

# MODULE DESCRIPTION

Department: Computer Sc. Eng.

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## Title of the Module

### Database

Code: GINF\_TC 03 108

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
		X	

**Teacher: Saïd Taktak**  
**Grade: Full time faculty member**  
**University: IIT**

Email:  
 Said.taktak@iit.ens.tn

Total module duration

70 h

Contact hours	Out of class activities
35h	35h

The equivalent credits  
 3 ECTS

Semester 1

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the fundamental concepts of relational databases. It aims at teaching the students not only the terminology of relational databases, but also the concepts of data modeling, entity-relationship diagramming (ERD), and ERD mapping.

Oracle SQL Developer Data Modeler is used to create ERDs, and the Structured Query Language (SQL) is used to interact with a relational database and manipulate the data that contains.

### Objectives

Through this course, the student will be able to design, implement and present a database solution for a business or organization.

At the end of this course, the student will be able to set for Oracle Academy Database certificate.

### 1.2: Prerequisites

General knowledge of the purpose of databases

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Fundamental Concepts	3 hours	Introduce information systems
<b>Chapter 2</b>	The E/A model	6 hours	Conceive a standardized DB according to the E / A model
<b>Chapter 3</b>	Relational model	6 hours	Apply the rules of: - standardization and verification of the model - transformation of the E / A model to the relational model
<b>Chapter 4</b>	Relational Algebra	3 hours	Learn how to manipulate relationships using relational algebra operators
<b>Chapter 5</b>	The SQL language	12 hours	learn SQL language : - data language definition - data manipulation language - data consultation language

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	15
Practical work (h)	12
Project (h)	8
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	1->6	30%
Practical work		
Mid-term	1->3	20%
Oral test		
Final exam	1->6	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

H. Garcia Molina, J.D. Ullman and J. Widom: Database Systems - The Complete Book, Prentice Hall, 2002

R.A. El Masri and S.B. Navathe: Fundamentals of Database Systems, Fourth Edition; Prentice Hall

C.J. Date: An introduction to Database Systems; Pearson Education 2004

## Title of the module

Preparation for DELF I/II B2 certification

Code: GINF\_TC 03 111

GINF\_TC 03 212

**Aymen Degachi**

**Permanent Teacher**

International Institute of Technology

aymen.degachi@iit.ens.tn

Total module duration

70 h

Contact hours	Out of class activities
35	35

The equivalent credits

3

Semester 2

**1. COURSE DESCRIPTION AND COMPETENCIES:****1.1: Course description**

This course is a preparation for the DELF level B2 certification. Indeed, it is a training on a refinement of the different skills required for the DELF B2 exam. These skills revolve around oral and written comprehension as well as oral and written production. In this sense, in each session our work consists in elaborating staggered exercises in two parts: an oral and a written activity. In addition, we encourage students to practice the different DELF B2 exams. This is done through various applications that allow students to learn, revise and deepen their knowledge of French lexical, grammatical and civilizational aspects by tackling many topical themes.

**1.2: objectives****➤ Global objective :**

To develop students' communicative skills and improve their self-confidence when speaking in public and to be able to discuss, debate and present a personal point of view in any communication situation; both written and oral.

**➤ Specific Objectives :**

At the end of this course the student will be able to:

- Direct the listening of an audio support, pick up the most relevant details and understand authentic audio documents.
- Locate the information necessary for the comprehension of an informative text relating to various fields.
- Take a position in front of a well determined problematic and produce an argumentative essay related to several themes.
- Locate the main idea of an article and present orally a personal opinion on the subject in question.

**1.3: Prerequisites**

The students can easily build a brainstorming network of ideas on the different topics proposed in the sessions. They are also able to produce and present short fragments orally to

the class. They are also able to write a short paragraph in a given time frame in relation to defined themes.

## 1.4: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	The keys to talk about our plural identity	14 H	<p>In this work unit we evoke the theme of the new links between the individual and his environment in order to have the ability to :</p> <ul style="list-style-type: none"> <li>- Better talk about new social models, relationships between family members.</li> <li>- Identify the notions of cause and consequence</li> <li>- Elaborate an argumentative discourse</li> <li>- Master the keys to the newsletter / informative text / argumentative essay / general idea</li> </ul>
<b>Chapter 2</b>	Keys to Talk about Civil Rights	14 H	<p>In this course, we will discuss the struggle of men and women for their rights and social benefits in order to be able to :</p> <ul style="list-style-type: none"> <li>- Talk about freedom of choice / civil rights and equality / solidarity</li> <li>- Work on the modes of the indicative, the infinitive and the subjunctive + the goal</li> <li>- Make a plan to organize ideas: informative and argumentative text</li> <li>- Master the keys to the interview / the argumentative text / the professional letter / the point of view</li> </ul>
<b>Chapter 3</b>	The keys to talk about the professional world	14 H	<p>In this section we focus on professions, trades and working conditions with the objective of knowing :</p>

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			<ul style="list-style-type: none"> <li>- Giving an opinion</li> <li>- Structuring a statement</li> <li>- Using opposition and concession</li> <li>- Elaborate the introduction and conclusion of an argumentative text</li> <li>- To master the keys of the argumentation / letter of application and complaint</li> </ul>
<b>Chapter 4</b>	Keys to Talk about Citizenship	14 H	<p>In this module we highlight the theme of citizenship, the rights and duties of citizens to learn to :</p> <ul style="list-style-type: none"> <li>- Address administrative and political issues in France</li> <li>- Talking about the symbols of the state</li> <li>- Using the hypothesis</li> <li>- Maintain a moderate tone in a formal letter.</li> <li>- Mastering the keys to discourse/opinion debate</li> </ul>
<b>Chapter 5</b>	The keys to talk about future world	14 H	<p>In this unity we focus on solutions for a better world, for sustainable development and for the environment in order to be able to :</p> <ul style="list-style-type: none"> <li>- Confirm or contradict the interlocutor</li> <li>- Ask for more information</li> <li>- Using time indicators</li> <li>- Using reported speech</li> <li>- Using non-verbal communication in interaction</li> <li>- Mastering the expression of agreement, reserve, disagreement and uncertainty</li> </ul>

**2. METHODOLOGY:**

The DELF B2 certification preparation course is composed of two parts:

- Integrated courses (communication of fundamental information introduced by using multiple examples)
- Applications and exercises

**3. ASSESSMENT:**

Type	Focusing on which chapter(s)	Weighting
Project	All chapters	20 %
Mid-term	Chapter 1 and 3	20 %
Oral exam	All chapters	10 %
Final exam	All chapters	50 %

**4. RECOMMENDED BIBLIOGRAPHICAL AND LOGISTIC REFERENCES:**

- BRETONNIER Marie, GODARD Emmanuel, LIRIA Philippe, MISTICHELLI Marion et SIGÉ Jean-Paul, Les clés du nouveau DELF B2, Editions Maison des Langues, Paris, 2007, Réimpression Juillet 2014.
- COLLINI Virginie, JAMET Marie-Christine, Préparation à l'examen du DELF B2, Hachette Français Langue Étrangère, Paris, 2008, Impression Mai 2013.
- <https://www.bonjourdefrance.com/>
- <https://www.partajondelfdalf.com/>



## Title of the Module

Logical Systems

Code: GINF\_TC 03 110

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>x</b>			

**Teacher: Tarek Ouni**

**Grade: assistant professor**

**University: Enet'com**

**Email:**

**Tarek.ouni@gmail.com**

**Total module duration**

**49 h**

Contact hours	Out of class activities
<b>28 h</b>	<b>21h</b>

**The equivalent credits**

**2 ECTS**

**Semester 1**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces some basic notions of boolean algebra, boolean functions and combinatorial and sequential logic to master the operation of basic computer circuits. It consists also in designing some examples of sequential circuits.

### Objectives

The goal of this course is to master the basics of logical systems in order to understand the architecture of microprocessors. At the end of this course, students will be able to:


- represent and manipulate information in binary form (Boolean algebra)
- understand the binary information encoding
- understand the various integrated functions of combinatorial logic (Coding, decoding, transcoding, etc.)
- design and physically implement basic combinatorial and sequential logic circuits

### 1.2: Prerequisites

- Basics of binary algebra

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Numbers coding	5	<ul style="list-style-type: none"> <li>- Understand the representation of information and conversion techniques</li> <li>- Learn how to represent signed numbers and code reals (fixed point and floating point)</li> <li>- Understand binary arithmetic operators and binary codes</li> </ul>
<b>Chapter 2</b>	Properties of variables and logical functions	5	<ul style="list-style-type: none"> <li>- Understand the Boolean Algebra</li> <li>- Learn how to make doors and logic circuits, simplify logic circuits and design logic circuit</li> </ul>
<b>Chapter 3</b>	Combinatory logic circuits	6	<ul style="list-style-type: none"> <li>- Understand how to analyze and configure a combinational logic circuit</li> <li>- Study of different combinatorial circuits (adder, subtractor, decoder, etc.)</li> </ul>

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<b>Chapter 4</b>	The scales	6	- Understand the main two types of scales: Asynchronous scales (RS scales) and synchronous scales
<b>Chapter 5</b>	Counters- Countdowns	6	- Perform the design of synchronous and asynchronous counters using intuitive approaches.

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	15
Practical work (h)	13
Project (h)	0
Visits (h)	0

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	-	
Practical work	All chapters	20%
Mid-term	Chapter 1+Chapter 2+Chapter 3	30%
Oral test	-	
Final exam	All chapters	50%

## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Stephen Brown and Zvonko Vranesic, “Fundamentals of Digital Logic with VHDL Design”, McGraw-Hill, Third Edition, 2009.
- Thomas L.Floyd, Systèmes Numériques, Reynold Goulet inc 9ème édition, 2013

### Title of the Module

Management for the engineer

Code: GINF\_TC 03 113

**Teacher: Amel Trabelsi Elloumi**

**Grade: full-time faculty member**

**University: International Institute of Technology**

**Email:**

**Dep.PCP@iit.ens.tn**

**Total module duration**

**28 h**

Contact hours	Out of class activities
21h	7h

**The equivalent credits**

**1 ECTS**

**Semester 1**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course consists of an introduction to business management. It shows all the basic notions about companies, business environment, and management process.

#### Objectives

Its objectives are to :

- Present in a practical and logical way the fundamental notions and analyses of management science,
- Allow the student to get to know the company and the nature of its relationship with the environment,
- Introduce the student to the fundamental principles of management, the main functions of the company,
- To prepare the student for the different management specialties (Production Management, Procurement, Finance, Marketing, Human Resources Management),
- To guide the student in the choice of conceptual tools and means allowing him/her to intervene effectively in the search for solutions to his/her professional and personal problems.

### 1.2: Prerequisites

This course is an introduction to management and the student is not supposed to have previous knowledge as it's an initiation.

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	The company : generalities	4.5	<ul style="list-style-type: none"> <li>- Define the company</li> <li>- Explain the financial, economic and social role of the company.</li> </ul>
<b>Chapter 2</b>	The business environment	4.5	<ul style="list-style-type: none"> <li>- Define the company's environment</li> <li>- Explain the company's relationship with its environment.</li> </ul>
<b>Chapter 3</b>	The company and the manager	6	-Define management functions and the role of the manager
<b>Chapter 4</b>	The management process	6	<ul style="list-style-type: none"> <li>- Define the business process</li> <li>-Describe the four functions of management: planning, organizing, directing and controlling.</li> </ul>

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	*
Practical work (h)	*
Project (h)	*
Visits (h)	*

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	*	30%
Practical work		
Mid-term		
Oral test	*	20%
Final exam	*	50%

## 3. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- ABEL M. J. [1990], « Experiences in an exploratory distributed organization », in GALEGHER J., KRAUT R. et EGIDO C. (dir.), Intellectual team work: social and technological foundations of cooperative work, L. Erlbaum, Hillsdale, p. 489-510.
- ADLER P. S., MANDELBAUM A., NGUYEN V. et SCHWERER E. [1996], « Getting the most out of your product development process », Harvard Business Review , march-April, p. 135-152.
- AFITEP [1998], The Management of project, principles and practices, Afnor. — [2010], Project Management Dictionary, Afnor.

## Title of the Module

Math for Engineer

Code: GINF\_TC 03 101

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
	X		

**Teacher: Mondher Dammak**

**Grade: Professor**

**University: International Institute of technology of Sfax (IIT)**

**Email:**

Mondher\_dammak@yahoo.com

**Total module duration**

**56 h**

Contact hours	Out of class activities
28h	28h

**The equivalent credits**

**2 ECTS**

**Semester 1**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course consists of learning how to study the differential equation and transform it into an exact equation using integration factors. It then focuses on a first-order partial differential equation that involves only the first derivatives of the unknown function of  $n$  variables. Finally, non-linear first-order partial differential equations occupy the last part of this course.

### Objectives

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

- Diagonalize a matrix and calculate its  $n$ th powers.
- Calculate the limits of a multivariate function.
- Calculate the partial derivatives of a multivariate function and determine the critical points of this function.
- Determine whether a critical point of a multivariate function is a maximum or a minimum.
- Determine the gradient and the Jacobian of a multivariate function.
- Calculate the double and triple integrals of a function and apply this notion to calculate the volume, the center of gravity...
- Know the special Eulerian functions (Gamma and Beta)

### 1.2: Prerequisites

Mathematical Fundamentals

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Matrix reduction	12 h	To master: Transposed from a matrix Matrix multiplication Determinants Rank and trace of a matrix Gauss Inversion Triangulation of a matrix Solving a system of linear equations Eigenvalues and eigenvectors Diagonalization Basic change Passage matrix



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<b>Chapter 2</b>	Two-variable function	12 h	To learn: Homogeneous functions First partial derivatives Partial elasticity Partial derivatives seconds Hessian Matrix Schwarz Theorem
<b>Chapter 3</b>	Special functions (Gamma and Beta)	11h	To master: The Gamma function and properties The Beta function and properties Relationship between Gamma and Beta Formula of the complements Stirling formula

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	35h
Practical work (h)	
Project (h)	
Visits (h)	

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	Chapter 1, 2	30%
Oral test		
Final exam	All chapters	70%

## 4. RECOMMENDED BIBLIOGRAPHY:

[1] G. Choquet, T. De Pauw, P. de la Harpe, J.-P. Kahane, H. Pajot, B. Sévenec, Autour du centenaire Lebesgue, Panoramas et Synthèses, 18, Société Mathématique de France, 2004.

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[2] M. Berger, Convexité dans le plan, dans l'espace et au-delà. De la puissance et de la complexité d'une notion simple Opuscules (2 volumes), Ellipses, 2006.

## Title of the Module

Probability and statistics

Code: GINF\_TC 03 102

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
	X		

Teacher: Mahdi Louati

Grade: Associate Professor

University: Enet'Com

Email:

[louati\\_mahdi1@yahoo.fr](mailto:louati_mahdi1@yahoo.fr)

Total module duration

56 h

Contact hours	Out of class activities
28	28

The equivalent credits

2 ECTS

Semester 1

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces students to various topics in probability and uncertainty that they will encounter in economic theory. The concepts are illustrated with actual examples from the economics reviews. Topics include distribution functions, binomial, geometric, hyper-geometric, and Poisson distributions. The other topics covered are uniform, exponential, Gamma, normal distributions and Bayes theorem.

### Objectives

This course encourages the students to think about probability and uncertainty within a theoretical economics and industrial contexts. It permits to study the stochastic behavior of industrial systems and analyze them through continuous and discrete random methods.

### 1.2: Prerequisites

Basic mathematical knowledge

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Probability, conditional probability, Bayes theorems	6H	- describe the probability of an event, based on prior related knowledge of event conditions
<b>Chapter 2</b>	Discrete Random Variables	6H	- define expectation and variance - Develop cumulative distribution function - Use Binomial and Poisson distribution to describe discrete random variables
<b>Chapter 3</b>	Continuous random variables	6H	- Define Expectation and variance - Develop the cumulative distribution function - Use Normal, Gamma and exponential distributions to describe continuous random variables
<b>Chapter 4</b>	Descriptive statistics (using Excel and R software)	10 h	- Use Excel or R software to make static analysis: Mean standard deviation, Expectation and variance, Frequency and cumulative frequency tables, random distributions

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### 2. METHODOLOGY:

The contact hours consist of presenting theoretically related aspects and methods of probability and Statistics. Different activities are realized during this course. Practical activities are also made using analytical software.

Integrated Course (h)	20
Practical work (h)	8
Project (h)	-
Visits (h)	-

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work	-	-
Mid-term	Chapter 1, 2	30%
Oral test		
Final exam	Chapter 2, 3	70%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Taoufik Jmal et Abderrazak ellouz « Statistiques et probabilités » Tome1 et tome 2
- Jean Pierre Lecoutre (2012) « Statistique et probabilités » DUNOD 5<sup>ème</sup> édition
- Thérès Phan et Jean-Pierre Rowenczyk (2012) « Exercices et problèmes de Statistique et probabilités » DUNOD 2<sup>ème</sup> édition
- Excel and R software

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### Title of the Module

Python programming

Code: GINF\_TC 03 106

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Dr. Taoufik Ben Abdallah**

**Grade: Full-time faculty member**

**University: IIT**

**Email:**

**taoufik.benabdallah@iit.ens.tn**

**Total module duration**

**70 h**

Contact hours	Out of class activities
35	35

**The equivalent credits**

**3 ECTS**

**Semester 1**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course provides a pragmatic and hands-on introduction to the Python programming language, with a focus on practical applications and projects, rather than theoretical topics. Students will design and build software to solve problems from various disciplines using Python.

As the course progresses, students will learn to work with packages, data structures, and tools for data science.

### Objectives

On the completion of this course, the student should be able to:


- ✓ Master the fundamentals of writing Python scripts
- ✓ Learn core Python scripting elements such as variables and flow control structures
- ✓ Discover how to work with python containers
- ✓ Write Python functions to facilitate code reuse
- ✓ Use Python to read and write files
- ✓ Work with the Python standard library
- ✓ Make their code robust by handling errors and exceptions properly

### 1.2: Prerequisites

- ✓ Algorithms and data structures
- ✓ Experience with a high-level language as C

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Introduction to python programming	6h	<ul style="list-style-type: none"> <li>• Present the Integrated Development Environments (IDE) for Python</li> <li>• Learn the concept of Markdown format in Jupyter notebook</li> <li>• Understand the basic concepts of Python (comments, variables, reserved words, etc.)</li> <li>• Learn the I/O instructions</li> <li>• Learn how to convert types</li> <li>• Learn how to use data structure (<i>if</i>, <i>while</i>, and <i>for</i>)</li> </ul>
<b>Chapter 2</b>	Python containers	12h	<ul style="list-style-type: none"> <li>• Learn how to use <i>str</i></li> <li>• Learn how to use <i>list</i></li> <li>• Learn how to use <i>tuple</i></li> <li>• Learn how to use <i>set</i></li> <li>• Learn how to use <i>dict</i></li> </ul>
<b>Chapter 3</b>	Functions & Modules	9h	<ul style="list-style-type: none"> <li>• Understand the difference between parameters and arguments</li> <li>• Learn how to define variable number of arguments</li> <li>• Present the universal definition of function</li> <li>• Understand the difference between local and global variables</li> <li>• Learn how to define the anonymous function</li> </ul>

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			<ul style="list-style-type: none"> <li>• Learn how to use <i>map</i> function</li> <li>• Learn how to define <i>generator</i> function</li> </ul>
<b>Chapter 4</b>	Files handling	5h	<ul style="list-style-type: none"> <li>• Learn how to access <i>file</i></li> <li>• Learn how to read and write <i>file</i></li> <li>• Learn how to close <i>file</i></li> <li>• Present the optimized method of file handling</li> </ul>
<b>Chapter 5</b>	Exception handling	3h	<ul style="list-style-type: none"> <li>• Learn the type of exceptions</li> <li>• Learn how to handle exception</li> <li>• Learn how to handle AssertionError</li> </ul>

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	20
Practical work (h)	15
Project (h)	-
Visits (h)	-

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work	-	-
Mid-term	Chapter1+Chapter2	30%
Oral test	-	-
Final exam	All chapters	70%

## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Kenneth A. Lambert, The Fundamentals of Python: First Programs, 2011, Cengage Learning, ISBN: 978-1111822705.



## Title of the Module

**Research Methodology**

Code: GINF\_TC 03 112

**Teacher: Manel Dammak**

**Grade: Full-time Teacher**

**University: IIT**

**Email:**

**Avhraf.ammar@iit.ens.tn**

**Total module duration**

**28 h**

Contact hours	Out of class activities
21	7

**The equivalent credits**

**1 ECTS**

**Semester 1**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

The engineering profession requires both the development of scientific research skills and the ability to write and present reports. Also, during the engineering journey, student have to validate two mandatory internship and a graduation project in which they will be evaluated partially on its methodology of redaction and scientific research.

### Objectives

In this course, the student is tutored to:

- uses office environment to write correctly a report, using pertinent reference
- adopt predefined writing templates
- carry out literature research
- elaborate a specification and plan to achieve all objectives
- critically assess data and draw conclusions

### 1.2: Prerequisites

Basic knowledge on digital environment

Basic knowledge on office environment

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Methodology of redaction	9	Mastering the office environment Mastering how to respect a writing specification
<b>Chapter 2</b>	Methodology of scientific research	12	Mastering the research processes (Data collection – analysis – presentation of data and interpretation – discussion)

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	9
Practical work (h)	6
Project (h)	6
Visits (h)	-

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### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	Chapter 2	25%
Practical work	Chapter1	20%
Mid-term		
Oral test		
Final exam	All	55%

### 3. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

<https://pix.fr>
<https://support.microsoft.com>
<https://www.ibm.com/services/learning/fr/>

## Module Title

### Operating System

Code: GINF\_TC 03 103

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Ben Amar Mohamed Amin**

**Grade: Assistant Professor**

**University: Higher Institute of Computer Science and Communication Techniques  
Hammam Sousse**

**Email:**

**aminbenamar@yahoo.fr**

**Total module duration**

**70 h**

Contact hours	Out of class activities
35	35

**The equivalent credits**

**3 ECTS**

**Semester 1**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the fundamental concepts of operating systems. It aims at teaching the processes management, scheduling of processes, processes synchronization (fundamental models of synchronization: producers / consumers, dinner of philosophers, readers / editors), and deadlock.

### Objectives

A successful student will be able to understand the basic components of a computer operating system, and the interactions among the various components. The course covers an introduction on the processes management, policies for scheduling, deadlocks, and synchronization.

### 1.2: Prerequisites

Basic algorithmic knowledge

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Introduction to operating systems	4 hours	To learn: Objectives, functions, and issues of operating systems
<b>Chapter 2</b>	Processes	7 hours	To learn: Definition, status, and management of processes
<b>Chapter 3</b>	Policies for processes scheduling	7 hours	To master: FIFO, SJF, Round Robin, SRTF, PRIO
<b>Chapter 4</b>	Processes synchronization	9 hours	To master: Critical sections, locking variables, semaphores, and classic synchronization problems
<b>Chapter 5</b>	Deadlocks	8 hours	To master: Resource allocation graphs and matrices, deadlock avoidance and resolution.

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	20
Practical work (h)	15
Project (h)	0
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	1->3	30
Oral test		
Final exam	1->5	70

### 3. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Course of M. Mohamed Said Ouerghi, Professor at « ENSI Manouba, Tunisia »
- Course of M. François Pellegrin, Professor at « ENSEIR Bordeaux, France »
- Course of Ms Leila Baccouch « Les Systèmes d'exploitation »

## Title of the Module

Web programming  
Code: GINF\_TC 03 107

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>X</b>			

**Teacher: Fairouz Fakhfakh**

**Grade: full time teacher**

**University: IIT**

**Email:**

**fairouz.fakhfakh@iit.ens.tn**

**Total module duration**

**70 h**

Contact hours	Out of class activities
<b>35h</b>	<b>35h</b>

**The equivalent credits**  
**3 ECTS**

**Semester 1**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces client-side web technologies used for static web pages and interactive web applications. Emphasis is placed on advanced notions of Hyper Text Markup Language (HTML), Cascade Style Sheet (CSS) and JavaScript for interactive web applications that use rich user interfaces.

### Objectives

On the completion of this course, the student should be able to create a website using standard web languages. So, he gains skills for:

- appropriately using HTML5 to structure the content of web pages
- creating and applying CSS3 style sheets on a webpage to enhance its design
- understanding the principle of JavaScript to improve the user's interactivity with web pages.
- This course aims also to prepare students to pass the Microsoft certification exam 98-383.


### 1.2: Prerequisites

- Algorithms and data structures

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
Chapter 1	HTML 5	14	<ul style="list-style-type: none"> <li>- Understand the different standard tags</li> <li>- Understand the structuring tags of a web page</li> <li>- Learn to use multimedia tags</li> <li>- Learn how to use the new elements of forms and fields validation</li> </ul>
Chapter 2	CSS 3	8	<ul style="list-style-type: none"> <li>- Understand the style selectors</li> <li>- Use formatting properties: Text, List, Box, and Table</li> <li>- Understand the positioning in CSS: relative, absolute and static</li> <li>- Learn to use the new features in CSS3: shading, transparency, transition and animation.</li> </ul>
Chapter 3	Javascript	13	<ul style="list-style-type: none"> <li>- Use dialogue boxes</li> <li>- Use String, Date and Array Objects</li> <li>- Learn to use Document Object Model (DOM)</li> </ul>



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			- Understand the standard JQuery library: element selectors, event management and animation.	

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	12
Practical work (h)	14
Project (h)	9
Visits (h)	0

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	20%
Practical work	All chapters	10%
Mid-term	Chapter 1+Chapter 2	20%
Oral test	-	0
Final exam	All chapters	50%

## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Harvey Deitel, Abbey Deitel. Internet & World Wide Web How to Program, 5th edition, Pearson, 2012.
- Denis MATARAZZO, « Apprenez les langages HTML5, CSS3 et JavaScript pour créer votre premier site web », ENI, 2014. 295p. ISBN: 978-2746091054.
- [www.w3schools.com](http://www.w3schools.com)

## Title of the Module

Algorithm and Programming using C language

Code: GINF\_TC 03 105

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>X</b>			

**Teacher: Mouna Rekik**

Grade: Full Time faculty member

University: International institute of technology

Email:

Mouna.rekik@iit.ens.tn

Total module duration

**77h**

Contact hours	Out of class activities
<b>42</b>	<b>35</b>

The equivalent credits

**3 ECTS**

**Semester 1**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course ensures the manipulation and the understanding of the algorithmic concepts. It allows the ability of developing programs and software.

### Objectives

After this course, the students will be able to:


- Identify the problem and formulate an algorithm for it.
- Identify various control structures and implement them.
- Identify various types of variables.
- Use pointer in an array and structure.
- Use structures and union for handling data.
- Explain the concepts of C programming language
- Explain and implement the language constructs concepts
- Explain and execute member functions of C in the programme
- Describe and implement array concept in C programme
- Describe and execute pointers
- Expose File System using File Handling.

### 1.2: Prerequisites

There are no prerequisites

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Introduction to algorithms and programming	6	Understand the advantages of algorithms and programming
<b>Chapter 2</b>	Input and output in C language	6	Manipulate functions able to write texts on screen and inserting variables using keyboards
<b>Chapter 3</b>	Conditional structures	6	Propose different instructions according to various conditions. Understand conditional statements
<b>Chapter 4</b>	Iterative structure	9	Define iterative structures and the difference between

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<b>Chapter 5</b>	Tables and strings	9	Using and proposing dedicated functions to manipulate data stored into tables and consecutive memories
<b>Chapter 6</b>	Pointer	6	Manipulate pointer to store memories addresses of variable

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	15
Practical work (h)	15
Project (h)	12
Visits (h)	-

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	30%
Practical work	-	-
Mid-term	Chapter1+Chapter2+ Chapter3	25%
Oral test	-	-
Final exam	All chapters	45%

## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

Programmme in C: A Practical Approach by Ajay Mittal, Pearson Publication

# MODULE DESCRIPTION

## Title of the Module

Computer Architecture

Code: GINF\_TC 03 109

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
	x		

**Teacher: Tarek Frikha**

**Grade: Assistant teacher**

**University: ENIS**

**Email:**

**Tarek.1982@gmail.com**

**Total module duration**

**56 h**

Contact hours	Out of class activities
28	28

**The equivalent credits**  
**2 ECTS**

**Semester 1**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course discusses the design techniques that improve the performance of computer systems. It shows the evolution of the main innovations in architecture and computer technology and explains the incorporation of these advances in current processors, justifying its usefulness in terms of performance improvement.

### Objectives

The competencies to be acquired with this course are:

- Knowledge of the structure, organization, operation and interconnection of Computer Systems, the fundamentals of their programming and the application of this knowledge in solving engineering problems.
- Ability to understand and evaluate computer structures and architectures, as well as the basic components that make them up.
- Ability to design and construct digital systems, including computers, microprocessor based systems and communications systems.

### 1.2: Prerequisites

Computer Fundamentals

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Abstractions, Technology and Performance of Computers.	6 hours	<ul style="list-style-type: none"> <li>- Describe the main aspects that influence technological evolution in today's computer systems.</li> <li>- Recognize the basic vocabulary of computer architecture.</li> <li>- Identify the components of a computer system.</li> <li>- Understand the concept of runtime in a system.</li> </ul>
<b>Chapter 2</b>	Pipelined Processors.	6 hours	<ul style="list-style-type: none"> <li>- Understand the basic concepts of computer architecture. Arithmetic Logic Unit (ALU), register banks, registers and flip-flop latch, clock period, and Harvard RISC architecture.</li> <li>- Understand the concept of pipeline (segmentation) and the concepts</li> </ul>

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			associated latency and throughput.
<b>Chapter 3</b>	Memory Organization and Structure: caches and virtual memory	10 hours	<ul style="list-style-type: none"> <li>- Understand the concept of memory hierarchy. Reasons why the different storage levels are organized into hierarchy.</li> <li>- Understand the operation of virtual memory: paging, segmentation and paged segmentation.</li> </ul>
<b>Chapter 4</b>	Storage and other aspects of the input / output	6 hours	<ul style="list-style-type: none"> <li>- Understand and differentiate the concepts of reliability and availability.</li> <li>- Recognize the key features of storage in disks and flash memory.</li> <li>- Indicate the main performance metrics in the input-output systems.</li> </ul>

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	20
Practical work (h)	8
Project (h)	0
Visits (h)	0

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work		
Mid-term	1->2	30%
Oral test		
Final exam	1->4	70%

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#### 4. RECOMMENDED BIBLIOGRAPHY:

- Estructura y diseño de computadores: La interfaz software/hardware. D.A. Patterson y J.L. Hennessy. Ed. Reverte 2011. ISBN: 978-84-291-2620-4. Ref\_UAM: INF/681.32.3/PAT.
- Computer Organization and Design: The Hardware/Software Interface. D.A. Patterson y J.L. Hennessy. Morgan Kaufmann. 4<sup>a</sup> Ed. 2009. ISBN: 978-01-237-4493-7. Ref\_UAM: INF/681.3.06/PAT.



## Title of the Module

**Data transmission**

Code: GINF\_TC 03 104

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>X</b>			

**Teacher: Hekma Chaari**

**Grade: Permanent teacher**

**University: IIT**

**Email:**

**Hekma.chaari@iit.ens.tn**

**Total module duration**

**49 h**

Contact hours	Out of class activities
<b>28h</b>	<b>21h</b>

**The equivalent credits**  
**2 ECTS**

**Semester 1**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course includes layered communication architectures, transmission techniques, protocol design, network organization, security, implementation techniques and user-to-user data exchange principles. The course has practical assignments on network operation, protocol design and implementation.

### Objectives

The objectives of this course are:


- To focus on information sharing and networks.
- To introduce flow of data, categories of network, different topologies.
- To focus on different coding schemes.
- To give students idea about protocols and standards.
- To give clear idea of signals, transmission media, errors in data communications and their correction, networks classes and devices, etc.

### 1.2: Prerequisites

Electronic

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Information Transport Element	6	To learn: - Analog signal - Digital signal - Numeration
<b>Chapter 2</b>	Transmission media	6	To master: - Transmission medium (wireless, fiber optic, ...) - Overall characteristics of transmission media - Cable quality
<b>Chapter 3</b>	Transmission technology	6	To master: - Transmission type - Baseband transmission - MIC coding - Transmission by modulation
<b>Chapter 4</b>	Data circuit	4	To master - Quality of the data circuit - Signal multiplexing
<b>Chapter 5</b>	Standardization and other	6	To learn:

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	techniques		-External interface - ADSL	computer-modem

## 2. METHODOLOGY:

Integrated Course	18
Practical work	10
Project	-
visits	-

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	Chapter 1, 2	30%
Oral test		
Final exam	All chapters	70%

## 4. RECOMMENDED BIBLIOGRAPHY:

Stalling, R., Data Computer Communications, V edition, McMillan.

Stevens, R., TCP/IP Illustrated. Vol. I and II, Addison Wesley.

Halsall, F., Data Communication, Computer Networks and Open Systems, Addison Wesley, IV edition.

