup>vo</sup> Semestre.
<b>2.3 Credits</b>	:	2
<b>2.4 Horas</b>	:	2 HT;
<b>2.5 Duration of the period</b>	:	16 weeks
<b>2.6 Type of course</b>	:	Mandatory
<b>2.7 Learning modality</b>	:	Blended
<b>2.8 Prerequisites</b>	:	None None

**3. PROFESSORS**

Meetings after coordination with the professor

**4. INTRODUCTION TO THE COURSE**

Ofrece una visión amplia de los aspectos éticos y profesionales relacionados con la computación. Los tópicos que se incluyen abarcan los aspectos éticos, sociales y políticos. Las dimensiones morales de la computación. Los métodos y herramientas de análisis. Administración de los recursos computacionales. Seguridad y control de los sistemas computacionales. Responsabilidades profesionales y éticas. Propiedad intelectual.

**5. GOALS**

- Hacer que el alumno entienda la importancia del cuidado y la ética en la transferencia y uso de la información.
- Inculcar en el alumno que las tendencias de mejoramiento de la tecnología, no debe ser llevada a degradar la moral de la sociedad.

**6. COMPETENCES**

- 3)** Communicate effectively in a variety of professional contexts. (**Familiarity**)
- 4)** Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles. (**Usage**)
- 6)** Apply computer science theory and software development fundamentals to produce computing-based solutions. (**Usage**)
- 7)** Develop computational technology for the well-being of all, contributing with human formation, scientific, technological and professional skills to solve social problems of our community. (**Usage**)

**7. TOPICS**

Unit 1: History (2)	
Competences Expected:	
Topics	Learning Outcomes
<ul style="list-style-type: none"> <li>• Prehistory, the world before 1946</li> <li>• History of computer hardware, software, networking</li> <li>• Pioneers of computing</li> <li>• History of the Internet</li> </ul>	<ul style="list-style-type: none"> <li>• Identify significant continuing trends in the history of the computing field [Familiarity]</li> <li>• Identify the contributions of several pioneers in the computing field [Familiarity]</li> <li>• Discuss the historical context for several programming language paradigms [Familiarity]</li> <li>• Compare daily life before and after the advent of personal computers and the Internet [Familiarity]</li> </ul>
Readings : [LL04], [McL00]	

Unit 2: Social Context (4)	
Competences Expected:	
Topics	Learning Outcomes
<ul style="list-style-type: none"> <li>• Social implications of computing in a networked world</li> <li>• Impact of social media on individualism, collectivism and culture</li> <li>• Growth and control of the Internet</li> <li>• Often referred to as the digital divide, differences in access to digital technology resources and its resulting ramifications for gender, class, ethnicity, geography, and/or underdeveloped countries</li> <li>• Accessibility issues, including legal requirements</li> <li>• Context-aware computing</li> </ul>	<ul style="list-style-type: none"> <li>• Describe positive and negative ways in which computer technology (networks, mobile computing, cloud computing) alters modes of social interaction at the personal level [Familiarity]</li> <li>• Identify developers' assumptions and values embedded in hardware and software design, especially as they pertain to usability for diverse populations including under-represented populations and the disabled [Usage]</li> <li>• Interpret the social context of a given design and its implementation [Assessment]</li> <li>• Evaluate the efficacy of a given design and implementation using empirical data [Familiarity]</li> <li>• Summarize the implications of social media on individualism versus collectivism and culture [Familiarity]</li> <li>• Discuss how Internet access serves as a liberating force for people living under oppressive forms of government; explain how limits on Internet access are used as tools of political and social repression [Familiarity]</li> <li>• Analyze the pros and cons of reliance on computing in the implementation of democracy (eg delivery of social services, electronic voting) [Familiarity]</li> <li>• Describe the impact of the under-representation of diverse populations in the computing profession (eg, industry culture, product diversity) [Usage]</li> <li>• Explain the implications of context awareness in ubiquitous computing systems [Familiarity]</li> </ul>
Readings : [LL04], [McL00]	

**Unit 3: Analytical Tools (2)****Competences Expected:**

Topics	Learning Outcomes
<ul style="list-style-type: none"><li>• Ethical argumentation</li><li>• Ethical theories and decision-making</li><li>• Moral assumptions and values</li></ul>	<ul style="list-style-type: none"><li>• Evaluate stakeholder positions in a given situation [Familiarity]</li><li>• Analyze basic logical fallacies in an argument [Usage]</li><li>• Analyze an argument to identify premises and conclusion [Familiarity]</li><li>• Illustrate the use of example and analogy in ethical argument [Familiarity]</li><li>• Evaluate ethical/social tradeoffs in technical decisions [Familiarity]</li></ul>
<b>Readings :</b> [LL04], [McL00]	

