

BUSINESS-DRIVEN INFORMATION TECHNOLOGIES

IE University

Professor: **ROBERTO TORENA CRISTÓBAL**

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Academic year: 22-23

Degree course: SECOND

Semester: 1^o

Category: COMPULSORY

Number of credits: 5.0

Language: English

PREREQUISITES

No prerequisites required

SUBJECT DESCRIPTION

This course focuses on the critical personal and organizational issues of the information systems. The unifying theme is the type of computer-based hardware and software being used at different levels of an organization and how computer technology assists individuals to perform their jobs. The student is provided with content to evaluate the role of information systems used to create competitive firms, manage digital organizations and provide useful online products and services for customers. Topics include new technology-based business models in the Internet, mobile technologies, networking systems, the use of social networks for marketing, Cloud Computing, Big Data and advanced analytics and new trends like, IoT, Blockchain and Artificial Intelligence.

The main aim of the course is to develop an overall understanding of the nature and efforts required to exploit the potential of the Information Technologies (IT) and Management Information Systems (MIS) in contemporary organizations, whether they are start-ups or large multinationals. This course does not study any particular technology, nor does it study in- depth technical processes for systems development such as design, programming or coding. Rather, this course provides a critical understanding of the outcomes of the information systems in an organization and provides students with innovative ideas focusing on entrepreneurship.

The program is divided into three main blocks:

1. Foundations: main definitions and elements
2. The infrastructure and interconnectivity of digital business
3. Using the infrastructure

OBJECTIVES AND SKILLS

At the end of this course students should be able to:

- Discuss the process of Information Systems (IS) innovation as a socio-technical endeavor that comprises both technology and organizational change.
- Identify the main trends in the socio-economic context of organizations and IS. Critically

- discuss the relationship between IS and business processes.
- Discuss the strategic value of IS for organizations and methods used for IS planning.
 - Critically discuss the options organizations have to acquire the technologies they need for their information systems.
 - Critically discuss some of the most frequently used methods for the information systems development or implementation.
 - Describe the tasks comprising the process of managing IS development and implementation projects.
 - Analyze the situation of IS markets, its history and future trends.
 - Design the IS infrastructure a digital business model requires to support a successful implementation.

METHODOLOGY

Teaching methodology	Weighting	Estimated time a student should dedicate to prepare for and participate in
Lectures	33.33 %	25 hours
Discussions	6.67 %	5 hours
Exercises	20.0 %	15 hours
Group work	20.0 %	15 hours
Other individual studying	20.0 %	15 hours
TOTAL	100.0 %	75 hours

PROGRAM

SESSION 1 (LIVE IN-PERSON)

INTRODUCTION TO INFORMATION TECHNOLOGY IN BUSINESS

Book Chapters : Chapter 1, Bélanger et al (See Bibliography)

- Introduction to the course
- Information Technology evolution
- The challenge of managing information in today business. The new era: the 4th industrial revolution and the digital transformation

SESSION 2 (LIVE IN-PERSON)

HARDWARE, SOFTWARE & THE VALUE OF INFORMATION

Book Chapters : Chapters 1 & 2, Bélanger et al (See Bibliography)

- Introduction to information systems and their main components: Hardware & Software
- Data, information, knowledge and wisdom
- Introduction to digital innovation

SESSION 3 (LIVE IN-PERSON)

ENTERPRISE INFORMATION SYSTEMS I

Book Chapters : Chapter 12, Bélanger et al (See Bibliography)

- The flow of digital information
- Enterprise systems
- ERP, CRM and SCM
- Automation

SESSION 4 (LIVE IN-PERSON)

ENTERPRISE INFORMATION SYSTEMS II

Book Chapters : Chapter 12, Bélanger et al (See Bibliography)

- The flow of digital information
- Enterprise systems
- ERP, CRM and SCM
- Automation

SESSION 5 (LIVE IN-PERSON)

GAINING STRATEGIC VALUE FROM INFORMATION. BUSINESS DECISION MAKING: BUSINESS INTELLIGENCE

Practical Case: Business Intelligence (IST010050-U-ENG-HTM)

Book Chapters : Chapters 4 & 14, Bélanger et al (See Bibliography)

- Data
- Introducing business intelligence and data analytics
- Using information for decision making
- Introduction to knowledge management

During this session the teams for the assignments and the final presentation will be closed and students will be provided with a week to validate the company to be analyzed as final project.