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### Title of the Module

Digital analytics  
Code: GINF\_TC 03 201

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
	X		

Teacher: Mahdi Louati

Grade: Associate Professor

University: Enet'Com

Email:

[louati\\_mahdi1@yahoo.fr](mailto:louati_mahdi1@yahoo.fr)

Total module duration

28 h

Contact hours	Out of class activities
21	7

The equivalent credits

1 ECTS

Semester 2

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course is an Introduction to digital analytics based on the most useful numerical methods and covers more particularly linear and nonlinear equations, digital interpolation differentiation and integration methods.

### Objectives

This course aims to provide engineering graduates a clear understanding about digital analytics and guides them to master defining and implementing solutions within an analytic problem, as well as the appropriate use of the main basic numerical methods.

### 1.2: Prerequisites

Math background is needed for this course

Basics fundamental skills in office programs use

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Nonlinear equation	3h	Apply correctly bisection, Fixed point, Newton and Secant methods to solve digital functions
<b>Chapter 2</b>	Systems of algebraic equations	3h	Treat Linear and nonlinear data system know Basic operations on the lines Treat symmetrical and Band matrix within conditioned system
<b>Chapter 3</b>	Iterative method for linear systems	4h	know Jacobi and Gauss-seidel method to differentiate iterative Relaxation method and SSOR Gradient method and conjugate gradient
<b>Chapter 4</b>	Interpolation	5h	Describe data by matrix of Vandermonde Interpolation of Lagrange and Newton's polynomial
<b>Chapter 5</b>	Digital integration	6h	Define digital integration methods and use Simple Newton-Cotes Laws, middle point and trapezoidal method, Newton-Cotes Composite Laws.

## 2. METHODOLOGY:

Integrated Course (h)	21
Practical work (h)	7
Project (h)	-
Visits (h)	-

## 3. EVALUATION :

Type	Covering which Chapter (s)	In which week ?	The weighting factors
Project			
Practical work			
Mid-term	Chapter 1, 2,3	4	30%
Oral test			
Final exam	Chapter 4, 5	8	70%

## 3. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

Yger, A., Weil, J-A. Mathématiques L3 - Mathématiques appliquées (Cours complet avec 500 tests et exercices corrigés, 890p et Dvd). Pearson, 2009.

Hardy, G. H. (1952), a course material of pure mathematics, Cambridge University Press, Cambridge. 2<sup>nd</sup> edition (1<sup>st</sup> edition, 1908). 49

Krylov, V. I. (1962), approximate calculation of integrals, Translated by Arthur H. Stroud, The Macmillan Co., New York. Reprinted by Dover. 49

Paterson, A. (1991), Differential equations and numerical analysis, Cambridge university press, Cambridge. 49

Schatzman, M. Analyse numérique, cours et exercices pour la licence. InterEditions, Paris, 1991.

Quarteroni, A., Sacco, R. and Salai, F. (1998), Matematica Numerica, Springer-Verlag, Milano.

Ralston, A. and Rabinowitz, P. (2001), A first course in numerical analysis, second edn, Dover Publications Inc., Mineola, NY. 33, 77

Sibony, M. and R., J. C. M. (1982), Analyse numérique (2 tomes), Hermann, Paris.

### Title of the Module

Economy for the engineer

Code: GINF\_TC 03 213

**Teacher: Amel Trabelsi Elloumi**

**Grade: Full-time faculty member**

**University: International Institute of Technology**

**Email:**

**Dep.PCP@iit.ens.tn**

**Total module duration**

**28 h**

Contact hours	Out of class activities
21	7h

**The equivalent credits**

**1 ECTS**

**Semester 2**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

The aim of this course is to enable the student to acquire the essential tools to a good understanding of the training and evolution of exchange institutions, and of price formation. The analysis of these phenomena will be based on the study of the behavior of decision-making centers (business, consumer and other institutions) that affect the distribution of resources in an economy. The course also aims to familiarize the student with scientific methodology in economics as well as to abstract reasoning for a better understanding in economic realities. This course will cover the general foundations of the economy and the two main levels of economic analysis: microeconomics and macroeconomics.

#### Objectives

Overall objectives: Introduce the student to basic concepts in economics, explain and analyze, ranging from individual behavior (microeconomics) to general behavior (macroeconomics), the main mechanisms of economic life.

At the end of this course, the student should be able to:

- know the fundamentals of microeconomic analysis and to study the behavior of individual economic agents (consumers and companies) in markets where products are traded.
- Master the tools of microeconomic analysis will allow the student to learn how to assess the health of a company.
- Be familiar with the tools and aggregates used to measure economic activity.
- Interpret and analyze the main macroeconomic imbalances.
- Analyze current problems and economic realities.

### 1.2: Prerequisites

Mathematics

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
Chapter 1	Chapter 1: Introduction to Economic Analysis		<ul style="list-style-type: none"> <li>❖ Differentiate between economic and non-economic goods and classify economic goods and needs</li> <li>❖ Analyze economic activity (organization and relations between actors)</li> <li>❖ Learn the tasks of the economist, the methods used and the different levels of economic analysis.</li> </ul>



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<b>Chapter 2</b>	<b>Chapter 2: The economy and main schools of economic thought: foundations and contributions</b>	<ul style="list-style-type: none"> <li>❖ Know the main currents of economic thought and their main contributions,</li> <li>❖ Understand why and how an economic issue can be addressed in a different way with different economists</li> <li>❖ Know the basis on which the main economic systems are built.</li> </ul>
<b>Chapter 3</b>	<b>Chapter 3: Analysis of consumer behavior</b>	<ul style="list-style-type: none"> <li>❖ Describe how and why individuals choose one good over another;</li> <li>❖ Show that the combination of preferences and budget constraints determine consumer choices</li> <li>❖ Determine which combination of goods to choose to maximize consumer utility.</li> </ul>
<b>Chapter 4</b>	<b>Chapter 4: Analysis of consumer behavior</b>	<ul style="list-style-type: none"> <li>❖ Introduce producer behavior, the production function, productivity and cost theory and introduce the relationship between costs, prices and profits</li> </ul>
<b>Chapter 5</b>	<b>Chapter 5: Economic circuit</b>	<ul style="list-style-type: none"> <li>❖ Know the decision-making and economic agents and the interactions underlying economic activities.</li> <li>❖ Determine the national accounts (financial and non-financial) used to record and summarize the economic activities carried out by economic agents.</li> </ul>

## 2. METHODOLOGY:

The method adapted in this course is:

- Economic activity
- Organization of economic activity
- Methods and levels of analysis in economics

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The teaching includes:

- Lectures (communication of basic information using examples and applications)
- Tutorial sessions (exercises)
- Homework

The contact hours consist of:

Integrated Course (h)	15
Practical work (h)	6
Project (h)	
Visits (h)	

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work	Chapter1 to 3	10%
Mid-term	Chapter 2,3,4	20%
Oral test		
Final exam	All chapters	70%

### 3. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

#### Course manual :

Course material in General Economics  
Workbook Exercises

#### Reference manuals :

- Mankiw G.N. (1998), *Principles of Economics*, Economica.
- Parkin M. AND BADE R. (2002), *Introduction to Modern Macroeconomics*, Collection ERPJ.
- Samuelson P. A. AND Nordhaus W. D. (2000), *The Economy*, Economica.
- Bosserelle E. (2017), *Fundamentals - General Economics, School / University*

## Title of the Module

Multimedia technologies

Code: GINF\_TC 03 205

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Eya Mezghani**

Grade: full time teacher

University: IIT

Email:

Eya.mezghani@iit.ens.tn

Total module duration

56 h

Contact hours	Out of class activities
28 h	28 h

The equivalent credits

2 ECTS

Semester 2

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the different multimedia objects (text, sound, image and video). It presents also the necessary theory elements for the analysis of signals and the elementary treatments used to extract the information contained in the signal. At the end of this course, emphasis is placed on the multimedia data production chain.

### Objectives

At the end of the course, the student should be able to:

- understand the multimedia fundamentals, namely the various multimedia objects
- know the classification and the properties of the signals
- gain knowledge about the basic notions of the signal processing theory including the Fourier Transform
- understand the multimedia data production chain

### 1.2: Prerequisites

Algorithms and data structures

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Theory and signal processing	6	<ul style="list-style-type: none"> <li>- Understand the signal classification modes</li> <li>- Learn about the signal properties</li> <li>- Understand the digital signals</li> <li>- Have theoretical overview on a digital system</li> </ul>
<b>Chapter 2</b>	Frequency transform	6	<ul style="list-style-type: none"> <li>- Understand the Fourier series</li> <li>- Learn about Fourier Transform</li> </ul>
<b>Chapter 3</b>	Introduction to multimedia	3	<ul style="list-style-type: none"> <li>- Understand the basic theorems related to multimedia applications</li> </ul>
<b>Chapter 4</b>	Multimedia objects	6	<ul style="list-style-type: none"> <li>- Learn about the multimedia objects: text, sound, image and video</li> </ul>
<b>Chapter 5</b>	Multimedia data production chain	7	<ul style="list-style-type: none"> <li>- Understand the multimedia data production chain: digital acquisition, treatment, analysis, synthesis, compression and storage.</li> </ul>

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	12
Practical work (h)	16
Project (h)	0
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	-	0
Practical work	All chapters	20%
Mid-term	Chapter 1+Chapter 2+Chapter3	30%
Oral test	-	0
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- The synthesis of images, J. P. Couwenbergh, Marabout, Belgium, 1998
- Internet, Multimedia and Real Time, J. F. Susbielle, Eyrolles, France, 2000.
- Theory and signal processing, F. de Coulon, Swiss Polytechnic Press, Lausanne, 1996.
- "Signal Processing First", Prentice Hall, JH McClellan, R. Schafer, A. Yoder New Jersey, 2003.
- [http: //www.cndp.fr](http://www.cndp.fr)
- [http: //www.ccm.com](http://www.ccm.com)

## MODULE DESCRIPTION

### Title of the Module

Network architecture and protocols (CCNA1)

Code : GINF\_TC 03 209

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
		x	

**Teacher: Mr. Hassen Mrabet**

**Grade: full time faculty member**

**University: International Institute of Technology**

**Email :**

**Hassen.mrabet@iit.ens.tn**

**Total module duration**

**56 h**

Contact hours	Out of class activities
28 h	28 h

**The equivalent credits**

**2 ECTS**

**semester 2**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the architecture, structure, functions, components, and models of the Internet and other computer networks. The principles and structure of IP addressing and the fundamentals of Ethernet concepts, media, and operations are introduced to provide a foundation for the curriculum.

### Objectives

At the end of this course, students will be able to build simple LANs, perform basic configurations for routers and switches, and implement IP addressing schemes, Licensing/Certification Agency: Cisco Corporation.

Students in this course will obtain the first level of knowledge required for these objectives. Completion of the course is the first phase of preparation for the certification exams. Students should be prepared to invest significant additional time for intense preparation prior to taking the exams.

### 1.2: Prerequisites

Prerequisite for this course is an advanced level of understanding of personal computers and operating systems approved by designated Information Technology personnel.

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Network exploration	3 hours	Discover all types of computer networks
<b>Chapter 2</b>	Configuring a network operating system	3 hours	Configure a Cisco router or switch
<b>Chapter 3</b>	Network protocols and communications	3 hours	Discover the OSI / TCP model
<b>Chapter 4</b>	Network access	3 hours	Discover the principle of physical layer operation
<b>Chapter 5</b>	Ethernet technology	3 hours	Discover the principle of data link working
<b>Chapter 6</b>	Network layer	3 hours	Discover the principle of network working

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<b>Chapter 7</b>	IP addressing	3 hours	Discover IPv4 and IPv6 Addressing
<b>Chapter 8</b>	Segmentation of IP network into subnets	3 hours	Segment an IPv4 network
<b>Chapter 9</b>	Transport layer	3 hours	Discover the principle of the transport layer working
<b>Chapter 10</b>	Application layer	3 hours	Discover the principle of application layer working

### 2. METHODOLOGY:

This course includes:

Integrated Course	15
Practical work	13
Project	-
visits	-

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work	All chapters	20%
Mid-term	1→5	30%
Oral test	-	
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

Logistically I recommend having a well-equipped laboratory with computers of high technical configuration, in which we find the package Racer software installed.

To reference, I recommend the official Cisco page, the netacad platform.



## Title of the Module

Object-Oriented Programming

Code: GINF\_TC 03 206

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>X</b>			

**Teacher: Said Taktak**

**Grade: full time teacher**

**University: IIT**

**Email:**

**Said.taktak@iit.tn**

**Total module duration**

**70 h**

Contact hours	Out of class activities
<b>35h</b>	<b>35h</b>

**The equivalent credits**

**3 ECTS**

**Semester 2**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course is an introduction to software engineering, using the Java programming language. The focus is on developing high quality, working software that solves real problems, including creating and manipulating objects, classes, and using object-oriented tools such as the class debugger.

### Objectives

On the completion of this course, the student should be able to:


- use an integrated development environment to write, compile and test object-oriented java programs
- gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as conditional and iterative structures
- understand the fundamentals of object-oriented programming in Java including defining classes, objects, invoking methods and exception handling mechanisms
- understand the principles of inheritance, packages and interfaces.

### 1.2: Prerequisites

- Algorithms and data structures
- The C programming language

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
Chapter 1	Introduction to object-oriented programming (OOP)	3 hours	<ul style="list-style-type: none"> <li>- Understand the main advantages of OOP in today's world</li> </ul>
Chapter 2	JAVA language	9 hours	<ul style="list-style-type: none"> <li>- Understand the concepts of instructions, variables and expressions</li> <li>- Learn to use conditional instructions and buckles</li> <li>- Understand and use tables and characters chains</li> </ul>
Chapter 3	The principles of object-oriented programming	9 hours	<ul style="list-style-type: none"> <li>- Understand how to create and destruct an object in Java</li> <li>- Learn to use packages</li> <li>- Understand and use visibility modifiers (private, protected and public)</li> </ul>
Chapter 4	Inheritance, polymorphism, abstract classes and interfaces	9 hours	<ul style="list-style-type: none"> <li>- Understand and use classes, inheritance, polymorphism and super and final keywords</li> <li>- Understand the conversion of objects</li> </ul>

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			- Use abstract classes and interfaces
<b>Chapter 5</b>	Basic classes	6 hours	- Learn to use packages (Object classes, Wrapper classes, the chains of characters and the Vector class)
<b>Chapter 6</b>	The management of exceptions	6 hours	- Learn to use Java exception handling features (defining an exception, capturing and handling of exceptions, using the finally block, etc.)

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	18
Practical work (h)	11
Project (h)	6
Visits (h)	0

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	25%
Practical work	-	-
Mid-term	Chapter 1+Chapter 2+Chapter 3	25%
Oral test	-	
Final exam	All chapters	50%

## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- James Gosling, Bill Joy, Guy L. Steele, Jr., Gilad Bracha, and Alex Buckley. The Java Language Specification, Java SE 7 Edition. Addison-Wesley Professional, 1st edition, 2013.
- Anne Tasso, Le Livre De Java Premier Langage : Avec 109 Exercices Corrigés, Eyrolles, 2011, ISBN2212133073

## MODULE DESCRIPTION

### Title of the Module

Operation Research  
Code: GINF\_TC 03 202

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
	X		

**Teacher: Seifeddine Mechti**

**Grade: Associate Professor**

**University: IIT**

**Email:**

[mechtiseif@gmail.com](mailto:mechtiseif@gmail.com)

**Total module duration**

**49h**

Contact hours	Out of class activities
28	21

**The equivalent credits**  
**2 ECTS**

**Semester 2**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course consists of applying scientific methods and tools to problems involving the operations of a system so as to find optimum solutions in parity with the overall objectives and constraints. The types of problems that may be addressed by operation research methods are firstly described. The structure of a linear program is then presented to model mathematically the operation research problems. The graphical and simplex methods are then studied as basics resolution methods.

### Objectives

The purpose of this module is to investigate modeling and solving techniques of optimization problems. Based on several examples, and following an analogy approach between the considered methods, the student is expected to learn how to identify a linear operational research problem, develop corresponding model (linear program), solve it with one of the studied methods and analyze the obtained solutions.

### 1.2: Prerequisites

Basic mathematical knowledge are recommended

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Linear modeling	6H	<ul style="list-style-type: none"> <li>- Know the type of operation research problems and application area of operation research methods</li> <li>- distinguish the different component of operation research problem : decision variables, parameters, objectives and constraints</li> <li>- Develop the canonic and standard formulations of linear programs</li> </ul>
<b>Chapter 2</b>	Graphical resolution method	6H	<ul style="list-style-type: none"> <li>- Solve problems using graphical method</li> </ul>
<b>Chapter 3</b>	Simplex algorithm	10H	<ul style="list-style-type: none"> <li>- know the different steps of Simplex method and the analogy with graphical method</li> </ul>
<b>Chapter 4</b>	Duality and post-optimality analysis	6H	<ul style="list-style-type: none"> <li>-solve dual problem and make post-optimality analysis</li> </ul>

## 2. METHODOLOGY:

The contact hours consist of presenting different aspects related to operation research: problem modeling, methods and analysis. The theoretical aspects are accompanied by cases study. A part of these cases is requested to be made as self-study activities.

Integrated Course (h)	18
Practical work (h)	10
Project (h)	-
Visits (h)	-

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	Chapter 1+2	30%
Oral test		
Final exam	All Chapters	70%

## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Introduction to Operations Research and Production Management (2005) Kacem Saï. University Publication Center, Tunisia
- Introduction to Differentiable Optimization (2006) Michel Bierlaire. Presses Polytechniques et universitaires romandes

## MODULE DESCRIPTION

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### Title of the Module

Administration of systems and networks using Linux (LPI 101)

**Code: GINF\_TC 03 211**

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
		x	

**Teacher: Mr. Lotfi Tlili**
**Grade: Technologist Professor**
**Establishment: ISET**
**Email:**

tlili.lotfi@yahoo.fr

**Total module duration**

56 h

Contact hours	Out of class activities
28h	28h

**The equivalent credits**
**2 ECTS**
**Semester 2**

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### 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

#### 1.1: Course Description

This course covers fundamental Linux skills such as file management and manipulation, text processing, command line use, package management, file systems, hardware, and many more. Students will feel confident taking the LPI LPIC-1 101 exam with in classroom assessments and practice exams.

#### Objectives

At the end of this training, the learner will be able to sit for the LPIC 101 exams which relate to:

- Mastering the architecture system under Gnu / Linux
- Linux installation and package management
- Execution of Gnu and Unix commands

#### 1.2: Prerequisites

General computing knowledge and experience. No prior knowledge with Linux is required.

#### 1.2: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
Chapter 1	Hardware architecture and device management	6 hours	Determine and configure fundamental system hardware
Chapter 2	Starting Linux	6 hours	Interact with shells and commands using the command line. The objective assumes the Bash shell.
Chapter 3	Installing and managing packages	6 hours	Perform package management using RPM, YUM and Zypper.
Chapter 4	File system	6 hours	Use the basic Linux commands to manage files and directories.
Chapter 5	GNU and Unix commands	6 hours	Perform basic process management.



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### 2. METHODOLOGY:

The course includes:

Integrated Course	14
Practical work	14
Project	-
visits	-

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	Chapter 1+Chapter 2+Chapter 3	30%
Oral test	-	
Final exam	All chapters	70%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

Preparation for the certification LPIC 101

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### Title of the Module

Software analysis and design methodology

Code: GINF\_TC 03 207

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>x</b>			

**Teacher: Mohamed Amine CHAABANE**

**Grade: Assistant professor**

**University: ISAAS**

**Email:**

**Mahamedamine.chaabane@isaas.usf.tn**

**Total module duration**

**70 h**

Contact hours	Out of class activities
<b>35</b>	<b>35</b>

**The equivalent credits**

**3 ECTS**

**Semester 2**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the Unified Modeling Language (UML) and several diagrams that are most often used in software development. The student is exposed to several object-oriented concepts such as objects, classes, attributes, methods, inheritance, etc.

### Objectives

On the completion of this course, the student should be able to:


- use the UML notation to create efficient system designs
- know the importance of modeling in the software development life cycle
- understand the UML notation and symbols
- understand the main UML diagrams (use case, class, sequence and activity) and be able to apply them in order to model a medium sized project.

### 1.2: Prerequisites

NONE

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Fundamental concepts of the object approach	3	<ul style="list-style-type: none"> <li>- Understand the need of modeling</li> <li>- Understand the history of design methods intended for information system</li> <li>- Learn what is an information system</li> </ul>
<b>Chapter 2</b>	Use case diagram	5	<ul style="list-style-type: none"> <li>- Understand the basic concepts of the use case diagram</li> <li>- Discuss how to find use cases based on some examples</li> </ul>
<b>Chapter 3</b>	Class diagram	8	<ul style="list-style-type: none"> <li>- Understand the basic concepts of the class diagram such as classes, attributes, methods and the relation among objects</li> </ul>
<b>Chapter4</b>	Sequence diagram	9	<ul style="list-style-type: none"> <li>- Understand the basic features of a sequence diagram</li> <li>- Learn to use synchronous and asynchronous messages</li> </ul>
<b>Chapter 5</b>	Activity Diagram	4	<ul style="list-style-type: none"> <li>- Understand the basic features of an activity diagram (action</li> </ul>

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			states, transitions, operations, etc.) - Discuss how to create activity diagrams based on some examples.
<b>Chapter 6</b>	Unified process	6	- Identify and understand the key phases of the Unified process

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	25
Practical work (h)	10
Project (h)	0
Visits (h)	0

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work	-	-
Mid-term	Chapter 1+Chapter 2+chapter3	30%
Oral test	-	-
Final exam	All chapters	70%

## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Odell, James J. Advanced object-oriented analysis and design using UML. Vol. 12. Cambridge University Press, 1998
- Miles, R., Hamilton, K.: Learning UML 2.0. O'Reilly Media, Sebastopol CA USA (2006).

## MODULE DESCRIPTION

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### Title of the Module

Systems and Networks Administration in Windows

Code: GINF\_TC 03 211

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Mr. Mustapha Sakka**

Grade: Expert

Email :

Sakka.mustapha@gmail.com

Total module duration

56 h

Contact hours	Out of class activities
28h	28h

The equivalent credits

2 ECTS

Semester 2

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course covers the installation and configuration of mainstream operating systems, important network services, disaster recovery procedures, and techniques for ensuring the security of the system.

#### Objectives

At the end of this course, the student will:

- Understand the ethical issues of working as a Network Administrator
- Understand network security issues
- Be familiar with common network operating systems (NOSs) used by network servers
- Be able to design and implement a Novell Directory Services (NDS) installation
- Be able to design and implement a Microsoft Active Directory (AD) installation
- Be able to work as a basic Network Administrator with NDS
- Be able to work as a basic Network Administrator

### 1.2: Prerequisites

Basic knowledge of computers and networks.

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	The administrator job	3 hours	To master : - Administrator tasks - Required skills
<b>Chapter 2</b>	The DNS system	3 hours	To master : - Principle of working - DNS servers - The BIND software
<b>Chapter 3</b>	The routing	6 hours	To master : - IP addressing - Static and dynamic routing protocol - Assignment of IP addresses
<b>Chapter 4</b>	The DHCP system	6 hours	To master : - operating mechanism - the DHCP server

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			- Customer configuration
<b>Chapter 5</b>	The electronic messaging	3 hours	- Architecture - mail protocols - the Sendmail server - the ICMP protocol
<b>Chapter 6</b>	The security of information systems	3 Hours	To master : - the attacks - security policy - security tools
<b>Chapter 7</b>	Administration tools	3 Hours	To master : - the network administration commands under DOS
<b>Chapter 8</b>	The maintenance of computer systems	3 hours	To master : - Configuration files - Partitioning of disks

## 2. METHODOLOGY:

The course includes:

Integrated Course	16
Practical work	12
Project	-
visits	-

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	Chapter 1+Chapter 2+Chapter 3+ Chapter 4	30%
Oral test	-	
Final exam	All chapters	70%

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#### **4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:**

Principles of Network and System Administration, 2nd edition, Mark Burgess, Wiley and Sons, 2004 (PNSA in Course Outline), ISBN 0470868074



# MODULE DESCRIPTION

## Title of the Module

Theory of languages and compilation

Code: GINF\_TC 03 208

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>X</b>			

**Teacher: Sofien Lajmi**

**Grade: Assistant professor**

**University: ISIMS**

**Email:**

**Sofiene.lajmi@gmail.com**

**Total module duration**

**49 h**

Contact hours	Out of class activities
<b>28 h</b>	<b>21h</b>

**The equivalent credits**

**2 ECTS**

**Semester 2**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces some fundamental notions in automata theory and formal languages including grammar, finite automaton, regular expression and formal language. It presents also some classical techniques in compilation, in particular lexical and syntax analysis.

### Objectives

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

- construct finite state machines
- prove the equivalence of languages described by finite state machines and regular expressions
- convert non-deterministic finite automaton to deterministic finite automaton
- understand the basic principles inherent in carrying out a compiler: lexical analysis, syntax analysis, semantic analysis and code generation
- master prototyping tools (LEX and YACC / BISON) to build lexical and syntactic analyzers.

### 1.2: Prerequisites

- Algorithms and data structures
- Some knowledge of programming languages
- Fundamentals of set theory

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Language: basic concept and properties	4	<ul style="list-style-type: none"> <li>- Understand the basic notions of the theory of languages: the concept of language, regular languages, regular expressions, pump lemma, etc.</li> </ul>
<b>Chapter 2</b>	Grammars	6	<ul style="list-style-type: none"> <li>- Understand the basic concepts of grammars such as derivations, trees and ambiguity</li> </ul>
<b>Chapter 3</b>	Automatons	6	<ul style="list-style-type: none"> <li>- Understand the deterministic and nondeterministic finite automaton</li> <li>- Learn to convert non-deterministic finite automaton to deterministic finite automaton</li> <li>- Learn how to minimize automata</li> </ul>

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<b>Chapter 4</b>	Introduction to compilation	3	<ul style="list-style-type: none"> <li>- Understand the different phases of compilation including lexical analysis, syntax analysis, semantic analysis and code generation.</li> </ul>
<b>Chapter 5</b>	Lexical Analysis	4	<ul style="list-style-type: none"> <li>- Understand the concepts of lexeme and lexical errors</li> <li>- Learn how to implement a lexical analyzer</li> </ul>
<b>Chapter 6</b>	Syntax Analysis	5	<ul style="list-style-type: none"> <li>- Understand the types of syntax analysis (Top-down analysis and Bottom-up analysis) and syntax errors</li> <li>- Learn how to implement a syntax analyzer</li> </ul>

### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	18
Practical work (h)	10
Project (h)	0
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	-	
Practical work	All chapters	20%
Mid-term	Chapter 1+Chapter 2+Chapter 3	30%
Oral test	-	
Final exam	All chapters	50%

#### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Krithivasan, Kamala. Introduction to formal languages, automata theory and computation. Pearson Education India, 2009.
- Silverio Nino, « Réaliser un compilateur : les outils Lex et Yacc », Eyrolles, 1994, 2-212-08834-5.
- Alfred Aho, Monica Lam, Ravi Sethi and Jeffrey Ullman, « Compilateurs Principes, techniques et outils », Pearson education, 2007, 920 p, EAN13 : 9782744070372

### Title of the Module

Accounting for the engineer

Code: GINF\_TC 03 214

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
			<b>x</b>

**Teacher: Sodki Amine FRIKHA**

**Grade: expert**

Email :

[fiduciaire.elmanar@gnet.tn](mailto:fiduciaire.elmanar@gnet.tn)

**Total module duration**

**28 h**

Contact hours	Out of class activities
<b>21 h</b>	<b>7 h</b>

**The equivalent credits**

**1 ECTS**

**Semester 2**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This is an introductory survey course in accounting. The course covers the financial reporting process and uses of accounting data, linkages between accounting information and management planning, decision-making and control. Managerial topics include product costing, cost terminology, budgeting, cost-volume-profit analysis, standard costs and activity based costing.

### Objectives

After completing the course, students should be able to:


- Understand and analyze a company's income statement, balance sheet and statement of cash flows
- Understand the impact various decisions or transactions will have on the company's statements and financial health.
- Prepare an analysis of the financial health of a public company using ratio analysis.
- Prepare a detailed financial budget.
- Make decisions using managerial accounting information.
- Be able to comfortably communicate with senior financial and non-financial leaders about financial statement issues and the financial impact of business decisions.

### 1.2: Prerequisites

None

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	General introduction Accounting history and standardization	3 h	Course Introduction Introduce to Financial reporting environment
<b>Chapter 2</b>	Accounting nomenclature, postings and summary documents	3 h	Understand the Financial Statements: Accountant's Letter, balance sheets, income statement, cash flow and statement of changes of changes in financial position, footnotes
<b>Chapter 3</b>	Financial and tax comments on balance sheet items	6h	Learn key balance sheet accounts and classifications, AP, AR, Inventory, Unearned Revenues and Prepaid expenses Capital Assets, Depreciation & Amortization
<b>Chapter 4</b>	Cash flow accounts, self-financing, cash flow statement	6 h	Learn Financial Statement analysis: Cash Flow, Ratios, ROI, TCO, Time Value of Money Bank Reconciliations

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<b>Chapter 5</b>	Consolidated financial statements	3 h	Master Income & Recognition, Accounts Receivable –Allowance for Doubtful Accounts, Inventory Valuation, Mark-to-market

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course	21
Practical work	-
Project	-
visits	-

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work	-	-
Mid-term	Chapter 1+Chapter 2	30%
Oral test	-	-
Final exam	All chapters	70%

## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

Antony R.N., Hawkins D.F., Merchant K.A., "Accounting: Text and Cases", Thirteenth Edition, McGraw-Hill International Edition.

# MODULE DESCRIPTION

## Title of the Module

Algorithmic II and complexity of algorithms

Code: GINF\_TC 03 203

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>x</b>			

**Teacher: Atef Masmoudi**

**Grade: temporary teacher**

**University: IIT**

**Email:**

**masatef@gmail.com**

**Total module duration**

**70 h**

Contact hours	Out of class activities
<b>35h</b>	<b>35h</b>

**The equivalent credits**

**3 ECTS**

**Semester 2**



## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the fundamental techniques used to design efficient algorithms and analyze their running time. After a brief review of prerequisite concepts (search, sorting, asymptotic notation), it focuses on the methods used to determine the time complexity of an algorithm.

### Objectives

On the completion of this course, the student should be able to:

- Analyze and classify problems in different areas
- Build solution(s) for these problems
- Evaluate the different solutions in terms of complexity calculation
- Choose the best solution

### 1.2: Prerequisites

Algorithms and data structures

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Recap on algorithmic progress and combinatorial optimization	6	<ul style="list-style-type: none"> <li>- Understand the concept of difficult problems and combinatorial explosion</li> </ul>
<b>Chapter 2</b>	Validity, analysis and comparison of algorithms	9	<ul style="list-style-type: none"> <li>- Analysis of algorithms through insertion sorting</li> <li>- Understand the split-to-reign methods and the fusion sorting</li> </ul>
<b>Chapter 3</b>	Growth in functions	5	<ul style="list-style-type: none"> <li>- Understand the asymptotic notation</li> <li>- Apply the concept of function growth to compute and compare the complexity of simple algorithms</li> </ul>
<b>Chapter 4</b>	Complexity of recurrence: General method	9	<ul style="list-style-type: none"> <li>- Technical considerations</li> <li>- Understand the general method used to determine the complexity of recurrence</li> </ul>
<b>Chapter 5</b>	Sorting by heap	6	<ul style="list-style-type: none"> <li>- Understand the Heap sort algorithm</li> </ul>

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## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	15
Practical work (h)	20
Project (h)	0
Visits (h)	0

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work	All chapters	20%
Mid-term	Chapter 1+Chapter 2	30%
Oral test	-	-
Final exam	All chapters	50%

## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- WILF, Herbert S. *Algorithms and complexity*. AK Peters/CRC Press, 2002.
- DU, Ding-Zhu et KO, Ker-I. (Eds.). *Advances in Algorithms, Languages, and Complexity*. Springer Science & Business Media, 2013.

## MODULE DESCRIPTION

### Title of the Module

Artificial Intelligence:  
Code: GINF\_TC 03 204

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Dr. Taoufik Ben Abdallah**

**Grade: : Full-time faculty member**

**University: IIT**

**Email:**

**taoufik.benabdallah@iit.ens.tn**

**Total module duration**

**70 h**

Contact hours	Out of class activities
35	35

**The equivalent credits**  
**3 ECTS**

**Semester 2**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course presents the history of Artificial Intelligence (AI), explores use cases and applications of AI, and understands the concepts and specific terms of AI especially in machine learning. Students will be exposed to various questions and concerns about AI.