Unit 4: Professional Ethics (4)	
Competences Expected:	
Topics	Learning Outcomes
<ul style="list-style-type: none"> <li>• Community values and the laws by which we live</li> <li>• The nature of professionalism including care, attention and discipline, fiduciary responsibility, and mentoring</li> <li>• Keeping up-to-date as a computing professional in terms of familiarity, tools, skills, legal and professional framework as well as the ability to self-assess and progress in the computing field</li> <li>• Professional certification, codes of ethics, conduct, and practice, such as the ACM/IEEE-CS, SE, AITP, IFIP and international societies</li> <li>• Accountability, responsibility and liability (e.g. software correctness, reliability and safety, as well as ethical confidentiality of cybersecurity professionals)</li> <li>• The role of the computing professional in public policy</li> <li>• Maintaining awareness of consequences</li> <li>• Ethical dissent and whistle-blowing</li> <li>• The relationship between regional culture and ethical dilemmas</li> <li>• Dealing with harassment and discrimination</li> <li>• Forms of professional credentialing</li> <li>• Acceptable use policies for computing in the workplace</li> <li>• Ergonomics and healthy computing environments</li> <li>• Time to market and cost considerations versus quality professional standards</li> </ul>	<ul style="list-style-type: none"> <li>• Identify ethical issues that arise in software development and determine how to address them technically and ethically [Usage]</li> <li>• Explain the ethical responsibility of ensuring software correctness, reliability and safety. [Assessment]</li> <li>• Describe the mechanisms that typically exist for a professional to keep up-to-date [Familiarity]</li> <li>• Describe the strengths and weaknesses of relevant professional codes as expressions of professionalism and guides to decision-making [Familiarity]</li> <li>• Analyze a global computing issue, observing the role of professionals and government officials in managing this problem [Familiarity]</li> <li>• Evaluate the professional codes of ethics from the ACM, the IEEE Computer Society, and other organizations [Familiarity]</li> <li>• Describe ways in which professionals may contribute to public policy [Familiarity]</li> <li>• Describe the consequences of inappropriate professional behavior [Usage]</li> <li>• Identify progressive stages in a whistle-blowing incident [Usage]</li> <li>• Identify examples of how regional culture interplays with ethical dilemmas [Familiarity]</li> <li>• Investigate forms of harassment and discrimination and avenues of assistance [Usage]</li> <li>• Examine various forms of professional credentialing [Usage]</li> <li>• Explain the relationship between ergonomics in computing environments and people's health [Usage]</li> <li>• Develop a computer usage/acceptable use policy with enforcement measures [Familiarity]</li> <li>• Describe issues associated with industries' push to focus on time to market versus enforcing quality professional standards [Usage]</li> </ul>
<b>Readings :</b> [LL04], [McL00], [Edi09a], [Edi09b], [Edi10]	

<b>Unit 5: Intellectual Property (4)</b>	
<b>Competences Expected:</b>	
<b>Topics</b>	<b>Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Philosophical foundations of intellectual property</li> <li>• Intellectual property rights (cross-reference IM/Information Storage and Retrieval/intellectual property and protection)</li> <li>• Intangible digital intellectual property (IDIP)</li> <li>• Legal foundations for intellectual property protection</li> <li>• Digital rights management</li> <li>• Copyrights, patents, trade secrets, trademarks</li> <li>• Plagiarism</li> <li>• Foundations of the open source movement</li> <li>• Software piracy</li> </ul>	<ul style="list-style-type: none"> <li>• Discuss the philosophical bases of intellectual property [Assessment]</li> <li>• Discuss the rationale for the legal protection of intellectual property [Familiarity]</li> <li>• Describe legislation aimed at digital copyright infringements [Assessment]</li> <li>• Critique legislation aimed at digital copyright infringements [Familiarity]</li> <li>• Identify contemporary examples of intangible digital intellectual property [Assessment]</li> <li>• Justify uses of copyrighted materials [Assessment] [Familiarity]</li> <li>• Evaluate the ethical issues inherent in various plagiarism detection mechanisms [Familiarity]</li> <li>• Interpret the intent and implementation of software licensing [Familiarity]</li> <li>• Discuss the issues involved in securing software patents [Familiarity]</li> <li>• Characterize and contrast the concepts of copyright, patenting and trademarks [Familiarity]</li> <li>• Identify the goals of the open source movement [Assessment]</li> <li>• Identify the global nature of software piracy [Familiarity]</li> </ul>
<b>Readings :</b> [LL04], [McL00], [Edi09a], [Edi09b], [Edi10]	