SESSION 6 (LIVE IN-PERSON)

STORING AND ORGANIZING INFORMATION: DATA, DATABASES AND BIG DATA I

Practical Case: The BI/Big Data Transformation Journey in Telefónica España (2011-2018) Part 1 (IST010082-A-ENG-WOD)

Practical Case: The BI/Big Data Transformation Journey in Telefónica España (2011-2018) Part 2 (IST010083-B-ENG-WOD)

Book Chapters : Chapter 5, Bélanger et al (See Bibliography)

- Overview of Databases: relational and non-structured databases
- ERD (Entity relationship Diagrams)
- Big Data: main characteristics and uses Exploiting information in organizations

SESSION 7 (LIVE IN-PERSON)

STORING AND ORGANIZING INFORMATION: DATA, DATABASES AND BIG DATA II

Practical Case: The BI/Big Data Transformation Journey in Telefónica España (2011-2018) Part 3 (IST010099-C-ENG-WOD)

Practical Case: The BI/Big Data Transformation Journey in Telefónica España (2011-2018) Part 4

(IST010085-D-ENG-WOD)

Technical note & tutorials: Big Data (IST020061-U-ENG-HTM)

Book Chapters : Chapter 5, Bélanger et al (See Bibliography)

- Overview of Databases: relational and non-structured databases
- ERD (Entity relationship Diagrams)
- Big Data: main characteristics and uses Exploiting information in organizations

1st assignment: Teams will write a paper on how companies use Big Data and advanced analytics. Students will follow the guidelines provided by the Professor and will have two weeks to submit it.

SESSION 8 (ASYNCHRONOUS)

PRACTICAL ACTIVITIES

- Business Intelligence Dashboard – Instructions will be uploaded to the blackboard
- ERD (Entity relationship Diagrams) – Instructions will be uploaded to the blackboard

SESSION 9 (LIVE IN-PERSON)

INTERNET AND THE WEB: TRANSMITTING INFORMATION I

Book Chapters : Chapter 7, Bélanger et al (See Bibliography)

- Networks
- Introduction to the Internet
- Client/Server architecture
- Introduction to the Web
- IoT

SESSION 10 (LIVE IN-PERSON)

INTERNET AND THE WEB: TRANSMITTING INFORMATION II

Technical note & tutorials: Internet of Things (IST020081-U-ENG-HTM)

Book Chapters : Chapter 7, Bélanger et al (See Bibliography)

- Networks
- Introduction to the Internet
- Client/Server architecture
- Introduction to the Web
- IoT

SESSION 11 (LIVE IN-PERSON)

PROTECTING THE INTERNET: CYBERSECURITY AND DATA PRIVACY I

Book Chapters : Chapters 8 & 9, Bélanger et al (See Bibliography)

- Information security concepts
- Main Information security threats
- Techniques for protecting digital information

SESSION 12 (LIVE IN-PERSON)

PROTECTING THE INTERNET: CYBERSECURITY AND DATA PRIVACY II

Book Chapters : Chapters 8 & 9, Bélanger et al (See Bibliography)

- Information security concepts
- Main Information security threats
- Techniques for protecting digital information

SESSION 13 (ASYNCHRONOUS)

PRACTICAL ACTIVITIES

- Cybersecurity – Instructions will be uploaded to the blackboard

SESSION 14 (LIVE IN-PERSON)

MOBILE, CLOUD AND ON-DEMAND PROVISIONING MODELS I

Book Chapters : No chapter associated in the book.

- Mobile: Information everywhere
- Cloud computing: Definition and implications
- Types (Public, Private, Hybrid) and Services (IaaS, PaaS, SaaS)Edge computing
- Edge computing

SESSION 15 (LIVE IN-PERSON)

MOBILE, CLOUD AND ON-DEMAND PROVISIONING MODELS II

Practical Case: An app you cannot refuse (IST010069-U-ENG-HTM)

Book Chapters : No chapter associated in the book.

