Subjects Modules for S2

Semester 2 Year 1

U2.1: Engineering Tools II

Probability and Statistics

Module designation	**Engineering Tools II**
Module level, if applicable	Year 1, Semester 2
Code, if applicable	U2.1
Subtitle, if applicable	
Courses, if applicable	**Probability and Statistics**
Semester(s) in which the module is taught	Semester 2
Person responsible for the module	Dept Head
Lecturer	Ms. Chahnez Thabet
Language	French
Relation to curriculum	Compulsory module
Type of teaching, contact hours	31.5 hours Lecture/ semester
Workload	Total 66.5 hours/ Semester (35 hours of Self Study)
Credit points	2.5
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	
Module objectives/intended learning outcomes	On successful completion, students will be able to: ▪ define probability, random variable, and probability distribution. ▪ understand the concept of Bayesian statistics. ▪ grasp the definition of joint and marginal distributions. ▪ calculate expectation values and higher moments. ▪ comprehend important inequality equations and limit theorems.
Content	**1. Probability** **1.1 Definitions** **1.2 Independent events** **1.3 Conditional probability** **1.4 Bayesian statistics** **2. Random Variables** **2.1 Random Variables** **2.2 Distribution functions and probability mass functions**

	2.3 Important discrete probability distributions **2.4 Important continuous probability distributions** **3. Joint Distributions** **3.1 Joint distributions** **3.2 Marginal distributions** **3.3 Independent random variables** **3.4 Conditional distributions** **4. Expectation and Variance** **4.1 Expectation of a random variable, conditional expectations** **4.2 Variance and covariance** **4.3 Expectations and variances of important probability distributions** **4.4 Algebraic and central moments** **4.5 Moment-generating functions** **5. Inequalities and Limit Theorems** **5.1 Probability inequalities** **5.2 Inequalities for expectations** **5.3 The law of large numbers** **5.4 Central limit theorem**
Study and examination requirements and forms of examination	Written Mid-Term Exam (40%) + Written Final Exam (60%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online(Moodle ULT) Video projection
Reading list	1. Downey, A.B. (2011). Think stats (2nd ed.). Sebastopol, CA: O'Reilly 2. Kim, A. (2019). Exponential Distribution—Intuition, Derivation, and Applications. Available online. 3. Wasserman, L. (2004). All of Statistics: A concise course in statistical inference. New York, NY: Springer

U2.1: Engineering Tools II

Operational Research and Optimization

Module designation	**Engineering Tools II**
Module level, if applicable	Year 1, Semester 2
Code, if applicable	U2.1
Subtitle, if applicable	
Courses, if applicable	**Operational Research and Optimization**
Semester(s) in which the module is taught	Semester 2
Person responsible for the module	Dept Head
Lecturer	Ms. Amira Brahmi
Language	French
Relation to curriculum	Compulsory module
Type of teaching, contact hours	31.5 hours of Classroom Lecture/ Semester
Workload	Total 66.5 hours/ Semester (35 hours of Self Study)
Credit points	2.5
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Mathematic fundamentals, Basic algorithmic concepts
Module objectives/intended learning outcomes	**Objectives:** The course aims at building capabilities in the students for analysing different situations in the industrial/ business scenario involving limited resources and finding the optimal solution within constraints. The objective of this course is to enable the student to understand and analyse managerial and engineering problems to equip him to use the resources such as capitals, materials, productions, controlling, directing, staffing, and machines more effectively. **Learning outcomes:** Upon completion of the course, the student will be able to achieve the following outcomes: 1. Solve linear programming problems using appropriate techniques and optimization solvers, interpret the results obtained. 2. Determine optimal strategy for Minimization of Cost of shipping of products from source to Destination/ Maximization of profits of shipping products using various methods, Finding initial basic feasible and optimal solution of the Transportation problems

