## BACHELOR IN COMPUTER SCIENCE FOR BUSINESS

**Main Language of Instruction :**
French ☑   English ○   Arabic ○

**Campus Where the Program is Offered:** CSS

### OBJECTIVES

The Bachelor in Computer Science for Business aims to train future professionals who are immediately operational in the job market. It provides training that is highly valued by companies, developing and reinforcing students' skills at three complementary levels:
- Computer concepts, methods, and technologies: Students will gain a solid foundation in computer science (programming languages, systems, networks, databases, methods) enabling them to work on various business applications based on technologies using market-required technologies (Web, mobile, Java, PHP, JavaScript, databases, etc.).
- Communication and interpersonal skills: Students develop essential skills in expression, persuasion, sales, negotiation, and presentation, with a focus on business English.
- Management and business administration: Students learn the fundamentals of business operations to digitize processes, covering subjects such as accounting, marketing, law, economics, and finance.

### PROGRAM LEARNING OUTCOMES (COMPETENCIES)

- Specify and design an IT solution.
- Implement an IT solution.
- Estimate and monitor a development project.
- Understand the business environment and essential management and communication principles.

### PROGRAM REQUIREMENTS

**180 credits: Required courses (128 credits), Institution's Elective Courses (14 credits), USJ General Education Program (34 credits), Open Elective Courses (4 credits).**
**Arabic Language and Culture (2 Cr.) is part of the USJ General Education Program and the Open Elective Courses.**

**USJ General Education Program (34 credits)**
**English (4 Cr.)**
  English Level A (4 Cr.)
**Arabic (4 Cr.)**
  Arabic Language and Culture (2 Cr.)
  Arabic Language and Media اللغة العربيّة في الصحافة والإعلان (2 Cr.)
  Other course taught in Arabic (2 Cr.)
  Labor Law and Social Security (2 Cr.)
**Communication Techniques (4 Cr.)**
  Communication and Selling Skills: (4 Cr.)
**Humanities (8 Cr.)**
 **Ethics (2 Cr.)**
    Business Ethics (2 Cr.)
 **Religious Studies (2 Cr.)**
    USJ Values (2 Cr.)
 **Civic and Citizen Engagement: (2 Cr.)**
    Voluntary and Civic Action (2 Cr.)
 **Other (2 Cr.)**
    Psychology (2 Cr.)

**Social Sciences (6 Cr.)**
  **Professional Insertion and Entrepreneurship: (2 Cr.)**
    Work Ready Now (4 Cr.)
  **Other (4 Cr.)**
    Financial Accounting (4 Cr.)
**Quantitative techniques (6 Cr.)**
  Financial Mathematics (2 cr.)
  Statistics (4 Cr.)

**Fundamental Courses (142 Cr.)**

**Required Courses (128 Cr.)**
Advanced Programming in Java (6 Cr.). Algorithms and Data Structures (4 Cr.). Business Law - Fundamental Themes (2 Cr.). Computer Architecture (4 Cr.). Computer Security (2 Cr.). Cost Control Analysis (4 Cr.). Databases - Modeling (2 Cr.). Databases (6 Cr.). Discrete Mathematics (4 Cr.). Bachelor Degree Final Project I (Analysis) (6 Cr.). Bachelor Degree Final Project II (Programming) (6 Cr.). The Foundations of Marketing (4 Cr.). Infrastructure Administration (2 Cr.). Internship 1 (6 Cr.). Internship 2 (8 Cr.). Introduction to Artificial Intelligence (2 Cr.). Introduction to IT Project Management (3 Cr.). Logic and Proof Systems (2 Cr.). Management (4 Cr.). Mobile Application Development (4 Cr.). Networks (3 Cr.). Object-Oriented Analysis and Design I (2 Cr.). Object-Oriented Analysis and Design II (3 Cr.). Object-Oriented Programming in Java (3 Cr.). Operating Systems (4 Cr.). Operating Systems II (3 Cr.). Operational Research (4 Cr.). Programming I (4 Cr.). Programming II (4 Cr.). Quality Control and Operations in Software Development (4 Cr.). Web Development in .NET (4 Cr.). Web Development in Java (4 Cr.). Web Programming Techniques I (3 Cr.). Web Programming Techniques II (2 Cr.).