### Objectives

On the completion of this course, the student should be able to:


- ✓ Introduce Artificial Intelligence (AI)
- ✓ Understand the development of AI
- ✓ Master AI technologies and related concepts
- ✓ Present the basic concepts of Machine Learning
- ✓ Focus on the use of supervised and unsupervised learning
- ✓ Learn the theoretical and practical principles of some Machine Learning techniques

### 1.2: Prerequisites

- ✓ Basics of Math and Statistics
- ✓ Basics of Python programming

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Overview of Artificial Intelligence	4h	<ul style="list-style-type: none"> <li>• Understand the difference between AI, machine learning and deep learning</li> <li>• Distinguish the AI Approaches: Symbolism, Connexionism and Actionism</li> <li>• know the history of AI</li> <li>• Learn the hierarchy of AI</li> <li>• Learn the Man-Machine relationship and AI governance</li> <li>• Focus on AI society in the future</li> </ul>
<b>Chapter 2</b>	Overview of machine learning	4h	<ul style="list-style-type: none"> <li>• Understand the difference between Machine learning and transfer learning</li> <li>• Present the application areas</li> <li>• Learn the machine learning process : feature space detection, learning, and validation</li> <li>• Distinguish the machine learning categories supervised, unsupervised, semi-supervised, reinforcement</li> <li>• Present the Frameworks and libraries</li> </ul>
<b>Chapter 3</b>	Python Programming Basics for data analysis and machine learning	10h	<ul style="list-style-type: none"> <li>• Learn to use Python Numpy Array</li> <li>• Learn to use pandas for data analysis</li> <li>• Learn to use matplotlib data visualization</li> </ul>
<b>Chapter 4</b>	unsupervised learning	8h	<ul style="list-style-type: none"> <li>• Understand the concept of Hierarchical clustering</li> <li>• Understand the concept of K-means technique</li> <li>• Learn to use skit-learn for clustering</li> </ul>

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	Supervised learning	9h	<ul style="list-style-type: none"> <li>• Overview of evaluation metrics</li> <li>• Understand the concept of K nearest neighbors technique</li> <li>• Understand the concept of Naïve Bayes</li> <li>• Understand the concept of linear and logistic regression techniques</li> <li>• Understand the concept of Support Vector Machine (SVM) technique</li> <li>• Learn to use skit-learn for prediction</li> </ul>

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	20
Practical work (h)	15
Project (h)	-
Visits (h)	-

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work	-	-
Mid-term	Chapter1+Chapter2+ Chapter3	30%
Oral test	-	-
Final exam	All chapters	70%

## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Gupta, Gopal K. Introduction to data mining with case studies. PHI Learning Pvt. Ltd., 2014.



## COURSE PLAN

### Module Title

Preparation for DELF I/II B2 certification

Code: GINF\_TC 03 111

GINF\_TC 03 212

**Aymen Degachi**

**Permanent Teacher**

International Institute of Technology

aymen.degachi@iit.ens.tn

Total module duration

70 h

Contact hours	Out of class activities
35	35

The equivalent credits

3

Semester 2

**1. COURSE DESCRIPTION AND COMPETENCIES:****1.1: Course description**

This course is a preparation for the DELF level B2 certification. Indeed, it is a training on a refinement of the different skills required for the DELF B2 exam. These skills revolve around oral and written comprehension as well as oral and written production. In this sense, in each session our work consists in elaborating staggered exercises in two parts: an oral and a written activity. In addition, we encourage students to practice the different DELF B2 exams. This is done through various applications that allow students to learn, revise and deepen their knowledge of French lexical, grammatical and civilizational aspects by tackling many topical themes.

**1.2: objectives****➤ Global objective :**

To develop students' communicative skills and improve their self-confidence when speaking in public and to be able to discuss, debate and present a personal point of view in any communication situation; both written and oral.

**➤ Specific Objectives :**

At the end of this course the student will be able to:

- Direct the listening of an audio support, pick up the most relevant details and understand authentic audio documents.
- Locate the information necessary for the comprehension of an informative text relating to various fields.
- Take a position in front of a well determined problematic and produce an argumentative essay related to several themes.
- Locate the main idea of an article and present orally a personal opinion on the subject in question.

**1.3: Prerequisites**

The students can easily build a brainstorming network of ideas on the different topics proposed in the sessions. They are also able to produce and present short fragments orally to

the class. They are also able to write a short paragraph in a given time frame in relation to defined themes.

## 1.4: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	The keys to talk about our plural identity	14 H	<p>In this work unit we evoke the theme of the new links between the individual and his environment in order to have the ability to :</p> <ul style="list-style-type: none"> <li>- Better talk about new social models, relationships between family members.</li> <li>- Identify the notions of cause and consequence</li> <li>- Elaborate an argumentative discourse</li> <li>- Master the keys to the newsletter / informative text / argumentative essay / general idea</li> </ul>
<b>Chapter 2</b>	Keys to Talk about Civil Rights	14 H	<p>In this course, we will discuss the struggle of men and women for their rights and social benefits in order to be able to :</p> <ul style="list-style-type: none"> <li>- Talk about freedom of choice / civil rights and equality / solidarity</li> <li>- Work on the modes of the indicative, the infinitive and the subjunctive + the goal</li> <li>- Make a plan to organize ideas: informative and argumentative text</li> <li>- Master the keys to the interview / the argumentative text / the professional letter / the point of view</li> </ul>
<b>Chapter 3</b>	The keys to talk about the professional world	14 H	<p>In this section we focus on professions, trades and working conditions with the objective of knowing :</p>



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			<ul style="list-style-type: none"> <li>- Giving an opinion</li> <li>- Structuring a statement</li> <li>- Using opposition and concession</li> <li>- Elaborate the introduction and conclusion of an argumentative text</li> <li>- To master the keys of the argumentation / letter of application and complaint</li> </ul>
<b>Chapter 4</b>	Keys to Talk about Citizenship	14 H	<p>In this module we highlight the theme of citizenship, the rights and duties of citizens to learn to :</p> <ul style="list-style-type: none"> <li>- Address administrative and political issues in France</li> <li>- Talking about the symbols of the state</li> <li>- Using the hypothesis</li> <li>- Maintain a moderate tone in a formal letter.</li> <li>- Mastering the keys to discourse/opinion debate</li> </ul>
<b>Chapter 5</b>	The keys to talk about future world	14 H	<p>In this unity we focus on solutions for a better world, for sustainable development and for the environment in order to be able to :</p> <ul style="list-style-type: none"> <li>- Confirm or contradict the interlocutor</li> <li>- Ask for more information</li> <li>- Using time indicators</li> <li>- Using reported speech</li> <li>- Using non-verbal communication in interaction</li> <li>- Mastering the expression of agreement, reserve, disagreement and uncertainty</li> </ul>

**2. METHODOLOGY:**

The DELF B2 certification preparation course is composed of two parts:

- Integrated courses (communication of fundamental information introduced by using multiple examples)
- Applications and exercises

**3. ASSESSMENT:**

Type	Focusing on which chapter(s)	Weighting
Project	All chapters	
Mid-term	Chapter 1 and 3	20 %
Oral exam	All chapters	10 %
Final exam	All chapters	50 %

**4. RECOMMENDED BIBLIOGRAPHICAL AND LOGISTIC REFERENCES:**

- BRETONNIER Marie, GODARD Emmanuel, LIRIA Philippe, MISTICHELLI Marion et SIGÉ Jean-Paul, Les clés du nouveau DELF B2, Editions Maison des Langues, Paris, 2007, Réimpression Juillet 2014.
- COLLINI Virginie, JAMET Marie-Christine, Préparation à l'examen du DELF B2, Hachette Français Langue Étrangère, Paris, 2008, Impression Mai 2013.
- <https://www.bonjourdefrance.com/>
- <https://www.partajondelfdalf.com/>

### Title of the Module

#### Culture Entrepreneurship

Code: GINF\_ASR 04 113

**Teacher: Mrs. Amel Trabelsi Elloumi**

**Grade: Full-time faculty member**

In charge of the preparation for the professional career department

**University: International Institute of Technology**

Email:

**Dep.PCP@iit.ens.tn**

Total module duration

**28 h**

Contact hours	Out of class activities
21	7

The equivalent credits

**1 ECTS**

**Semester 3**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

- To carry out their Innovation & Entrepreneurship Project, student engineers must analyze the market, find an innovative concept, develop the product, federate a team, carry out an operating plan and comply with regulatory constraints. So many missions that fit perfectly with what a company expects of a young engineer.
- These Innovation & Entrepreneurship projects often come from companies seeking to develop new products, to respond to innovation and development issues related to their sectors.

### Objectives

The development of the entrepreneurial culture requires an awareness and promotion effort:

- knowing entrepreneurship
- imagining and becoming an entrepreneur
- building a project and making it reliable
- Discovering the process to implement
- Finding an innovative idea to create a project
- creating a competitive business model

### 1.2: Prerequisites

- Having an idea about the socio-economic environment
- The fundamentals of management
- Entrepreneurship processes
- Some functions (of the company)

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Entrepreneurship sensitization	7h	<ul style="list-style-type: none"> <li>- Learn about entrepreneurship.</li> <li>- Become familiar with the characteristics of the entrepreneurship environment.</li> <li>- Extend the spectrum of entrepreneurial knowledge.</li> </ul>
<b>Chapter 2</b>	The forms of entrepreneurship	7h	<ul style="list-style-type: none"> <li>- Know the main forms of entrepreneurship.</li> <li>- Understand the specificity of the different forms.</li> </ul>
<b>Chapter 3</b>	Business model	7h	<ul style="list-style-type: none"> <li>- define the research methods of an innovative or creative idea</li> <li>- Know the different forms of business Model</li> <li>- Extend the skills of students to prepare their Business Model</li> </ul>

## MODULE DESCRIPTION

### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	17 h
Practical work (h)	
Project (h)	
Visits (h)	4 h

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	30%
Practical work		
Mid-term		
Oral test	All chapters	20%
Final exam	All chapters	50%

### 3. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- <http://www.granddictionnaire.com/>.
- <http://www.olf.gouv.qc.ca/ressources/bibliotheque/officialisation/terminologique/fiches/1298933.html>

### Title of the Module

END OF YEAR PROJECT

Code: GINF\_ASR 04 114

**Teacher: Achraf Ammar**

**Grade: Internship coordinator**

**University: IIT**

**Email:**

**Achraf.ammar@iit.ens.tn**

**Total module duration**

**126 h**

Contact hours	Out of class activities
35	91

**The equivalent credits**

**5 ECTS**

**Semester 4**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

After having validated a first year of the engineering cycle and also carried out a first internship, the student engineer will be able to achieve scientific projects with more efficiency. This course is a real preparation for the graduation project and will help students who have a project idea to start developing it.

### 1.2: Objectives

In this course, the student is tutored to:

- Master report redaction
- carry out literature research with more accuracy.
- do advanced research on a specific topic
- develop an action plan to meet a predefined objective
- to realize real projects

### 1.3: Prerequisites

Validate Internships and Graduation project course

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Preparing research topic	6	Detect research themes related to personal skills do an advanced search in a chosen theme Detect innovation and advancement opportunities in a chosen theme
<b>Chapter 2</b>	Developing action plan	10.5	Apply a scientific research process to identify a concrete action plan.
<b>Chapter 3</b>	Reporting results	4.5	Synthesis correctly results Develop the critical perception Identify perspectives and new opportunities

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	9
Practical work (h)	-
Project (h)	12
Visits (h)	-

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### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	1	25%
Practical work		
Mid-term		
Oral test	2	20%
Final exam	1-2-3	55%

### 3. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

<https://pix.fr>



## Title of the Module

Huawei Routing & Switching (HCNA1)

Code: GINF\_ASR 04 103

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
		X	

**Teacher: Tarak Abbes**

**Grade: Associate professor**

**University: ENET'COM**

**Email:**

**abbes.tarek@gmail.com**

**Total module duration**

**28h**

Contact hours	Out of class activities
21	7h

**The equivalent credits**

**1 ECTS**

**Semester 3**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course is the first level of the HCIA routing and switching certification of Huawei. It encompasses a description of the network protocols, hardware as well as the operating system VPR.

### Objectives

It aims Making the student able to understand the role of various network protocols namely the STP/RSTP and the DHCP and to configure them

### 1.2: Prerequisites

Local networks  
 TCP/IP protocols  
 Data transmission

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Introduction to Transmission Media	1.5	Understand and to configure the transmission media
<b>Chapter 2</b>	Ethernet Framing	1.5	Understand and to configure the ethernet framing
<b>Chapter 3</b>	IP Addressing	1.5	Understand and to configure the ip addressing
<b>Chapter 4</b>	Internet Control Message Protocol	1.5	Understand and to configure the transmission media
<b>Chapter 5</b>	Address Resolution Protocol	3	Understand and to configure address resolution protocol
<b>Chapter 6</b>	Transport Layer Protocols	3	Understand and to configure transport layer protocol
<b>Chapter 7</b>	Data Forwarding Scenario	3	Understand and to configure data forwarding scenario
<b>Chapter 8</b>	VRP Foundation	3	Understand the VRP foundation
<b>Chapter 9</b>	Navigating the CLI	3	Manipulate and navigate the CLI
<b>Chapter 10</b>	File System Navigation and Management	3	Manage and navigate the file system
<b>Chapter 11</b>	VRP Operating System Image Management	3	Manage the VRP operating system image

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	18
Practical work (h)	10
Project (h)	
Visits (h)	

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work	1->11	20%
Mid-term	1->6	30%
Oral test	-	-
Final exam	1->11	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Huawei Talent Teaching Platform, with two course and workbooks URL : <https://ilearningx.huawei.com/portal/>
- ENSP network interconnection equipment simulation software URL: <http://support.huawei.com/enterprise/en/software/eNSP/9017384.html>

## Title of the Module

Human Machine Interface

Code: GINF\_ASR 04 109

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Mohamed MAZOUZI**

**Grade: technology professor**

**University: ISAAS**

**Email:**

**Mohamed.mazouzi@gmail.com**

**Total module duration**

**56 h**

Contact hours	Out of class activities
28h	28h

**The equivalent credits**

**2 ECTS**

**Semester 3**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the evolution and the elements of the Human Machine Interfaces by relying on the human processor model. In addition, it presents a detailed description of ISO and AFNOR standards. Machine here is generally defined as any physical systems that can be operated by human operators.

#### Objectives

On the completion of this course, the student should be able to:

- be familiar with the basic concepts, methods, principles and skills in designing and evaluating various human-machine interfaces
- develop applications complying with ISO and AFNOR standards and meeting international ergonomics criteria

### 1.2: Prerequisites

- Computer architecture
- Software engineering: UML
- The foundations of Web development

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	GUIs in Human-Machine Communication	5	- Understand the definition and evolution history of human machine interfaces
<b>Chapter 2</b>	Elements of Human Machine Interfaces	4	- Learn about human processor model
<b>Chapter 3</b>	Ergonomic principle	6	- Master ergonomic criteria according to AFNOR and ISO standards
<b>Chapter 4</b>	Web ergonomics	3	- Use Web Usability Criteria
<b>Chapter 5</b>	Projects	10	- Master the development of applications complying with ISO and AFNOR standards and meeting the criteria of international ergonomics

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	12
Practical work (h)	12
Project (h)	4
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	20%
Practical work	All chapters	10%
Mid-term	Chapter 1+Chapter 2	20%
Oral test	-	-
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Nogier, Jean-François. Ergonomie du logiciel et design web: Le manuel des interfaces utilisateur. Dunod, 2005.
- Galitz, Wilbert O. The essential guide to user interface design: an introduction to GUI design principles and techniques. John Wiley & Sons, 2007.

## Title of the Module

Protocol engineering (IPV6)

Code: GINF\_ASR 04 110

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
		x	

**Teacher: Faouzi Zerai**

**Grade: Associate professor**

**University: ENET'COM**

Email:

[faouzi.zarai@isecs.rnu.tn](mailto:faouzi.zarai@isecs.rnu.tn)

Total module duration

49 h

Contact hours	Out of class activities
28	21

The equivalent credits

2 ECTS

Semester 3

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course describes all the concepts related to IPv6 technologies and strategies for transitioning enterprise networks to IPv6. Multiple hands-on configuration labs provide students with practical experience implementing the technologies learned.

### Objectives

The students will have knowledge about the fundamental issues in network protocol design and implementation with the principles underlying TCP/IP protocol design; historical development of the Internet Protocol Version-6; IPv6 and QoS, IP network migrations and applications.


### 1.2: Prerequisites

It is recommended to have a good working knowledge of IPv4 and related protocols.

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Internet and the Networking Protocols	3	To learn: <ul style="list-style-type: none"> <li>- Historical Development</li> <li>- OSI Model</li> <li>- Internet IP/UDP/TCP/IPv4 Addressing Review</li> </ul>
<b>Chapter 2</b>	Next Generation Internet Protocol	5	To master: <ul style="list-style-type: none"> <li>- Internet Protocol Version 6</li> <li>- ICMPv6</li> </ul>
<b>Chapter 3</b>	Security and Quality of Service in IPv6	5	To understand: <ul style="list-style-type: none"> <li>- Types of Threats</li> <li>- Security Techniques</li> <li>- IPSEC Framework</li> <li>- QoS in IPv6 Protocols</li> </ul>
<b>Chapter 4</b>	Routing with IPv6	5	To master: <ul style="list-style-type: none"> <li>- Routing in the Internet and CIDR</li> <li>- Multicasting</li> <li>- Unidirectional Link Routing</li> <li>- RIPng</li> <li>- OSPF for IPv6</li> <li>- PIM-SM &amp; DVMRP for IPv6</li> </ul>
<b>Chapter 5</b>	IPv4/IPv6 Transition Mechanisms	5	To learn: <ul style="list-style-type: none"> <li>- Tunneling</li> <li>- Dual Stack</li> <li>- Translation</li> <li>- Migration Strategies for</li> </ul>



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			Telcos and ISPs.	
<b>Chapter 6</b>	IPv6 Deployment	5	To master: <ul style="list-style-type: none"> <li>- Challenges and Risks</li> <li>- IPv6 Deployment Plan</li> <li>- IPv6 DNS (AAAA &amp; A6 records)</li> <li>- IPv6 enabled Proxy, Web &amp; Mail Servers</li> </ul>	

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	16
Practical work (h)	12
Project (h)	-
Visits (h)	-

## 3. EVALUATION:

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	1->4	30%
Oral test		
Final exam	1->6	70%

## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Joseph Davice, Understanding IPv6
- Silvia Hagen: IPv6 Essentials, O'reilly

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### Title of the Module

Administration of systems and networks under Linux 2 (LPI 102)

Code: GINF\_ASR 04 102

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
		X	

Teacher : Lotfi Tlili

Grade: Technologist Professor

Establishment: ISET

Email:

tlili.lotfi@yahoo.fr

Total module duration

49h

Contact hours	Out of class activities
28	21

The equivalent credits

2 ECTS

Semester 3

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### 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

#### 1.1: Course Description

This course material relates to the Linux Professionals Institute's LPI 102 examination (release 2). This course is intended to provide student with the basic skills required for operating and administering Linux systems.

#### Objectives

This course covers fundamental Linux skills such as file management and manipulation, text processing, command line use, package management, filesystems, hardware, and many more. Students will feel confident taking the LPI LPIC-1 102 exam with in classroom assessments and practice exams.

#### 1.2: Prerequisites

LPI101 "LPIC-1 Exam Prep (Course 1)" or knowledge and experience equivalent to the LPI101 course

#### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Account and Security Administration	3	The student will be able to perform tasks : <ul style="list-style-type: none"> <li>- User and group concepts</li> <li>- User private group scheme</li> <li>- User administration</li> </ul>
<b>Chapter 2</b>	Customizing the Shell and Writing Simple Scripts	3	To master: <ul style="list-style-type: none"> <li>- Configuration files</li> <li>- Script execution</li> </ul>
<b>Chapter 3</b>	Automating Tasks	3	<ul style="list-style-type: none"> <li>- Add system cron jobs</li> <li>- Create and manage user cron jobs</li> </ul>
<b>Chapter 4</b>	NETWORKING	3	To understand: <ul style="list-style-type: none"> <li>- Basic client networking</li> </ul>

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			<ul style="list-style-type: none"> <li>- Configuring IPv6</li> </ul>
<b>Chapter 5</b>	X Window System	3	<ul style="list-style-type: none"> <li>- Configure X Security</li> <li>- Launch X Apps Automatically</li> <li>- Secure X</li> </ul>
<b>Chapter 6</b>	Accessibility and Localization	3	<p>To master:</p> <ul style="list-style-type: none"> <li>- GNOME Accessibility</li> <li>- Character Encoding Conversion</li> <li>- Locale Configuration</li> <li>- Time Zone Configuration</li> <li>- Traditional Method</li> <li>- System Clock Configuration</li> <li>- Distribution tools</li> <li>- SystemClock Configuration</li> <li>- – Distribution tools</li> </ul>
<b>Chapter 7</b>	Time and Printing	3	<p>To learn:</p> <ul style="list-style-type: none"> <li>- NTP Client Configuration</li> <li>- Printing</li> <li>- Configuring Print Queues</li> </ul>
<b>Chapter 8</b>	Log File Administration	3	<ul style="list-style-type: none"> <li>- Use the system d Journal</li> <li>- Set up a Full Debug Logfile</li> <li>- Remote Syslog Configuration</li> </ul>
<b>Chapter 9</b>	SQL and MTA Fundamentals	3	<p>To master:</p> <ul style="list-style-type: none"> <li>- SQL with Sqlite3</li> <li>- Configuring Postfix</li> <li>- Configuring Sendmail debug commands</li> </ul>
<b>Chapter 10</b>	Host Security and Encryption	3	<ul style="list-style-type: none"> <li>- Secure xinetd services</li> <li>- Enforce security policy with xinetd</li> <li>- Secure services with TCP wrappers</li> </ul>

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				<ul style="list-style-type: none"> <li>- Introduction to ssh and scp</li> <li>- SSH key-based user authentication</li> </ul>

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	12
Practical work (h)	16
Project (h)	-
Visits (h)	-

## 3. EVALUATION:

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work	-	-
Mid-term	1->5	30%
Oral test		
Final exam	All chapters	70%

## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

Preparation for the certification LPIC 102

# MODULE DESCRIPTION

## Title of the Module

Optical communication components and systems

Code : GINF\_ASR 04 202

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
		x	

**Teacher: Sabeur Louhichi**

**Grade: expert**

**University: Tunisia Telecom**

**Email:**

[saber.louhichi@tunisiatelecom.tn](mailto:saber.louhichi@tunisiatelecom.tn)

**Total module duration**

**30h**

Contact hours	Out of class activities
42	35

**The equivalent credits**

**3 ECTS**

**Semester 3**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course covers fiber optic communication design, measurements and simulations. This includes numerical aperture, fiber attenuation, and power distribution in single mode fibers, mode distribution in multimode fibers, fiber coupling efficiency and Connectors / splices losses. Also design, construction and simulation of WDM communication system components are covered.

### Objectives

After completing this course, the students should be able to:


- Align light waves into small optical components with high precision
- Use modern hardware/software design tools to develop modern communication systems
- Calculate and simulate the attenuation and signal degradation due to intermodal and intramodal distortion.
- Calculate power coupling losses due to connectors, splices, source output pattern and fiber numerical aperture
- Understand, compute and simulate the modes in step index fiber and graded index fiber.
- Design, implement and test WDM communication system using its basic components
- Participate in team projects including design, inspection and optimization
- Understand the reliability issues of the highly delicate optical devices

### 1.2: Prerequisites

Students should be familiar with analog and digital communication systems

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Optical Fibers	7	To learn: <ul style="list-style-type: none"> <li>- Geometrical</li> <li>- Optics Description</li> <li>- Wave Propagation</li> <li>- Chromatic Dispersion</li> <li>- Polarization Mode Dispersion</li> <li>- Dispersion Induced Limitations</li> <li>- Fiber Losses</li> <li>- Nonlinear Optical Effects.</li> </ul>
<b>Chapter 2</b>	Optical Transmitters, Modulators	7	To master: <ul style="list-style-type: none"> <li>- Light-Emitting Diodes</li> <li>- Semiconductor Lasers</li> <li>- Control of Longitudinal Modes</li> <li>- Laser Characteristics</li> <li>- Transmitter Design</li> </ul>
<b>Chapter 3</b>	Lightwave Transmission Systems	7	To understand: <ul style="list-style-type: none"> <li>- Intensity Modulation - Direct</li> </ul>

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				Detection Systems - Homodyne and heterodyne detection - Modulation formats: ASK, FSK, PSK, QAM - Demodulation schemes
<b>Chapter 4</b>	Multichannel Systems	7		To master: - WDM Lightwave Systems and Components - WDM System Performance Issues - Orthogonal Frequency Division Multiplexing (OFDM)
<b>Chapter 5</b>	Optical Transmission Enabling Technologies	7		To know: - Dispersion Management - Modulation Formats - Nonlinearity Management - Wavelength Conversion - Optical 3R
<b>Chapter 6</b>	Optical Networks	7		To master: - Access and Metro Networks - Long-Haul Networks - Design Guidelines

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	24
Practical work (h)	18
Project (h)	-
Visits (h)	-



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### 3. EVALUATION:

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	1->3	30 %
Oral test		
Final exam	1->6	70%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Optical Fiber Communications by John Senior, 3rd Edition, Prentice Hall, 2009.

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### Title of the Module

Preparation to .NET Certification (MTA)

Code: GINF\_ASR 04 107

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>x</b>			

**Teacher: Mohamed MANAA**

**Grade: Master Technologist**

**University: ISET Sfax**

**Email:**

**medmanaa.iset@gmail.com**

**Total module duration**

**49h**

Contact hours	Out of class activities
<b>35h</b>	<b>14h</b>

**The equivalent credits**

**2 ECTS**

**Semester 3**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This Preparatory Course for NET: MTA 98-361 is designed to introduce the architecture of the .NET platform as well as the concepts of basic programming, object-oriented programming, software development and web applications.

### 2.2: Objectives

On the completion of this course, the student should be able to:

- understand the basic concepts of .Net architecture and C # language
- understand .NET Code Compilation
- acquire the basic notions of basic programming, object-oriented programming, software development and web applications.
- successfully pass the MTA 98-361 certification exam

### 1.2: Prerequisites

It is recommended to have a basic general culture in:

- Algorithmic
- Operating system
- Programming C, JAVA, C ++

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	General presentation of the .Net platform	3	- Master the basic concepts of .Net architecture
<b>Chapter 2</b>	Introduction to C# programming	9	- Understand the basic notions of C # language
<b>Chapter 3</b>	General presentation of software development	6	- Learn the basic concepts of software development
<b>Chapter 4</b>	Presentation of applications on the work jam	9	- Know how to present applications on the work jam
<b>Chapter 5</b>	Presentation of Web Applications	8	- Understand the main notions related to Web applications - Learn to develop a Web application

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	12
Practical work (h)	15
Project (h)	8
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	20%
Practical work	All chapters	10%
Mid-term	Chapter 1+Chapter 2	20%
Oral test	-	0
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Official Microsoft MTA 98-361 Certification Course

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### Title of the Module

Administration of systems and networks in Windows 2

Code : GINF\_ASR 04 101

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
		X	

**Teacher: Mr. Mustapha Sakka**

**Grade: Expert**

**Email :**

[Sakka.mustapha@gmail.com](mailto:Sakka.mustapha@gmail.com)

**Total module duration**

**35h**

Contact hours	Out of class activities
21	14

**The equivalent credits**

**1 ECTS**

**Semester 3**

**1. DESCRIPTION OF COURSE AND SKILLS COVERED:**

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### 1.1: Course Description

Through commonly used Windows network operating systems, the course focuses on installation, configuration, administration, maintenance and troubleshooting networked computer system servers.

### Objectives

Students will learn and apply basic concepts and methodologies of System Administration and Security by building from the ground up a miniature corporate network. They will be responsible for installing backend servers that users would normally require for day-to-day operations. They will also be responsible for validating, from a user's perspective that their network is functional. Lastly, they will implement security measures into the network and do a risk assessment as to how effective their security measures are and their fellow students.

### 1.2: Prerequisites

This course requires students to have a basic knowledge of computers and networks.

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Security Basics	3	Master: -Authentication: Proof of identity - Authorization: Limiting System - Access and Controlling Using Behavior - Restricting Access to Software; - Restricting Software Access to Resources - Controlling Access to Data - EFS Basics
<b>Chapter 2</b>	Maintenance and Recovery	6	Master: - Maintenance Strategies and Administrative Practices - Basics of Data Backup and

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			Restore
<b>Chapter 3</b>	Monitoring and Audit	6	Learn <ul style="list-style-type: none"> <li>- Auditing</li> <li>- Monitoring and Assessment</li> </ul>
<b>Chapter 4</b>	Laboratory Exercises	6	Master <ul style="list-style-type: none"> <li>- Windows Server Installation and Configuration</li> </ul>

### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	15
Practical work (h)	6
Project (h)	-
Visits (h)	-

### 3. EVALUATION:

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work	-	-
Mid-Term	1->2	30%
Oral test		
Final exam	All chapters	70%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

Installing and Configuring Windows Server 2012R2® with Lab Manual Set, by Craig Zacker and others. ISBN: 978-1-118-96609-9;

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### Title of the Module

Advanced Web Programming  
Code: GINF\_ASR 04 108

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Affef Samet Ellouze**

**Grade: technology professor**

**University: ISET-Sfax**

**Email:**  
**Samet\_afef@yahoo.fr**

**Total module duration**

**70 h**

Contact hours	Out of class activities
35h	35h

**The equivalent credits**  
**3 ECTS**

**Semester 3**



## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces server-side web technologies used for dynamic web. During the course, students practice and apply the essentials of web server-side programming language and database interaction. Emphasis is placed on several topics including an introduction to PHP/PHP5 (Hypertext preprocessor) language, data types and operators, functions, and control structures, as well as exploration of MySQL (My Structured Query Language) databases with PHP, and debugging and error handling.

### Objectives

On the completion of this course, the student should be able to create a website using PHP language. So, he gains skills for:


- incorporating PHP elements such as strings, numbers, functions, objects, expressions, and cookies
- appropriately using PHP language elements and the most commonly encountered SQL commands
- analyzing the process of configuring a PHP site and PHP server behavior
- learning methods to create, define, and access MySQL (My Structured Query Language) databases

### 1.2: Prerequisites

- HTML5 language
- JavaScript language
- The basic notions of object-oriented programming

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Introduction to PHP language	3	- Understand the basic syntax of PHP5
<b>Chapter 2</b>	Form processing	6	- Learn the mechanism for receiving data from the form
<b>Chapter 3</b>	The Object-Oriented concepts in PHP	6	- Learn the object-oriented programming approach in PHP5
<b>Chapter 4</b>	Connection to the database	8	- Manipulate the properties and methods of the PDO class for connection to the database
<b>Chapter 5</b>	Sessions and cookies	6	- Learn the security mechanisms of web pages

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<b>Chapter 6</b>	Introduction to AJAX	6	- Understand how to create an AJAX search engine	
<b>Chapter 7</b>	JQuery	6	- Understand the main concepts of JQuery	

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	12
Practical work (h)	14
Project (h)	9
Visits (h)	0

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	20%
Practical work	All chapters	10%
Mid-term	Chapter 1+Chapter 2	20%
Oral test	-	-
Final exam	All chapters	50%

## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- NARAMORE, Elizabeth, GERNER, Jason, LE SCOUARNEC, Yann, et al. Beginning PHP5, Apache, and MySQL web development. John Wiley & Sons, 2005.
- Hayder, H. (2007). Object-Oriented Programming with PHP5. Packt Publishing Ltd.
- LURIG, Mario. PHP Reference: Beginner to intermediate PHP5. Mario Lurig, 2008.

### Title of the Module

Business English Certificate

B1//B2

**Code:**GINF\_ASR 04 112

GINF\_ASR 04 211

**Teacher: Nada BEN MAHFOUDH FOURATI**

**Grade: Full-time faculty member**

**University: International Institute of Technology**

**Email:**

**Nada.benmahfoudh@iit.ens.tn**

**Total module duration**

**70 h \* 2**

Contact hours	Out of class activities
35	35

**The equivalent credits**

**3 ECTS**

**Semester 3 + 4**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course focuses on familiarizing students with the level and content of the BUSINESS ENGLISH CERTIFICATE abbreviated as BEC. It prepares students to communicate in a good way whether in a written way or orally in the context of work. Each lesson is organized so that it develops and enhances all skills and sub-skills necessary to learn the English language adequately and to be familiarized with international tests.

According to the European framework, the BEC PRELIMINARY is B1.

### Objectives

The student will be able to:

- ✓ use English in an International context of business.
- ✓ To help students revise the necessary skills to learn business English and to sit for the exam
- ✓ To learn time management
- ✓ To encourage students to speak
- ✓ To enhance students to write correctly and up to the point.

### 1.2: Prerequisites

The student should have the level A2 in order to follow these lectures.