- Mobile: Information everywhere
- Cloud computing: Definition and implications
- Types (Public, Private, Hybrid) and Services (IaaS, PaaS, SaaS)Edge computing
- Edge computing

SESSION 16 (LIVE IN-PERSON)

INFORMATION INTERCHANGE, SOCIAL MEDIA AND E-COMMERCE

Book Chapters : Chapter 13, Bélanger et al (See Bibliography)

- From the Web 2.0 to the web 3.0
- Introduction to the Web 2.0 and social Media
- Social Media strategies
- E-commerce: Definition and implications
- Intro to digital transformation: 4 digital transformation types
- The new consumer: from Multichannel to Omnichannel
- The customer journey supported by technology
- e-marketing: SEO, SEM...

SESSION 17 (LIVE IN-PERSON)

DEVELOPING INFORMATION SYSTEMS. DIGITAL PLATFORMS

Technical note & tutorials: Agile Methodologies (ENT020084-U-ENG-HTM)

Book Chapters : Chapter 10, Bélanger et al (See Bibliography)

- Introducing software development methodologies: Agile, Scrum, Lean...
- Business requirements representation using data-flow diagrams and use case diagrams
- Challenges in developing information system

SESSION 18 (ASYNCHRONOUS)

PRACTICAL ACTIVITIES

- Cloud Computing – Instructions will be uploaded to the blackboard
- Cloud Economics – Instructions will be uploaded to the blackboard

SESSION 19 (LIVE IN-PERSON)

LOOKING AHEAD: INFORMATION TECHNOLOGIES TRENDS I

Technical note & tutorials: Machine Learning (IST020075-U-ENG-HTM)

Book Chapters : No chapter associated in the book.

- The new ecosystem
- AI (Machine learning, deep learning, Robotics...)
- A business example: Fintech, cryptocurrencies, Blockchain, NFTs

SESSION 20 (LIVE IN-PERSON)

LOOKING AHEAD: INFORMATION TECHNOLOGIES TRENDS II

Book Chapters : No chapter associated in the book.

- The new ecosystem
- AI (Machine learning, deep learning, Robotics...)
- A business example: Fintech, cryptocurrencies, Blockchain, NFTs

SESSION 21 (LIVE IN-PERSON)

LOOKING AHEAD: INFORMATION TECHNOLOGIES TRENDS III

Book Chapters : No chapter associated in the book.

- AR, VR, MR
- The metaverse

SESSION 22 (LIVE IN-PERSON)

LOOKING AHEAD: INFORMATION TECHNOLOGIES TRENDS IV

Book Chapters : No chapter associated in the book.

- AR, VR, MR
- The metaverse

SESSION 23 (ASYNCHRONOUS)

PRACTICAL ACTIVITIES

- Robotics – Instructions will be uploaded to the blackboard

SESSION 24 (LIVE IN-PERSON)

FINAL PROJECT PRESENTATIONS. Understanding the “Big picture” I

Details for the Final Project will be arranged at the start of the course.

Details on assignments will be provided during the course according to the content explained.

SESSION 25 (LIVE IN-PERSON)

FINAL PROJECT PRESENTATIONS. Understanding the “Big picture” II

Details for the Final Project will be arranged at the start of the course.

Details on assignments will be provided during the course according to the content explained.

BIBLIOGRAPHY

Compulsory

- France Bélanger, Craig Van Slyke, Robert E. Crossler. (2022). *Information Systems for Business: An Experiential Approach..* 4. Prospect Press. ISBN 9781943153886 (Digital)

This book is available in an online version only and can be acquired via:
<https://www.redshelf.com/app/ecom/book/1828292/information-systems-for-business-1828292-9781943153879-france-belanger-craig-van-slyke-robert-e-crossler>

Recommended

- Gabriele Picoli, Federico Pigni. (2019). *Information Systems for Managers.* Prospect Press. ISBN 9781943153527 (Printed)
- Kenneth C. Laudon, Jane P. Laudon. (2017). *Management Information Systems.* Prentice Hall. ISBN 0133050696 (Printed)

EVALUATION CRITERIA

This course requires students to attend, at least, to the 70 % of the sessions. You will be asked to make written and verbal presentations and take an active role in class discussions. The evaluation is based on the following criteria:

Criteria	Percentage	Comments
Class Participation	10 %	
Workgroups	15 %	Report in teams
Intermediate Tests	45 %	3 quizzes distributed in three sessions of the course
Group Presentation	30 %	Final presentation in teams

A. CLASS PARTICIPATION

Students must attend, at least, 70% of all classes and participate in class discussions. The rating of the class participation is based on two aspects, the presence and contributions to class discussions. Contributions on class discussions will focus on quality, not quantity of the contribution, so that students who participate often do not necessarily receive a better rating than those who participate less frequently. Therefore, students are encouraged to start contributing to the discussions since the beginning of the course.