**Institutions' Elective Courses (14 Cr.)**
Advanced Web Programming (4 Cr.). E-commerce (2 Cr.). Emotional Intelligence (2 Cr.). Events Management (4 Cr.). Biblical Readings (3 Cr.). Mediation (3 Cr.). Mindfulness Based Stress Reduction (2 Cr.). Multimedia Software (Flash) (2 Cr.). PL/SQL Language (2 Cr.). Programming in Node.js (2 Cr.). REACT (2 Cr.). SEO/SEM (2 Cr.). Social Networking for Business (2 Cr.). Sport, Health, and Well-Being (2 Cr.). Starting Your Startup (2 Cr.). Web Development in PHP (2 Cr.).

**Open Elective Courses (4 Cr.)**

## SUGGESTED STUDY PLAN

**Semester 1**

| Code | Course Name | Credits |
|------|-------------|---------|
| 063CPTGL1 | Financial Accounting | 4 |
| 063MAT1L1 | Logic and Proof Systems | 2 |
| 063PRG1L1 | Programming I | 4 |
| 063SCSKL2 | Communication and Selling Skills | 4 |
| 063STA1L1 | Statistics I | 4 |
| 063ISY1L1 | Operating Systems | 4 |
| 063WPR1L3 | Web Programming Techniques I | 3 |
| 063PSYCL4 | Psychology | 2 |
| 435LAJPL1 | Arabic Language and Media اللغة العربيّة في الصحافة والإعلان | 2 |
|  | **Total** | **29** |

## Semester 2

| Code | Course Name | Credits |
|---|---|---|
| 063ISY2L2 | Computer Architecture | 4 |
| 063BD01L2 | Databases | 6 |
| 063DRTSL3 | Labor Law and Social Security | 2 |
| 063MKT1L1 | The Foundations of Marketing | 4 |
| 063MAT2L2 | Discrete Mathematics II | 4 |
| 063PRG3L2 | Programming II | 4 |
| 063WPR2L2 | Web Programming Techniques II | 2 |
| 063ETHIL2 | Business Ethics | 2 |
| | **Total** | **28** |

## Summer Semester

| Code | Course Name | Credits |
|---|---|---|
| 063SLI1L2 | Internship I | 6 |

## Semester 3

| Code | Course Name | Credits |
|---|---|---|
| 063PRG5L3 | Algorithms and Data Structures | 4 |
| 063GL01L3 | Object-Oriented Analysis and Design I | 2 |
| 063BD02L3 | Databases - Modeling | 2 |
| 063MGT1L1 | Management | 4 |
| 063MATFL3 | Financial Mathematics | 2 |
| 063PRG6L3 | Object-Oriented Programming in Java | 3 |
| 063RXT1L3 | Networks | 3 |
| 015ABC2L3 | Voluntary Action | 2 |
| | Open Elective Course | 4 |
| | **Total** | **26** |

## Semester 4

| Code | Course Name | Credits |
|---|---|---|
| 063GL02L4 | Object-Oriented Analysis and Design II | 3 |
| 063WNETL4 | Web Development in .NET | 4 |
| 063WJAVL5 | Web Development in Java | 4 |
| 063DRASL2 | Business Law I Fundamental Themes | 2 |
| 063INIAL6 | Introduction to Artificial Intelligence | 2 |
| 063PRG7L4 | Advanced Programming in Java | 6 |
| 063WRNEL5 | Work Ready Now | 4 |
| | USJ Values | 2 |
| | **Total** | **27** |

| Code | Course Name | Credits |
|------|-------------|---------|
| 063SLI2L4 | Internship II | 8 |

**Semester 5**

| Code | Course Name | Credits |
|------|-------------|---------|
| 063ADINM3 | Infrastructure Administration | 2 |
| 063ANGAL5 | Business English | 4 |
| 063DMB1L6 | Mobile Application Development | 4 |
| 063IPRIL6 | Introduction to IT Project Management | 3 |
| 063PJI1L5 | Bachelor Degree Final Project I (Analysis) | 6 |
| 063ISY3L5 | Operating Systems II | 3 |
|  | Institution's Elective Courses | 8 |
|  | **Total** | **30** |