When the student is B1 in General English, he excels and gets the gist of these tasks and training

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	<ul style="list-style-type: none"> <li>- Getting to know each other</li> <li>- Introduction to the main axes of the course</li> <li>- Job Application</li> <li>- Employment</li> </ul>	23 h	<ul style="list-style-type: none"> <li>- Know the benefits and the utility of learning business English</li> <li>- Understand the context in which business English is used</li> <li>- Differentiate and use formal and informal language</li> <li>- Establish the link between learning English and being prepared for the professional career</li> </ul>
<b>Chapter 2</b>	<ul style="list-style-type: none"> <li>- Travel / Business Accommodation/ Organizing a conference</li> </ul>	12 h	<ul style="list-style-type: none"> <li>- Learn the vocabulary related to accommodation</li> <li>- Discover another context of business English in which you should necessarily use</li> </ul>

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			a foreign language
<b>Chapter 3</b>	<ul style="list-style-type: none"> <li>- Money</li> <li>- Graphs and Charts</li> </ul>	10 h	<ul style="list-style-type: none"> <li>- Understand that business English can be part of their engineering knowledge</li> <li>- Learn the comparative, the superlative, contrasting words, adverbs ... that describe a movement in a graph</li> </ul>
<b>Chapter 4</b>	<ul style="list-style-type: none"> <li>- Exams</li> </ul>	25 h	<ul style="list-style-type: none"> <li>- Understand the format of the exam</li> <li>- Learn that time management is an important skill to succeed in this certificate</li> <li>- Raise the student's awareness that the exam covers the four skills</li> </ul>

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	35
Practical work (h)	35
Project (h)	
Visits (h)	

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	Chapter 1, 2	15%
Oral test	Chapter 2,3	15%
Final exam	All chapters	70%

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#### **4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:**

- English for Business
- Pass Cambridge BEC Preliminary

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### Title of the Module

Routing and Switching (CCNA2)

Code: GINF\_ASR 04 104

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
		X	

**Grade: Technologist Professor**

**Establishment: ISET**

**Email:**

**tlili.lotfi@yahoo.fr**

**Total module duration**

**70h**

Contact hours	Out of class activities
<b>21</b>	<b>7</b>

**The equivalent credits**

**1 ECTS**

**Semester 3**

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### 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

#### 1.1: Course Description

This course describes the architecture, components, and operation of routers. It explains the principles of routing and routing protocols. Students analyze, configure, verify, and troubleshoot the primary routing protocols RIPv1, RIPv2, EIGRP, and OSPF. They will be able to recognize and correct common routing issues and problems, model and analyze routing processes.

#### Objectives

Upon completion of this course, student should be able to:

- Configure and maintain routers and switches
- Resolve common issues with routing protocols, virtual LANs, and inter-VLAN routing in both IPv4 and IPv6 networks.

#### 1.2: Prerequisites

- CCNA1

#### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	WANs and Routers	1.5	The student will be able to perform tasks : - WANs - Routers
<b>Chapter 2</b>	Introduction to Router	1.5	Understand and describe the importance of addressing and naming schemes a various layers of data networks in IPv4 and IPv6 environments a small to medium-sized business LAN.
<b>Chapter 3</b>	Configuring a Router	3	- Develop and master skills of routers configuration,



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			managing Cisco IOS software, and configuring and troubleshooting routing protocols
<b>Chapter 4</b>	Learning about Other Devices	1.5	<ul style="list-style-type: none"> <li>- Cisco Discovery Protocol</li> <li>- Getting information about remote devices</li> </ul>
<b>Chapter 5</b>	Managing Cisco IPS Software	6	<ul style="list-style-type: none"> <li>- Identify Allowed Hosts</li> <li>- Configure SNMP</li> <li>- Configure the External Product Interface</li> <li>- Identify an NTP Server</li> <li>- Identify DNS Servers</li> <li>- Identify an HTTP Proxy Server</li> <li>- Configure Logging</li> <li>- Configure Blocking</li> <li>- Configure Virtual Sensors</li> </ul>
<b>Chapter 6</b>	Routing and Routing Protocols	3	<ul style="list-style-type: none"> <li>- Learn the OSI model, LAN &amp; WAN topologies, WANs, router components and configuration, IOS, IEEE &amp; routing protocols &amp; standards</li> </ul>
<b>Chapter 7</b>	Distance Vector Routing Protocols	3	Identify: <ul style="list-style-type: none"> <li>- Distance vector routing</li> <li>- RIP</li> <li>- IGRP</li> </ul>
<b>Chapter 8</b>	TCP/IP Suite Error and Control Messages	1.5	<ul style="list-style-type: none"> <li>- Describe ICMP</li> <li>- Describe the ICMP message format</li> <li>- Identify ICMP error</li> </ul>

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			<p>message types</p> <ul style="list-style-type: none"> <li>- Identify potential causes of specific ICMP error messages</li> <li>- Describe ICMP control messages</li> <li>- Identify a variety of ICMP control messages used in networks today</li> <li>- Determine the causes for ICMP control messages</li> </ul>
<b>Chapter 9</b>	Basic Router Troubleshooting	3	<ul style="list-style-type: none"> <li>- This chapter focuses exclusively on your troubleshooting skills. As a major part of the CCNA exam, you must be proficient at troubleshooting a simple internetwork. Exercises include dissecting a routing table entry, knowing troubleshooting steps, matching a problem to the correct layer, and reviewing the most powerful show and debug commands</li> </ul>
<b>Chapter 10</b>	Intermediate TCP/IP	3	<ul style="list-style-type: none"> <li>- This chapter is mostly a review of material covered in your CCNA 1 studies. Exercises include learning vocabulary, reviewing TCP and User Datagram Protocol (UDP) segments, understanding port numbers,</li> </ul>

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and comparing Layers 2, 3 and 4.

### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	14
Practical work (h)	7
Project (h)	-
Visits (h)	-

### 3. EVALUATION:

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work	-	-
Mid-term	1->5	30%
Oral test		
Final exam	All chapters	70%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

Cisco Systems, Inc., & Cisco Networking Academy Program. (2003). Cisco Networking Academy Program: CCNA 3 and 4 companion guide. Indianapolis, Ind: Cisco.

## Title of the Module

Development of Communicating Systems

Code: GINF\_ASR 04 106

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Mohamed MAZOUZI**

**Grade: Assistant**

**University: ISAAS**

**Email:**

**Mohamed.mazouzi@gmail.com**

**Total module duration**

**49 h**

Contact hours	Out of class activities
<b>28h</b>	<b>21h</b>

**The equivalent credits**

**2 ECTS**

**Semester 3**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the basic components in communication system. It presents also the structure of http requests and responses. In addition, it consists in explaining how to develop multi-threaded client-server applications in Java using sockets.

### Objectives

On the completion of this course, the student will be able to:

- understand the structure of http requests and responses
- manage the stream of bytes in java
- write applications required by communication
- develop multi-threaded client applications using: TCP, UDP and Multicast

### 1.2: Prerequisites

- Computer Network Courses
- Basic Concepts of Object-Oriented Programming
- Java programming

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Recall on Networks and Server Client Architecture	5	- Reminder about the OSI model especially the transport layer paradigm Client / server
<b>Chapter 2</b>	the HTTP protocol: Request and Answer	4	- Understand the details about client requests and server responses in the HTTP protocol
<b>Chapter 3</b>	Java flow management: the java.io. library	4	- Learn about Byte and character stream management in java
<b>Chapter 4</b>	Sockets and threads in java	5	- Understand multi-threaded client-server programming in Java using sockets.
<b>Chapter 5</b>	Projects	10	- Learn how to develop multi-threaded server client applications using: TCP, UDP and Multicast.

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	20
Practical work (h)	0
Project (h)	8
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	20%
Practical work		
Mid-term	Chapter 1+Chapter2+ Chapter 3	30%
Oral test	-	-
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Elliotte Harold, Java Network Programming: Developing Networked Applications, 4th Edition: O'Reilly Media, October 2013, p 506.
- DOSTERT, Jan et FLEISCHER, Christian. Socket-like communication API for Java. U.S. Patent No 7,600,217, 6 oct. 2009.

## Title of the Module

Concurrent and parallel programming

Code: GINF\_ASR 04 105

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>x</b>			

**Teacher: Imen LAHYENI**

**Grade: Assistant**

**University: ENIS Sfax**

**Email:**

**lahyani.imene@gmail.com**

**Total module duration**

**56 h**

Contact hours	Out of class activities
<b>35h</b>	<b>21h</b>

**The equivalent credits**

**2 ECTS**

**Semester 3**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the main concepts related to parallel and distributed programming based on inter-process communication. This communication can be done in two ways:

- 1) By sharing information: represents the first part of the course
- 2) By the passage of messages: represents the second part of the course

The first part deals with tools for communication by information sharing. The two tools are semaphores and monitors. The second part deals with communication tools by passing messages. Typically, message passing can be done in several ways. We deal with the following methods: synchronous communication (Channel), asynchronous communication (port)

### Objectives

On the completion of this course, the student should be able to:

- write parallel programs in Java
- ensure the principles of mutual exclusion, whether by sharing information or by message exchanges.

### 1.2: Prerequisites

It is recommended to have a basic general culture in:

- Object-oriented programming
- Operating systems

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Introduction to concurrent and parallel programming	6	- Understand the parallelism at the program level as well as the different parallel process modes
<b>Chapter 2</b>	Communication by information sharing: Semaphore	10	- Master the use of semaphores to build parallel programs to protect shared variables
<b>Chapter 3</b>	Communication by information sharing: Monitor	10	- develop parallel programs using monitors to ensure the principle of mutual exclusion
<b>Chapter 4</b>	Communication by passing messages	9	- Develop parallel programs by passing messages using the notions of port and channel



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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	20
Practical work (h)	15
Project (h)	0
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	Chapter 1+Chapter 2	30%
Oral test	-	-
Final exam	All chapters	70%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- An Introduction to Parallel Programming, Morgan Kaufmann, 2011, ISBN 9780123742605, <https://doi.org/10.1016/B978-0-12-374260-5.00012-9>
- BUELL, Duncan. In Praise of An Introduction to Parallel Programming.

### Title of the Module

Development of distributed system: Enterprise JavaBeans (EJB)

Code : GINF\_ASR 04 203

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Ahmed Jmal**

**Grade: Master Technologist**

**University: ISET-Sfax**

**Email :**

**jmlhmd@gmail.com**

**Total module duration**

**49 h**

Contact hours	Out of class activities
28h	21h

**The equivalent credits  
2 ECTS**

**Semester 4**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the knowledge and experience required to develop and deploy Enterprise JavaBeans (EJB) applications. It begins with the basic notions and APIs of EJB and then continues on with complex topics such as message driven beans and transactions. Newer concepts such as the use of annotations and the use of dependency injection to initialize references are covered in depth.

### Objectives

On the completion of this course, the student should be able to:


- know the features and benefits of the EJB architecture
- use EJB annotations
- create, deploy and use stateful and stateless session Beans
- develop EJB clients
- deploy and use of message-driven Beans

### 1.2: Prerequisites

- Good knowledge of Java
- HTML, JSP, Servlet

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	EJB Overview	3	<ul style="list-style-type: none"> <li>- Understand the need for EJBs</li> <li>- Know the main Characteristics of EJBs</li> <li>- Understand the EJB Architecture Components</li> </ul>
<b>Chapter 2</b>	EJB component	3	<ul style="list-style-type: none"> <li>- Learn the concept of session Beans</li> <li>- Understand the difference between Stateless Session Bean and Stateful Session Bean</li> </ul>
<b>Chapter 3</b>	Session Bean Lifecycle	3	<ul style="list-style-type: none"> <li>- Learn the business Interface and Bean class details</li> <li>- Understand the session Bean lifecycle</li> </ul>
<b>Chapter 4</b>	Advanced features	8	<ul style="list-style-type: none"> <li>- Understand several features of EJB such as: Driven Bean Message, Timer Bean, Interceptor, Asynchronous method, Beans naming and embedded EJB container</li> </ul>

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<b>Chapter 5</b>	Working with Entities	6	<ul style="list-style-type: none"> <li>- Understand the entity Instance Lifecycle</li> <li>- Learn the transaction basics</li> <li>- Implement the CRUD pattern (inserting Data, retrieving Data, updating Data and deleting Data)</li> </ul>
<b>Chapter 6</b>	Reference and Injections	3	<ul style="list-style-type: none"> <li>- Understand the role of references</li> <li>- Use EJB reference annotations</li> <li>- Manipulate deployment descriptors</li> </ul>
<b>Chapter 7</b>	EJB Deployment	4	<ul style="list-style-type: none"> <li>- Understand the Bean classes, dependent classes and business interfaces</li> <li>- Configure an EJB Session</li> </ul>

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	14
Practical work (h)	14
Project (h)	0
Visits (h)	0

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work	All chapters	20%
Mid-term	Chapter 1+Chapter2+Chapter 3	30%
Oral test	-	-
Final exam	All chapters	50%

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### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Burke, Bill, and Richard Monson-Haefel. Enterprise JavaBeans 3.0. " O'Reilly Media, Inc.", 2006.
- Rubinger, Andrew Lee, and Bill Burke. Enterprise JavaBeans 3.1: Developing Enterprise Java Components. " O'Reilly Media, Inc.", 2010.
- Wetherbee, Jonathan, et al. Beginning EJB in Java EE 8: Building Applications with Enterprise JavaBeans. Apress, 2018.

## Title of the Module

Web Framework

Code: GINF\_ASR 04 204

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Marwa HACHICHA**

**Grade: Part-time Faculty Member**

**University: International Institute of Technology**

**Email:**

**marwahachicha@gmail.com**

**Total module duration**

**56 h**

Contact hours	Out of class activities
28h	28h

**The equivalent credits**

**2 ECTS**

**Semester 4**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the basic components of the angular platform that aims to develop dynamic web applications. Emphasis is placed on several topics including the communication of the different angular components, the communication of an angular application with the back-end part and the creation of CRUD angular application with Firebase.

### Objectives

On the completion of this course, the student should be able to develop dynamic web applications while using the angular platform. So, he gains skills for:

- creating angular components
- manipulating a template (View part) with databinding, directives and pipes
- using the services to communicate the different angular components
- creating SPAs (single page application) using the angular routing service
- knowing how to create and use forms to communicate with users and retrieve data
- creating http requests (GET, POST, Delete, Patch, etc.) to communicate an angular application with the back-end part
- discovering the google Firebase service and create a CRUD angular application with Firebase

### 1.2: Prerequisites

- Solid knowledge of HTML
- A good knowledge of Javascript or typescript
- A good knowledge of CSS

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Introduction to Angular	3	<ul style="list-style-type: none"> <li>- Discover the Angular platform: the advantages of using angular, the different versions of angular, the MVC architecture, etc.</li> <li>- Create a first application: installation of NodeJS, Typescript and visual studio code</li> </ul>
<b>Chapter 2</b>	The components of an Angular application	3	<ul style="list-style-type: none"> <li>- Know the architecture of Angular:</li> <li>- Know what is a module, a component and a template</li> <li>- Master the different databinding techniques</li> <li>- Know how to use instructions and pipes</li> </ul>
<b>Chapter 3</b>	The services	6	<ul style="list-style-type: none"> <li>- Create angular services</li> <li>- Register a service</li> <li>- Inject a service into a component</li> </ul>

## MODULE DESCRIPTION

<b>Chapter 4</b>	Routing and navigation	6	- Know how to use Angular's routing service: define the paths and associated components - Know how to use guards to control access to a road
<b>Chapter 5</b>	The forms	4	- Know how to create forms according to the template method and the reactive method
<b>Chapter 6</b>	http : Interaction with the back-end part	4	- Perform http requests such as Get, Post, Delete and Put requests to interact with the back-end part
<b>Chapter 7</b>	Creating an Angular CRUD application with Firebase	4	- Know the firebase platform and their different services offered. - Know how to create and use the firestore database - Know how to create an angular CRUD application using firestore and other firebase services

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	10
Practical work (h)	14
Project (h)	4
Visits (h)	-

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	20%
Practical work	All chapters	10%
Mid-term	Chapter 1→Chapter 4	20%
Oral test	-	-
Final exam	All chapters	50%



## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- MURRAY, Nathan, CORY, Felipe, LERNER, Ari, *et al.* *Ng-Book: The Complete Guide to Angular*. Create Space Independent Publishing Platform, 2018.
- Fain, Yakov, and Anton Moiseev. *Angular 2 Development with Typescript*. Manning Publications Co., 2016.
- Arora, Chandermani, and Kevin Hennessy. *Angular 6 by Example: Get up and running with Angular by building modern real-world web apps*. Packt Publishing Ltd, 2018.
- Official documentation (link: <https://angular.io/>)

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## Title of the Module

Huawei Routing &amp; Switching (HCNA 2)

Code: GINF\_ASR 04 209

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
		x	

**Teacher: Tarak Abbes**
**Grade: Associate professor**
**University: ENET'COM**
**Email:**
**abbes.tarek@gmail.com**
**Total module duration**
**70h**

Contact hours	Out of class activities
35h	35h

**The equivalent credits**
**3 ECTS**
**Semester 4**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course is the second level of the HCIA routing and switching certification of Huawei. It describes the managing network such as SNMP and VPN (GRE and IPSEC).

### Objectives

Making the student able to master the VALN networks, the serial linking using PPP protocols and HDLC as well as the NAT translation addresses.

### 1.2: Prerequisites

Local networks  
 TCP/IP protocols  
 Data transmission

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Link aggregation	3h	Understand and configure the link aggregation
<b>Chapter 2</b>	VLAN principles	3h	Understand the VLAN principles
<b>Chapter 3</b>	VLAN routing	3h	Understand and to configure VLAN routing
<b>Chapter 4</b>	Principle and configuration of HDLC and PPP	3h	Understand and to configure HDLC and PPP
<b>Chapter 5</b>	Principle and configuration of PPPoE	3h	Understand and to configure the PPPoE
<b>Chapter 6</b>	Access control lists	3h	Understand and to configure access control lists
<b>Chapter 7</b>	Securing data with IPsec VPN	3h	Understand and to configure IPsec VPN
<b>Chapter 8</b>	Simple network management Protocol	3h	Understand the simple network management protocol
<b>Chapter 9</b>	Introduction to IPv6 networks	3h	Manipulate the IPv6 networks
<b>Chapter 10</b>	IPv6 routing technologies	3h	Manage and understand the IPv6 routing technologies
<b>Chapter 11</b>	MPLS basic principle	3h	Manage and understand the MPLS principles
<b>Chapter 12</b>	SR basic principles	3h	Manage and understand the SR basic principles

## MODULE DESCRIPTION

### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	20
Practical work (h)	15
Project (h)	-
Visits (h)	-

### 3. EVALUATION:

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work	1->12	20%
Mid-term	1->9	30%
Oral test	-	-
Final exam	1-12	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Huawei Talent Teaching Platform, with two course and workbooks URL: <https://ilearningx.huawei.com/portal/>
- ENSP network interconnection equipment simulation software URL: <http://support.huawei.com/enterprise/en/software/eNSP/9017384.html>

## Title of the Module

Mobile Networks

Code: GINF\_ASR 04 201

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
		x	

**Teacher: Faouzi Zerai**

**Grade: Associate professor**

**University: ENET'COM**

Email:

[faouzi.zarai@isecs.rnu.tn](mailto:faouzi.zarai@isecs.rnu.tn)

Total module duration

77 h

Contact hours	Out of class activities
42	35

The equivalent credits

3 ECTS

Semester 4

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course describes all the concepts related to the mobile networks, namely, their different categories, their architecture, the required Qos and their related security requirements. The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences: Maintain wireless and Mobile Networks.

### Objectives

Making the student able to understand the concept of the mobile networks and to be familiar with their management and their use:

- Troubleshoot mobile handsets.
- Choose relevant method to improve Cellular System capacity.
- Select cellular Mobile system standard.
- Select wireless technology for various applications.
- Select wireless network Technologies.

### 1.2: Prerequisites

No specific prerequisites

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
Chapter 1	Introduction	6	Understand the objective of the course and the mobile networks advantages
Chapter 2	Cellular networks	6	Understand and to define the various cellular networks concepts
Chapter 3	Satellite networks	6	Understand and to define the satellite networks concepts
Chapter 4	Wireless networks	6	Understand and to define the various wireless networks concepts
Chapter 5	Wifi architecture	6	Understand And To Design The Wifi Architecture
Chapter 6	QoS of Wireless networks	6	Enumerate and to monitor the QoS of wireless networks
Chapter 7	Wireless networks security	6	Enumerate the wireless networks security requirements

## MODULE DESCRIPTION

### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	24
Practical work (h)	18
Project (h)	
Visits (h)	

### 3. EVALUATION:

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	1->4	30%
Oral test		
Final exam	1->7	70%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Mobile network standards
- The Evolution of mobile technologies:-[https://www.qualcomm.com/..\\_/the-evolution-of-mobile-technologies-1g-to-2g-to-3g-](https://www.qualcomm.com/.._/the-evolution-of-mobile-technologies-1g-to-2g-to-3g-).
- Wireless tutorials:  
[https://www.octoscope.com/English/.../octoscope\\_WirelessTutorial\\_20090209.pdf](https://www.octoscope.com/English/.../octoscope_WirelessTutorial_20090209.pdf)

## MODULE DESCRIPTION

### Title of the Module

Next Generation Network

Code : GINF\_ASR 04 202

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
		x	

**Teacher: Sabeur Louhichi**

**Grade: expert**

**University: Tunisie Telecom**

**Email:**

[saber.louhichi@tunisietelecom.tn](mailto:saber.louhichi@tunisietelecom.tn)

**Total module duration**

**77h**

Contact hours	Out of class activities
42	35

**The equivalent credits**  
**3 ECTS**

**Semester 4**



## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course describes all the concepts related to the new generation networks and to manipulate them and to enumerate advantages and inconvenient of each category. It presents different variants of NGN service architectures. Emphasis is put on presentation of the Common IMS architecture as an enabler and service delivery platform for innovative convergent services and applications which is access network neutral. The components, protocols, session control mechanisms, policy and charging, quality of service, security and approach to building services are covered in detail. The course will emphasize paradigm shift in telecom triggered by IP and SIP application protocol.

### Objectives


Making the student able to compare, to choose appropriate network types and to learn Wireless technologies and Ad-hoc Network.

### 1.2: Prerequisites

Network notions prerequisites

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Introduction	6	Understand the utility of ipv6 And its related functionalities.
<b>Chapter 2</b>	Adressing	9	Being able to understand concepts such as Multicast, Anycast Autoconfig / Renumbering, NDP, RS, RA, NS, NA, Redirection, PMTU
<b>Chapter 3</b>	Routing	9	Being able to understand and to manipulate the principles of IPv6 RIPng OSPFv3 IS-IS for IPv6 MP-BGP4 EIGRP for IPv6
<b>Chapter 4</b>	New protocols	6	Being able to enumerate new protocols namely ICMPv6, ML DNDP : RA, RS, NS, NA, REDIRECT DHCPv6

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<b>Chapter 5</b>	4G and 5G networks	6	Being able to understand the 4G and 5G evolutions
<b>Chapter 6</b>	Technologies evolution	6	SONET et SDH DWDM et ROADM CES et TDM over IP

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	24
Practical work (h)	18
Project (h)	-
Visits (h)	-

## 3. EVALUATION:

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	1->3	30 %
Oral test		
Final exam	1->6	70%

## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Mobile Computing , Asoke K Telukder, Roopa R Yavagal, TMH
- Mobile Communications, Jochen Schiller, Pearson
- Wireless Communications and Networks, 3G and beyond, ITI Saha Misra, TMH.
- Principle of wireless Networks by Kaveh Pahlavan and Prashant Krishnamurthy, Pearson 2002.



## COURSE FILE

### PERSONAL PROFESSIONAL PROJECT 1

Code: GINF\_ASR 04 212

**Teacher: Amel Elloumi Trabelsi**

**Grade: Doctorate in Economics**

**Establishment: IIT**

**Email:**

*dep.pcp@iit.ens.tn*

**Duration**

**28h**

Contact hours	Non-contact hours
21	7

**Number of credits**

**1 ECTS**

**Semester**

**4**

## 1. Course description and targeted skills:

### 1.1: Course description and objectives:

The objective of this course is to impart to the engineering student several principles and methods of economic analysis. More specifically, this course is intended to give a good knowledge of economic activity and the main economic problems. The economic functions and the behavior of the producer and the costs of production are also discussed.

### 1.2: Prerequisites

No prerequisites are required to take this course.

### 1.3: Learning outcomes:

Chapters	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Presentation and measurement of economic activity	3	give a good knowledge of the organization of economic activity
<b>Chapter 2</b>	Economic problems	4.5	understand the major contemporary economic issues
<b>Chapter 3</b>	Consumption, Savings and Investment	4.5	Know the main economic functions
<b>Chapter 4</b>	The behaviour of the producer	4.5	Understand the behaviour of the producer
<b>Chapter 5</b>	Production costs	4.5	Know the production structure

## 2. METHODOLOGY:

Contact hours are composed of:

Integrated course (h)	15
Practical exercises (h)	
Projects (h)	7
Visits (h)	

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### 3. Evaluation :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	70%
Practical work		
Mid-term		
Oral test	All chapters	30%
Final exam		

### 4. Reference works and recommended logistics:

- Alain Beitone, Emmanuel Buisson and Christine Dollo, Economics, Syrey edition
- C.D Echaudemaison: Economics at the "Major Schools" competitions, Nathan Editions
- G. Mankiw: Principles of Economics, Boeck Editions
- Joseph Stiglitz: Principles of Modern Economics, Boeck Editions
- René Derome: Engineering Economics, 2nd edition International Presses Polytechnic

## Title of the Module

**Programming Mobile**

**Code: GINF\_ASR 04 205**

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>X</b>			

**Teacher: Hadhri Sami**

**Grade: Technologist**

**University: ISET**

**Email:**

**hadhri.sami@gmail.com**

**Total module duration**

**49 h**

Contact hours	Out of class activities
<b>28h</b>	<b>21h</b>

**The equivalent credits**  
**2 ECTS**

**Semester 4**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the main concepts needed for the design and implementation of Android applications for mobile devices. Emphasis is placed on several concepts including handling notifications, using multimedia and graphics and incorporating touch and gestures into applications.

### Objectives

On the completion of this course, the student should be able:


- Understand a mobile platform to develop mobile applications on Google Phones devices
- Discover the architecture of mobile systems and the functionalities of a smartphone
- Manipulate widgets to build the graphical interface
- Develop a custom Android application

### 1.2: Prerequisites

- The basic notions of object-oriented programming
- Java language

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Android architecture	3	<ul style="list-style-type: none"> <li>- Understand the different folders that make up an Android project</li> <li>- Understand the Android Studio development environment</li> </ul>
<b>Chapter 2</b>	Android widgets	3	<ul style="list-style-type: none"> <li>- Use widgets to build the graphical interface</li> <li>- Use layouts to organize widgets</li> </ul>
<b>Chapter 3</b>	Spinner	3	<ul style="list-style-type: none"> <li>- Use a Spinner statically</li> <li>- Start an activity B from an activity A</li> <li>- Know the life cycle of an activity</li> </ul>
<b>Chapter 4</b>	ListView	3	<ul style="list-style-type: none"> <li>- Use the ListView widget dynamically via an ArrayAdapter</li> <li>- Use Table Layouts to organize widgets</li> </ul>
<b>Chapter 5</b>		3	<ul style="list-style-type: none"> <li>- Use several activities in an</li> </ul>

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	RadioButton and DatePicker widgets			Android project <ul style="list-style-type: none"> <li>- Pass data between 2 activities</li> <li>- Discover the Radio Button and Date Picker widgets</li> </ul>
<b>Chapter 6</b>	Shared preferences	3		<ul style="list-style-type: none"> <li>- State the different methods of data persistence</li> <li>- Backup local data through shared preferences</li> </ul>
<b>Chapter 7</b>	SQLite	6		<ul style="list-style-type: none"> <li>- Use the SQLiteOpenHelper, SQLiteDatabase classes to create a SQLite database</li> <li>- Query the database (CRUD methods) using the ContentValues and Cursor classes</li> </ul>
<b>Chapter 8</b>	XAMPP 5.5.38	3		<ul style="list-style-type: none"> <li>- Apply mobile solutions that manage a remote database through a web service</li> </ul>
<b>Chapter 9</b>	Google Maps Android API Key	3		<ul style="list-style-type: none"> <li>- Access and display GPS coordinates (longitude &amp; latitude)</li> <li>- View a "Google Maps" map in an application</li> <li>- Add markers to the map</li> </ul>

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	11
Practical work (h)	12
Project (h)	5
Visits (h)	0



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### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	20%
Practical work	All chapters	10%
Mid-term	Chapter 1→Chapter 4	20%
Oral test	-	0
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- FIRTMAN, Maximiliano. Programming the Mobile Web: Reaching Users on iPhone, Android, BlackBerry, Windows Phone, and more. " O'Reilly Media, Inc.", 2013.
- MEDNIEKS, Zigurd R., DORNIN, Laird, MEIKE, G. Blake, et al. Programming android. " O'Reilly Media, Inc.", 2012.
- DiMarzio, Jerome. Beginning Android Programming with Android Studio. John Wiley & Sons, 2016.

## Title of the Module

Security Fundamentals

Code : GINF\_ASR 04 210

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
		X	

**Teacher: Amal Ben Amor**

Grade: Expert

University: **Hat Web Security**

Email:

[amal@hat-websecurity.com](mailto:amal@hat-websecurity.com)

Total module duration

49h

Contact hours	Out of class activities
28	21

The equivalent credits

2 ECTS

Semester 4

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course presents the main concepts and fundamentals of security related to the computer science. Basic information security goals of availability, integrity, accuracy, and confidentiality. Vocabulary and terminology specific to the field of information security are discussed. Identification of exposures and vulnerabilities and appropriate countermeasures are addressed. The importance of appropriate planning and administrative controls is also discussed. Additional topics include: instruction in security for network hardware, software, and data including physical security, backup procedures, firewalls, encryption, and protection from viruses.

### Objectives

The student will be able to understand the different risks types as well as attacks. Moreover, the students would be aware about the different tools that mitigates these risks

### 1.2: Prerequisites

Systems and networks administration

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	security layers	6	<ul style="list-style-type: none"> <li>- Understand core security principles</li> <li>- Understand Internet security</li> <li>- Understand wireless security</li> </ul>
<b>Chapter 2</b>	operating system security	6	<ul style="list-style-type: none"> <li>- Understand user authentication</li> <li>- Understand permissions</li> <li>- Understand password policies</li> <li>- Understand audit policies</li> <li>- Understand encryption</li> <li>- Understand malware</li> </ul>
<b>Chapter 3</b>	network security	10	<ul style="list-style-type: none"> <li>- Understand dedicated firewalls</li> <li>- Understand network isolation</li> <li>- Understand protocol</li> </ul>

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			security
<b>Chapter 4</b>	security software	6	<ul style="list-style-type: none"> <li>- Understand client protection</li> <li>- Understand email protection</li> <li>- Understand server protection</li> </ul>

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	20
Practical work (h)	8
Project (h)	
Visits (h)	

## 3. EVALUATION:

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work	-	-
Mid-term	Chapter 1+ Chapter 2	30%
Oral test		
Final exam	All chapters	70%

## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- William Stallings and Lawrie Brown, Computer Security Principles and Practice, (3rd Edition), Pearson, 2014

### Title of the Module

Business English Certificate

B1//B2

**Code:**GINF\_ASR 04 112

GINF\_ASR 04 211

**Teacher: Nada BEN MAHFOUDH FOURATI**

**Grade: Full-time faculty member**

**University: International Institute of Technology**

**Email:**

**Nada.benmahfoudh@iit.ens.tn**

**Total module duration**

**70 h \* 2**

Contact hours	Out of class activities
35	35

**The equivalent credits**

**3 ECTS**

**Semester 3 + 4**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course focuses on familiarizing students with the level and content of the BUSINESS ENGLISH CERTIFICATE abbreviated as BEC. It prepares students to communicate in a good way whether in a written way or orally in the context of work. Each lesson is organized so that it develops and enhances all skills and sub-skills necessary to learn the English language adequately and to be familiarized with international tests.

According to the European framework, the BEC PRELIMINARY is B1.

### Objectives

The student will be able to:

- ✓ use English in an International context of business.
- ✓ To help students revise the necessary skills to learn business English and to sit for the exam
- ✓ To learn time management
- ✓ To encourage students to speak
- ✓ To enhance students to write correctly and up to the point.

### 1.2: Prerequisites

The student should have the level A2 in order to follow these lectures.

When the student is B1 in General English, he excels and gets the gist of these tasks and training

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	<ul style="list-style-type: none"> <li>- Getting to know each other</li> <li>- Introduction to the main axes of the course</li> <li>- Job Application Employment</li> </ul>	23 h	<ul style="list-style-type: none"> <li>- Know the benefits and the utility of learning business English</li> <li>- Understand the context in which business English is used</li> <li>- Differentiate and use formal and informal language</li> <li>- Establish the link between learning English and being prepared for the professional career</li> </ul>
<b>Chapter 2</b>	<ul style="list-style-type: none"> <li>- Travel / Business Accommodation/ Organizing a conference</li> </ul>	12 h	<ul style="list-style-type: none"> <li>- Learn the vocabulary related to accommodation</li> <li>- Discover another context of business English in which you should necessarily use</li> </ul>

## MODULE DESCRIPTION

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			a foreign language
<b>Chapter 3</b>	<ul style="list-style-type: none"> <li>- Money</li> <li>- Graphs and Charts</li> </ul>	10 h	<ul style="list-style-type: none"> <li>- Understand that business English can be part of their engineering knowledge</li> <li>- Learn the comparative, the superlative, contrasting words, adverbs ... that describe a movement in a graph</li> </ul>
<b>Chapter 4</b>	<ul style="list-style-type: none"> <li>- Exams</li> </ul>	25 h	<ul style="list-style-type: none"> <li>- Understand the format of the exam</li> <li>- Learn that time management is an important skill to succeed in this certificate</li> <li>- Raise the student's awareness that the exam covers the four skills</li> </ul>

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	35
Practical work (h)	35
Project (h)	
Visits (h)	

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	Chapter 1, 2	15%
Oral test	Chapter 2,3	15%
Final exam	All chapters	70%

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### 3. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- English for Business
- Pass Cambridge BEC Preliminary



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### Title of the Module

Network design (CCNA3)

Code : GINF\_ASR 04 208

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
		X	

**Teacher: Amal Ben Amor**

Grade: Expert

University: **Hat Web Security**

Email:

[amal@hat-websecurity.com](mailto:amal@hat-websecurity.com)

Total module duration

70h

Contact hours	Out of class activities
35	35

The equivalent credits

3 ECTS

Semester 4

#### 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

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### 1.1: Course Description

A course introducing the architecture, structure, functions, components, and models of the Internet. Describes the use of OSI and TCP layered models to examine the nature and roles of protocols and services at the applications, network, data link, and physical layers. Covers the principles and structure of IP addressing and the fundamentals of Ethernet concepts, media, and operations. Build simple LAN topologies by applying basic principles of cabling; perform basic configurations of network devices, including routers.