	3. Optimize the allocation of resources to Demand points in the best possible way using various techniques and minimize the cost or time of completion of number of jobs by number of persons. 4. Model competitive real-world phenomena using concepts from game theory. Analyse pure and mixed strategy games 5. Formulate Network models for service and manufacturing systems, and apply operations research techniques and algorithms to solve these Network problems
Content	**Chapter-I Introduction to OR:** 1. Meaning and scope of O.R 2. Definition of O.R 3. LPP (Linear Programming Problem) 4. Formulation of LPP 5. Graphical solution of LPP- Problems **Chapter-II LPP:** 1. Def. of LPP , IBFS 2. Basic and Non-basic variable 3. Slack variable 4. Surplus variable and Artificial variable 5. Simplex method 6. Big M 7. Two phase simplex methods and problems **Chapter – III Transportation problem :** 1. Definition 2. Feasible solution by North-West corner rule 3. Matrix minima VAM methods 4. Optimal solution through MODI & stepping stone method for balanced and unbalanced transportation problem. **Chapter-IV Assignment problem:** Meaning of assignment problem, unbalanced assignment problem, travelling salesman problem, Hungarian method for optimal solution. **Chapter - V Sequencing problem:** Optimal sequencing of N Jobs on 2 and 3 machines without passing.
Study and examination requirements and forms of examination	Written Mid-Term Exam (40%) + Written Final Exam (60%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online(Moodle ULT) Video projection

Reading list	- ESSID S. (1998)), « RECHERCHE OPERATIONNELLE COURS ET EXERCICES». - MARTEL A. (1979), « TECHNIQUES ET APPLICATION DE LA RECHERCHE OPERTIONNELLE », GAETAN MORIN EDITEUR. - YVES NOBERT, ROCH OUELLET ET REGIS PARENT (1999), « PROBLEMES RESOLUS DE RECHERCHE OPERATIONNELLE », GAETAN MORIN EDITEUR. (COTE :RO1)

U2.2: Object Oriented Programming

Object Oriented Programming

Module designation	**Object Oriented Programming**
Module level, if applicable	Year 1, Semester 2
Code, if applicable	U2.2
Subtitle, if applicable	
Courses, if applicable	**Object-Oriented Programming (Java)**
Semester(s) in which the module is taught	Semester 2
Person responsible for the module	Dept Head
Lecturer	Ms. Aida Tmimi
Language	Frensh
Relation to curriculum	Compulsory module
Type of teaching, contact hours	21 hours of Classroom Lecture/ Semester 21 hours practical workshop in Lab/ semester 10.5 hours of Supervised projects on Campus/ semester
Workload	Total 94.5 hours/ Semester (42 hours of Self Study)
Credit points	4
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Practice of a programming language like the C language. Algorithm and data structures.
Module objectives/intended learning outcomes	**Objectives:** This is an introductory course in algorithms and data structures. All the notions must be taught in algorithmic and not in a programming language, following this course the student must acquire the fundamental notions of algorithmic and especially of the different simple and compound types, and of modularity. **Learning outcomes:** 1. On successful completion of this course, the student should be able to: 2. Show competence in the use of the Java programming language in the development of small to medium-sized application programs that demonstrate professionally acceptable coding and performance standard 3. Understand the basic principles of the object-oriented

	programming 4. Demonstrate an introductory understanding of graphical user interfaces and event-driven programming.
Content	**I- Introduction to Java :** Basics of Java programming, Data types, Variables, Operators, Control structures including selection, Looping, Java methods, Overloading, Math class, Arrays in java. **II- Objects and Classes :** Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers, Methods and objects, Inbuilt classes like String, Character, StringBuffer, File, this reference. **III- Inheritance and Polymorphism :** Inheritance in java, Super and sub class, Overriding, Object class, Polymorphism, Dynamic binding, Generic programming, Casting objects, Instance of operator, Abstract class, Interface in java, Package in java, UTIL package. **IV- Event and GUI programming :** Event handling in java, Event types, Mouse and key events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout, Border Layout, Grid Layout, GUI components like Buttons, Check Boxes, Radio Buttons, Labels, Text Fields, Text Areas, Combo Boxes, Lists, Scroll Bars, Sliders, Windows, Menus, Dialog Box, Applet and its life cycle, Introduction to swing. **V- Files and connecting to database :** Files: streams, byte streams, character stream, text input/output, binary input/output, random access file operations, file management using file class: Connecting to Database, querying a database and processing the results, updating data with JDBC
Study and examination requirements and forms of examination	Continuous Assessment (50%) + Project (50%) (Report for each workshop/Project required)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online(Moodle ULT) Video projection
Reading list	1. Introduction to Java Programming (Comprehensive Version), Daniel Liang, Seventh Edition, Pearson. 2. Programming in Java, Sachin Malhotra & Saurabh Chaudhary, Oxford University Press. 3 Murach's Beginning Java 2, Doug Lowe, Joel Murach and Andrea Steelman, SPD. 3. Core Java Volume-I Fundamentals, Eight Edition, Horstmann & Cornell, Pearson Education. 4. The Complete Reference, Java 2 (Fourth Edition), Herbert Schild, TMH. *5.* Java Programming, D. S. Malik, Cengage Learning.