**Semester 6**

| Code | Course Name | Credits |
|------|-------------|---------|
| 063CPTAL4 | Cost Control Analysis | 4 |
| 063QUPRL6 | Quality Control and Operations in Software Development | 4 |
| 063PJI2L6 | Bachelor Degree Final Project I (Programming) | 6 |
| 063RCOPL5 | Operational Research | 4 |
| 063SECUM4 | Computer Security | 2 |
|  | Institution's Elective Courses | 6 |
|  | **Total** | **26** |

## COURSE DESCRIPTION

| 063ADINM3 | Infrastructure Administration | 2 Cr. |
|-----------|-------------------------------|-------|

This course enables students to identify types of Network Management Systems (NMS) and their functions, distinguish current enterprise architectures, and develop a management plan for a data center. It contributes to the development of the following competencies:
  - Managing enterprise networks.
  - Designing a data center.

| 063PRG5L3 | Algorithms and Data Structures | 4 Cr. |
|-----------|--------------------------------|-------|

This course contributes to the development of the following competencies:
  - Continuing to enhance skills in analysis, design, and programming.
  - Developing advanced algorithms in computer science.
This course aims to teach advanced concepts in algorithms and data structures: complexity, recursion, lists, stacks and queues, trees, and sorting and searching algorithms.

| 063GL01L3 | Object-Oriented Analysis and Design I | 2 Cr. |
|-----------|---------------------------------------|-------|

This course contributes to the development of the following competencies:
Specifying and designing an IT solution:
  - Designing a UML model and design patterns.
  - Mastering the Model View Controller (MVC) framework.

It aims to understand the main design patterns and identify those that best address a specific problem in order to design a performant and scalable solution.

| 063GL02L4 | Object-Oriented Analysis and Design II | 3 Cr. |
|---|---|---|

This course contributes to the development of the following competencies:
Specifying and designing an IT solution:
  - Designing a UML model and design patterns.
  - Mastering the Model View Controller (MVC) framework.
It aims to understand the main design patterns and identify those that best address a specific problem in order to design a performant and scalable solution.

| 063ISY2L2 | Computer Architecture | 4 Cr. |
|---|---|---|

This course is designed for students with little or no prior knowledge of computer science, offered in the fourth semester of the Bachelor of Management Informatics program. There are no prerequisites.
It begins with an introduction to computer architecture, explaining how computers work and how processors function. The second part covers memory operation and lays the groundwork for programming and algorithms by teaching scripting in both Linux and Windows operating systems.

| 063BD01L2 | Databases | 6 Cr. |
|---|---|---|

This course contributes to the development of the following competencies:
  - Understand different relational databases.
  - Use the SQL language.
  - Manage databases.

| 063BD02L3 | Databases - Modeling | 2 Cr. |
|---|---|---|

This course contributes to the development of the following competencies:
  Specify and design a computer solution:
    Establish a standardized and efficient model for stored data.
  Implement a computer solution:
    Manage databases.
By the end of this course, students will be able to analyze a business problem to derive a coherent and optimized conceptual model, and then translate it into a relational database.

| 063ANGAL5 | Business English | 4 Cr. |
|---|---|---|

This course familiarizes students with both general business language and the technical terminology specific to this training.

| 063BSPLL6 | Business Plan | 2 Cr. |
|---|---|---|

This course equips students with an understanding of the basic structure of a business plan and how it addresses market and organizational needs. Students will work in groups of 4 to create and present a well-developed and well-structured business plan covering all vital elements.

| 063SCSKL2 | Communication and Selling Skills | 4 Cr. |
|---|---|---|

This course focuses on the essential skills of effective communication and sales with coworkers and business associates. Through interactive, hands-on activities, students will explore crucial concepts in both verbal and non-verbal communication.
Students will learn how body language and non-verbal cues such as eye contact and perception, can impact communication challenges. This course will also highlight the importance of active listening skills in enhancing interactions.
By adopting new perspectives, students will discover ways to improve their communication and selling techniques, fostering stronger relationships. This open approach will enhance their writing, speaking, presentations, and even

the research and development of work products while transforming how they perceive themselves and their interactions with others.