### Objectives

Upon completion of this course, student should be able to:

- Define and describe routing functionality and packet forwarding in the language of the OSI and TCP/IP models.
  - Define, describe, and categorize routing protocol characteristics, topologies, and operation including RIP, EIGRP, and OSPF.
  - Perform basic router configuration, administration, and troubleshooting.
  - Configure, secure, administer, troubleshoot, and use router in-band and out-of-band device access, i.e., console and Telnet connections.
  - Design, configure, and troubleshoot IPv4 CIDR, supernetting, and route summarization schemes.
  - Thread routing tables using both static and dynamic entries.
  - Install, configure, and use a packet sniffer (Wireshark) for basic network troubleshooting.
  - Design, build, administer, and troubleshoot a network using, Telnet, RIP, EIGRP, and OSPF. Use and describe command lines, show commands/output, modes, and prompts.
- ### 1.2: Prerequisites
- CCNA1 + CCNA2

### 1.3: Learning Outcomes

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Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	LAN Design	6	<ul style="list-style-type: none"> <li>- Explain why it is important to design a scalable hierarchical network.</li> <li>- Select network devices based on feature compatibility and network requirements.</li> </ul>
<b>Chapter 2</b>	Scaling VLANs	5	<ul style="list-style-type: none"> <li>- Configure enhanced inter-switch connectivity technologies.</li> <li>- Troubleshoot issues in an inter-VLAN routing environment.</li> <li>- Implement inter-VLAN routing using Layer 3 switching to forward data in a small to medium-sized business LAN.</li> </ul>
<b>Chapter 3</b>	STP	3	<ul style="list-style-type: none"> <li>- Spanning Tree Concepts</li> <li>- Varieties of Spanning Tree Protocols</li> <li>- Spanning Tree Configuration</li> </ul>
<b>Chapter 4</b>	EtherChannel and HSRP	3	<ul style="list-style-type: none"> <li>- Explain link aggregation operation in a switched LAN environment.</li> <li>- Implement link aggregation to improve performance on high-traffic switch links.</li> </ul>

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			<ul style="list-style-type: none"> <li>- Implement HSRP</li> </ul>
<b>Chapter 5</b>	Dynamic Routing	3	<ul style="list-style-type: none"> <li>- Explain the features and characteristics of dynamic routing protocols.</li> <li>- Explain how distance vector routing protocols operate.</li> <li>- Explain how link-state protocols operate.</li> </ul>
<b>Chapter 6</b>	EIGRP	3	<ul style="list-style-type: none"> <li>- Compare routing concepts of EIGRP and OSPF (advanced distance vector vs. linked state, load balancing, path selection, path operations, metrics)</li> </ul>
<b>Chapter 7</b>	EIGRP Tuning and Troubleshooting	3	<ul style="list-style-type: none"> <li>- Configure EIGRP to improve network performance.</li> <li>- Troubleshoot common EIGRP configuration issues in a small to medium-sized business network.</li> </ul>
<b>Chapter 8</b>	Single-Area OSPF	3	<ul style="list-style-type: none"> <li>- Explain how single-area OSPF operates.</li> <li>- Implement single-area OSPFv2.</li> <li>- Implement single-area OSPFv3.</li> </ul>
<b>Chapter 9</b>	Multiarea OSPF	3	<ul style="list-style-type: none"> <li>- Explain how multiarea OSPF operates in a small to medium-sized business network.</li> <li>- Implement multiarea OSPFv2 and OSPFv3.</li> </ul>

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### Chapter 10

 OSPF Tuning and  
 Troubleshooting

3

- Configure OSPF to improve network performance.
- Troubleshoot common OSPF configuration issues in a small to medium-sized business network.

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	20
Practical work (h)	15
Project (h)	
Visits (h)	

## 3. EVALUATION:

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work	-	-
Mid-term	1->5	30%
Oral test		
Final exam	All chapters	70%

## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

Cisco Systems, Inc., & Cisco Networking Academy Program. (2003). Cisco Networking Academy Program: CCNA 3 and 4 companion guide. Indianapolis, Ind: Cisco.

## Title of the Module

### Cloud Computing & virtualization

Code: GINF\_ASR 04 207

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Ridha Azizi**

**Grade: Technologist professor**

**University: ISET Sousse**

**Email:**

**Azizi\_ridha@yahoo.fr**

**Total module duration**

**70h**

Contact hours	Out of class activities
35h	35h

**The equivalent credits**

**3 ECTS**

**Semester 4**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course presents an overview of the field of Cloud Computing, its enabling technologies, main building blocks, and hands-on experience through projects utilizing public Cloud infrastructures (Amazon Web Services (AWS) and Microsoft Azure). It introduces also the concept of virtualization as a key Cloud technique for offering software, computation and storage services. In addition, this course consists in using public Clouds to rent compute resources and deploy applications on these resources.

### Objectives

On the completion of this course, the student should be able to:

- understand the fundamental ideas behind Cloud Computing
- compare the advantages and disadvantages of various Cloud Computing platforms
- deploy applications over commercial Cloud Computing infrastructures
- develop the skills needed to carry out research projects in Cloud Computing.

### 1.2: Prerequisites

- Corporate Networks and Internet
- Systems Administration

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Fundamentals concepts of virtualization	6	<ul style="list-style-type: none"> <li>- Learn the main advantages of virtualization</li> <li>- Understand the technical concepts of virtualization</li> <li>- Know the main virtualization software solutions</li> </ul>
<b>Chapter 2</b>	Fundamentals concepts of Cloud Computing	9	<ul style="list-style-type: none"> <li>- Understand the fundamental ideas behind Cloud Computing, the evolution of this paradigm, its applicability, benefits, etc.</li> </ul>
<b>Chapter 3</b>	Essential components of a Cloud solution	6	<ul style="list-style-type: none"> <li>- Understand the main concepts of Cloud Computing</li> <li>- Know the virtualization techniques that serve in offering software, computation and storage services on the cloud</li> </ul>
<b>Chapter 4</b>	Case study	9	<ul style="list-style-type: none"> <li>- Understand how to deploy applications over commercial Cloud Computing infrastructures</li> </ul>

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	15
Practical work (h)	12
Project (h)	8
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	20%
Practical work	All chapters	10%
Mid-term	Chapter 1+Chapter 2	20%
Oral test	-	-
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Furht, Borivoje, and Armando Escalante. Handbook of cloud computing. Vol. 3. New York: Springer, 2010.
- Sehgal, Naresh Kumar, and P. Ch Bhatt. Cloud Computing. Springer, Heidelberg, 2018.
- Buyya, Rajkumar, James Broberg, and Andrzej M. Goscinski, eds. Cloud computing: Principles and paradigms. Vol. 87. John Wiley & Sons, 2010.



## Title of the Module

Database administration

Code: GINF\_ASR 04 206

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>x</b>			

**Teacher: Saïd Taktak**

**Grade: full time Faculty Member**

**University: IIT**

**Email:**

**Said.taktak@iit.ens.tn**

**Total module duration**

**49 h**

Contact hours	Out of class activities
<b>28h</b>	<b>21h</b>

**The equivalent credits**

**2 ECTS**

**Semester 4**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course is designed to give students a firm foundation in basic administration of Oracle Database 11g. In this class, students learn how to install and maintain Oracle Database 11g. Students gain a conceptual understanding of the Oracle database architecture and how its components work and interact with one another. Students learn how to create an operational database and properly manage the various structures in an effective and efficient manner including performance monitoring, database security, user management, and backup/recovery techniques. The lesson topics are reinforced with structured hands-on practices

### Objectives

On the completion of this course, the student should be able to:


- Software installation and the creation of new databases.
- An in-depth exploration of the database architecture, including memory, process and data structures, and the management of those structures.
- Management of database files.
- Management of security policies and procedures, including administration of user accounts, roles, privileges and profiles.
- Utilization of advanced self-tuning and self-management capabilities, including the use of Oracle-Managed Files, database Advisors and other components of the Management Framework.
- Performance monitoring, problem troubleshooting, and resolving lock and conflict issues.
- Using the Oracle Enterprise Manager and SQL interfaces for administration tasks.
- Control over database support services, including the Database Control, Oracle Net and others.
- A primer on backup and recovery structures and strategies.

### 1.2: Prerequisites

- Relational model (structure, constraints, SQL)

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Profession Database Administrator	3	- Know the main activities and the required skills for database administration
<b>Chapter 2</b>	Oracle Database Architecture	6	- Understand Oracle Data Base Architecture and Data dictionary - Learn how requests work
<b>Chapter 3</b>	Oracle Database Creation	6	- Describe the steps involved in creating the database. - Prepare the operating system

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				for the installation of the database. - Create a database manually. - Change the name of the instance of a database instance. - Describe the files needed to make a backup. - Delete a database.
<b>Chapter 4</b>	The tablespaces	3		- Understand the types of tablespaces - Know how to create tablespaces - Know temporary Tablespaces - Learn how to undo Tablespaces
<b>Chapter 5</b>	Oracle Net and Network Architecture	3		- Know how to remote databases and database Links - Understand the configuration of listener and tnsnames files
<b>Chapter 6</b>	Oracle Audit	3		- Understand the Four levels of audit - Understand audit parameters and AWR Report
<b>Chapter 7</b>	Backup and Recovery	6		- Learn the DataPump and SQL*LOADER - Understand Backup and Recovery Strategy - Use RMAN (Recovery Manager)

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	11
Practical work (h)	12
Project (h)	5
Visits (h)	0

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### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	Chapter 3	30%
Practical work		
Mid-term	Chapter 1→Chapter 4	20%
Oral test	-	-
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- RIES, Steve. *OCA Oracle Database 11g Database Administration I: A Real-World Certification Guide*. Packt Publishing Ltd, 2013.
- Mullins, Craig. *Database administration: the complete guide to practices and procedures*. Addison-Wesley Professional, 2002.
- FOOT, Christopher. *OCP Instructors Guide for Oracle DBA Certification: A Study Guide to Advanced Oracle Certified Professional Database Administration Techniques*. Rampant Techpress, 2004.

### Title of the Module

#### Culture Entrepreneurship

Code: GINF\_GLID 04 111

**Teacher: Mrs. Amel Trabelsi Elloumi**

**Grade: Full-time faculty member**

In charge of the preparation for the professional career department

**University: International Institute of Technology**

Email:

**Dep.PCP@iit.ens.tn**

Total module duration

**28 h**

Contact hours	Out of class activities
21	7

The equivalent credits

**1 ECTS**

**Semester 3**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

- To carry out their Innovation & Entrepreneurship Project, student engineers must analyze the market, find an innovative concept, develop the product, federate a team, carry out an operating plan and comply with regulatory constraints. So many missions that fit perfectly with what a company expects of a young engineer.
- These Innovation & Entrepreneurship projects often come from companies seeking to develop new products, to respond to innovation and development issues related to their sectors.

### Objectives

The development of the entrepreneurial culture requires an awareness and promotion effort:

- knowing entrepreneurship
- imagining and becoming an entrepreneur
- building a project and making it reliable
- Discovering the process to implement
- Finding an innovative idea to create a project
- creating a competitive business model

### 1.2: Prerequisites

- Having an idea about the socio-economic environment
- The fundamentals of management
- Entrepreneurship processes
- Some functions (of the company)

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Entrepreneurship sensitization	7h	<ul style="list-style-type: none"> <li>- Learn about entrepreneurship.</li> <li>- Become familiar with the characteristics of the entrepreneurship environment.</li> <li>- Extend the spectrum of entrepreneurial knowledge.</li> </ul>
<b>Chapter 2</b>	The forms of entrepreneurship	7h	<ul style="list-style-type: none"> <li>- Know the main forms of entrepreneurship.</li> <li>- Understand the specificity of the different forms.</li> </ul>
<b>Chapter 3</b>	Business model	7h	<ul style="list-style-type: none"> <li>-the research methods of an innovative or creative idea</li> <li>- Know the different forms of business Model</li> <li>- Extend the skills of students to prepare their Business Model</li> </ul>

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	Yes
Practical work (h)	Yes
Project (h)	Yes
Visits (h)	Yes

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	30%
Practical work		
Mid-term		
Oral test	Chapter 1,2	20%
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- <http://www.granddictionnaire.com/>.
- <http://www.olf.gouv.qc.ca/ressources/bibliotheque/officialisation/terminologique/fiches/1298933.html>

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## Title of the Module

Data Mining

Code: GINF\_GLID 04 103

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>X</b>			

**Teacher: Dr. Taoufik Ben Abdallah**

**Grade: Full-time faculty member**

**University: IIT**

**Email:**

**taoufik.benabdallah@iit.ens.tn**

**Total module duration**

**56 h**

Contact hours	Out of class activities
<b>35</b>	<b>21</b>

**The equivalent credits**

**2 ECTS**

**Semester 3**



## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

Volume of information is increasing every day so that we can handle from business transactions, scientific data, sensor data, Pictures, videos, etc. Therefore, we need a system capable of extracting essence of information available and that can automatically generate report, views or summary of data for better decision-making. The course is structured to perform classification and predictive data mining tasks, including discovering association rules, building classification trees, building and training decision trees, using random forests, using neural networks, applying data preprocessing techniques. The course also trains and instructs on "best practices" for using Python especially with the *sklit-learn* and *mlxtend* libraries.

### Objectives

On the completion of this course, the student will be able to:

- be aware of the importance of Data Mining as a new technological field
- Set Data Mining in the Knowledge Discovery in Databases (KDD) process
- Understand the theory of some Data Mining techniques
- Handle some Data Mining Frameworks

### 1.2: Prerequisites


- Basics of Math and Statistics
- Basics of Python programming

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Knowledge Discovery in Databases (KDD) process	3h	<ul style="list-style-type: none"> <li>• Understand the difference between data, information and knowledge</li> <li>• Learn the KDD process</li> <li>• Learn the basic concepts: feature detection; data preprocessing; features space; data types; validation</li> <li>• Present the predictive Data Mining techniques</li> <li>• Present the descriptive Data Mining techniques</li> <li>• Focus on the data mining framework</li> </ul>
<b>Chapter 2</b>	Data preprocessing	6h	<ul style="list-style-type: none"> <li>• Learn to use data cleaning techniques</li> <li>• Learn to use data transformation techniques</li> <li>• Learn to apply data discretization for converting continuous attributes to categorical attributes</li> <li>• Understand the dimensionality</li> </ul>

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			<p>reduction techniques</p> <ul style="list-style-type: none"> <li>• Learn to use <i>sklit-learn</i> for data preprocessing</li> </ul>
<b>Chapter 3</b>	Discovering the association rules	6h	<ul style="list-style-type: none"> <li>• Learn the concepts : items, frequent items, support, minimal support</li> <li>• Understand how to determine frequent items using <i>Apriori</i> et <i>Fp-growth</i> algorithms</li> <li>• Learn to use <i>mlexend</i> for discovering association rules</li> </ul>
<b>Chapter 4</b>	Supervised learning	12h	<ul style="list-style-type: none"> <li>• Understand the techniques of performance estimation</li> <li>• Understand how to build confusion matrix</li> <li>• Learn the splitting data techniques</li> <li>• Learn the evaluation metrics for evaluating models</li> <li>• Understand the difference between overfitting and underlining</li> <li>• Understand the difference parameters and hyper parameters</li> <li>• Present some techniques for determining hyper parameters</li> <li>• Understand the Decision Tree technique for classification</li> <li>• Focus on CART algorithm</li> <li>• Learn to use <i>sklit-learn</i> for building decision tree model</li> <li>• Understand the bagging and boosting concepts</li> <li>• Understand the Random Forest technique for classification</li> <li>• Learn the neural network technique</li> <li>• Understand the process for building a neural network (perceptron and multilayer perceptron)</li> <li>• Learn to use <i>sklit-learn</i> for</li> </ul>

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			building neural network model
<b>Chapter 5</b>	Unsupervised learning (Overview)	3h	Reminder on the use skit-learn for clustering

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	22
Practical work (h)	13
Project (h)	-
Visits (h)	-

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work	-	-
Mid-term	Chapter1+Chapter2+chapter3	30%
Oral test	-	-
Final exam	All chapters	70%

## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- WANG, John. Data mining: opportunities and challenges. Idea Group Pub., 2003.
- Gupta, Gopal K. Introduction to data mining with case studies. PHI Learning Pvt. Ltd., 2014.
- Rajaraman, A., & Ullman, J. D. (2011). Mining of massive datasets. Cambridge University Press.

### Title of the Module

#### END OF YEAR PROJECT

Code: GINF\_GLID 04 112

**Teacher: Achraf Ammar**

**Grade: Internship coordinator**

**University: IIT**

**Email:**

**Achraf.ammar@iit.ens.tn**

**Total module duration**

**126 h**

Contact hours	Out of class activities
35	91

**The equivalent credits**

**5 ECTS**

**Semester 3**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

After having validated a first year of the engineering cycle and also carried out a first internship, the student engineer will be able to achieve scientific projects with more efficiency. This course is a real preparation for the graduation project and will help students who have a project idea to start developing them.

### 1.2: Objectives

In this course, the student is tutored to:

- Master report redaction
- carry out literature research with more accuracy.
- do advanced research on a specific topic
- develop an action plan to meet a predefined objective
- to realize real projects

### 1.3: Prerequisites

Validate Internships and Graduation project course

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Preparing research topic	6	Detect research themes related to personal skills do an advanced search in a chosen theme Detect innovation and advancement opportunities in a chosen theme
<b>Chapter 2</b>	Developing action plan	10.5	Apply a scientific research process to identify a concrete action plan.
<b>Chapter 3</b>	Reporting results	4.5	Synthesis correctly results Develop the critical perception Identify perspectives and new opportunities

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	9
Practical work (h)	-
Project (h)	12
Visits (h)	-

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### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	1	25%
Practical work		
Mid-term		
Oral test	2	20%
Final exam	1-2-3	55%

### 3. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

<https://pix.fr>

# MODULE DESCRIPTION

## Title of the Module

Data Warehouse  
 Code: GINF\_GLID 04 108

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Saïd Tatak**

**Grade: Full time faculty member**

**University: IIT**

**Email:**

**Said.taktak@iit.ens.tn**

**Total module duration**

**49 h**

Contact hours	Out of class activities
28	21

**The equivalent credits**

**2 ECTS**

**Semester 3**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the fundamental concepts of Data Warehousing (DW).

Data Warehouse is essential for Business Intelligence to store cross-functional data from several heterogeneous sources and requires specific processing to collect this information. Data Warehousing has become an essential part of many IT strategies. The objective of this course is to identify the contributions of a Data Warehouse and then to understand the steps involved in designing and implementing a Data Warehouse.

### Objectives

Thanks to this course, the student will be able to:

- Evaluate an organization for data warehouse maturity and business architecture alignment;
- Create a data warehouse design and reflect on alternative design methodologies and design goals;
- Create data integration workflows using OWB;
- Reflect on the role of change data, refresh constraints, refresh frequency trade-offs, and data quality goals in data integration process design; and
- Perform operations on pivot tables to satisfy typical business analysis requests

### 1.2: Prerequisites

Database course: Preparation for Oracle 1 certification

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Introduction to the Data Warehouse	3	<ul style="list-style-type: none"> <li>- Understand the difference between:</li> <li>- Operational and decision-making information systems</li> <li>- DW and DM</li> <li>- OPAP vs OLTP</li> </ul> Define the Architecture of a decision-making information system
<b>Chapter 2</b>	Multidimensional Modeling	6	To master: <ul style="list-style-type: none"> <li>-the basic concepts (dimensions ,fact, ...)</li> <li>- Multidimensional models (star, constellation, snowflake)</li> <li>- logic models (ROLAP, MOLAP, HOLAP, HOLAP, OOLAP)</li> </ul>



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<b>Chapter 3</b>	Method for designing a Data Warehouse	6	To master: - Ascending method - Top-down method - Mixed method - Reuse of PM
<b>Chapter 4</b>	OLAP cubes and aggregates	3	To define: - OLAP rules - Dimensional navigation and cubic algebra
<b>Chapter 5</b>	Practical part	12	To learn: - Presentation of the "Oracle Warehouse Builder" tool - Creating the data warehouse schema - Implementation of the ETL data loading process - Data loading and processing

### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	15
Practical work (h)	13
Project (h)	0
Visits (h)	0

### 3. EVALUATION:

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work	5	30%
Mid-term		
Oral test		
Final exam	1->5	70%

### 3. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

Kimball et al. 2013]: Kimball R. et Ross M. "The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling", Third Edition, Wiley Computer Publishing, 2013

## MODULE DESCRIPTION

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### Title of the Module

Human Machine Interface

Code: GINF\_GLID 04 107

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Mohamed MAZOUZI**

Grade: technology professor

University: ISAAS

Email:

Mohamed.mazouzi@gmail.com

Total module duration

56 h

Contact hours	Out of class activities
28h	28h

The equivalent credits

2 ECTS

Semester 3

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the evolution and the elements of the Human Machine Interfaces by relying on the human processor model. In addition, it presents a detailed description of ISO and AFNOR standards. Machine here is generally defined as any physical systems that can be operated by human operators.

#### Objectives

On the completion of this course, the student should be able to:

- be familiar with the basic concepts, methods, principles and skills in designing and evaluating various human-machine interfaces
- develop applications complying with ISO and AFNOR standards and meeting international ergonomics criteria

### 1.2: Prerequisites

- Computer architecture
- Software engineering: UML
- The foundations of Web development

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	GUIs in Human-Machine Communication	5	- Understand the definition and evolution history of human machine interfaces
<b>Chapter 2</b>	Elements of Human Machine Interfaces	4	- Learn about human processor model
<b>Chapter 3</b>	Ergonomic principle	6	- Master ergonomic criteria according to AFNOR and ISO standards
<b>Chapter 4</b>	Web ergonomics	3	- Use Web Usability Criteria
<b>Chapter 5</b>	Projects	10	- Master the development of applications complying with ISO and AFNOR standards and meeting the criteria of international ergonomics

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	12
Practical work (h)	12
Project (h)	4
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	20%
Practical work	All chapters	10%
Mid-term	Chapter 1+Chapter 2	20%
Oral test	-	-
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Nogier, Jean-François. Ergonomie du logiciel et design web: Le manuel des interfaces utilisateur. Dunod, 2005.
- Galitz, Wilbert O. The essential guide to user interface design: an introduction to GUI design principles and techniques. John Wiley & Sons, 2007.

## Title of the Module

Integration Patterns  
 Code: GINF\_GLID 04 102

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Hatem Jarraya**

**Grade: Expert**

**Freedom of Dev Services**

**Email:**

**harraya@freedomofdev.com**

**Total module duration**

**49h**

Contact hours	Out of class activities
<b>35h</b>	<b>14h</b>

**The equivalent credits**  
**2 ECTS**

**Semester 3**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the basic concepts related to design and architectural patterns as they are implemented in large scale system architectures currently used in industry. It consists in mastering the application integration tool « Talend » and implementing soap web services.

#### Objectives

The objective of this course is to enable engineering students to:

- understand the importance of integrating enterprise applications through real case studies
- be familiar with application integration tools (Talend) and service-oriented architecture

### 1.2: Prerequisites

- Software engineering

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Enterprise Applications Integration	5	<ul style="list-style-type: none"> <li>- Understand the concept of enterprise application</li> <li>- Understand the need for integration and the integration challenges</li> </ul>
<b>Chapter 2</b>	Integration Styles & Technologies	6	<ul style="list-style-type: none"> <li>- Know the application integration criteria</li> <li>- Understand application integration styles, file transfer and shared database</li> </ul>
<b>Chapter 3</b>	Application Integration Tools : Talend	9	<ul style="list-style-type: none"> <li>- Use talend open studio</li> <li>- Understand the advantages and the concepts of service-oriented architecture (soa)</li> <li>- Learn how to implement approaches of web services</li> </ul>
<b>Chapter 4</b>	RPI Integration Style: Web Services	9	<ul style="list-style-type: none"> <li>- Implement soap web service using Talend</li> </ul>
<b>Chapter 5</b>	Talend : Developing routes	6	<ul style="list-style-type: none"> <li>- Know some terminologies about Talend</li> <li>- Master Talend &amp; apache camel framework</li> </ul>

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	15
Practical work (h)	12
Project (h)	8
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	20%
Practical work	All chapters	10%
Mid-term	Chapter 1+Chapter 2	20%
Oral test	-	-
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Hohpe, Gregor, and Bobby Woolf. Enterprise integration patterns: Designing, building, and deploying messaging solutions. Addison-Wesley Professional, 2004.
- <https://fr.talend.com/resources/discovering-talend-studio/>



## MODULE DESCRIPTION

### Title of the Module

Preparation to .NET Certification (MTA)

Code: GINF\_GLID 04 105

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>x</b>			

**Teacher: Mohamed MANAA**

**Grade: Master Technologist**

**University: ISET Sfax**

**Email:**

**medmanaa.iset@gmail.com**

**Total module duration**

**49h**

Contact hours	Out of class activities
<b>35h</b>	<b>14h</b>

**The equivalent credits**

**2 ECTS**

**Semester 3**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This Preparatory Course for NET: MTA 98-361 is designed to introduce the architecture of the .NET platform as well as the concepts of basic programming, object-oriented programming, software development and web applications.

### 2.2: Objectives

On the completion of this course, the student should be able to:

- understand the basic concepts of .Net architecture and C # language
- understand .NET Code Compilation
- acquire the basic notions of basic programming, object-oriented programming, software development and web applications.
- successfully pass the MTA 98-361 certification exam

### 1.2: Prerequisites

It is recommended to have a basic general culture in:

- Algorithmic
- Operating system
- Programming C, JAVA, C ++

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	General presentation of the .Net platform	3	- Master the basic concepts of .Net architecture
<b>Chapter 2</b>	Introduction to C# programming	9	- Understand the basic notions of C # language
<b>Chapter 3</b>	General presentation of software development	6	- Learn the basic concepts of software development
<b>Chapter 4</b>	Presentation of applications on the work jam	9	- Know how to present applications on the work jam
<b>Chapter 5</b>	Presentation of Web Applications	8	- Understand the main notions related to Web applications - Learn to develop a Web application

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	12
Practical work (h)	15
Project (h)	8
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	20%
Practical work	All chapters	10%
Mid-term	Chapter 1+Chapter 2	20%
Oral test	-	0
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Official Microsoft MTA 98-361 Certification Course

## Title of the Module

Software Development Life Cycle (SDLC)

Code: GINF\_GLID 04 101

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Nissen Masmoudi**

**Grade: master technologist**

**University: ISET-Sfax**

**Email:**

**Nissen.masmoudi@gmail.com**

**Total module duration**

**77 h**

Contact hours	Out of class activities
42h	35h

**The equivalent credits**

**3 ECTS**

**Semester 3**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course describes and explains the different phases of the software development cycle. It introduces also the activities at the level of each phase. In addition, it presents the different steps of a unified process.

### Objectives

On the completion of this course, the student should be able to:

- understand the main phases of the software life cycle and the activities at the level of each phase
- know the difference between the iterative model and the cascade model
- know how to write a specification
- understand the activities of a unified process

### 1.2: Prerequisites

- Database
- Object oriented programming
- Object-oriented modeling

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Introduction to Software Engineering	6	- Understand the main concepts related to Software Engineering
<b>Chapter 2</b>	Software life cycle	9	- Understand the phases of the software life cycle - Explore activities at the level of each phase
<b>Chapter 3</b>	Models of the development process	9	- Describe the cascade model and explain the differences with iterative models
<b>Chapter 4</b>	The specifications	9	- Knowing the elements of a specification - Know how to write specifications
<b>Chapter 5</b>	The unified process	9	- Be familiar with the phases - Understand the activities of a unified process

## MODULE DESCRIPTION

### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	30
Practical work (h)	0
Project (h)	12
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	20%
Practical work	-	-
Mid-term	Chapter 1+Chapter 2+Chapter 3	30%
Oral test	-	-
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Van Vliet, Hans, Hans Van Vliet, and J. C. Van Vliet. Software engineering: principles and practice. Vol. 13. Hoboken, NJ: John Wiley & Sons, 2008.
- Boyde, Joshua. A Down-To-Earth Guide to SDLC Project Management: Getting your system/software development life cycle project successfully across the line using PMBOK adaptively. Joshua Boyde, 2014.

## Title of the Module

Advanced Web Programming

Code: GINF\_GLID 04 106

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Affef Samet Ellouze**

**Grade: technology professor**

**University: ISET-Sfax**

**Email:**

**Samet\_afef@yahoo.fr**

**Total module duration**

**70 h**

Contact hours	Out of class activities
35h	35h

**The equivalent credits**

**3 ECTS**

**Semester 3**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces server-side web technologies used for dynamic web. During the course, students practice and apply the essentials of web server-side programming language and database interaction. Emphasis is placed on several topics including an introduction to PHP/PHP5 (Hypertext preprocessor) language, data types and operators, functions, and control structures, as well as exploration of MySQL (My Structured Query Language) databases with PHP, and debugging and error handling.

### Objectives

On the completion of this course, the student should be able to create a website using PHP language. So, he gains skills for:

- incorporating PHP elements such as strings, numbers, functions, objects, expressions, and cookies
- appropriately using PHP language elements and the most commonly encountered SQL commands
- analyzing the process of configuring a PHP site and PHP server behavior
- learning methods to create, define, and access MySQL (My Structured Query Language) databases

### 1.2: Prerequisites

- HTML5 language
- JavaScript language
- The basic notions of object-oriented programming

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Introduction to PHP language	3	- Understand the basic syntax of PHP5
<b>Chapter 2</b>	Form processing	6	- Learn the mechanism for receiving data from the form
<b>Chapter 3</b>	The Object Oriented concepts in PHP	6	- Learn the object-oriented programming approach in PHP5
<b>Chapter 4</b>	Connection to the database	8	- Manipulate the properties and methods of the PDO class for connection to the database
<b>Chapter 5</b>	Sessions and cookies	6	- Learn the security mechanisms of web pages
<b>Chapter 6</b>	Introduction to AJAX	6	- Understand how to create an AJAX search engine
<b>Chapter 7</b>	JQuery	6	- Understand the main concepts of JQuery



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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	12
Practical work (h)	14
Project (h)	9
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	20%
Practical work	All chapters	10%
Mid-term	Chapter 1+Chapter 2	20%
Oral test	-	-
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- NARAMORE, Elizabeth, GERNER, Jason, LE SCOUARNEC, Yann, et al. Beginning PHP5, Apache, and MySQL web development. John Wiley & Sons, 2005.
- Hayder, H. (2007). Object-Oriented Programming with PHP5. Packt Publishing Ltd.
- LURIG, Mario. PHP Reference: Beginner to intermediate PHP5. Mario Lurig, 2008.

### Title of the Module

Business English Certificate

B1//B2

**Code:**GINF\_GLID 04 110

GINF\_GLID 04 213

**Teacher: Nada BEN MAHFOUDH FOURATI**

**Grade: Full-time faculty member**

**University: International Institute of Technology**

**Email:**

**Nada.benmahfoudh@iit.ens.tn**

**Total module duration**

**35h \* 2**

Contact hours	Out of class activities
35	35

**The equivalent credits**

**3 ECTS**

**Semester 3 + 4**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course focuses on familiarizing students with the level and content of the BUSINESS ENGLISH CERTIFICATE abbreviated as BEC. It prepares students to communicate in a good way whether in a written way or orally in the context of work. Each lesson is organized so that it develops and enhances all skills and sub-skills necessary to learn the English language adequately and to be familiarized with international tests.

According to the European framework, the BEC PRELIMINARY is B1.

### Objectives

The student will be able to:

- ✓ To use English in an International context of business.
- ✓ To help students revise the necessary skills to learn business English and to sit for the exam
- ✓ To learn time management
- ✓ To encourage students to speak
- ✓ To enhance students to write correctly and up to the point.

### 1.2: Prerequisites

The student should have the level A2 in order to follow these lectures.