For this course, consider the cases and the documentation just a starting point. Feel free to update, add additional data or analysis to the discussion, or ask questions in the light of recent news or the news the read.

B. GROUP CASE

For the group case, there is an upper limit of 4 pages of text (assuming 11-point font size, Times New Roman, double spacing) plus no more than one page of exhibits.

A soft copy of the case write-up will be submitted to the professor via Blackboard.

Make sure the case write-up is easy to read. Consider using bullets, headings, etc., to make the case write-up easy to follow.

The objective of this process is to give you practice writing concise executive summaries –something that would make the reader believe that you have done a thorough analysis supporting your recommendations. This is the type of briefing that must typically be prepared for upper management – before they provide the resources for a more detailed investigation.

Good case briefs are concise, but also provide a fact-based rationale for your recommendations and implementation plan. The rationale should reflect a good understanding of the important issues of the case and may integrate previous material from the class or your experience. You might also note factors that argue against your recommendation, and how your implementation plan might minimize the impact of these factors.

C. FINAL GROUP PRESENTATION AND REPORT

You are also expected to complete a final project with your group and present it in written form. The project will give you the opportunity to reflect on what you have learnt in class and apply it to some practical problems. More details of the project will be provided by the start of the course.

D. INTERMEDIATE TESTS / QUIZZES

The intermediate tests focus on the topics explained throughout the course. Detailed instructions will be provided during the course.

E. RE-SIT / RE-TAKE POLICY

Each student has four (4) chances to pass any given course distributed over two (2) consecutive academic years. Each academic year consists of two calls: one (1) ordinary call (during the semester when the course is taking place); and one (1) extraordinary call (or “re-sit”) in June/July.

Students who do not comply with the 70% attendance requirement in each subject during the semester will automatically fail both calls (ordinary and extraordinary) for that Academic Year and have to re-take the course (i.e., re-enroll) during the next Academic Year.

The Extraordinary Call Evaluation criteria will be subject to the following rules:

- Students failing the course in the ordinary call (during the semester) will have to re-sit evaluation for the course in June / July (except those students who do not comply with the attendance rule, and therefore will not have that opportunity, since they will fail both calls and must directly re- enroll in the course during the next Academic Year).
- It is not permitted to change the format nor the date of the extraordinary call exams or deadlines under any circumstance. All extraordinary call evaluation dates will be announced in advance and must be taken into consideration before planning the summer (e.g. internships, trips, holidays, etc.).
- The June/July re-sit will consist of a comprehensive evaluation of the course. Your final grade for the course will depend on the performance in this exam or evaluation only. I.e., continuous

evaluation over the semester (e.g. participation, quizzes, projects and/or other grade components over the semester) will not be taken into consideration on the extraordinary call. Students will have to achieve the minimum passing grade of 5 and the maximum grade will be capped at 8.0 (out of 10.0) – i.e., “notable” in the extraordinary call.

- Re-takers: Students who failed the subject on a previous Academic Year and are now reenrolled as re-takers in a course will need to check the syllabus of the assigned professor, as well as contact the professor individually, regarding the specific evaluation criteria for them as re-takers in the course during that semester (ordinary call of that Academic Year). The maximum grade that may be obtained as a retaker during the ordinary call (i.e., the 3rd call) is 10.0 (out of 10.0).

After exams and other assessments are graded by the professor (on either the ordinary or extraordinary call), students will have a possibility to attend a review session (whether it be a final exam, a final project, or the final overall grade in a given course). Please be available to attend the session in order to clarify any concerns you might have regarding your grade. Your professor will inform you about the time and place of the review session.

- Students failing more than 18 ECTS credits after the June/July re-sits will be asked to leave the Program. Please, make sure to prepare yourself well for the exams in order to pass your failed subjects.
- In case you decide to skip the opportunity to re-sit for an exam or evaluation during the June/July extraordinary call, you will need to enroll in that course again for the next Academic Year as a re-taker, and pay the corresponding tuition fees. As you know, students have a total of four (4) allowed calls to pass a given subject or course, in order to remain in the program.