| 063CPTAL4 | Cost Control Analysis | 4 Cr. |
|---|---|---|

This course demonstrates how information from general accounting can be used to enhance the efficiency of business management, sometimes employing statistical tools.
It specifically addresses the needs of industrial companies in determining their various costs, particularly the cost of goods sold, along with all related concepts, to establish selling prices. This course also focuses on categorizing a company's expenses into fixed and variable costs and determining the break-even point accordingly.

| 063CPTGL1 | General Accounting | 4 Cr. |
|---|---|---|

This course introduces students to accounting principles, covering essential topics such as accounting entries, reading and interpreting corporate accounts, and understanding company obligations.
This course aims to help students "understand the basics and techniques of accounting management". As a prerequisite for analytical accounting, it guides students in assimilating a set of concepts and accounting mechanisms needed to construct social accounts at the end of the financial year. Students will acquire vocabulary and accounting mechanisms while gaining a clear understanding of key concepts such as double entry accounting, assets, the income statement, the balance sheet and the annex.
This course also highlights accounting as a management tool for businesses, enabling the creation of essential management documents, such as analytical accounting reports. By standardizing accounting practices, students learn how to compare similar companies, allowing them to analyze balance sheets and income statements to assess a company's position relative to its competitors.

| 063QUPRL6 | Quality Control and Operations in Software Development | 4 Cr. |
|---|---|---|

This course contributes to the development of the following competencies:
  - Develop software solutions in accordance with specifications.
  - Conduct unit and integration testing.
This course aims to:
  - Ensure software quality during its development.
  - Manage code versions and updates.

| 063DMB1L6 | Mobile Application Development | 3 Cr. |
|---|---|---|

This course covers the fundamental concepts of designing and developing mobile applications from a practical perspective. Programming is conducted on the Android system using Java and Android Studio, enabling students to quickly engage with the subject matter.

| 063DVDRL2 | Sustainable Development | 3 Cr. |
|---|---|---|

This course examines the concept of sustainable development, which addresses social and ecological concerns about the negative consequences of growth. It focuses on how sustainable development aims to balance economic growth with the need to preserve resources for future generations. This course also examines the increasing prominence of this concept in political, economic, marketing and industrial sectors, driven by heightened public awareness of sustainability issues.

| 063WJAVL5 | Web Development in Java | 4 Cr. |
|---|---|---|

This course enables students to master the tools for developing dynamic web applications using Java. It also teaches them how to manage any database using SQL, particularly focusing on Postgres, and utilizing the PgAdmin web interface.

| 063WNETL4 | Web Development in .NET | 3 Cr. |
|---|---|---|

This course contributes to the development of the following competencies:
  - Create forms to manage database content
  - Display database content interactively

- Develop according to specifications
 - Develop on multiple platforms and quickly adapt to new ones (Web).
It also aims to develop a dynamic website using ASP.NET.

| 063WPHPL6 | Web Development in PHP | 2 Cr. |
|---|---|---|

This course trains students in developing dynamic web applications using PHP. It also teaches them how to manage any database with SQL, particularly MySQL, using its web interface, PhpMyAdmin.

| 063DRASL2 | Business Law - Fundamental Themes | 2 Cr. |
|---|---|---|

This course covers key commercial companies, various payment methods (checks, credit cards, and debit cards) as well as modern conflict resolution techniques (conciliation, arbitration).

| 063DRTSL3 | Labor Law and Social Security | 2 Cr. |
|---|---|---|

This course prepares students for their professional lives as employees by introducing them to their future working environment (the company) and the legal relationships that develop within it. Students will gain awareness of their rights and obligations toward their future employers and vice versa.