When the student is B1 in General English, he excels and gets the gist of these tasks and training

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	<ul style="list-style-type: none"> <li>- Getting to know each other</li> <li>- Introduction to the main axes of the course</li> <li>- Job Application Employment</li> </ul>	23 h	<ul style="list-style-type: none"> <li>- To know the benefits and the utility of learning business English</li> <li>- To understand the context in which business English is used</li> <li>- To differentiate and use formal and informal language</li> <li>- To establish the link between learning English and being prepared for the professional career</li> </ul>
<b>Chapter 2</b>	<ul style="list-style-type: none"> <li>- Travel / Business Accommodation/ Organizing a conference</li> </ul>	12 h	<ul style="list-style-type: none"> <li>- To learn the vocabulary related to accommodation</li> <li>- To discover another context of business English in which you should necessarily use a foreign language</li> </ul>

## MODULE DESCRIPTION

<b>Chapter 3</b>	<ul style="list-style-type: none"> <li>- Money</li> <li>- Graphs and Charts</li> </ul>	10 h	<ul style="list-style-type: none"> <li>- To understand that business English can be part of their engineering knowledge</li> <li>- To learn the comparative, the superlative, contrasting words, adverbs ... that describe a movement in a graph</li> </ul>
<b>Chapter 4</b>	<ul style="list-style-type: none"> <li>- Exams</li> </ul>	25 h	<ul style="list-style-type: none"> <li>- To understand the format of the exam</li> <li>- To learn that time management is an important skill to succeed in this certificate</li> <li>- To raise the student's awareness that the exam covers the four skills</li> </ul>

### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	20
Practical work (h)	15
Project (h)	
Visits (h)	

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	Chapter 1, 2	15%
Oral test	Chapter 2,3	15%
Final exam	All chapters	70%

### 3. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- English for Business
- Pass Cambridge BEC Preliminary

## Title of the Module

Development of Communicating Systems

Code: GINF\_GLID 04 104

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Mohamed MAZOUZI**

**Grade: Assistant**

**University: ISAAS**

**Email:**

**Mohamed.mazouzi@gmail.com**

**Total module duration**

**49 h**

Contact hours	Out of class activities
<b>28h</b>	<b>21h</b>

**The equivalent credits**

**2 ECTS**

**Semester 3**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the basic components in communication system. It presents also the structure of http requests and responses. In addition, it consists in explaining how to develop multi-threaded client-server applications in Java using sockets.

### Objectives

On the completion of this course, the student will be able to:

- understand the structure of http requests and responses
- manage the stream of bytes in java
- write applications required by communication
- develop multi-threaded client applications using: TCP, UDP and Multicast

### 1.2: Prerequisites

- Computer Network Courses
- Basic Concepts of Object-Oriented Programming
- Java programming

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Recall on Networks and Server Client Architecture	5	- Reminder about the OSI model especially the transport layer paradigm Client / server
<b>Chapter 2</b>	the HTTP protocol: Request and Answer	4	- Understand the details about client requests and server responses in the HTTP protocol
<b>Chapter 3</b>	Java flow management: the java.io. library	4	- Learn about Byte and character stream management in java
<b>Chapter 4</b>	Sockets and threads in java	5	- Understand multi-threaded client-server programming in Java using sockets.
<b>Chapter 5</b>	Projects	10	- Learn how to develop multi-threaded server client applications using: TCP, UDP and Multicast.

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	20
Practical work (h)	0
Project (h)	8
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	20%
Practical work		
Mid-term	Chapter 1+Chapter2+ Chapter 3	30%
Oral test	-	-
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Elliotte Harold, Java Network Programming: Developing Networked Applications, 4th Edition: O'Reilly Media, October 2013, p 506.
- DOSTERT, Jan et FLEISCHER, Christian. Socket-like communication API for Java. U.S. Patent No 7,600,217, 6 oct. 2009.

## Title of the Module

Concurrent and parallel programming

Code: GINF\_GLID 04 103

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>X</b>			

**Teacher: Imen LAHYENI**

**Grade: Assistant**

**University: ENIS Sfax**

**Email:**

**lahyani.imene@gmail.com**

**Total module duration**

**56 h**

Contact hours	Out of class activities
<b>35h</b>	<b>21h</b>

**The equivalent credits**

**2 ECTS**

**Semester 3**



## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the main concepts related to parallel and distributed programming based on inter-process communication. This communication can be done in two ways:

- 1) By sharing information: it represents the first part of the course
- 2) By the passage of messages: it represents the second part of the course

The first part deals with tools for communication by information sharing. The two tools are semaphores and monitors. The second part deals with communication tools by passing messages. Typically, message passing can be done in several ways. We deal with the following methods: synchronous communication (Channel), asynchronous communication (port)

### Objectives

On the completion of this course, the student should be able to:

- write parallel programs in Java
- ensure the principles of mutual exclusion, whether by sharing information or by message exchanges.

### 1.2: Prerequisites

It is recommended to have a basic general culture in:

- Object-oriented programming
- Operating systems

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Introduction to concurrent and parallel programming	6	- Understand the parallelism at the program level as well as the different parallel process modes
<b>Chapter 2</b>	Communication by information sharing: Semaphore	10	- Master the use of semaphores to build parallel programs to protect shared variables
<b>Chapter 3</b>	Communication by information sharing: Monitor	10	- develop parallel programs using monitors to ensure the principle of mutual exclusion
<b>Chapter 4</b>	Communication by passing messages	9	- Develop parallel programs by passing messages using the notions of port and channel

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	20
Practical work (h)	15
Project (h)	0
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	Chapter 1+Chapter 2	30%
Oral test	-	-
Final exam	All chapters	70%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- An Introduction to Parallel Programming, Morgan Kaufmann, 2011, ISBN 9780123742605, <https://doi.org/10.1016/B978-0-12-374260-5.00012-9>
- BUELL, Duncan. In Praise of An Introduction to Parallel Programming.

## Title of the Module

Cloud Computing  
Code GINF\_GLID 04 208

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Ridha Azizi**

**Grade: Technologist professor**

**University: ISET Sousse**

**Email:**

**Azizi\_ridha@yahoo.fr**

**Total module duration**

**70h**

Contact hours	Out of class activities
35h	35h

**The equivalent credits**

**3 ECTS**

**Semester 4**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course presents an overview of the field of Cloud Computing, its enabling technologies, main building blocks, and hands-on experience through projects utilizing public Cloud infrastructures (Amazon Web Services (AWS) and Microsoft Azure). It introduces also the concept of virtualization as a key Cloud technique for offering software, computation and storage services. In addition, this course consists in using public Clouds to rent computer resources and deploy applications on these resources.

### Objectives

On the completion of this course, the student should be able to:

- understand the fundamental ideas behind Cloud Computing
- compare the advantages and disadvantages of various Cloud Computing platforms
- deploy applications over commercial Cloud Computing infrastructures
- develop the skills needed to carry out research projects in Cloud Computing.

### 1.2: Prerequisites

- Corporate Networks and Internet
- Systems Administration

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Fundamentals concepts of virtualization	6	<ul style="list-style-type: none"> <li>- Learn the main advantages of virtualization</li> <li>- Understand the technical concepts of virtualization</li> <li>- Know the main virtualization software solutions</li> </ul>
<b>Chapter 2</b>	Fundamentals concepts of Cloud Computing	9	<ul style="list-style-type: none"> <li>- Understand the fundamental ideas behind Cloud Computing, the evolution of this paradigm, its applicability, benefits, etc.</li> </ul>
<b>Chapter 3</b>	Essential components of a Cloud solution	6	<ul style="list-style-type: none"> <li>- Understand the main concepts of Cloud Computing</li> <li>- Know the virtualization techniques that serve in offering software, computation and storage services on the cloud</li> </ul>
<b>Chapter 4</b>	Case study	9	<ul style="list-style-type: none"> <li>- Understand how to deploy applications over commercial Cloud Computing infrastructures</li> </ul>

## MODULE DESCRIPTION

### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	15
Practical work (h)	12
Project (h)	8
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	20%
Practical work	All chapters	10%
Mid-term	Chapter 1+Chapter 2	20%
Oral test	-	-
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Furht, Borivoje, and Armando Escalante. Handbook of cloud computing. Vol. 3. New York: Springer, 2010.
- Sehgal, Naresh Kumar, and P. Ch Bhatt. Cloud Computing. Springer, Heidelberg, 2018.
- Buyya, Rajkumar, James Broberg, and Andrzej M. Goscinski, eds. Cloud computing: Principles and paradigms. Vol. 87. John Wiley & Sons, 2010.

## Title of the Module

Database administration

Code: GINF\_GLID 04 207

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Saïd Taktak**

**Grade: full time Faculty Member**

**University: IIT**

**Email:**

**Said.taktak@iit.ens.tn**

**Total module duration**

**49 h**

Contact hours	Out of class activities
28h	21h

**The equivalent credits**

**2 ECTS**

**Semester 4**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course is designed to give students a firm foundation in basic administration of Oracle Database 11g. In this course, students learn how to install and maintain Oracle Database 11g. Students gain a conceptual understanding of the Oracle database architecture and how its components work and interact with one another. Students learn how to create an operational database and properly manage the various structures in an effective and efficient manner including performance monitoring, database security, user management, and backup/recovery techniques. The lesson topics are reinforced with structured hands-on practices

### Objectives

On the completion of this course, the student should be able to:

- Software installation and the creation of new databases.
- An in-depth exploration of the database architecture, including memory, process and data structures, and the management of those structures.
- Management of database files.
- Management of security policies and procedures, including administration of user accounts, roles, privileges and profiles.
- Utilization of advanced self-tuning and self-management capabilities, including the use of Oracle-Managed Files, database Advisors and other components of the Management Framework.
- Performance monitoring, problem troubleshooting, and resolving lock and conflict issues.
- Using the Oracle Enterprise Manager and SQL interfaces for administration tasks.
- Control over database support services, including the Database Control, Oracle Net and others.
- A primer on backup and recovery structures and strategies.

### 1.2: Prerequisites

Relational model (structure, constraints, SQL)

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Profession Database Administrator	3	- Know the main activities and the required skills for database administration
<b>Chapter 2</b>	Oracle Database Architecture	6	- Understand Oracle Data Base Architecture and Data dictionary

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			<ul style="list-style-type: none"> <li>- Learn how requests work</li> </ul>
<b>Chapter 3</b>	Oracle Database Creation	6	<ul style="list-style-type: none"> <li>- Describe the steps involved in creating the database.</li> <li>- Prepare the operating system for the installation of the database.</li> <li>- Create a database manually.</li> <li>- Change the name of the instance of a database instance.</li> <li>- Describe the files needed to make a backup.</li> <li>- Delete a database.</li> </ul>
<b>Chapter 4</b>	The tablespaces	3	<ul style="list-style-type: none"> <li>- Understand the types of tablespaces</li> <li>- Know how to create tablespaces</li> <li>- Know temporary Tablespaces</li> <li>- Learn how to undo Tablespaces</li> </ul>
<b>Chapter 5</b>	Oracle Net and Network Architecture	3	<ul style="list-style-type: none"> <li>- Know how to remote databases and database Links</li> <li>- Understand the configuration of listener and Tnsnames files</li> </ul>
<b>Chapter 6</b>	Oracle Audit	3	<ul style="list-style-type: none"> <li>- Understand the Four levels of audit</li> <li>- Understand audit parameters and AWR Report</li> </ul>
<b>Chapter 7</b>	Backup and Recovery	6	<ul style="list-style-type: none"> <li>- Learn the DataPump and SQL*LOADER</li> <li>- Understand Backup and Recovery Strategy</li> <li>- Use RMAN (Recovery Manager)</li> </ul>



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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	11
Practical work (h)	12
Project (h)	5
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	Chapter 3	30%
Practical work		
Mid-term	Chapter 1→Chapter 4	20%
Oral test	-	-
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- RIES, Steve. *OCA Oracle Database 11g Database Administration I: A Real-World Certification Guide*. Packt Publishing Ltd, 2013.
- Mullins, Craig. *Database administration: the complete guide to practices and procedures*. Addison-Wesley Professional, 2002.
- FOOT, Christopher. *OCP Instructors Guide for Oracle DBA Certification: A Study Guide to Advanced Oracle Certified Professional Database Administration Techniques*. Rampant Techpress, 2004.

## Title of the Module

Development of distributed system: Enterprise JavaBeans (EJB)

Code : GINF\_GLID 04 204

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Ahmed Jmal**

**Grade: Master Technologist**

**University: ISET-Sfax**

**Email:**

jmlhmd@gmail.com

**Total module duration**

**49 h**

Contact hours	Out of class activities
28h	21h

**The equivalent credits**

**2 ECTS**

**Semester 4**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the knowledge and experience required to develop and deploy Enterprise JavaBeans (EJB) applications. It begins with the basic notions and APIs of EJB and then continues with complex topics such as message driven beans and transactions. New concepts such as the use of annotations and the use of dependency injection to initialize references are covered in depth.

### Objectives

On the completion of this course, the student should be able to:


- know the features and benefits of the EJB architecture
- use EJB annotations
- create, deploy and use stateful and stateless session Beans
- develop EJB clients
- deploy and use of message-driven Beans

### 1.2: Prerequisites

- Good knowledge of Java
- HTML, JSP, Servlet

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	EJB Overview	3	<ul style="list-style-type: none"> <li>- Understand the need for EJBs</li> <li>- Know the main Characteristics of EJBs</li> <li>- Understand the EJB Architecture Components</li> </ul>
<b>Chapter 2</b>	EJB component	3	<ul style="list-style-type: none"> <li>- Learn the concept of session Beans</li> <li>- Understand the difference between Stateless Session Bean and Stateful Session Bean</li> </ul>
<b>Chapter 3</b>	Session Bean Lifecycle	3	<ul style="list-style-type: none"> <li>- Learn the business Interface and Bean class details</li> <li>- Understand the session Bean lifecycle</li> </ul>
<b>Chapter 4</b>	Advanced features	8	<ul style="list-style-type: none"> <li>- Understand several features of EJB such as: Driven Bean Message, Timer Bean, Interceptor, Asynchronous method, Beans naming and embedded EJB container</li> </ul>

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<b>MODULE DESCRIPTION</b>			
<b>Chapter 5</b>	Working with Entities	6	<ul style="list-style-type: none"> <li>- Understand the entity Instance Lifecycle</li> <li>- Learn the transaction basics</li> <li>- Implement the CRUD pattern (inserting Data, retrieving Data, updating Data and deleting Data)</li> </ul>
<b>Chapter 6</b>	Reference and Injections	3	<ul style="list-style-type: none"> <li>- Understand the role of references</li> <li>- Use EJB reference annotations</li> <li>- Manipulate deployment descriptors</li> </ul>
<b>Chapter 7</b>	EJB Deployment	4	<ul style="list-style-type: none"> <li>- Understand the Bean classes, dependent classes and business interfaces</li> <li>- Configure an EJB Session</li> </ul>

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	14
Practical work (h)	14
Project (h)	0
Visits (h)	0

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work	All chapters	20%
Mid-term	Chapter 1+Chapter 2++Chapter 3	30%
Oral test	-	-
Final exam	All chapters	50%

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### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Burke, Bill, and Richard Monson-Haefel. Enterprise JavaBeans 3.0. "O'Reilly Media, Inc.", 2006.
- Rubinger, Andrew Lee, and Bill Burke. Enterprise JavaBeans 3.1: Developing Enterprise Java Components. "O'Reilly Media, Inc.", 2010.
- Wetherbee, Jonathan, and al. Beginning EJB in Java EE 8: Building Applications with Enterprise JavaBeans. April, 2018.

## Title of the Module

### ERP: Enterprise Resources Planning

Code: GINF\_GLID 04 210

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Mohamed MANAA**

**Grade: Master Technologist**

**University: ISET Sfax**

**Email:**

**medmanaa.iset@gmail.com**

**Total module duration**

**49 h**

Contact hours	Out of class activities
28	21

**The equivalent credits**  
**2 ECTS**

**Semester 4**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces Enterprise Resource Planning (ERP) Systems and their impact on organizations. It presents also the different modules of an ERP as well as the integration between them. In addition, it aims to explain how to adapt an ERP to the needs of a company by using parameterization and configuration.

### Objectives

On the completion of this course, the student will be able to:

- make an ERP Inventory control module
- examine all the issues in the company
- understand the difficulty of managing change
- propose a practical methodology for setting up ERP

### 1.2: Prerequisites

- Information Systems
- Databases

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Overview of ERP	4	<ul style="list-style-type: none"> <li>- Understand the concept of ERP</li> <li>- Know the history of the ERP</li> <li>- Understand the main advantages and disadvantages of an ERP.</li> </ul>
<b>Chapter 2</b>	ERP implementation project	6	<ul style="list-style-type: none"> <li>- Understand the material requirement planning</li> </ul>
<b>Chapter 3</b>	Customer relationship management (CRM) module	6	<ul style="list-style-type: none"> <li>- Understand the definitions and concepts related to the customer relationship management</li> </ul>
<b>Chapter 4</b>	Supply Chain Management (SCM) module	6	<ul style="list-style-type: none"> <li>- Understand the operation of an ERP</li> <li>- Understand the ITIL approach</li> <li>- Understand how to manage customer needs</li> </ul>
<b>Chapter 5</b>	Electronic Data Interchange (EDI)	6	<ul style="list-style-type: none"> <li>- Understand the main notions of the Electronic Data Interchange (EDI)</li> </ul>

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	15
Practical work (h)	12
Project (h)	3
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	30%
Practical work		
Mid-term	Chapter 1+Chapter2+ Chapter 3	20%
Oral test	-	-
Final exam	All chapters	50%

### 3. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Business 2.0: Roadmap for Success, Ravi Kalakota and Marcia Robinson, Addison Wesley, 2001. ISBN-13: 978-0-201-72165-2
- Mastering ERP Software Packages, by Gérard Baglin, Samir Lamouri, André Thomas, ed. Economica, Collection Gestion, 2015



## Title of the Module

Web Framework  
Code: GINF\_GLID 04 205

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Marwa HACHICHA**

**Grade: Part-time Faculty Member**

**University: International Institute of Technology**

**Email:**

**marwahachicha@gmail.com**

**Total module duration**

**56 h**

Contact hours	Out of class activities
28h	28h

**The equivalent credits**  
**2 ECTS**

**Semester 4**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the basic components of the angular platform that aims to develop dynamic web applications. Emphasis is placed on several topics including the communication of the different angular components, the communication of an angular application with the back-end part and the creation of CRUD angular application with Firebase.

### Objectives

On the completion of this course, the student should be able to develop dynamic web applications while using the angular platform. So, he gains skills for:

- creating angular components
- manipulating a template (View part) with databinding, directives and pipes
- using the services to communicate the different angular components
- creating SPAs (single page application) using the angular routing service
- knowing how to create and use forms to communicate with users and retrieve data
- creating http requests (GET, POST, Delete, Patch, etc.) to communicate an angular application with the back-end part
- discovering the google Firebase service and create a CRUD angular application with Firebase

### 1.2: Prerequisites

- Solid knowledge of HTML
- A good knowledge of Javascript or typescript
- A good knowledge of CSS

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Introduction to Angular	3	<ul style="list-style-type: none"> <li>- Discover the Angular platform: the advantages of using angular, the different versions of angular, the MVC architecture, etc.</li> <li>- Create a first application: installation of NodeJS, Typescript and visual studio code</li> </ul>
<b>Chapter 2</b>	The components of an Angular application	3	<ul style="list-style-type: none"> <li>- Know the architecture of Angular:</li> <li>- Know what is a module, a component and a template</li> <li>- Master the different databinding techniques</li> <li>- Know how to use instructions and pipes</li> </ul>
<b>Chapter 3</b>	The services	6	<ul style="list-style-type: none"> <li>- Create angular services</li> <li>- Register a service</li> <li>- Inject a service into a component</li> </ul>

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<b>Chapter 4</b>	Routing and navigation	6	<ul style="list-style-type: none"> <li>- Know how to use Angular's routing service: define the paths and associated components</li> <li>- Know how to use guards to control access to a road</li> </ul>
<b>Chapter 5</b>	The forms	4	<ul style="list-style-type: none"> <li>- Know how to create forms according to the template method and the reactive method</li> </ul>
<b>Chapter 6</b>	http : Interaction with the back-end part	4	<ul style="list-style-type: none"> <li>- Perform http requests such as Get, Post, Delete and Put requests to interact with the back-end part</li> </ul>
<b>Chapter 7</b>	Creating an Angular CRUD application with Firebase	4	<ul style="list-style-type: none"> <li>- Know the firebase platform and their different services offered.</li> <li>- Know how to create and use the firestore database</li> <li>- Know how to create an angular CRUD application using firestore and other firebase services</li> </ul>

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	10
Practical work (h)	14
Project (h)	4
Visits (h)	-

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	20%
Practical work	All chapters	10%
Mid-term	Chapter 1→Chapter 4	20%
Oral test	-	-
Final exam	All chapters	50%

#### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- MURRAY, Nathan, CORY, Felipe, LERNER, Ari, *et al. Ng-Book: The Complete Guide to Angular*. Create Space Independent Publishing Platform, 2018.
- Fain, Yakov, and Anton Moiseev. *Angular 2 Development with Typescript*. Manning Publications Co., 2016.
- Arora, Chandermani, and Kevin Hennessy. *Angular 6 by Example: Get up and running with Angular by building modern real-world web apps*. Packt Publishing Ltd, 2018.
- Official documentation (link: <https://angular.io/>)

## Title of the Module

Machine Learning  
Code: GINF\_GLID 04 211

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>x</b>			

**Teacher: Yosri Kessentini**

**Grade: Assistant professor**

**University: Sfax research center**

**Email:**

**Yousri.kessentini@gmail.com**

**Total module duration**

**70 h**

Contact hours	Out of class activities
<b>35h</b>	<b>35h</b>

**The equivalent credits**  
**3 ECTS**

**Semester 4**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

Machine Learning is the study of predictive analytics where the structured or unstructured data are analyzed, and new results are predicted after the model is trained to learn the patterns from historical data. There are several pre-programmed Machine Learning algorithms, which help in building the model, and the choice of the algorithm to be used completely depends on the problem statement, the architecture and the relationship among the variables.

Deep Learning is a sub-field of Machine Learning. It presents several neural networks architectures which work almost similarly to the neurons in the human brain.

#### Objectives

On the completion of this course, the student should be able to:

- train and deploy Deep Neural Networks
- improve Neural Network performance
- design and optimize of deep neural network for image recognition using TensorFlow.
- introduce students to algorithms and architectures of deep neural networks using Python (Google colab).


### 1.2: Prerequisites

It is recommended to know the basics of:

- data Mining
- statistics and probability
- data analysis

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Fundamentals of Deep Learning for Computer Vision	15h	<ul style="list-style-type: none"> <li>- Understand the main concepts of Deep Learning for Computer Vision</li> <li>- Train and Deploy Deep Neural Networks</li> <li>- Improve Neural Network performance</li> <li>- Explore Advanced Workflows</li> <li>- Assess/ NVIDIA Certification</li> </ul>
<b>Chapter 2</b>	Design and optimization of deep neural network for image	20h	<ul style="list-style-type: none"> <li>- Understand several concepts of the design and</li> <li>- the optimization of deep</li> </ul>

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	recognition using TensorFlow		neural network such as: - Softmax, cross-entropy, mini-batch, fully connected NN, the difference between Sigmoid and RELU, Learning rate decay, Dropout, CNN, Bigger CNN + Dropout and Google colab - Use Anaconda and TensorFlow

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	20
Practical work (h)	10
Project (h)	0
Visits (h)	0

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	Chapter 1	30%
Oral test	-	-
Final exam	All chapters	70%

## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Burkov, Andriy. *The hundred-page machine learning book*. Vol. 1. Canada: Andriy Burkov, 2019.
- Sra, Suvrit, Sebastian Nowozin, and Stephen J. Wright, eds. *Optimization for machine learning*. Mit Press, 2012.
- Rogers, Simon, and Mark Girolami. *A first course in machine learning*. CRC Press, 2016.



### COURSE FILE

#### Personalized Professional Project (PPP)

Code: GINF\_GLID 04 214

Teacher: Amel Elloumi Trabelsi

Grade: Doctorate in Economics

Establishment: IIT

Email:

*dep.pcp@iit.ens.tn*

Duration

28h

Contact hours	Non-contact hours
21	7

Number of credits

1 ECTS

Semester

4



## 1. Course description and targeted skills:

### 1.1: Course description and objectives:

The objective of this course is to impart to the engineering student several principles and methods of economic analysis. More specifically, this course is intended to give a good knowledge of economic activity and the main economic problems. The economic functions and the behaviour of the producer and the costs of production are also discussed.

### 1.2: Prerequisites

No prerequisites are required to take this course.

### 1.3: Learning outcomes:

Chapters	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Presentation and measurement of economic activity	3	Give a good knowledge of the organization of economic activity
<b>Chapter 2</b>	Economic problems	4.5	Understand the major contemporary economic issues
<b>Chapter 3</b>	Consumption, Savings and Investment	4.5	Know the main economic functions
<b>Chapter 4</b>	The behaviour of the producer	4.5	Understand the behaviour of the producer
<b>Chapter 5</b>	Production costs	4.5	Know the production structure

## 2. METHODOLOGY:

Contact hours are composed of:

Integrated course (h)	15
Practical exercises (h)	
Projects (h)	6
Visits (h)	

## 3. Evaluation :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	70%
Practical work		
Mid-term		
Oral test	All chapters	30%
Final exam		

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#### 4. Reference works and recommended logistics:

- Alain Beitone, Emmanuel Buisson and Christine Dollo, Economics, Syrey edition
- C.D Echaudemaison: Economics at the "Major Schools" competitions, Nathan Editions
- G. Mankiw: Principles of Economics, Boeck Editions
- Joseph Stiglitz: Principles of Modern Economics, Boeck Editions
- René Derome: Engineering Economics, 2nd edition International Presses Polytechnic

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### Title of the Module

Processus within companies: concept and implementation

Code: GINF\_GLID 04 209

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Hatem Jarraya**

**Grade: Expert**

**Freedom of Dev Services**

**Email:**

[hjarraya@freedomofdev.com](mailto:hjarraya@freedomofdev.com)

**Total module duration**

**56 h**

Contact hours	Out of class activities
28h	28h

**The equivalent credits**

**2 ECTS**

**Semester 4**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the basic concepts needed to develop the ability of understanding and modeling business process in a graphical standard notation (BPMN) that can be easily analyzed, improved, and automated using the Bonita BPM platform.

#### Objectives

On the completion of this course, the student should be able to:

- understand the different concepts of the business process
- perform the modeling of business processes
- know the standard of business modeling notation
- manipulate the Bonita BPM platform in practice.

### 1.2: Prerequisites

- No prerequisites are required.

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
Chapter 1	Business process	6	- Understand the notion of the business process and the different steps of business process modeling
Chapter 2	BPMN	9	- Understand the standard of business modeling notation
Chapter 3	Bonita BPM	13	- Manipulate the Bonita BPM platform in practice.

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	15
Practical work (h)	13
Project (h)	0
Visits (h)	0

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### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work	-	-
Mid-term	Chapter 1+Chapter 2	30%
Oral test	-	0
Final exam	All chapters	70%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- CARMONA, Josep, ENGELS, Gregor, and KUMAR, Akhil (ed.). Business Process Management: 15th International Conference, BPM 2017, Barcelona, Spain, September 10–15, 2017, Proceedings. Springer, 2017.
- <https://documentation.bonitasoft.com/bonita/7.9/>

## Title of the Module

Programming Mobile  
Code: GINF\_GLID 04 206

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>X</b>			

**Teacher: Hadhri Sami**

**Grade: Technologist**

**University: ISET**

**Email:**

**hadhri.sami@gmail.com**

**Total module duration**

**49 h**

Contact hours	Out of class activities
<b>28h</b>	<b>21h</b>

**The equivalent credits**  
**2 ECTS**

**Semester 4**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the main concepts needed for the design and implementation of Android applications for mobile devices. Emphasis is placed on several concepts including handling notifications, using multimedia and graphics and incorporating touch and gestures into applications.

### Objectives

On the completion of this course, the student should be able:

- Understand a mobile platform to develop mobile applications on Google Phones devices
- Discover the architecture of mobile systems and the functionalities of a smartphone
- Manipulate widgets to build the graphical interface
- Develop a custom Android application

### 1.2: Prerequisites

- The basic notions of object-oriented programming
- Java language

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Android architecture	3	<ul style="list-style-type: none"> <li>- Understand the different folders that make up an Android project</li> <li>- Understand the Android Studio development environment</li> </ul>
<b>Chapter 2</b>	Android widgets	3	<ul style="list-style-type: none"> <li>- Use widgets to build the graphical interface</li> <li>- Use layouts to organize widgets</li> </ul>
<b>Chapter 3</b>	Spinner	3	<ul style="list-style-type: none"> <li>- Use a Spinner statically</li> <li>- Start an activity B from an activity A</li> <li>- Know the life cycle of an activity</li> </ul>
<b>Chapter 4</b>	ListView	3	<ul style="list-style-type: none"> <li>- Use the ListView widget dynamically via an ArrayAdapter</li> <li>- Use Table Layouts to organize widgets</li> </ul>
<b>Chapter 5</b>		3	<ul style="list-style-type: none"> <li>- Use several activities in an</li> </ul>

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	RadioButton and DatePicker widgets		Android project <ul style="list-style-type: none"> <li>- Pass data between 2 activities</li> <li>- Discover the Radio Button and Date Picker widgets</li> </ul>
<b>Chapter 6</b>	Shared preferences	3	<ul style="list-style-type: none"> <li>- State the different methods of data persistence</li> <li>- Backup local data through shared preferences</li> </ul>
<b>Chapter 7</b>	SQLite	6	<ul style="list-style-type: none"> <li>- Use the SQLiteOpenHelper, SQLiteDatabase classes to create a SQLite database</li> <li>- Query the database (CRUD methods) using the ContentValues and Cursor classes</li> </ul>
<b>Chapter 8</b>	XAMPP 5.5.38	3	<ul style="list-style-type: none"> <li>- Apply mobile solutions that manage a remote database through a web service</li> </ul>
<b>Chapter 9</b>	Google Maps Android API Key	3	<ul style="list-style-type: none"> <li>- Access and display GPS coordinates (longitude &amp; latitude)</li> <li>- View a "Google Maps" map in an application</li> <li>- Add markers to the map</li> </ul>

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	11
Practical work (h)	12
Project (h)	5
Visits (h)	0



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### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	20%
Practical work	All chapters	10%
Mid-term	Chapter 1→Chapter 4	20%
Oral test	-	0
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- FIRTMAN, Maximiliano. Programming the Mobile Web: Reaching Users on iPhone, Android, BlackBerry, Windows Phone, and more. " O'Reilly Media, Inc.", 2013.
- MEDNIEKS, Zigurd R., DORNIN, Laird, MEIKE, G. Blake, et al. Programming android. " O'Reilly Media, Inc.", 2012.
- DiMarzio, Jerome. Beginning Android Programming with Android Studio. John Wiley & Sons, 2016.

## Title of the Module

Quality and software test

Code: GINF\_GLID 04 202

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Imen Akrouit**

**Grade: Expert - Engineer**

**University: PRIMATEC**

**Email:**

**akrouit.imen@gmail.com**

**Total module duration**

**56h**

Contact hours	Out of class activities
28h	28h

**The equivalent credits**

**2 ECTS**

**Semester 4**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the basic concepts related to quality and Software Testing. It includes activities and related techniques, which ensure the implementation of appropriate functionalities that satisfy the requirements of its targeted users for the intended software system.

#### Objectives

On the completion of this course, the student should be able to:

- understand software testing and quality assurance as a main phase of software life cycle
- perform software-testing activities using modern software tools
- choose the appropriate testing strategies and develop test cases
- estimate cost of a testing and quality assurance project and manage budgets

### 1.2: Prerequisites

- good level of programming experience in Java and/or C++
- basic understanding of information systems

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	The basics of software testing	3	<ul style="list-style-type: none"> <li>- Understand the need of software testing</li> <li>- Master the basic concepts of software testing</li> </ul>
<b>Chapter 2</b>	Software testing levels	9	<ul style="list-style-type: none"> <li>- Understand the levels of software testing (unit testing, integration testing, etc.)</li> </ul>
<b>Chapter 3</b>	Types of software tests	7	<ul style="list-style-type: none"> <li>- Understand types of software testing</li> </ul>
<b>Chapter 4</b>	Test Management	6	<ul style="list-style-type: none"> <li>- Understand the test management process</li> <li>- Use modern software tools to perform software-testing activities</li> </ul>
<b>Chapter 5</b>	Software quality	3	<ul style="list-style-type: none"> <li>- Understand the notions of software quality</li> </ul>

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	16
Practical work (h)	12
Project (h)	0
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work	All chapters	20%
Mid-term	Chapter 1 → Chapter 3	20%
Oral test	-	0
Final exam	All chapters	60%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Harvey Black, Rex, Managing the Testing Process: Practical Tools and Techniques for Managing Hardware and Software Testing, 2nd Edition, 2009.
- Kathy Schwalbe, Information Technology Project Management, Course Technology Eclipse Distilled, Carlson, David, Addison-Wesley, 2005.

## Title of the Module

Teamwork and engineering leadership

Code: GINF\_GLID 04 203

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>x</b>			

**Teacher: Mohamed Menaa**

**Grade: Master Technologist**

**University: ISET-Sfax**

**Email:**

**medmanaa.iset@gmail.com**

**Total module duration**

**28h**

Contact hours	Out of class activities
<b>21h</b>	<b>7h</b>

**The equivalent credits**

**1 ECTS**

**Semester 4**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course provides a foundation for decision-making, consensus-building, and problem-solving within a group environment. It begins by unpacking the main skills it takes for individuals to work collaboratively with others, like social-emotional intelligence, communication and trust. In addition, it presents the advantages of diversity to enhance teamwork outcomes. This course consists also in practicing advanced teamwork skills, like negotiation and conflict resolution.