U2.2 Object Oriented Programming

Object Oriented Modeling

Module designation	**Object Oriented Programming**
Module level, if applicable	Year 1, Semester 2
Code, if applicable	U2.2
Subtitle, if applicable	
Courses, if applicable	**Object Oriented Modeling**
Semester(s) in which the module is taught	Semester 2
Person responsible for the module	Dept Head
Lecturer	Ms. Jihen Hedhli
Language	French
Relation to curriculum	Compulsory module
Type of teaching, contact hours	42 hours of Classroom Lecture/ Semester
Workload	Total 77 hours/ Semester (35 hours of Self Study)
Credit points	3
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Practice of a programming language like the C language. Algorithm and data structures.
Module objectives/intended learning outcomes	**Objectives:** -The main objective is the students become familiar with all phases of Object-Oriented Analysis and Design -Master the main features of the UML. -Master the main concepts of Object Technologies and how to apply them at work and develop the ability to analyse and solve challenging problem in various domains. -Learn the Object design Principles and understand how to apply them towards implementation. **Learning outcomes:** On the successful completion of this course, Students will be able to: 1. Analyse, design, document the requirements through use case driven approach. 2. Select the basic elements of modeling such as Things, Relationships and Diagrams depending on the views of UML Architecture and SDLC (software development lifecycle). 3. Apply basic and Advanced Structural Modeling Concepts for designing real time applications. 4. Design Class and Object Diagrams that represent Static Aspects of a Software System. 5. Analyse Dynamic Aspects of a Software System using Use

	Case, Interaction and Activity Diagrams. 6. Apply techniques of State Chart Diagrams and Implementation Diagrams to model behavioral aspects and Runtime environment of Software Systems.
Content	**UNIT – I** **Introduction to UML:** Importance of modeling, principles of modeling, object-oriented modeling, Conceptual model of the UML, Architecture, and Software Development Life Cycle. **UNIT - II** **Basic Structural Modeling:** Classes, Relationships, common Mechanisms, and diagrams. Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages. **UNIT - III** **Class & Object Diagrams:** Terms, concepts, modeling techniques for Class & Object Diagrams. **UNIT - IV** **Basic Behavioral Modeling:** Interactions, Interaction diagrams Use cases, Use case Diagrams, Activity Diagrams **UNIT - V** **Advanced Behavioral Modeling:** Events and signals, state machines, processes and Threads, time and space, state chart diagrams. **Architectural Modeling:** Component, Deployment, Component diagrams and Deployment diagrams.
Study and examination requirements and forms of examination	Written Mid-Term Exam (40%) + Written Final Exam (60%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online(Moodle ULT) Video projection
Reading list	1. Page-Jones, M. (2000). Fundamentals of Object-oriented Design in UML. Addison-Wesley Professional. 2. Osis, J., & Donins, U. (2017). Topological UML Modeling: An Improved Approach for Domain Modeling and Software Development. Elsevier. 3. Ramnath, S., & Dathan, B. (2010). Object-Oriented Analysis and Design. Springer Science & Business Media. 4. Lano, K. (2009). *UML 2 Semantics and Applications*. John Wiley & Sons.

U2.3 DBMS and Cyber Security

Database Management Systems (DBMS)

Module designation	**DBMS and Cyber Security**
Module level, if applicable	Year 1, Semester 2
Code, if applicable	U2.3
Subtitle, if applicable	
Courses, if applicable	**Database Management Systems (DBMS)**
Semester(s) in which the module is taught	Semester 2
Person responsible for the module	Dept Head
Lecturer	Ms. Sarra Lasmer
Language	French
Relation to curriculum	Compulsory module
Type of teaching, contact hours	21 hours of Classroom Lecture/ Semester 21 hours for Workshop in Lab
Workload	Total 77 hours/ Semester (35 hours of Self Study)
Credit points	3
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Database Fundamentals (ME/A, MR, SQL)
Module objectives/intended learning outcomes	**Objectives:** This course offers an in-depth education of database management systems, their architectures and their evolution. This course presents the essential components of database management systems (storage, indexing, transactions, query evaluation, optimization, distribution) with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS. **Learning outcomes:** Upon completing the course, the student will be able to: 1- Get familiar with a development tool, such as SQL Developer 2- Learn the structure of PL/SQL blocks 3- Recall variables and use them in code 4- Apply loop control structures 5- Use conditional statement control structures 6- Know how to select data into variables 7- Be able to create and use cursors for data selections 8- Know how to create procedures and functions