| 063ECOML3 | E-commerce | 2 Cr. |
|---|---|---|

This course explores the differences between traditional commerce and e-commerce, which has drastically changed business practices. Students will gain insights into consumer behavior related to online shopping, including what attracts customers, their preferences, and how to navigate the absence of tactile product experiences. This course also identifies the key elements that contribute to a successful e-commerce website through a detailed case study on Amazon. Additionally, it examines specific marketing tools for e-commerce designed to enhance website visibility and increase traffic, sales and revenues. Finally, this course assesses the impact of technology on businesses and discusses strategies for addressing e-commerce problems, both proactively and during the operational phase of a website.

| 063INTEL5 | Emotional Intelligence | 2 Cr. |
|---|---|---|

This course emphasizes the necessity for organizations to adapt swiftly to maintain their competitive edge. It explores how rapid change requires leaders and employees who are flexible, effective, and committed to continuous improvement while sharing a focus on profitability. The course covers the principles of Emotional Intelligence, which is essential for achieving better results for individuals, teams, and organizations, ultimately enhancing overall performance. Participants will learn to manage their time, people, and performance more effectively, enabling them to deliver exceptional quality and facilitate cultural change.

| 063ETHIL2 | Professional ethics | 2 Cr. |
|---|---|---|

This course addresses the growing importance of ethics, professional conduct, morality, and corporate social responsibility in business. In today's business world, compliance with ethical principles by all stakeholders—employers, employees, and administrations—has become essential. This course highlights the positive consequences of ethical behavior while also addressing the detrimental effects of unethical behavior. This course familiarizes students with the ethical issues that may arise in business practices while illustrating how societal and cultural factors influence ethical conduct. As Theodore Roosevelt stated, "The biggest corporation, like the humblest citizen, must be held to strict compliance with the will of the people".

| 063MGECL5 | Events Management | 4 Cr. |
|---|---|---|

This course introduces students to the researching, planning, coordinating, marketing and managing special events that cater to customers' needs.

| 063IPRIL6 | Introduction to IT Project Management | 3 Cr. |
|---|---|---|

This course contributes to the development of the following skills:
 - Understand the business world and essential management principles.
 - Manage a project.

- Collaborate effectively in a team.
- Communicate empathetically with users (listen, understand, explain, persuade) using appropriate arguments.
It also aims to:
- Understand the role of a project manager.
- Estimate, plan, and monitor an IT project.

| 063INIAL6 | Introduction to Artificial Intelligence | 2 Cr. |
|---|---|---|

This course introduces artificial intelligence (AI). It equips students with the knowledge and tools to use AI technologies effectively, enhancing their ability to innovate and solve real-world problems in their respective fields. Students will explore the definition of AI, its history, various technologies and techniques, the structure and functionality of AI systems, and the emerging field of generative AI.

| 063PSQLL5 | PL/SQL Language | 2 Cr. |
|---|---|---|

This course contributes to the development of the following competencies:
- Write and execute PL/SQL program units.
- Manage databases.
It also aims to teach Oracle's procedural language extension to SQL.

| 063BBL1L4 | Biblical Readings | 3 Cr. |
|---|---|---|

This course is part of the USJ General Education Program, of "Religious Sciences". It introduces students to the Bible and biblical exegesis through the study of twelve texts, three from each gospel.

| 063MKT1L1 | The Foundations of Marketing | 4 Cr. |
|---|---|---|

The course "Marketing I" is designed for Bachelor students in Marketing & Advertising, and is taught in semester 1. There are no prerequisites for this course; however, it serves as a prerequisite for various other bachelor's courses, such as "Market Studies", "Product Policy", "Pricing Policy", "Distribution Policy" and "Integrated Communication Policy".
This course familiarizes students with the importance of marketing in commercial companies, as well as public institutions and non-profit organizations. It will also introduce the basic concepts of marketing and the marketing approach.

| 063MAT1L1 | Logic and Proof Systems | 2 Cr. |
|---|---|---|

This two-semester course explains how to reformulate a problem into logical and demonstrable propositions. It covers the essential mathematical foundations for computer science. This semester focuses on formal logic (propositional logic and predicate logic) and proof methods (direct, case-based, contradiction, contrapositive), both with and without quantifiers.

| 063MGT1L1 | Management | 4 Cr. |
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In-class time: 35 hours, Student workload: 65 hours
This course introduces the functions of management and the importance of implementing them in the workplace.