### Objectives

On the completion of this course, the student will:

- gain extensive experience working with various teams on different tasks
- be more effective at working with others
- understand how culture and identity can influence teamwork and group processes
- apply knowledge of team to propose solutions for modern problems facing groups

### 1.2: Prerequisites

None

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Self-knowledge and recognition of difference	3	<ul style="list-style-type: none"> <li>- Understand how our social identities, like gender and culture, can shape our work ways and our interactions with others.</li> <li>- Understand how diversity can enhance teamwork outcomes, like creativity and problem-solving</li> </ul>
<b>Chapter 2</b>	Pattern and characteristics of interpersonal communication	3	<ul style="list-style-type: none"> <li>- Measure of a person's ability to operate within business organizations through social communication and interactions</li> </ul>
<b>Chapter 3</b>	Emotions, type of behavior, positive communication	3	<ul style="list-style-type: none"> <li>- Learn how to build positive communication skills</li> </ul>
<b>Chapter 4</b>	Requirements, functions and techniques	3	<ul style="list-style-type: none"> <li>- Know the main requirements and techniques needed to ensure teamwork</li> </ul>

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<b>Chapter 5</b>	Interpersonal conflict management	3	<ul style="list-style-type: none"> <li>- Understand the interpersonal conflict</li> <li>- Learn the interpersonal conflict management strategies and how to handle conflict in a positive way</li> </ul>
<b>Chapter 6</b>	Knowledge and practice of teamwork dynamics and organization	3	<ul style="list-style-type: none"> <li>- understand the complexities of group dynamics and interactions</li> </ul>
<b>Chapter 7</b>	Animation, leadership styles	3	<ul style="list-style-type: none"> <li>- understand and appreciate other leadership styles</li> </ul>

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	21
Practical work (h)	0
Project (h)	0
Visits (h)	0

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work	-	-
Mid-term	Chapter 1→Chapter 4	30%
Oral test	-	-
Final exam	All chapters	70%

## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Salas, Eduardo, Clint A. Bowers, and Eleana Edens, eds. *Improving teamwork in organizations: Applications of resource management training*. CRC Press, 2001.
- Mackall, Dandi Daley. *Teamwork Skills*. Infobase Publishing, 2004.
- Mujtaba, Bahaudin G. *Managerial skills and practices for global leadership*. ILEAD Academy, 2013.

## Title of the Module

Advanced Information Systems Modeling (Design Pattern)

Code: GINF\_GLID 04 201

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Riadh Ben halima**

**Grade: Assistant professor**

**University: ENIS**

**Email:**

**Riadh.benhalima@enis.tn**

**Total module duration**

**70 h**

Contact hours	Out of class activities
35h	35h

**The equivalent credits**

**3 ECTS**

**Semester 4**



## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces design patterns, which are used as reusable solutions for the creation of flexible, reusable, reliable and maintainable software applications. It offers students a hands-on opportunity to apply creational, functional and behavioral design patterns, as well as architectural patterns, in a software design.

### Objectives

On the completion of this course, the student will:

- understand the main advantages of using design patterns
- be able to use the language of patterns to find and to record solutions to recurring problems of system architecture
- have personal practical experience of a number of the best and most useful patterns such as Strategy, Observer, Decorator, Factory and Singleton.
- be able to select and apply the most appropriate pattern for a given scenario

### 1.2: Prerequisites

- At least one object-oriented programming language
- Algorithms and data structures
- Modelling language (UML) for object-oriented systems

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	History & Motivation	2	<ul style="list-style-type: none"> <li>- Understand the history of design patterns</li> <li>- Know the main advantages of design patterns</li> </ul>
<b>Chapter 2</b>	The pattern "Strategy"	4	<ul style="list-style-type: none"> <li>- Understand the main concepts of the pattern "Strategy"</li> <li>- Be able to apply the strategy pattern for a given scenario</li> </ul>
<b>Chapter 3</b>	The pattern "Observer"	3	<ul style="list-style-type: none"> <li>- Understand the main notions of the pattern "Observer"</li> <li>- Be able to use the observer pattern to design a given scenario</li> </ul>
<b>Chapter 4</b>	The pattern "Decorator"	3	<ul style="list-style-type: none"> <li>- Know the essential notions of the pattern "Decorator"</li> <li>- Learn to use the decorator pattern to design some examples</li> </ul>

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<b>Chapter 5</b>	The pattern "Factory"	4	<ul style="list-style-type: none"> <li>- Understand the main notions of the pattern "Factory"</li> <li>- Learn to use the Factory pattern to design some examples</li> </ul>
<b>Chapter 6</b>	The pattern "Singleton"	2	<ul style="list-style-type: none"> <li>- Understand the main features of the pattern "Singleton"</li> <li>- Learn to use the Singleton pattern to design some examples</li> </ul>
<b>Chapter 7</b>	The pattern "Command"	4	<ul style="list-style-type: none"> <li>- Understand the main features of the pattern "Command"</li> <li>- Be able to use the Command pattern to design some examples</li> </ul>
<b>Chapter 8</b>	Other patterns	8	<ul style="list-style-type: none"> <li>- Present the remaining patterns: Adapter, Builder, State, Iterator, etc.</li> </ul>

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	20
Practical work (h)	15
Project (h)	0
Visits (h)	0

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work	All chapters	20%
Mid-term	Chapter 1+Chapter 2	30%
Oral test	-	-
Final exam	All chapters	50%

#### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- FREEMAN, Eric, ROBSON, Elisabeth, BATES, Bert, et al. Head first design patterns. «O'Reilly Media, Inc.", 2008.
- Alan Shalloway, James Trott, "Design Patterns Explained: A New Perspective on Object Oriented Design", Addison-Wesley, 2005

### Title of the Module

Business English Certificate

B1//B2

**Code:**GINF\_GLID 04 110

GINF\_GLID 04 213

**Teacher: Nada BEN MAHFOUDH FOURATI**

**Grade: Full-time faculty member**

**University: International Institute of Technology**

**Email:**

**Nada.benmahfoudh@iit.ens.tn**

**Total module duration**

**35 h \* 2**

Contact hours	Out of class activities
35	35

**The equivalent credits**

**3 ECTS**

**Semester 3 + 4**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course focuses on familiarizing students with the level and content of the BUSINESS ENGLISH CERTIFICATE abbreviated as BEC. It prepares students to communicate in a good way whether in a written way or orally in the context of work. Each lesson is organized so that it develops and enhances all skills and sub-skills necessary to learn the English language adequately and to be familiarized with international tests.

According to the European framework, the BEC PRELIMINARY is B1.

### Objectives

The student will be able to:

- ✓ To use English in an International context of business.
- ✓ To help students revise the necessary skills to learn business English and to sit for the exam
- ✓ To learn time management
- ✓ To encourage students to speak
- ✓ To enhance students to write correctly and up to the point.


### 1.2: Prerequisites

The student should have the level A2 in order to follow these lectures.

When the student is B1 in General English, he excels and gets the gist of these tasks and training

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	<ul style="list-style-type: none"> <li>- Getting to know each other</li> <li>- Introduction to the main axes of the course</li> <li>- Job Application Employment</li> </ul>	23 h	<ul style="list-style-type: none"> <li>- To know the benefits and the utility of learning business English</li> <li>- To understand the context in which business English is used</li> <li>- To differentiate and use formal and informal language</li> <li>- To establish the link between learning English and being prepared for the professional career</li> </ul>
<b>Chapter 2</b>	<ul style="list-style-type: none"> <li>- Travel / Business Accommodation/ Organizing a conference</li> </ul>	12 h	<ul style="list-style-type: none"> <li>- To learn the vocabulary related to accommodation</li> <li>- To discover another context of business English in which you should necessarily use a foreign language</li> </ul>
<b>Chapter 3</b>	<ul style="list-style-type: none"> <li>- Money</li> <li>- Graphs and Charts</li> </ul>	10 h	<ul style="list-style-type: none"> <li>- To understand that business</li> </ul>

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			English can be part of their engineering knowledge	
			<ul style="list-style-type: none"> <li>- To learn the comparative, the superlative, contrasting words, adverbs ... that describe a movement in a graph</li> </ul>	
<b>Chapter 4</b>	- Exams	25 h	<ul style="list-style-type: none"> <li>- To understand the format of the exam</li> <li>- To learn that time management is an important skill to succeed in this certificate</li> <li>- To raise the student's awareness that the exam covers the four skills</li> </ul>	

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	20
Practical work (h)	15
Project (h)	
Visits (h)	

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	Chapter 1, 2	15%
Oral test	Chapter 2,3	15%
Final exam	All chapters	70%

## 3. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- English for Business
- Pass Cambridge BEC Preliminary

## MODULE DESCRIPTION

### Title of the Module

Business Intelligence  
Code GINF\_GLID 04 212

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Noura Azaiez**

**Grade: Expert**

**University: IIT**

**Email:**

**noura.azaiez@gmail.com**

**Total module duration**

**56h**

Contact hours	Out of class activities
28h	28h

**The equivalent credits**  
**2 ECTS**

**Semester 4**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course provides an overview of the technology of Business Intelligence (BI) and its application to an organization's strategies and goals. It refers to technologies, applications, and practices for the collection, integration, analysis, and presentation of business information.

### 2.2: Objectives

On the completion of this course, the student should be able to:

- master the concepts related to Business Intelligence, namely OLAP cubes, MDX language
- identify how various business intelligence systems can contribute to organizational success
- apply common methods used in business intelligence
- manipulate the SSAS tool
- generate reports via the PowerBI tool


### 1.2: Prerequisites

- Basic understanding of Data warehouse course

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Introduction to Business Intelligence	3	<ul style="list-style-type: none"> <li>- Understand the main concepts of Business Intelligence: BI architecture, OLAP cubes, multidimensional manipulation</li> </ul>
<b>Chapter 2</b>	BI features	3	<ul style="list-style-type: none"> <li>- Learn to use the OLAP rules</li> <li>- Know the essential notions of BI analysis cycle, BI analysis types and BI application design</li> <li>- Understand the BI application characteristics</li> </ul>
<b>Chapter 3</b>	Introduction to Multi-Dimensional Expressions MDX language for OLAP	6	<ul style="list-style-type: none"> <li>- Understand the MDX basic syntax, members and tuples in MDX, functions on MDX members and sets, advanced MDX expressions</li> </ul>
<b>Chapter 4</b>	Microsoft SQL SERVER Analysis Service SSAS	12	<ul style="list-style-type: none"> <li>- Learn to use the Microsoft SQL Server tool, SSAS features, SSAS benefits, performance indicators (KPI)</li> </ul>



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<b>Chapter 5</b>	Microsoft Power BI Desktop	6	<ul style="list-style-type: none"> <li>- Learn the Microsoft Power BI Desktop tool, Power BI Desktop features</li> <li>- Understand the Data Analysis Expressions (DAX) + examples, example report creation and publication</li> </ul>	

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	16
Practical work (h)	12
Project (h)	0
Visits (h)	0

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work	Chapter 4+Chapter 5	20%
Mid-term	Chapter 1+Chapter 2+Chapter 3	30%
Oral test	-	-
Final exam	All chapters	50%

## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Negash, S., & Gray, P. (2008). Business intelligence. In *Handbook on decision support systems 2* (pp. 175-193). Springer, Berlin, Heidelberg.
- MÜLLER, Roland M. et LENZ, Hans-Joachim. *Business intelligence*. Berlin, Heidelberg: Springer Berlin Heidelberg, 2013.
- Lachev, Teo, and Edward Price. *Applied Microsoft Power BI: Bring your data to life!*. Prologika Press, 2017.

## MODULE DESCRIPTION

### Title of the Module

Advanced software architecture: J2EE

Code: GINF\_ASR 05 104

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Riadh Ben Halima**

**Grade: Assistant Master**

**University: ENIS**

**Email:**

**riadh.benhalima@enis.tn**

**Total module duration**

**77 h**

Contact hours	Out of class activities
42	35

**The equivalent credits**

**3 ECTS**

**Semester 5**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course provides a comprehensive presentation of the JEE platform. It begins with a presentation of the evolutionary history of development approaches. Then, he explains the fundamental concepts of this specification in order to clearly control his results. Then, the technologies associated with this architecture are presented by focusing on the business layer and manipulating concrete cases. At the end of this course, participants will be able to understand JEE architecture and related technologies.

### Objectives

Thanks to this course, the student will be able to:

- understand the JEE architecture and associated technologies, including SpringBoot, JPA, etc.
- develop Spring-Boot applications with respect of recommendations from software architects.

### 1.2: Prerequisites

The student must have an understanding of the following concepts:

- The oriented object-oriented design
- The Java development language

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	History	3h	To learn: - Introduction & limits of the distributed object oriented approach - EJB component: 1.0, 2.x and 3.x
<b>Chapter 2</b>	Bean Session - Singleton Dependency injection (IoC)	6h	- To understand the difference between the types of session-EJB - Illustration on Eclipse
<b>Chapter 3</b>	Entity Bean (JPA)	6h	To learn: - JPA introduction - Entity - Relations between entities
<b>Chapter 4</b>	Implementation of an application in accordance with the EJB architecture	6h	To learn: - Entity - Session - Controller - JavaScript/JQuery/ Ajax/Bootstrap
<b>Chapter 5</b>	Spring-Boot	21 h	To learn: - Architecture of a SpringBoot application - SpringData - SpringSecurity

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	21
Practical work (h)	21
Project (h)	0
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work	All chapters	20%
Mid-term	Chapter 1→Chapter 3	30%
Oral test	-	-
Final exam	All chapters	50%

### 3. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Burke, Bill, and Richard Monson-Haefel. *Enterprise JavaBeans 3.0*. " O'Reilly Media, Inc.", 2006.
- Hutton, D. M. "Clean Code: A Handbook of Agile Software Craftsmanship." *Kybernetes* (2009).
- official website of Spring-boot : <https://spring.io/projects/spring-boot>

## Title of the Module

Network simulation and sizing

Code: GINF\_ASR 05 106

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
		x	

**Teacher: Amal Hammami**

Grade: expert

University: Tunisia Telecom

Email:

[amal.hammami.expert@gmail.com](mailto:amal.hammami.expert@gmail.com)

Total module duration

77h

Contact hours	Out of class activities
42	35

The equivalent credits

3 ECTS

Semester 5

## MODULE DESCRIPTION

### 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

#### 1.1: Course Description

This course describes and exposes the networks sizing, densification. It shows multiple access techniques for new generation of cellular networks.

#### Objectives

Making the student familiarized with networks sizing, planification and deployment of cellular networks. More specifically, the student will be able to plan a cellular networks PAR/PIRE/Perte. Moreover, students will understand Internet of Things and 4G/5G networks.

#### 1.2: Prerequisites

Networks concepts  
 Cellular network

#### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Mobile networks engineering	6	Understand the telecommunication radio mobile concepts
<b>Chapter 2</b>	Cellular networks planification	9	Understand the propagation mechanisms, to predict various metrics related to the propagation
<b>Chapter 3</b>	Isotropic antenna	9	Understand the sensitivity of a receiver as well as the gain and loss of an antenna. Enumerate the fundamental parameters of an antenna
<b>Chapter 4</b>	Networks, planification and quality of service	9	Understand the planification for a telecommunication network
<b>Chapter 5</b>	Limited spectrum heavy traffic	9	Frequencies allocation Pattern/Cluster Reuse distance

## MODULE DESCRIPTION

### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	30
Practical work (h)	8
Project (h)	
Visits (h)	3

### 3. EVALUATION:

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	1->3	30%
Oral test		
Final exam	1->5	70%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

Amal. Hammami. "Optimisation de la QoS d'un réseau mobile 3G++ (UMTS/HSPA++)", Editor : Editions universitaires Européennes (EUE), Editions Scholastic, Français, Published August 2018, ISBN : 978—613-8-41338-7.

X. lagrange, PH. Godlewski, S, Tabbane, "Réseaux GSM", 5<sup>th</sup> edition, Hermès 2000.

## Title of the Module

### DEVOPS

Code: GINF\_ASR 05 112

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Farouk Ellouze**

**Grade: Expert**

**University: IIT**

**Email:**

**farouk.ellouze@csys.com.tn**

**Total module duration**

**70h**

Contact hours	Out of class activities
35	35

**The equivalent credits**

**3 ECTS**

**Semester 5**



## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the fundamental concepts of the term DEVOPS. It aims at teaching the students why many organizations have adopted this model and what practices should be implemented in order to gain the maximum benefits from it.

#### Objectives

By the end of this course, the student will:

- be familiar with the major practices of DEVOPS
- have the chance to apply what he learned through a small project consisting of automating the process of building and deploying his source code
- improve his knowledge in multiple technologies such as Maven, Docker, Jenkins, etc.

### 1.2: Prerequisites

None

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
Chapter 1	What is DEVOPS	5 hours	- Understand the concept, pros, and practices of DEVOPS.
Chapter 2	Maven	10 hours	- Build a java project into a runnable artifact (jar, war, etc...)
Chapter 3	Docker	10 hours	-Learn the concept of containerization -Building, running Docker containers and connecting them with each other
Chapter 4	Jenkins	10 hours	- Automate the hole build and deploy process through CI/CD

## MODULE DESCRIPTION

### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	15
Practical work (h)	15
Project (h)	5
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	30%
Practical work		
Mid-term	Chapter 1→Chapter 2	20%
Oral test		
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Bass, Len, Ingo Weber, and Liming Zhu. DevOps: A software architect's perspective. Addison-Wesley Professional, 2015.
- Verona, Joakim. Practical DevOps. Packt Publishing Ltd, 2016.

## Title of the Module

### Audit and security

Code: GINF\_ASR 05 113

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Mohamed MANAA**

**Grade: Master Technologist**

**University: ISET Sfax**

Email:

medmanaa.iset@gmail.com

Total module duration

70 h

Contact hours	Out of class activities
35	35

The equivalent credits

3 ECTS

Semester 5

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course examines the key principles related to auditing information technology processes and related controls and is designed to meet the increasing needs of audit, compliance, security and risk management professionals.

### Objectives

The primary objectives of the course are to:

- Establish an understanding of the IT environment and the role of the IT auditor,
- Recognize how corporate and IT governance practices impact the IT audit process,
- Develop an understanding of the IT audit process i.e., risk assessment, planning, standards, guidelines and best practices, and
- Survey IT audit approaches to:
  - o Systems development and maintenance,
  - o IT security,
  - o IT service delivery and support,
  - o Business continuity and disaster recovery, and
  - o Data analytics and fraud detection


### 1.2: Prerequisites

It is recommended to have a basic general knowledge in:

- Operating system
- Networks (TCP / IP, ARP, DNS, ...)
- Information System

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	IT environment and role of the IT auditor	5hours	Understand business risk IT governance – the starting point
<b>Chapter 2</b>	Audit standards and pronouncements	10 hours	To master: <ul style="list-style-type: none"> <li>- AICPA, GAAP, GAAS, IIA, ISACA</li> <li>- Audit and other frameworks (tools of the trade)</li> <li>- COSO, COBIT, FFIEC, ISO, ITIL</li> </ul>
<b>Chapter 3</b>	IT audit process	10 hours	<ul style="list-style-type: none"> <li>- Develop the IT audit plan (Risk assessment, Audit universe, Audit planning)</li> <li>- Conduct the IT audit (Design risk-based audit procedures, Perform risk-based testing, Communication and</li> </ul>

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<b>Chapter 4</b>	Auditing IT security	10 hours	<ul style="list-style-type: none"> <li>- Risks defined</li> <li>- Security policy</li> <li>- Security architecture</li> <li>- Security processes</li> </ul>	

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	20
Practical work (h)	15
Project (h)	0
Visits (h)	0

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	1->2	30%
Oral test		
Final exam	1->4	70%

## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- William Stallings and Lawrie Brown, Computer Security Principles and Practice, (3rd Edition), Pearson, 2014
- Bruce Schneier, Applied Cryptography: Protocols, Algorithms and Source Code in C, Wiley, 2015
- Niels Ferguson, Bruce Schneier, and Tadayoshi Kohno, Cryptography Engineering: Design Principles and Practical Applications, John Wiley & Sons, 2010.

## MODULE DESCRIPTION

### Title of the Module

#### Cyber Security

Code: GINF\_ASR 05 114

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Mr. Mustapha Sakka**

**Grade: Expert**

**Email :**

**Sakka.mustapha@gmail.com**

**Total module duration**

**70 h**

Contact hours	Out of class activities
35	35

**The equivalent credits**  
**3 ECTS**

**Semester 5**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the concept of cyber security, its interdisciplinary nature and its relation to nation, businesses, society and people. Participating students would gain knowledge of various cyber security terminologies, technologies, protocols, threat analysis, security principles, security mechanisms, policies, forensics, incidence response and methods/practices to secure systems.

### Objectives

Upon successful completion of the course, the students will have:

- Reasonable understanding of the fundamentals of the cybersecurity domain and related issues
- Practical knowledge of various tools, processes and methods to ensure security of systems through a minimum of two hands-on assignments involving attack and protection in a virtual environment
- An understanding of the inter-disciplinary nature of cybersecurity domain
- Adequate level of cross-disciplinary knowledge of design, implementation, evaluation and testing of secure protocols, systems or applications
- Basic knowledge to be able to build bug-free systems, dependable during malice or error
- Foundational skills for developing expertise in one or more sub-domains of cyber-security

### 1.2: Prerequisites

It is recommended to have a basic general knowledge in:

- Operating system
- Networks (TCP / IP, ARP, DNS, ...)
- Information System

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Introduction to Cyber Security	5hours	Overview of Cyber Security, Internet Governance – Challenges and Constraints, Cyber Threats: - Cyber Warfare-Cyber Crime-Cyber terrorism-Cyber Espionage, Need for a Comprehensive Cyber Security Policy, Need for a Nodal Authority, Need for an International convention on Cyberspace.
<b>Chapter 2</b>	Cyber Security Vulnerabilities and Cyber Security Safeguards	10 hours	Know: Cyber Security Vulnerabilities- Overview, vulnerabilities in software, System administration, Complex Network Architectures, Open Access to Organizational

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			Data, Weak Authentication
<b>Chapter 3</b>	Securing Web Application, Services and Servers	10 hours	Master: Basic security for HTTP Applications and Services, Basic Security for SOAP Services, Identity Management and Web Services, Authorization Patterns, Security Consideration
<b>Chapter 4</b>	Intrusion Detection and Prevention	10 hours	Learn: Physical Theft, Abuse of Privileges, Unauthorized Access by Outsider, Malware infection, Intrusion detection and Prevention Techniques, Anti-Malware software, Network based Intrusion detection Systems, Network based Intrusion Prevention Systems

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	20
Practical work (h)	15
Project (h)	0
Visits (h)	0

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	1->2	30%
Oral test		
Final exam	1->4	70%



#### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Rhodes-Ousley, Mark. Information Security: The Complete Reference, Second Edition, Information Security Management: Concepts and Practice. New York, McGraw-Hill, 2013.
- Whitman, Michael E. and Herbert J. Mattord. Roadmap to Information Security for IT and Infosec Managers. Boston, MA: Course Technology, 2011.

## Title of the Module

### Architecture and security of E-commerce systems

Code: GINF\_ASR 05 115

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>X</b>			

**Teacher: Mohamed MANAA**

**Grade: Master Technologist**

**University: ISET Sfax**

**Email:**

**medmanaa.iset@gmail.com**

**Total module duration**

**70 h**

Contact hours	Out of class activities
35	35

**The equivalent credits**  
**3 ECTS**

**Semester 5**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

The course focuses on the technology, concepts, issues and principles that are important in the design and implementation of secure e-commerce system. The course examines technology for protecting electronic commerce. It includes discussion of basic security principles, as well as the issues, policy and standards particular to e-commerce applications

### Objectives

The objectives of the course are:

- to understand related technologies in order to develop a secure e-commerce system
- to understand the basic requirements for secure e-commerce systems
- to develop an understanding of the client/server architecture and the various components used in distributed systems
- to review areas of potential compromises in the security of client/server systems
- to be able to analyze the vulnerabilities of a given system and make recommendations for making the system more secure.
- to describe remedies for various existing security breaches in c/s systems and to show the methodologies required to make future systems less prone to security failures and outside attack

### 1.2: Prerequisites

The course requires knowledge of Internet and Internet applications, especially the WWW. The course also requires a basic knowledge of the communication protocols used on the Internet. Basic programming skill in C and C++ or Java is strongly recommended.

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Introduction: E-commerce on the Internet	5hours	To take an overview of e-commerce and related security principles and concepts
<b>Chapter 2</b>	Privacy and Security	10 hours	To learn privacy and security concerns as they pertain to users
<b>Chapter 3</b>	Web Technology	10 hours	To describe: Web system security, Web Server Security and Web Applications
<b>Chapter 4</b>	Digital Payments	10 hours	To learn secure e-commerce transactions and Public Key Infrastructure

## MODULE DESCRIPTION

### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	30
Practical work (h)	5
Project (h)	0
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	1->2	30%
Oral test		
Final exam	1->4	70%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Grafinkle, Simson, Web Security, Privacy and Commerce, 2<sup>nd</sup> Edition, O'Reilly, 2002.

## Title of the Module

### Development Platform of an E-Commerce solution

Code: GINF\_ASR 05 116

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>X</b>			

**Teacher: Nissan Masmoudi**

**Grade: master technologist**

**University: ISET-Sfax**

**Email:**

**Nissen.masmoudi@gmail.com**

**Total module duration**

**70 h**

Contact hours	Out of class activities
<b>35</b>	<b>35</b>

**The equivalent credits**

**3 ECTS**

**Semester 5**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

The course focuses on the theory and practice of doing business over the Internet and World Wide Web. Topical coverage includes an overview of the economic foundations, infrastructure, technologies, and business strategies of E-Commerce.

### Objectives

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

- To describe the Foundations of e-commerce.
- To Describe And Plan With The Infrastructure Supporting Ecommerce Transactions.
- To Describe Technologies And Platforms Supporting Ecommerce.
- To Implement E-Commerce Solutions Across Transaction Types And Endpoints.
- To suggest e-commerce solutions to fit particular Business Strategies

### 1.2: Prerequisites

The course requires knowledge of Internet and Internet applications, especially the WWW. The course also requires a basic knowledge of the communication protocols used on the Internet.

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
Chapter 1	Introduction	5hours	Explain what Ecommerce is. Explain how Ecommerce works on the Internet. Explain the forces behind Ecommerce Discuss the role of Ecommerce in the current business world.
Chapter 2	The Infrastructure of Ecommerce	10 hours	Demonstrate how TCP/IP and Packet switching works Demonstrate Markup Languages Explain relationships between web client/server Differentiate Internet/Intranet/Extranet
Chapter 3	Software solutions	10 hours	Explain the different kinds of hosting solutions and software that runs them. Differentiate software solutions based on company size.
Chapter 4	Project	10 hours	Implement, in simulation or authentically, an ecommerce site

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	25
Practical work (h)	10
Project (h)	0
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	1->4	30%
Practical work		
Mid-term		
Oral test		
Final exam	1->4	70%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- E-Commerce Essentials by Kenneth C. Laudon and Carol Traver. 2013. ISBN-13: 978-0133544985

### Title of the Module

#### Personalized Professional Project (PPP)

Code: GINF\_ASR 05 101

**Teacher: Mrs. Amel Trabelsi Elloumi**

**Grade: Ph.D. in economics**

Full-time faculty member

Head of the department of career preparation

**University: International Institute of Technology**

**Email:**

**Dep.PCP@iit.ens.tn**

**Total module duration**

**56 h**

Contact hours	Out of class activities
28	28

**The equivalent credits**

**2 ECTS**

**Semester 5**



## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description:

- **P** as **P**roject: before job search or further study
- **P** as **P**rofessional: to move towards a trade or a sector of activity
- **P** as **P**ersonal: after reflecting on their own abilities and needs

### Objectives

This course aims to:

- Teach the student to get to know himself better in order to evaluate his professional potential skills.
- Prepare him for professional integration.
- Make it confront the professional reality.
- Help him to be an actor of his professional future

### 1.2: Prerequisites

- CV
- Entrepreneurship culture
- Behavioral and professional skills

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Self-knowledge	8 hours	What I am (to know how to be)! What I know (know)! What I can do (know how)!
<b>Chapter 2</b>	Choice of profession	8 hours	What I can do!
<b>Chapter 3</b>	Development of an action plan	5 hours	How to do (job search techniques, CV, LM ...)?
<b>Chapter 4</b>	Rehearsals	7 hours	To train students to present their skills in a way that imitates the job interview

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	Yes
Practical work (h)	Yes
Project (h)	Yes
Visits (h)	No

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All projects	70%
Practical work		
Mid-term		
Oral test	Chapter 1,2 and 3	30%
Final exam		

## MODULE DESCRIPTION

### Title of the Module

Project management  
Code: GINF\_ASR 05 102

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
			X

**Teacher: Mohamed Elleuch**

**Grade: Technologist**

**University: ISET Sfax**

**Email :**

[meelleuch@gmail.com](mailto:meelleuch@gmail.com)

**Total module duration**

**49h**

Contact hours	Out of class activities
28h	21h

**The equivalent credits**  
**2 ECTS**

**Semester 5**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the basic concepts related to project management and productivity. It consists in examining activities related to project planning and estimating project scope and schedule.

### Objectives

On the completion of this course, the student should be able to:

- acquire organizational and management techniques to efficiently carry out projects within the deadlines, the budget and the expected performance of the company.
- master the use of MS Project tool

### 1.2: Prerequisites

- Software engineering

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Introduction to project management	6	<ul style="list-style-type: none"> <li>- Understand the definition of project concept, project management and productivity</li> <li>- Understand the paradox of project management</li> <li>- Master the methods of conducting and managing projects.</li> <li>- Introduce some concepts of Devops</li> </ul>
<b>Chapter 2</b>	project in the company	3	<ul style="list-style-type: none"> <li>- Understand the advantages and disadvantages of the project in the economic context</li> <li>- Master the selection of the organization mode of the projects taking into account the organizational strategy and the culture of the company</li> </ul>
<b>Chapter 3</b>	Planification and estimation	6	<ul style="list-style-type: none"> <li>- Master Gantt diagram and pert Diagram</li> </ul>
<b>Chapter 4</b>	MS project	10	<ul style="list-style-type: none"> <li>- Master the use of MS Project</li> </ul>
<b>Chapter 5</b>	Audit and project closure	3	Master: <ul style="list-style-type: none"> <li>- The leadership</li> <li>- Audit and project closure</li> </ul>

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	12
Practical work (h)	10
Project (h)	6
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	20%
Practical work	All chapters	10%
Mid-term	Chapter 1→Chapter 3	20%
Oral test	-	0
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Oberlender, Garold D. Project management for engineering and construction. McGraw-Hill Education, 2014.
- Cooper, Dale F., and al. Project risk management guidelines: Managing risk in large projects and complex procurements. Chichester: Wiley, 2005.

## MODULE DESCRIPTION

### Title of the Module

Quality of Service in Networks

Code: GINF\_ASR 05 107

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
		x	

**Teacher: Aref Jarraya**

**Grade: Expert**

**University: Tunisie Telecom**

**Email:**

**aref.jarraya@tunisiatelecom.tn**

**Total module duration**

**77h**

Contact hours	Out of class activities
42	35

**The equivalent credits**

**3 ECTS**

**Semester 5**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

The course gives a basic knowledge in QoS through metrics, algorithms, routing protocols and their application in the performance evaluation of communication systems. This course covers the principles and algorithms that arise in the QoS provision over different kind of networks, mainly in constrained wireless networks such as the infrastructure less ad hoc networks

### Objectives

- Knowledge of the main algorithms for packet forwarding and classification, scheduling, traffic shaping and policing, congestion control.
- Knowledge of the main architectures to provide QoS on the Internet.
- Ability to discuss and analyse the performance of different routing protocols.
- Ability to carry out performance evaluations of QoS-aware routing protocols in communication systems using the NS-2 simulator.
- Ability to discuss and analyse the results of a performance evaluation of routing protocols in communication systems using NS-2 simulations.
- QoS-aware routing protocols for MANETs (Mobile Adhoc Networks) and VANETs (Vehicular Adhoc Networks)
- Smart City applications involving VANETs and multimedia services

### 1.2: Prerequisites

Mobile networks 2G/3G/4G

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Introduction	6	- Introduction. QoS architectures for the Internet: IntServ, RSVP, Diffserv. - Different classes of services and their QoS requirements (ftp, video-streaming). - Introduction to the practices to be done with the Network Simulator NS-2.
<b>Chapter 2</b>	Algorithms to provide QoS	6	Master: - Traffic policing and traffic shaping algorithms. Leaky bucket algorithms. - Algorithms to provide QoS locally: Scheduling algorithms (FIFO, RR, WRR <sub>i</sub> ) - Queuing algorithms (RED, WRED, RIO, CBQ <sub>i</sub> ) - Introduction to simple

			network scenarios using NS-2
<b>Chapter 3</b>	Routing protocols and QoS	12	<ul style="list-style-type: none"> <li>- Classification of routing protocols in communication networks from the QoS perspective.</li> <li>- Routing protocols for ad hoc networks and QoS offered by each one: Terminology, basics and applications, characteristics of ad hoc communication, ad hoc routing protocols (AODV, OLSR, DSR, GPSR<sub>i</sub>).</li> <li>- Simulation of network scenarios for different routing protocols.</li> </ul>
<b>Chapter 4</b>	QoS metrics used in routing protocols. QoS parameters used in performance evaluation	9	<p>Master:</p> <ul style="list-style-type: none"> <li>- QoS parameters (delay, jitter delay, percentage of packet losses, throughput)</li> <li>- QoS metrics (distance, available bandwidth, delay, jitter delay, losses, load).</li> <li>- Advanced QoS metrics for ad hoc networks (path quality, link lifetime, battery lifetime, nodes' density, nodes' trajectory<sub>i</sub>).</li> <li>- Measure of QoS parameters using real traces from simulations.</li> <li>- Performance evaluation of proposals of QoS-aware routing protocols compared to traditional routing protocols based only on the distance to destination.</li> </ul>
<b>Chapter 5</b>	Advanced QoS-aware routing protocols considering different QoS metrics.	9	<p>Master:</p> <ul style="list-style-type: none"> <li>- QoS parameters (delay, jitter delay, percentage of packet losses, throughput)</li> <li>- QoS metrics (distance, available bandwidth, delay, jitter delay, losses, load).</li> <li>- Advanced QoS metrics for ad hoc networks (path quality, link lifetime, battery lifetime, nodes' density, nodes' trajectory).</li> <li>- Confidence intervals of simulation results.</li> </ul>



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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	30
Practical work (h)	12
Project (h)	
Visits (h)	

### 3. EVALUATION:

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	1->3	30%
Oral test		
Final exam	1->5	70%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

Braun, T. [et al.]. End-to-end quality of service over heterogeneous networks [on line]. New York: Springer, 2008 [Consultation: 08/10/2014]. Available on: <http://site.ebrary.com/lib/upcatalunya/docDetail.action?docID=10240702>. ISBN 9783540791201.