Content	**Chapter 1: Introduction to DBMS and PLSQL** **Chapter 2: Control structures (PLSQL)** **Chapter3: Interaction with Oracle and explicit cursors** **Chapter 4: Exception management** **Chapter 5: Sub-programs** **Chapter 6: Stored subroutines and packages** **Chapter 7: Triggers**
Study and examination requirements and forms of	Written Mid-term Exam (25%) + Practical Exam (25%) + Written Final Exam (50%) (Report for each workshop required)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online(Moodle ULT) Video projection
Reading list	1- Zygiaris, S. (2018). *Database Management Systems: A Business-Oriented Approach Using ORACLE, MySQL and MS Access*. Emerald Group Publishing. 2- Sciore, E. (2020). *Database Design and Implementation: Second Edition*. Springer Nature. 3- Gupta, P. K. D., & Krishna, P. R. (2013). *DATABASE MANAGEMENT SYSTEM ORACLE SQL AND PL/SQL*. PHI Learning Pvt. Ltd. 4- Sieben, J. (2018) *Oracle PL/SQL Das Umfassende Handbuch*. Bonn: Rheinwerk Verlag.

U2.3 DBMS and Cyber Security

Introduction to Cyber Security

Module designation	**DBMS and Cyber Security**
Module level, if applicable	Year 1, Semester 2
Code, if applicable	U2.3
Subtitle, if applicable	
Courses, if applicable	**Introduction to Cyber Security**
Semester(s) in which the module is taught	Semester 2
Person responsible for the module	Dept Head
Lecturer	Mr. Imed Ben Boukatem
Language	French
Relation to curriculum	Compulsory module
Type of teaching, contact hours	21 hours of Classroom Lecture/ Semester 10.5 hours for Workshop in Lab
Workload	Total 52.5 hours/ Semester (21 hours of Self Study)
Credit points	2
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	• Basic knowledge in HTML and Javascript. • Basic understanding of relational databases. • Basic understanding of JSON Objects.
Module objectives/intended learning outcomes	**Course Objectives:** The training allows students to: - To have technical knowledge in the fields of information systems security, - Deep knowledge in risk management and security issues. **Learning Outcomes:** At the end of the training, the student will master information system security - Network security, - Application security - Database security...
Content	**Part 1. The foundations of information system security Level I** 1-Definition of process/information assets and supporting assets (IT). 2-Introduction to Security 3-Safety cycle 4-Need for security 5-Security aspects 6-Security services (DICT/P classification: Availability, Integrity,

	7-Confidentiality and Traceability/Proof) 8-The definition of the ISS risk and its specific properties (vulnerabilities, threats). 9-Threatens 10-Attack 11-Vulnerability and risk 12-Intruder (hacker) 13-Mechanisms 14-The different types of risk: accident, error, malevolence. 15-The emergence of cyber risk, APTs, preparing for a cyber-crisis. 16-Essential external sources of information (ANSSI, CLUSIF, ENISA, etc.). **Part 2 The foundations of information system security Level II** 1-Introduction to cryptography 2-Terminology 3-Crypto-system: main objectives 4-Classic encryption: substitutions, transpositions 5- Symmetric cryptography 6-Asymmetric Cryptography 7-Exchange of secret keys 8-Hash function 9-Electronic signature 10-Electronic certificate 11-PKIs 12-Trust model in X.509 **Part 3. The foundations of information system security Level III** 1-Security of database systems 2-WEB Application Security 3-Perimeter and network environment security 4-Database Audit 5-Security policies
Study and examination requirements and forms of	Written Mid-term Exam (25%) + Practical Exam (25%) + Written Final Exam (50%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online(Moodle ULT) Video projection
Reading list	5- William Stallings, "Cryptography and Network Security: Principles and Practice", 3eme ed. Prentice Hall, 2003. 6- Mark Allen Ludwig, « Naissance d'un virus : Technologie et principes fondamentaux », Diff. Bordas, 1993, 47 p 7- LESCOP Yves, « Sécurité Informatique», 2002 8- H. NSENGE MPIA, « Sécurité Informatique », Institut Supérieur Emmanuel d"Alzon / Butembo, cours inédit, 2017. 9- ISO 27001 : Technologie de l'information – Techniques de sécurité – Systèmes de gestion de la sécurité de l'information – Exigences, Ed. AFNOR, 2005 (**https://www.iso.org/fr/standard/41933.html**) 10- **https://www.ssi.gouv.fr/entreprise/management-du-risque/la-methode-ebios-risk-manager/**