| 063MAT2L2 | Discrete Mathematics II | 4 Cr. |
|---|---|---|

This course is designed for Bachelor students in Computer Science for Business, and is taught in the second semester. A solid foundation in Discrete Mathematics is required. It enables students to understand set theory, counting, binary relations, arithmetic, and matrix calculations. It also enhances students' logical reasoning to manage IT services.

| 063MATFL3 | Financial Mathematics | 2 Cr. |
|---|---|---|

This required course assists students to master financial calculations for effective contract negotiations, taking into account different financial constraints, making sound investment choices, and accurately analyzing financial graphs for better management.

It covers fundamental formulas for simple and compound interest, the calculation of the average rate, the effective rate, and the average maturity of several commercial bills, as well as the comparison of two capital amounts on two different dates, and the construction of an amortization table for loans. This involves selecting investments based on economic profitability.

| 063MEDTL4 | Mediation | 3 Cr. |
|---|---|---|

This course familiarizes students with the concepts and methods of mediation, enhancing their conflict resolution skills, active listening, emotional intelligence, the ability to ask relevant questions and establishing trust.
Through these tools, students will learn to communicate effectively, understand and manage their own emotions as well as those of others, actively listen, identify win-win solutions, and generally resolve conflicts they may encounter in their lives.
This course covers the following themes: experimental learning, building trust, needs, interests, positions, positive neutrality, impartiality, compromise, reframing issues, validating feelings and emotions, verbal and non-verbal communication and creating a safe environment.
This course will be given interactively, incorporating group exercises and role-playing activities.

| 063MDFLM2 | Mindfulness Based Stress Reduction | 2 Cr. |
|---|---|---|

This course introduces the discipline and techniques of Mindfulness. It aims to modify the automatic thought patterns, enhance awareness, and cultivate non-judgmental observation through activities and training exercises. Mindfulness facilitates improved management of feelings and emotions, fostering awareness for a better lifestyle and sustainable well-being.

| 063PRG7L4 | Advanced Programming in Java | 6 Cr. |
|---|---|---|

**Prerequisite:** Object-Oriented Programming in Java (063PRG6L3)
This course contributes to the development of the following competencies:
  - Specify and design a computing solution:
  - Master the Model View Controller
  - Develop a computing solution:
  - Develop in accordance with specifications
  - Develop on multiple platforms and quickly adapt to new ones
It also implements professional-level multitasking Java applications and libraries, combining all software layers: UI, persistence, streams, and network communication.

| 063PNODL6 | Node.js Programming | 2 Cr. |
|---|---|---|

This course contributes to the development of the following competencies:
  - Develop a computing solution:
  - Develop in accordance with specifications
  - Develop on multiple platforms and quickly adapt to new ones (Web)
It also teaches how to develop server-side business web applications with Node.js and implement an architecture based on synchronous or asynchronous services.

| 063PRG1L1 | Programming I | 4 Cr. |
|---|---|---|

This course introduces the fundamental concepts of programming. It covers data types, expressions, control structures, loops, functions, as well as testing and debugging operations.

| 063PRG2L2 | Programming II | 4 Cr. |
|---|---|---|

Prerequisite: Programming I (063PRG1L1)
This course is the second programming course students take. In the first, they acquire the basic programming concepts. This course focuses on developing object-oriented programming concepts.

| 063PRG6L3 | Object-Oriented Programming in Java | 3 Cr. |
|---|---|---|

**Prerequisite:** Programming I (063PRG1L1)

This course contributes to the development of the following competencies:
- Implementing a computing solution:
  - Develop in accordance with specifications
  - Develop on multiple development platforms and quickly adapt to new ones

General objectives:
- Understand the fundamental principles of the Java language and gain sufficient autonomy to further deepen knowledge through advanced courses and internships
- Create simple yet functional applications in Java.

| 063WPR3L5 | **Advanced Web Programing** | **4 Cr.** |

This course contributes to the development of the following competencies:
- Implementing a computing solution:
  - Develop in accordance with specifications
  - Develop on multiple platforms and quickly adapt to new ones (Web)