<b>Unit 6: Privacy and Civil Liberties (4)</b>	
<b>Competences Expected:</b>	
<b>Topics</b>	<b>Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Philosophical foundations of privacy rights</li> <li>• Legal foundations of privacy protection</li> <li>• Privacy implications of widespread data collection for transactional databases, data warehouses, surveillance systems, and cloud computing</li> <li>• Ramifications of differential privacy</li> <li>• Technology-based solutions for privacy protection</li> <li>• Privacy legislation in areas of practice</li> <li>• Civil liberties and cultural differences</li> <li>• Freedom of expression and its limitations</li> </ul>	<ul style="list-style-type: none"> <li>• Discuss the philosophical basis for the legal protection of personal privacy [Familiarity]</li> <li>• Evaluate solutions to privacy threats in transactional databases and data warehouses [Familiarity]</li> <li>• Describe the role of data collection in the implementation of pervasive surveillance systems (e.g., RFID, face recognition, toll collection, mobile computing). [Familiarity]</li> <li>• Describe the ramifications of differential privacy. [Familiarity]</li> <li>• Investigate the impact of technological solutions to privacy problems [Familiarity]</li> <li>• Critique the intent, potential value and implementation of various forms of privacy legislation [Familiarity]</li> <li>• Identify strategies to enable appropriate freedom of expression [Familiarity]</li> </ul>
<b>Readings :</b> [LL04], [McL00], [Edi09a], [Edi09b], [Edi10]	

<b>Unit 7: Security Policies, Laws and Computer Crimes (2)</b>	
<b>Competences Expected:</b>	
<b>Topics</b>	<b>Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Examples of computer crimes and legal redress for computer criminals</li> <li>• Social engineering, identity theft and recovery</li> <li>• Issues surrounding the misuse of access and breaches in security</li> <li>• Motivations and ramifications of cyber terrorism and criminal hacking, “cracking”</li> <li>• Effects of malware, such as viruses, worms and Trojan horses</li> <li>• Crime prevention strategies</li> <li>• Security policies</li> </ul>	<ul style="list-style-type: none"> <li>• List classic examples of computer crimes and social engineering incidents with societal impact [Familiarity]</li> <li>• Identify laws that apply to computer crimes [Familiarity]</li> <li>• Describe the motivation and ramifications of cyber terrorism and criminal hacking [Familiarity]</li> <li>• Examine the ethical and legal issues surrounding the misuse of access and various breaches in security [Familiarity]</li> <li>• Discuss the professional’s role in security and the trade-offs involved [Familiarity]</li> <li>• Investigate measures that can be taken by both individuals and organizations including governments to prevent or mitigate the undesirable effects of computer crimes and identity theft [Familiarity]</li> <li>• Write a company-wide security policy, which includes procedures for managing passwords and employee monitoring [Familiarity]</li> </ul>
<b>Readings :</b> [LL04], [McL00], [Edi09a], [Edi09b], [Edi10]	

Unit 8: Economies of Computing (2)	
Competences Expected:	
Topics	Learning Outcomes
<ul style="list-style-type: none"> <li>• Monopolies and their economic implications</li> <li>• Effect of skilled labor supply and demand on the quality of computing products</li> <li>• Pricing strategies in the computing domain</li> <li>• The phenomenon of outsourcing and off-shoring software development; impacts on employment and on economics</li> <li>• Consequences of globalization for the computer science profession</li> <li>• Differences in access to computing resources and the possible effects thereof</li> <li>• Cost/benefit analysis of jobs with considerations to manufacturing, hardware, software, and engineering implications</li> <li>• Cost estimates versus actual costs in relation to total costs</li> <li>• Entrepreneurship: prospects and pitfalls</li> <li>• Network effect or demand-side economies of scale</li> <li>• Use of engineering economics in dealing with finances</li> </ul>	<ul style="list-style-type: none"> <li>• Summarize the rationale for antimonopoly efforts [Familiarity]</li> <li>• Identify several ways in which the information technology industry is affected by shortages in the labor supply [Familiarity]</li> <li>• Identify the evolution of pricing strategies for computing goods and services [Familiarity]</li> <li>• Discuss the benefits, the drawbacks and the implications of off-shoring and outsourcing [Familiarity]</li> <li>• Investigate and defend ways to address limitations on access to computing [Usage]</li> <li>• Describe the economic benefits of network effects [Usage]</li> </ul>
<b>Readings :</b> [LL04], [McL00], [Edi09a], [Edi09b], [Edi10]	

## 8. WORKPLAN

### 8.1 Methodology

Individual and team participation is encouraged to present their ideas, motivating them with additional points in the different stages of the course evaluation.

### 8.2 Theory Sessions

The theory sessions are held in master classes with activities including active learning and roleplay to allow students to internalize the concepts.

### 8.3 Practical Sessions

The practical sessions are held in class where a series of exercises and/or practical concepts are developed through problem solving, problem solving, specific exercises and/or in application contexts.

## 9. EVALUATION SYSTEM

\*\*\*\*\* EVALUATION MISSING \*\*\*\*\*

## 10. BASIC BIBLIOGRAPHY

[Edi09a] Datamation Ediciones, ed. *Revista Datamation MC Ediciones*. 2009.

[Edi09b] Datamation Ediciones, ed. *Understanding the Digital Economy*. 2009.

[Edi10] Datamation Ediciones, ed. *Financial Times Mastering Information Management*. 2010.

[LL04] Kenneth C. Laudon and Jane P. Laudon. *Sistemas de Información Gerencial*. Prentice Hall, 2004.

[McL00] Raymond McLeod Jr. *Sistemas de Información Gerencial*. Prentice Hall, 2000.