U2.4 Programming II

Python Programming Language

Module designation	**Programming II**
Module level, if applicable	Year 1, Semester 2
Code, if applicable	U2.4
Subtitle, if applicable	
Courses, if applicable	**Python Programming Language**
Semester(s) in which the module is taught	Semester 2
Person responsible for the module	Dept Head
Lecturer	Mr. Anis Chedli
Language	English
Relation to curriculum	Compulsory module
Type of teaching, contact hours	10.5 hours of Classroom Lecture/ semester 10.5 hours of workshop in Lab /semester 10.5 hours of Supervised projects on Campus/ semester
Workload	Total 52.5 hours/ Semester (21 hours of Self Study)
Credit points	2
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Students are expected to be able to open command prompt window or terminal window, edit a text file, download and install software, and understand basic programming concepts.
Module objectives/intended learning outcomes	**Objective:** This course leads students from the basics of writing and running Python scripts to more advanced features such as file operations, regular expressions, working with binary data, and using the extensive functionality of Python modules. Extra emphasis is placed on features unique to Python, such as tuples, array slices, and output formatting. **Learning Outcomes:** Upon successfully completing this course, students will be able to "do something useful with Python". • Identify/characterize/define a problem • Design a program to solve the problem • Create executable code • Read most Python code

	• Write basic unit tests
Content	I. Introductions II. Functions, Booleans and Modules III. Sequences, Iteration and String Formatting IV. Dictionaries, Sets, Exceptions, and Files V. Advanced Argument passing, List and Dict Comprehensions, Lambda and Functional programming VI. Object oriented programming: Classes, instances, attributes, and subclassing VII. Testing, More OO VIII. Generators, Iterators, Decorators, and Context Managers
Study and examination requirements and forms of examination	Continuous Assessment (50%) + Project (50%) (Report for each workshop/Project required)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online(Moodle ULT) Video projection
Reading list	• **The Python Tutorial** (https://docs.python.org/3/tutorial/): This is the official tutorial from the Python website. No more authoritative source is available. • **Code Academy Python Track** (http://www.codecademy.com/tracks/python): Often cited as a great resource, this site offers an entertaining and engaging approach and in-browser work. • **Learn Python the Hard Way** (http://learnpythonthehardway.org/book/): Solid and gradual. This course offers a great foundation for folks who have never programmed in any language before. [Python 2]

U2.4 Programming II

Web Development II

Module designation	**Programming II**
Module level, if applicable	Year 1, Semester 2
Code, if applicable	U2.4
Subtitle, if applicable	
Courses, if applicable	**Web Development II**
Semester(s) in which the module is taught	Semester 2
Person responsible for the module	Dept Head
Lecturer	Mr. Nassim Bahri
Language	French
Relation to curriculum	Compulsory module
Type of teaching, contact hours	21 hours of workshop in Lab /semester 10.5 hours of Supervised projects on Campus/ semester
Workload	Total 52.5 hours/ Semester (21 hours of Self Study)
Credit points	2
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Basic knowledge of HTML and JavaScript.
Module objectives/intended learning outcomes	Upon completion of this teaching module, the student will be able to: 1. Understand and implement advanced PHP concepts and features. 2. Design and develop web applications using object-oriented PHP. 3. Implement secure database interactions using PDO. 4. Analyze and optimize web applications for performance and scalability. 5. Incorporate advanced web development practices, including API integrations and modern web architectures. 6. Understand and prevent common web security threats in PHP applications. 7. Implement and manage user authentication and session management.

Content	Chapter 1: Review of Basic PHP 1.1 PHP Syntax and Structure 1.2 Variables, Arrays, and Data Types 1.3 Control Structures and Functions 1.4 Forms and PHP Data Handling 1.5 Basic File Operations Chapter 2: Advanced PHP Concepts and Techniques 2.1 Error Handling and Exception Handling 2.2 Namespaces and Autoloading 2.3 Advanced Array Functions and Manipulations 2.4 PHP Streams and File I/O 2.5 Regular Expressions in PHP Chapter 3: Object-Oriented PHP 3.1 Introduction to OOP Concepts 3.2 Classes, Objects, and Inheritance 3.3 Polymorphism and Interfaces 3.4 Traits and Namespaces in OOP 3.5 Design Patterns in PHP Chapter 4: Secure Database Interactions using PDO 4.1 Introduction to PDO and Why Use It 4.2 Connecting to Databases with PDO 4.3 Prepared Statements and Binding Values 4.4 Handling Errors in PDO 4.5 Transactions and Multiple Database Interactions Chapter 5: Web Application Optimization and Scalability 5.1 Performance Metrics and Monitoring 5.2 Database Optimization Techniques 5.3 Caching Mechanisms in PHP 5.4 Efficient Code and Algorithm Optimization 5.5 Scalable Web Architecture Basics Chapter 6: Web Security in PHP 6.1 Common Security Threats and Vulnerabilities 6.2 Input Validation and Sanitization 6.3 Securing File Uploads and System Operations 6.4 Defense against SQL Injection and XSS 6.5 Secure Sessions and Cookies