PROFESSOR BIO

Professor: **ROBERTO TORENA CRISTÓBAL**

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ROBERTO TORENA CRISTÓBAL

Academic Background

- eMBA. IE Business School
- MSc Telecommunications Engineering. Zaragoza University

Courses

- DeepLearning.AI TensorFlow Developer Specialization
- Deep Learning Specialization
- Applied Data Science with Python Specialization
- Machine Learning Specialization
- Executive Data Science
- Modern Big Data Analysis with SQL
- Business Analytics Specialization

Academic Experience

- "Management Information Systems" Adjunct Professor. IE University
- "Digital Transformation" Adjunct Professor. Fundesem Business School
- "Data Analytics" Adjunct Professor. Fundesem Business School

Corporate Experience

- Technical Lead - Machine Learning. Paradigma Digital
 - Artificial Intelligence (AI) Governance
 - Data / Machine Learning Architecture and MLOps in Azure: Definition and launching
 - Data Visualization and Democratization: Definition and launching
- Business Intelligence & Data Science Manager. Independent Consultant
- Director of "Business Intelligence", "Web and Mobile App Development", "R&D & Innovation" and "IT". ILUNION Technology and Accessibility
- Manager of "Web and mobile apps development" and "R&D & Innovation" departments. ILUNION Technology and Accessibility
- Brussels Office Manager. ILUNION Technology and Accessibility
- R&D Project Coordinator / Researcher. ILUNION Technology and Accessibility
- Monitoring of Satellite Services Project Manager for the Industry Ministry. Gamma Solutions
- Network Deployment Project Manager for SIEMENS. Gamma Solutions
- Network Optimization Engineer for SIEMENS. Gamma Solutions
- Transmission Engineer (Traineeship). Vodafone
- IT Project Responsible. Fundación Pioneros
- R&D master's thesis. SIEMENS

OTHER INFORMATION

OFFICE HOURS:

Live tutorials available by previous appointment.

CONTACT DETAILS:

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<https://www.linkedin.com/in/robertotorenadatadriven/>

CODE OF CONDUCT IN CLASS

1. Be on time: Students arriving more than 10 minutes late will be marked as "Absent". Only students that provide written notification to the professor in advance) that they will be late for a specific session (and the professor confirms receipt of this information) may be granted an exception at the discretion of the professor.
2. Respect your classmates. Classroom discussion is an important part of the learning process. Therefore, it is vital to maintain a classroom environment that is respectful and free of discrimination and/or recrimination from peers. Please keep in mind that at times, students may disclose personal information through class discussions. It is expected that all members of the class will respect the privacy of their classmates. However, please remember that class is NOT a protected, confidential environment, and the professor cannot guarantee that other students/peers will maintain your confidential information should you choose to share it.
3. If applicable, bring your name card and strictly follow the seating chart. It helps faculty members and fellow students learn your names.
4. Do not leave the room during the lecture: Students are not allowed to leave the room during lectures (unless specifically permitted by the course professor). If a student leaves the room during lectures without receiving permission from the professor, he/she will not be allowed to re-enter and, therefore, will be marked as "Absent". Only students that notify the course professor that they have a special reason to leave the session early will be granted an

- exception (at the discretion of the professor).
5. Do not engage in side-conversation. As a sign of respect toward the person presenting the lecture (the teacher as well as fellow students), side-conversations are not allowed. If you have a question, raise your hand and ask it. If you do not want to ask it during the lecture, feel free to approach your teacher after class. If a student is disrupting the flow of the lecture, he/she will be asked to leave the classroom and, consequently, will be marked as "Absent".
 6. Use your laptop for course-related purposes only. The use of laptops during lectures must be authorized by the professor. The use of Social Media or accessing any type of content not related to the lecture is not permitted. That is, the student will be asked to leave the room and thus will be marked as "Absent".
 7. No cellular phones: IE University implements a "Phone-free Classroom" policy and, therefore, the use of phones, tablets, etc. is forbidden inside the classroom. Failing to abide by this rule entails expulsion from the room and will be counted as one absence.