It also aims to build modern, sophisticated web applications with rich client interfaces and real-time capabilities.

| 063PJI1L5 | **Bachelor Degree Final Project I (Analysis)** | **6 Cr.** |

**Prerequisites:** Programming II (063PRG2L2), Object-Oriented Programming in Java (063PRG6L3), Object-Oriented Analysis and Design I (063GL01L3). This project aims to develop a complete software application, from analysis to design, using concrete management scenarios. (The programming part will be completed in the second semester).

| 063PJI2L6 | **Bachelor Degree Final Project II (Programming)** | **6 Cr.** |

**Prerequisite:** Bachelor Degree Final Project I (Analysis) (063PJI1L5).
This project aims to develop a complete software application, from analysis to design, using concrete management scenarios. (The analysis and design part is already completed in the first semester).

| 063PSYCL4 | **Psychology** | **2 Cr.** |

This course offers students a comprehensive exploration of diverse topics relevant to both personal and professional contexts, while also illuminating contemporary psychological theories associated with these themes. It is conducted in an interactive format that fosters personal reflection. Each session delves into a different theme, often integrating assessments to enhance self-awareness and engaging in role-playing exercises that emphasize the dynamics of group interaction.

| 063RECTL6 | **REACT** | **2 Cr.** |

Use the React JavaScript library for building user interfaces.

| 063RCOPL5 | **Operational Research** | **4 Cr.** |

This course encompasses a set of mathematical techniques used to formalize and analyze complex decision-making problems faced by businesses. This includes logistics and distribution issues, location planning, scheduling, inventory management, and energy reserve management, as well as specific applications such as circuit design or wiring, which lead to studying combinatorial optimization problems.
This course introduces several major families of operations research and decision-support methods, equipping students with modeling capabilities and enabling them to recognize problems where operations research could be a useful tool. It also aims to help them understand the possibilities and limitations of these methods.
Students will become familiar with the primary models in operations research, learn to use the associated algorithms, and grasp their underlying principles. Through examples and exercises, they will practice modeling decision-making problems encountered in real-world scenarios.

| 063RXT1L3 | **Networks** | **3 Cr.** |

This course enables students to identify the architecture, structure, functions, components, and models of computer networks and the Internet. It also allows students to deploy simple LANs and develop an IPv4 addressing plan. This course is essential for the course "Network Administration."

| 063SECUM4 | Computer Security | 2 Cr. |
|---|---|---|

This course serves as an introduction to computer security within the Bachelor in Computer Science for Business program at IGE. It details the risks and attack vectors targeting computer systems and provides a comprehensive overview of the field through conceptual, theoretical, and practical approaches, based on standards such as PCI-DSS Penetration Testing Guidance, OWASP, and MITRE Pre-ATT&CK/ATT&CK.
This course addresses offensive security at a global level, focusing on:
  - Identifying vulnerabilities
  - Understanding attack vectors
  - Simulating modern intrusions
  - Analyzing associated risks and impacts
Students will learn to interpret information security concepts, identify computer vulnerabilities, recognize corresponding attacks, and implement countermeasures for information systems at the network, system, and application levels.

| 063SEOML6 | SEO/SEM | 2 Cr. |
|---|---|---|

This course introduces SEO and SEM. It begins with an introduction to website trends and user behavior in online searches. Students will learn to design campaigns with clear briefs and effective tracking. Additionally, they will use Google Analytics to collect and analyze website audience data.

| 063RSSCL4 | Social Media for Business | 2 Cr. |
|---|---|---|

This course explores the role of social networks in shaping consumer behavior and interaction in today's digital landscape. It covers the integration of smartphones into daily life, highlighting the shift from traditional communication to messaging and social media engagement.
Students will examine the impact of these changes on brands, emphasizing the necessity of maintaining a strong online presence. The course will guide students through best practices for utilizing major social networks effectively. They will also identify different advertising goals, supported by practical examples to illustrate when and how to implement each objective. Additionally, students will learn the significance of storytelling and content creation in differentiating brands on social media.