	Chapter 7: User Authentication and Session Management 7.1 User Registration and Password Security 7.2 Login Mechanisms and Session Handling
Study and examination requirements and forms of examination	Continuous Assessment (50%) + Project (50%) (Report for each workshop/Project required)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online(Moodle ULT) Video projection
Reading list	1. PHP Objects, Patterns, and Practice by Matt Zandstra. 2. Modern PHP: New Features and Good Practices by Josh Lockhart. 3. PHP and MySQL Web Development by Luke Welling and Laura Thomson. 4. Pro PHP Security: From Application Security Principles to the Implementation of XSS Defenses by Chris Snyder and Michael Southwell

U2.5 Network and Architecture II

System Architecture, Embedded Systems and IoT

Module designation	**Network and Architecture II**
Module level, if applicable	Year 1, Semester 2
Code, if applicable	U2.5
Subtitle, if applicable	
Courses, if applicable	**System Architecture, Embedded Systems and IoT**
Semester(s) in which the module is taught	Semester 2
Person responsible for the module	Dept Head
Lecturer	Ms. Feten Ben Abdallah
Language	Frensh
Relation to curriculum	Compulsory module
Type of teaching, contact hours	09 hours of Lecture / Semester 12 hours of workshop in Lab/ Semester
Workload	Total 42 hours/ Semester (21 hours of Self Study)
Credit points	1.5
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Practice of a programming language like the C language. Algorithm and data structures.
Module objectives/intended learning outcomes	**Objectives:** 1. To provide students with good knowledge of Designing Embedded and IOT Systems for various application. 2. Knowledge for the design and analysis of Embedded and IOT Systems for Electronics Engineering students. **Learning outcomes:** 1. On completion of the course, the students will be able to: 2. Explain the real time embedded system and its components. 3. Understand basic components and building blocks of Internet of Things. 4. Apply skills to conduct interfacing of embedded boards with components, actuators and sensors.
Content	**Theory (L):** Real time systems and Real-time scheduling – Processor basics and System-OnChip – IOT- Definition and characteristics of IoT - Technical Building Blocks, Physical design of IoT, Things of IoT protocols - IoT communication models, IoT Communication Application Programming

	Interfacings. **Practical (P):** 1) Introduction of Components, Sensors and Actuators- Introduction of Arduino Mega2560. 2)Testing- Reading Switches and Blinking LED-Analog/Digital Port Programming - Accelerometer Sensor Interfacing- Temperature Sensor (LM35) Interfacing- Humidity Sensor (DHT11) Interfacing- PIR Sensor Interfacing. 3) Implementation of IoT using Raspberry Pi
Study and examination requirements and forms of examination	Continuous Assessment (50%) + Semester Workshop Exam (50 %) (Report for each workshop/Project required)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online(Moodle ULT) Video projection
Reading list	1. Muhammod Ali Mazidi, Rolin D. Mckinlay & Danny Sansey, PIC Microcontroller and Embeded System SPI, UART using Assembly & C for PICI8, Pearson International Edition, 2008. 2. A. N. Sloss, D. Symes, and C. Wright, ARM System Developer's Guide: Designing and Optimizing System Software, Elsevier, 2008 3. S. Monk, Programming the Raspberry Pi, McGraw-Hill Education, 2013 4. M. Siegesmund , Embedded C Programming: Techniques and Applications of C and PIC MCUS, Newnes, 2014

U2.5 Network and Architecture II

Computer Networks (CCNA Certification Level 2)

Module designation	**Network and Architecture II**
Module level, if applicable	Year 1, Semester 2
Code, if applicable	U2.5
Subtitle, if applicable	
Courses, if applicable	**Computer Networks (CCNA Certification Level 2)**
Semester(s) in which the module is taught	Semester 2
Person responsible for the module	Dept Head
Lecturer	Mr. Jamel Eddine Belmadhkour
Language	English
Relation to curriculum	Compulsory module
Type of teaching, contact hours	21 hours of workshop in Lab/ Semester 21 hours of Supervised projects on Campus/ semester
Workload	Total 63 hours/ Semester (21 hours of Self Study)
Credit points	2.5
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Practice of a programming language like the C language. Algorithm and data structures.
Module objectives/intended learning outcomes	**Objectives:** Cisco CCNA Routing &Switching Essentials CCNA R&S: Introduces the architecture, structure, functions, components, and operations of routers and switches in a simple network. Students will learn how to configure routers and switches for advanced functionality. Configure and verify static routing and default route. Configure and troubleshoot basic operations of a small, switched network. Configure and troubleshoot basic operations of routers in a small, routed network. Configure and monitor networks using device discovery, management, and maintenance tools. **Learning outcomes:** Students who complete Introduction to Networks will be able to perform the following functions: 1. Explain network technologies and how devices access local and remote networks. 2. Explain Static route on IPV4 and IPV6. 3. Explain Dynamic route on IPV4 and IPV6.

	4. Design an IPv4 and IPv6 addressing scheme to provide network connectivity for a small to medium-sized business network. 5. Explain RIP protocol configuration on IPV4 and IPV6 as an example of dynamic rout, configure router RIP by build small network using simulation program. 6. Understand Switch configuration, VLANS and frame forwarding. 7. Describe standard Access Control List 8. Explain DHCPv4 and DHCP v6. 9. Explain NAT configuration.
Content	**1 – Course introduction** **2 – Routing Concept** **3 – Static Routing** **4 – Dynamic Routing** **5 – Switch Network** **6 – Switch Configuration** **7 – VLANS** **8 – Access Control List** **9 – DHCP** **10 – NAT IPV4** **11 – Device Discovery Management**
Study and examination requirements and forms of examination	Continuous Assessment (50%) + Project (50%)(Report for each workshop/Project required)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online(Moodle ULT) Video projection Online materials to be downloaded from the QU Cisco website https://www.netacad.com/courses/networking/ccna-introduction-networks
Reading list	https://www.netacad.com/courses/networking/ccna-introduction-networks

U2.6 Languages and Communication II

Engineering Ethics

Module designation	**Languages and Communication II**
Module level, if applicable	Year 1, Semester 2
Code, if applicable	U2.6
Subtitle, if applicable	
Courses, if applicable	**Engineering Ethics**
Semester(s) in which the module is taught	Semester 2
Person responsible for the module	Dept Head
Lecturer	Mr. Mohamed Amir Montacer
Language	English
Relation to curriculum	Compulsory module
Type of teaching, contact hours	21 hours of Classroom Lecture/ Semester
Workload	Total 42 hours/ Semester (21hours of Self Study)
Credit points	1.5
Requirements according to the examination regulations	- Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	
Module objectives/intended learning outcomes	**Objectives:** Today, with the trivialization of information technology in the internationalization of exchanges thanks to the Internet, some people still claim that there is a void in legal matters on the Internet.
Content	**Chapter 1: Introduction** **Chapter 2: Ethics Engineering** **Chapter 3: Important skills for Ethical Reasoning** **Chapter 4: Engineering Ethics: Moral Dilemmas** **Chapter 5: Engineering Ethics: Moral Autonomy** **Chapter 6: Professions and Professionalism** **Chapter 7: Engineering Ethics: Social Experimentations** **Chapter 8: Engineering Ethics: Global Issues**

	Chapter 9: Responsibilities of Engineers **Chapter 10: Engineering Ethics: Moral Leadership**
Study and examination requirements and forms of examination	Written Mid-Term Exam (40%) + Written Final Exam (60%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online(Moodle ULT) Video projection
Reading list	**Réf 1** : LE LAMY DROIT DU NUMÉRIQUE : NOUVELLE PARUTION, village-justice, 2014. **Réf 2** : Droit du commerce électronique, J.-P. Clavier, 2018 **Réf 3** : Pratique du droit de l'informatique et du numérique. A. Hollande, X. Linant de Bellefonds, 2018