| 063SLI1L2 | Internship I | 6 Cr. |
|---|---|---|

Students must complete a two-month Sales Internship Program as part of their enrollment in a diploma of Marketing and Advertising or a diploma of Computer Science for Business. The "Selling Techniques" course is a prerequisite. This internship introduces students to the real working environment in real-time and helps them apply their theoretical knowledge. This experience is essential for graduates, as it increases their chances of being accepted into the job market. It demonstrates to employers that students have acquired practical experience in various sales processes, including selling products/services, negotiating, prospecting, and engaging in different types of sales and merchandising. This professional experience will also enable students to build a valuable professional network, facilitating access to important companies in the future.

| 063SLI2L4 | Internship II | 8 Cr. |
|---|---|---|

This internship aims to enable students to integrate into an IT company or the IT department of a large client organization. It serves as the student's first exposure to the corporate world.

| 063STRPL5 | Starting your Startup | 2 Cr. |
|---|---|---|

This course equips students with the knowledge and insights needed to initiate and navigate the early stages of launching a startup.

| 063STA1L1 | Statistics | 4 Cr. |
|---|---|---|

This course aims to further develop the skills acquired in statistics as well as to increase students' knowledge of univariate and bivariate descriptive statistics concepts and techniques. It will enable students to summarize and analyze a population or a set of data. By the end of this course, students will master the basic concepts

of descriptive statistics, the essential notions of statistical distributions, indices, and the ability to describe correlations that could exist between two statistical variables.

| 063ISY1L1 | Operating Systems | 4 Cr. |
|---|---|---|

The first part of this course introduces computer science, covering software, hardware, computing environments, and the underlying science. The second part establishes the foundations of programming and algorithmics, teaching scripting programming on both Linux and Windows operating systems.

| 063ISY3L5 | Operating Systems II | 3 Cr. |
|---|---|---|

Prerequisites: Operating Systems (063ISY1L1), Computer Architecture (063ISY2L2)
This course enables students to identify the factors influencing the performance of operating systems, recognize the advantages and disadvantages of different operating systems, and develop applications in a multitasking, multi-user programming environment.

| 063WPR1L3 | Web Programming Techniques I | 3 Cr. |
|---|---|---|

This course contributes to the development of the following competencies:
- Specify and design an IT solution:
  Apply ergonomic principles specific to different human-computer interfaces (Web).
- Develop in accordance with specifications:
  Develop across multiple development platforms and be capable of quickly adapting to new ones (Web).

General objective:
  Acquire the programming techniques and foundational concepts necessary for client-side web programming.

| 063WPR2L2 | Web Programming Techniques II | 2 Cr. |
|---|---|---|

This course contributes to the development of the following competencies:
- Specify and design an IT solution:
  Apply ergonomic principles specific to different human-computer interfaces (Web).
- Develop in accordance with specifications:
  Develop across multiple development platforms and be capable of quickly adapting to new ones (Web).

General objectives:
- Consolidate knowledge in JavaScript.
- Build dynamic and interactive web interfaces using JavaScript.

| 063GL04L4 | User Experience | 2 Cr. |
|---|---|---|

This course introduces students to the concept of user-centered design (UCD) and emphasizes that when designing any solution—whether a website, mobile app, PowerPoint presentation, or financial report—they should always focus on the end-user rather than their own preferences.
In conjunction with the other tech and digital courses, this course complements the development courses by equipping students with the skills to consider user needs and goals, understand the problems they are addressing, outline a preliminary solution, test it, and then proceed with development. This approach helps avoid the pitfalls of jumping directly into coding, which can lead to unnecessary code being discarded or the creation of a patchwork of code after the solution is implemented.

| 063WRNEL5 | Work Ready Now | 4 Cr. |
|---|---|---|

This course provides students with an overview of entrepreneurship and its impact on societies, emphasizing that SMEs account for the majority of businesses worldwide, representing about 90% of businesses and more than 50% of employment. Students will gain entrepreneurial thinking by identifying the characteristics of entrepreneurs and assessing whether their skills are suited for entrepreneurship. Additionally, the course will allow them to enhance their soft skills through the Work Ready Now curriculum. They will learn how to identify business opportunities and transform these into a business model canvas.