U2.6 Languages and Communication II

Technical English II

Module designation	**Languages & Communications II**
Module level, if applicable	Year 1, Semester 2
Code, if applicable	U2.6
Subtitle, if applicable	
Courses, if applicable	**Technical English II**
Semester (s) in which the module is taught	Semester 2
Person responsible for the module	Dept. Head
Lecturer	Ms. Nadia Zardi
Language	English
Relation to curriculum	Integrated course module
Type of teaching, contact hours	21 hours Classroom Lecture/ semester
Workload	Total 42 hours/semester (21 hours of Self-Study/semester)
Credit points	1.5 credits
Requirements according to the examination regulations	Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	English I
Module objectives/intended learning outcomes	**Objectives:** **1.** To Provide ESP instruction to enhance students' reading and writing in order to provide practice and interest in the language. **2.** To prepare students to sit for assessments and evaluations such as tests and quizzes in order to test and revise proper acquisition of the English language. **3**. To build students' confidence and motivation through exposure to facts, figures, quotations, and the latest technological innovations so to generate interest in the language from an ESP perspective. **4.** To allow students to gain key strategies and expressions for communicating with professionals and non-specialists **Learning Outcomes:** Students will be able to: **1.** Learn verbal and non-verbal communication skills **2.** Understand Business and Technical terminology **3.** Write formal and informal emails **4.** Be able to give a presentation

Content	**Classroom Lecture** **Chapter 1. General English** 4. Grammar Review 5. Sharing and discussing ideas 6. Practicing dialogues **Chapter 2. Business English** 6. Practicing vocabulary related the workplace 7. Using prepositions in Business English 8. Writing formal and informal e-mails 9. Introducing oneself 10. Presenting one's domain
Study and examination requirements and forms of examination	Written Mid-Term Exam (40%) + Written Final Exam (60%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online (Moodle ULT) Video projection
Reading list	1- Cambridge English for Engineering 2- VINCE MICHAEL WITH EMMERSON PAUL: FIRST CERTIFICATE LANGUAGE PRACTISE, MACMILLAN EDUCATION, MACMILLAN PUBLISHERS LIMITED, ED.2003. 3- HOOPES S.DAVID: READINGS IN INTERCULTURAL COMMUNICATION, WASHINGTON. D.C SOCIETY FOR INTERCULTURAL EDUCATION. TRAINING AND RESEARCH, VOL 2, ED 1973.

U2.7 PROJECT

Supervised Project II

Module designation	**Project**
Module level, if applicable	Year 1, Semester 2
Code, if applicable	U2.7
Subtitle, if applicable	
Courses, if applicable	**Supervised Project 2**
Semester (s) in which the module is taught	Semester 2 (S2)
Person responsible for the module	Dept Head
Lecturer	Ms. Salma Bouazizi
Language	French
Relation to curriculum	Compulsory module
Type of teaching, contact hours	21 hours of Supervision on Campus/ semester
Workload	Total 51 hours/semester (30 hours of Self-Study/semester)
Credit points	2 credits
Requirements according to the examination regulations	Minimum attendance rate: 80% of the total contact hours >20 % of nonattendance = elimination for exams
Recommended prerequisites	Embedded System-Electrical and mechanical design
Module objectives/intended learning outcomes	This exercise will help student to apply knowledges and Skills to work and present a basic project. **Objectives:** 1. Sizing and choice of solution 2. Project studies: functional and structural analysis, design (preparation of technical files) 3. Design Simulation using appropriate software & tools 4. Write a project report and do a presentation **Learning Outcomes:** Students will be able to: 1. Know how to manipulate a project through his steps. 2. Cooperate together and work in teams.

Content	**List of Projects 2023-2024** **Development of Applications** **Project 1**: **Niche Social Media Platform** Build a small-scale social network for users to connect based on shared hobbies (e.g., photography, sports, reading). **Project 2: Online Event Ticketing System** Develop a web application where users can browse, book, and purchase tickets for events (concerts, theatre, sports). **Project 3: Streaming Platform for Indie Creators** Build a lightweight streaming service focusing on independent content creators (films, podcasts, short videos). **Project 4: Service Marketplace Platform** Create an online marketplace where freelancers can offer services (e.g., graphic design, tutoring, coding help). **Project 5: Business Intelligence Dashboard for Retail** Build a BI web application for retail companies to track sales, customer behavior, and product performance through dashboards. **Project 6: Verifiable Diploma Management System Using Blockchain** Develop an application for universities that generates electronic diplomas and allows public verification through a private blockchain network
Study and examination requirements and forms of examination	Work carried out during the year (20%) + Prototype realization (30%) + Evaluation of the final report of project (50%)
Media employed	Course Material (Hard/ Soft copy) for Classroom & Online (Moodle ULT) Video projection
Reading list	Document and references are given by supervisors depending on each project