# MODULE DESCRIPTION

## Title of the Module

### Big Data

Code: GINF\_ASR 05 105

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>X</b>			

**Teacher: Mohamed MANAA**

**Grade: Master Technologist**

**University: ISET Sfax**

**Email:**

**medmanaa.iset@gmail.com**

**Total module duration**

**77 h**

Contact hours	Out of class activities
<b>42</b>	<b>35</b>

**The equivalent credits**  
**3 ECTS**

**Semester 5**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course prepares students to use the Big Data platform and methodologies in order to collect and analyze large amounts of data from different sources. This will require skills in Big Data architecture, such as Apache Hadoop, Ambari, Spark, Big SQL, HDFS, YARN, MapReduce, ZooKeeper, Knox, Sqoop, and HBase.

### Objectives

The objective of the course is to familiarize students with big data analysis as a tool for addressing substantive research questions. The course begins with a basic introduction to big data and discusses what the analysis of these data entails, as well as associated technical, conceptual and ethical challenges. It also provides a first hands-on experience in handling and analyzing large, complex data structures. The course is designed as a primer for anyone interested in attaining a basic understanding of what big data analysis entails. There are no prerequisite requirements for this course.

At the end of this course, the student will be able to set for IBM Big Data engineer certificate.

### 1.2: Prerequisites

It is recommended to have a basic general culture in:

- ✓ Databases
- ✓ Networks
- ✓ SQL (Structured Query Language)

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Introduction to Big Data and Data Analytics	6 hours	Develop an understanding of the complete open-source Hadoop ecosystem and its near-term future directions
<b>Chapter 2</b>	Hadoop: HDFS/MapReduce	9 hours	Master the basics of the technology: Hadoop & HDFS, MapReduce & YARN, Spark
<b>Chapter 3</b>	Hadoop Query Languages	9 hours	Describe and compare the open-source programming languages, Pig and Hive
<b>Chapter 4</b>	NoSQL	9 hours	Learn the list the characteristics of the four types of NoSQL datastores
<b>Chapter 5</b>	Big SQL	9 hours	Understand how Big SQL fits in the Hadoop architecture

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	24
Practical work (h)	18
Project (h)	0
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work	1->6	20%
Mid-term	1->3	30%
Oral test		
Final exam	1->6	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

Brian Godsey: Think Like a Data Scientist, Manning Publications, 2017

IBM Big Data Engineer official certification course, IBM Academy Skills; 2018

## Title of the Module

WAN technology (CCNA 4)

Code: GINF\_ASR 05 108

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
		x	

**Teacher: Lotfi Tlili**

**Grade: Technologist Professor**

**University: ISET Sfax**

Email:

[tlili.lotfi@yahoo.fr](mailto:tlili.lotfi@yahoo.fr)

Total module duration

77h

Contact hours	Out of class activities
42	35

The equivalent credits

3 ECTS

Semester 5

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course describes and exposes the most important notions and concepts related to the networks' connection. Moreover, it defines the security requirements and the monitoring tools and metrics essential in the network's connection.

### Objectives

Upon completion of this course, students should be able to:

- define and describe routing functionality and packet forwarding in the language of the OSI and TCP/IP models,
- describe, and categorize routing protocol characteristics, topologies, and operation including RIP, EIGRP, and OSPF and
- Perform basic router configuration, administration, and troubleshooting.

### 1.2: Prerequisites

Networks concepts and protocols such as:

- WAN
- NAT
- VPN

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Course presentation	1	Understand the objectives and the importance of the CCNA4 certifications
<b>Chapter 2</b>	hierarchical conception of networks	4	Enumerate the various models of hierarchical networks
<b>Chapter 3</b>	Connection to WAN	6	Understand the WAN network, the way to establish a connection and a data transition
<b>Chapter 4</b>	Point-to-point connections (PPP)	4	Understand the PPP protocol, and the way to establish a session.
<b>Chapter 5</b>	Frame Relay	4	Understand the overall technologies and concepts related to the frame relay such as LMI & DLCI interface, the switching table and transmission process and the way to configure it

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<b>Chapter 6</b>	Network address translation for IPv4 (NAT)	4	Understand the private and public addressing, addresses translation, and the way to configure the NAT
<b>Chapter 7</b>	Broadband solutions	4	Enumerate and to understand the various broadband solutions and technologies
<b>Chapter 8</b>	Secure site-to-site connection (VPN)	5	Secure the site-to-site connection
<b>Chapter 9</b>	Network monitoring (SNMP)	4	Understand the functionalities of the SNMP protocol
<b>Chapter 10</b>	Fix the networks problems	4	Detect networks problems, predict them and providing solutions

### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	20h
Practical work (h)	22h
Project (h)	-
Visits (h)	-

### 3. EVALUATION:

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	1->5	30%
Oral test		
Final exam	1->10	70%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

ROBIN Eric, TOURRES Grégoire, VERNERIE Matthieu, HOSEN Abdool & BODIN Laurent,  
 « CCNA 4 - Essentiel Réseaux et technologies WAN ».

## Title of the Module

Network infrastructure security (CCNAS)

Code: GINF\_ASR 05 109

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
		x	

**Teacher: Lotfi Tlili**

**Grade: Technologist Professor**

**University: ISET Sfax**

**Email:**

[tlili.lotfi@yahoo.fr](mailto:tlili.lotfi@yahoo.fr)

**Total module duration**

**77 h**

Contact hours	Out of class activities
42	35

**The equivalent credits**  
**3 ECTS**

**Semester 5**



## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course enhances the students' knowledge of securing Cisco routers and switches and their associated networks. It leads to validate skills for installing, troubleshooting, and monitoring network devices to maintain the integrity, confidentiality, and availability of data and devices and develops skills in the technologies that Cisco uses in its network infrastructure.

### Objectives


With a CCNA Security certification, student demonstrates the skills required to develop a security infrastructure, recognize threats and vulnerabilities to networks, and to mitigate security threats. The CCNA Security curriculum emphasizes core security technologies, the installation, troubleshooting and monitoring of network devices to maintain integrity, confidentiality and availability of data and devices, and competency in the technologies that Cisco uses in its security structure.

### 1.2: Prerequisites

Passing the CCNA 1 and 2. The course requires familiarity with using the Internet as well as some basic keyboard and office-style application skills.

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Modern Network Security Threats	3	Explain network threats, mitigation techniques, and the basics of securing a network
<b>Chapter 2</b>	Securing Network Devices	4	Secure administrative access on Cisco routers
<b>Chapter 3</b>	Authentication, Authorization and Accounting (AAA)	4	Secure administrative access with AAA
<b>Chapter 4</b>	Implementing Firewall Technologies	6	Implement firewall technologies to ensure network perimeter security
<b>Chapter 5</b>	Implementing Intrusion Prevention	4	Configure IPS to Mitigate Network Security Breaches
<b>Chapter 6</b>	Securing the Local Area Network	4	Describe LAN security considerations and implement the security and characteristics of layer equipment
<b>Chapter 7</b>	Cryptography systems	4	Describe the methods of implementing data confidentiality and integrity
<b>Chapter 8</b>	Implementing Virtual Private Networks	4	Set up secure virtual private networks
<b>Chapter 9</b>	Managing a Secure Network	4	Create and implement a comprehensive approach to a

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			security policy, taking into account the security needs of the company
<b>Chapter 10</b>	Implementing the Cisco Adaptive Security Appliance	4	Implement firewall technologies using the ASA to secure the network perimeter.

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	20
Practical work (h)	22
Project (h)	-
Visits (h)	-

## 3. EVALUATION:

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	1->4	30%
Oral test		
Final exam	1->10	70%

## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

CCNA Security 210-260 Official Cert Guide 1 Edition (English, Paperback, Santos Omar)

## Title of the Module

### Microservices

Code: GINF\_ASR 05 111

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>x</b>			

**Teacher: Farouk Ellouze**

**Grade: expert**

**Email:**

**farouk.ellouze@csys.com.tn**

**Total module duration**

**70 h**

Contact hours	Out of class activities
35	35

**The equivalent credits**

**3 ECTS**

**Semester 5**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the fundamental concepts of the microservices architectural style. It aims at teaching the students why and when we should use this style and the guidelines that we should follow to achieve it. In this course, we will also talk about the challenges and cons of adopting this concept.

### Objectives

By the end of this course, the student will:

- be able to design a distributed system based on the microservices architectural style
- have the chance to practice what he learned through a small project consisting of building a system composed of two services that communicate with each other
- improve his knowledge in multiple technologies such as REST API, spring-boot, HTTP, etc.

### 1.2: Prerequisites

It is recommended to have a basic general culture in java/j2ee.

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	What are microservices	10 hours	- Understand the concept, pros, and principles of microservices.
<b>Chapter 2</b>	Designing a system based on microservices	10 hours	- Conceive a distributed system by applying the principles of microservices. - Understand the role of each piece in the landscape of our design
<b>Chapter 3</b>	Hands on	10hours	- Implement parts of the design we've built using mainly spring-boot
<b>Chapter 4</b>	Challenges of microservices	5 hours	- Highlight the new challenges brought by microservices

## MODULE DESCRIPTION

### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	15
Practical work (h)	15
Project (h)	5
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	1->4	20%
Practicalwork		
Mid-term	1->2	30%
Oral test		
Final exam	1->4	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Newman, Sam. Monolith to Microservices: Evolutionary Patterns to Transform Your Monolith. O'Reilly Media, 2019.
- Sharma, Umesh Ram. Practical Microservices. Packt Publishing Ltd, 2017.

## MODULE DESCRIPTION

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### Title of the Module

Internet of Things  
 Code: GINF\_ASR 05 103

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Abdellatif Lassoued**

**Grade: Expert**

**Email:**

**abdellatif.lassoued2017@gmail.com**

**Total module duration**

**70 h**

Contact hours	Out of class activities
35h	35h

**The equivalent credits**  
**3 ECTS**

**Semester 5**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course gives a foundation in the Internet of Things (IoT), including the components, tools, and analysis by teaching the concepts behind the IoT and a look at real-world solutions and applications. In addition, it consists in developing an IOT gateway and using IOT platforms.

### Objectives

At the end of the session the student must:


- Learn the IOT basics
- Acquire the embedded electronics basics
- Acquire the embedded computing basics
- Acquire the IOT platforms basics

### 1.2: Prerequisites

The student must control the concepts of development in C ++.

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	IoT presentation	5	<ul style="list-style-type: none"> <li>- Understand the definition and significance of the Internet of Things</li> <li>- Know the applications of IOT: environment and industry, monitoring and e-health, Smart counter and smart grid, Smart City, Agriculture and Livestock, Automation, Trade, Transport and logistics</li> </ul>
<b>Chapter 2</b>	IoT networks	10	<ul style="list-style-type: none"> <li>- Understand the main concepts of LAN networks, Mobile networks, LPWAN networks, Gateways, SIGFOX network, LORA network, Development kits</li> <li>- Developing an IOT gateway and using an IOT platforms.</li> <li>-</li> </ul>
<b>Chapter 3</b>	Tutorials	10	<ul style="list-style-type: none"> <li>- Present the Aduino card</li> <li>- Present electronic</li> </ul>

	<b>MODULE DESCRIPTION</b>			Department: Computer Sc. Eng.
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			components - Present the Arduin development environment - Understand Lighting, ON / OFF, dimming, RGB led, Buzzer, push button - Creating an IOT gateway	
<b>Chapter 4</b>	IoT platforms	10	- Create an IoT dashboard - Control by mobile application	

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	15
Practical work (h)	15
Project (h)	5
Visits (h)	0

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	20%
Practical work	All chapters	10%
Mid-term	Chapter 1→Chapter 3	20%
Oral test	-	0
Final exam	All chapters	50%

## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Bahga, Arshdeep, and Vijay Madiseti. Internet of Things: A hands-on approach. Vpt, 2014.
- Fortino, Giancarlo, and Paolo Trunfio, eds. Internet of things based on smart objects: Technology, middleware and applications. Springer Science & Business Media, 2014.



## Title of the Module

### DEVOPS

Code: GINF\_GLID 05 111

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Farouk Ellouze**

**Grade: Expert**

**University: IIT**

**Email:**

**farouk.ellouze@csys.com.tn**

**Total module duration**

**70h**

Contact hours	Out of class activities
35	35

**The equivalent credits**

**3 ECTS**

**Semester 5**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the fundamental concepts of the term DEVOPS. It aims at teaching the students why many organizations have adopted this model and what practices should be implemented in order to gain the maximum benefits from it.

### Objectives

At the end of this course, the student will:

- be familiar with the major practices of DEVOPS
- have the chance to apply what he learned through a small project consisting of automating the process of building and deploying his source code
- improve his knowledge in multiple technologies such as Maven, Docker, Jenkins, etc.

### 1.2: Prerequisites

None

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	What is DEVOPS	5 hours	- Understand the concept, pros, and practices of DEVOPS.
<b>Chapter 2</b>	Maven	10 hours	- Build a java project into a runnable artifact (jar, war, etc...)
<b>Chapter 3</b>	Docker	10 hours	-Learn the concept of containerization -Building, running Docker containers and connecting them with each other
<b>Chapter 4</b>	Jenkins	10 hours	- Automate the hole build and deploy process through CI/CD

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	15
Practical work (h)	15
Project (h)	5
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	30%
Practical work		
Mid-term	Chapter 1→Chapter 2	20%
Oral test		
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Bass, Len, Ingo Weber, and Liming Zhu. DevOps: A software architect's perspective. Addison-Wesley Professional, 2015.
- Verona, Joakim. Practical DevOps. Packt Publishing Ltd, 2016.

# MODULE DESCRIPTION

## Title of the Module

### Microservices

Code: GINF\_GLID 05 110

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>X</b>			

**Teacher: Farouk Ellouze**

**Grade: expert**

**Email:**

**farouk.ellouze@csys.com.tn**

**Total module duration**

**70 h**

Contact hours	Out of class activities
35	35

**The equivalent credits**

**3 ECTS**

**Semester 5**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the fundamental concepts of the microservices architectural style. It aims at teaching the students why and when we should use this style and the guidelines that we should follow to achieve it. In this course, we will also talk about the challenges and cons of adopting this concept.

### Objectives

By the end of this course, the student will:

- be able to design a distributed system based on the microservices architectural style
- have the chance to practice what he learned through a small project consisting of building a system composed of two services that communicate with each other
- improve his knowledge in multiple technologies such as REST API, spring-boot, HTTP, etc.

### 1.2: Prerequisites

Basics in java/j2ee.

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	What are microservices	10 hours	- Understand the concept, pros, and principles of microservices.
<b>Chapter 2</b>	Designing a system based on microservice	10 hours	- Conceive a distributed system by applying the principles of microservices. - Understand the role of each piece in the landscape of our design
<b>Chapter 3</b>	Hands on	10 hours	- Implement parts of the design we've built using mainly spring-boot
<b>Chapter 4</b>	Challenges of microservices	5 hours	- Highlight the new challenges brought by microservices

## MODULE DESCRIPTION

### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	15
Practical work (h)	15
Project (h)	5
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	1->4	20%
Practicalwork		
Mid-term	1->2	30%
Oral test		
Final exam	1->4	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Newman, Sam. Monolith to Microservices: Evolutionary Patterns to Transform Your Monolith. O'Reilly Media, 2019.
- Sharma, Umesh Ram. Practical Microservices. Packt Publishing Ltd, 2017.

## Title of the Module

### Audit and security

Code: GINF\_GLID 05 112

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Mohamed MANAA**

**Grade: Master Technologist**

**University: ISET Sfax**

Email:

medmanaa.iset@gmail.com

Total module duration

70 h

Contact hours	Out of class activities
35	35

The equivalent credits

3 ECTS

Semester 5

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course examines the key principles related to auditing information technology processes and related controls and is designed to meet the increasing needs of audit, compliance, security and risk management professionals.

### Objectives

The primary objectives of the course are to:

- Establish an understanding of the IT environment and the role of the IT auditor,
- Recognize how corporate and IT governance practices impact the IT audit process,
- Develop an understanding of the IT audit process i.e., risk assessment, planning, standards, guidelines and best practices, and
- Survey IT audit approaches to:
  - o Systems development and maintenance,
  - o IT security,
  - o IT service delivery and support,
  - o Business continuity and disaster recovery, and
  - o Data analytics and fraud detection

### 1.2: Prerequisites

It is recommended to have a basic general knowledge in:

- Operating system
- Networks (TCP / IP, ARP, DNS, ...)
- Information System

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	IT environment and role of the IT auditor	5hours	Understand business risk IT governance – the starting point
<b>Chapter 2</b>	Audit standards and pronouncements	10 hours	To master: <ul style="list-style-type: none"> <li>- AICPA, GAAP, GAAS, IIA, ISACA</li> <li>- Audit and other frameworks (tools of the trade)</li> <li>- COSO, COBIT, FFIEC, ISO, ITIL</li> </ul>
<b>Chapter 3</b>	IT audit process	10 hours	- Develop the IT audit plan (Risk assessment, Audit universe, Audit planning) - Conduct the IT audit (Design risk-based audit procedures, Perform risk-based testing, Communication and reporting)
<b>Chapter 4</b>	Auditing IT security	10 hours	<ul style="list-style-type: none"> <li>- Risks defined</li> <li>- Security policy</li> <li>- Security architecture</li> <li>- Security processes</li> </ul>



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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	20
Practical work (h)	15
Project (h)	0
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	1->2	30%
Oral test		
Final exam	1->4	70%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- William Stallings and Lawrie Brown, Computer Security Principles and Practice, (3rd Edition), Pearson, 2014
- Bruce Schneier, Applied Cryptography: Protocols, Algorithms and Source Code in C, Wiley, 2015
- Niels Ferguson, Bruce Schneier, and Tadayoshi Kohno, Cryptography Engineering: Design Principles and Practical Applications, John Wiley & Sons, 2010.

## MODULE DESCRIPTION

### Title of the Module

#### Cyber Security

Code: GINF\_GLID 05 113

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Mr. Mustapha Sakka**

**Grade: Expert**

**Email :**

**Sakka.mustapha@gmail.com**

**Total module duration**

**70 h**

Contact hours	Out of class activities
35	35

**The equivalent credits**  
**3 ECTS**

**Semester 5**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the concept of cyber security, its interdisciplinary nature and its relation to nation, businesses, society and people. Participating students would gain knowledge of various cyber security terminologies, technologies, protocols, threat analysis, security principles, security mechanisms, policies, forensics, incidence response and methods/practices to secure systems.

### Objectives

Upon successful completion of the course, the students will have:

- Reasonable understanding of the fundamentals of the cybersecurity domain and related issues
- Practical knowledge of various tools, processes and methods to ensure security of systems through a minimum of two hands-on assignments involving attack and protection in a virtual environment
- An understanding of the inter-disciplinary nature of cybersecurity domain
- Adequate level of cross-disciplinary knowledge of design, implementation, evaluation and testing of secure protocols, systems or applications
- Basic knowledge to be able to build bug-free systems, dependable during malice or error
- Foundational skills for developing expertise in one or more sub-domains of cyber-security

### 1.2: Prerequisites

It is recommended to have a basic general knowledge in:

- Operating system
- Networks (TCP / IP, ARP, DNS, ...)
- Information System

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Introduction to Cyber Security	5hours	To learn: Overview of Cyber Security, Internet Governance – Challenges and Constraints, Cyber Threats:- Cyber Warfare-Cyber Crime-Cyber terrorism-Cyber Espionage, Need for a Comprehensive Cyber Security Policy, Need for a Nodal Authority, Need for an International convention on Cyberspace.
<b>Chapter 2</b>	Cyber Security Vulnerabilities and Cyber Security Safeguards	10 hours	To understand: Cyber Security Vulnerabilities- Overview, vulnerabilities in software, System administration, Complex Network Architectures,

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			Open Access to Organizational Data, Weak Authentication
<b>Chapter 3</b>	Securing Web Application, Services and Servers	10 hours	To know: Basic security for HTTP Applications and Services, Basic Security for SOAP Services, Identity Management and Web Services, Authorization Patterns, Security Consideration
<b>Chapter 4</b>	Intrusion Detection and Prevention	10 hours	To master: Physical Theft, Abuse of Privileges, Unauthorized Access by Outsider, Malware infection, Intrusion detection and Prevention Techniques, Anti-Malware software, Network based Intrusion detection Systems, Network based Intrusion Prevention Systems

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	20
Practical work (h)	15
Project (h)	0
Visits (h)	0

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	1->2	30%
Oral test		
Final exam	1->4	70%

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#### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Rhodes-Ousley, Mark. Information Security: The Complete Reference, Second Edition, Information Security Management: Concepts and Practice. New York, McGraw-Hill, 2013.
- Whitman, Michael E. and Herbert J. Mattord. Roadmap to Information Security for IT and Infosec Managers. Boston, MA: Course Technology, 2011.

## Title of the Module

### Architecture and security of E-commerce systems

Code: GINF\_GLID 05 114

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>x</b>			

**Teacher: Mohamed MANAA**

**Grade: Master Technologist**

**University: ISET Sfax**

**Email:**

**medmanaa.iset@gmail.com**

**Total module duration**

**70 h**

Contact hours	Out of class activities
35	35

**The equivalent credits**

**3 ECTS**

**Semester 5**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

The course focuses on the technology, concepts, issues and principles that are important in the design and implementation of secure e-commerce system. The course examines technology for protecting electronic commerce. It includes discussion of basic security principles, as well as the issues, policy and standards particular to e-commerce applications

### Objectives

The objectives of the course are:

- To Understand Related Technologies In Order To Develop A Secure E-Commerce System
- To Understand The Basic Requirements For Secure E-Commerce Systems
- To Develop An Understanding Of The Client/Server Architecture And The Various Components Used In Distributed Systems
- To Review Areas Of Potential Compromises In The Security Of Client/Server Systems
- To Be Able To Analyze The Vulnerabilities Of A Given System And Make Recommendations For Making The System More Secure.
- To Describe remedies for various existing security breaches in C/S systems and to show the methodologies required to make future systems less prone to security failures and outside attack

### 1.2: Prerequisites

The course requires knowledge of Internet and Internet applications, especially the WWW. The course also requires a basic knowledge of the communication protocols used on the Internet. Basic programming skill in C and C++ or Java is strongly recommended.

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Introduction: E-commerce on the Internet	5hours	To take an overview of e-commerce and related security principles and concepts
<b>Chapter 2</b>	Privacy and Security	10 hours	To learn privacy and security concerns as they pertain to users
<b>Chapter 3</b>	Web Technology	10 hours	To describe :Web system security, Web Server Security and Web Applications
<b>Chapter 4</b>	Digital Payments	10 hours	To learn secure e-commerce transactions and Public Key Infrastructure

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	30
Practical work (h)	5
Project (h)	0
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work		
Mid-term	1->2	30%
Oral test		
Final exam	1->4	70%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Grafinkle, Simson, Web Security, Privacy and Commerce, 2<sup>nd</sup> Edition, O'Reilly, 2002.



## Title of the Module

### Development Platform of an E-Commerce solution

Code: GINF\_GLID 05 115

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Nissan Masmoudi**

**Grade: master technologist**

**University: ISET-Sfax**

**Email:**

**Nissen.masmoudi@gmail.com**

**Total module duration**

**70 h**

Contact hours	Out of class activities
35	35

**The equivalent credits**

**3 ECTS**

**Semester 5**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

The course focuses on the theory and practice of doing business over the Internet and World Wide Web. Topical coverage includes an overview of the economic foundations, infrastructure, technologies, and business strategies of E-Commerce.

### Objectives

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

- To describe the Foundations of e-commerce.
- To Describe And Plan With The Infrastructure Supporting Ecommerce Transactions.
- To Describe Technologies And Platforms Supporting Ecommerce.
- To Implement E-Commerce Solutions Across Transaction Types And Endpoints.
- To suggest e-commerce solutions to fit particular Business Strategies

### 1.2: Prerequisites

The course requires knowledge of Internet and Internet applications, especially the WWW. The course also requires a basic knowledge of the communication protocols used on the Internet.

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
Chapter 1	Introduction	5hours	Define E-commerce. Explain how Ecommerce works on the Internet. Explain the forces behind Ecommerce Discuss the role of Ecommerce in the current business world.
Chapter 2	The Infrastructure of Ecommerce	10 hours	Demonstrate how TCP/IP and Packet switching works Demonstrate Markup Languages Explain relationships between web client/server Differentiate Internet/Intranet/Extranet
Chapter 3	Software solutions	10 hours	Explain the different kinds of hosting solutions and software that runs them. Differentiate software solutions based on company size.
Chapter 4	Project	10 hours	Implement, in simulation or authentically, an ecommerce site

## MODULE DESCRIPTION

### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	25
Practical work (h)	10
Project (h)	0
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	1->4	30%
Practical work		
Mid-term		
Oral test		
Final exam	1->4	70%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- E-Commerce Essentials by Kenneth C. Laudon and Carol Traver. 2013. ISBN-13: 978-0133544985

## Title of the Module

### Personal Professional Project

Code: GINF\_GLID 05 101

**Teacher: Mrs. Amel Trabelsi Elloumi**

**Grade: Ph.D. in economics**

Full-time faculty member

Head of the department of career preparation

**University: International Institute of Technology**

**Email:**

**Dep.PCP@iit.ens.tn**

**Total module duration**

**56 h**

Contact hours	Out of class activities
28	28

**The equivalent credits**

**2 ECTS**

**Semester 5**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description:

- **P** as **P**roject: before job search or further study
- **P** as **P**rofessional: to move towards a trade or a sector of activity
- **P** as **P**ersonal: after reflecting on their own abilities and needs

### Objectives

This course aims to:

- Teach the student to get to know himself better in order to evaluate his professional potential skills.
- Prepare him for professional integration.
- Make it confront the professional reality.
- Help him to be an actor of his professional future

### 1.2: Prerequisites

- CV
- Entrepreneurship culture
- Behavioral and professional skills

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Self-knowledge	8 hours	Know: What I am (to know how to be)! What I know (know)! What I can do (know how)!
<b>Chapter 2</b>	Choice of profession	8 hours	Master: What I can do!
<b>Chapter 3</b>	Development of an action plan	5 hours	Master: How to do (job search techniques, CV, LM ...)?
<b>Chapter 4</b>	Rehearsals	7 hours	To train students to present their skills in a way that imitates the job interview

## MODULE DESCRIPTION

### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	Yes
Practical work (h)	Yes
Project (h)	Yes
Visits (h)	No

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All projects	70%
Practical work		
Mid-term		
Oral test	Chapter 1,2,3	30%
Final exam		

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Emmanuelle Leclercq, « Teaching the personalized professional project: a new pedagogical approach for teacher-researchers? », *Carrefours de l'éducation* n° 34, 2/2012, p. 161-175
- Daniel Bart AND Michel Fournet, « The students' professional and personal project, the basis of their professionalization? », *International Journal of Higher Education Pedagogy* [In ligne], 26(1) | 2010, mis en ligne le 10 mai 2010, consulté le 10 septembre 2019. URL : <http://journals.openedition.org/ripes/314>
- J.-L. Vannier, « The Psychic Involuntary of the Personalized Professional Project », *Evaluation Management and Communication, Communication and Organization Review* n° 38 University Press of Bordeaux, December 2010
- J.-L. Vannier, « Does the Personal and Professional Project still have a future within the OTCs?? », IUT de Nice Côte d'Azur, avril 2013

## Title of the Module

### Project Management

Code: GINF\_GLID 05 102

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
			X

**Teacher: Mohamed Elleuch**

Grade: Technologist

University: ISET Sfax

Email :

[meelleuch@gmail.com](mailto:meelleuch@gmail.com)

Total module duration

49h

Contact hours	Out of class activities
28h	21h

The equivalent credits

2 ECTS

Semester 5

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the basic concepts related to project management and productivity. It consists of examining activities related to project planning and estimating project scope and schedule.

### Objectives

On the completion of this course, the student should be able to:

- acquire organizational and management techniques to efficiently carry out projects within the deadlines, the budget and the expected performance of the company.
- master the use of MS Project tool

### 1.2: Prerequisites

- Software engineering

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Introduction to project management	6	<ul style="list-style-type: none"> <li>- Understand the definition of project concept, project management and productivity</li> <li>- Understand the paradox of project management</li> <li>- Master the methods of conducting and managing projects.</li> <li>- Introduce some concepts of Devops</li> </ul>
<b>Chapter 2</b>	project in the company	3	<ul style="list-style-type: none"> <li>- Understand the advantages and disadvantages of the project in the economic context</li> <li>- Master the selection of the organization mode of the projects taking into account the organizational strategy and the culture of the company</li> </ul>
<b>Chapter 3</b>	Planification and estimation	6	<ul style="list-style-type: none"> <li>- Master Gantt diagram and pert Diagram</li> </ul>
<b>Chapter 4</b>	MS project	10	<ul style="list-style-type: none"> <li>- Master the use of MS Project</li> </ul>
<b>Chapter 5</b>	Audit and project closure	3	<ul style="list-style-type: none"> <li>- The leadership</li> <li>- Audit and project closure</li> </ul>



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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	12
Practical work (h)	10
Project (h)	6
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	20%
Practical work	All chapters	10%
Mid-term	Chapter 1→Chapter 3	20%
Oral test	-	0
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Oberlender, Garold D. Project management for engineering and construction. McGraw-Hill Education, 2014.
- Cooper, Dale F., and al. Project risk management guidelines: Managing risk in large projects and complex procurements. Chichester: Wiley, 2005.

## Title of the Module

# Service Oriented Architecture

Code: GINF\_GLID 05 105

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Ahmed Jmal**

**Grade: Master Technologist**

**University: ISET Sfax**

Email:

[jmlhmd@gmail.com](mailto:jmlhmd@gmail.com)

Total module duration

63h

Contact hours	Out of class activities
35	28

The equivalent credits  
2 ECTS

Semester 5

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course presents an introduction about Service-Oriented Architecture (SOA). It focuses on architectural principles and current technology used to implement and deploy it. It covers SOA concepts such as loose coupling, late binding and important Web services standards.

### Objectives

On the completion of this course, the student will be able to:

- understand the main concepts of SOA and Web services
- implement an SOA architecture
- evaluate the role of BPM, Web Services and enterprise service bus (ESB) in SOA
- use the WSDL description language
- model a software architecture and define how to build a scalable system based on a SOA

### 1.2: Prerequisites

- JAVA
- UML

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
Chapter 1	Introduction: SOA and Web Services	6	Understand the main concepts of SOA and Web services
Chapter 2	The SOAP communication protocol	9	Understand the role of the SOAP communication protocol
Chapter 3	The WSDL description language	8	Use and program using the WSDL description language
Chapter 4	The UDDI service directory	6	Discover and exploit the UDDI service directory
Chapter 5	BEEP protocol	6	Understand the BEEP protocol

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	21
Practical work (h)	14
Project (h)	
Visits (h)	

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work	All chapters	20%
Mid-term	Chapter 1+Chapter 2	30%
Oral test	-	-
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Barry, Douglas K. *Web services and service-oriented architectures*. San Francisco: Morgan Kaufmann, 2003.
- Lawler, James P., and Hortense Howell-Barber. *Service-oriented architecture: SOA strategy, methodology, and technology*. CRC Press, 2007.

## Title of the Module

### Big Data

Code: GINF\_GLID 05 108

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Mohamed MANAA**

**Grade: Master Technologist**

**University: ISET Sfax**

Email:

medmanaa.iset@gmail.com

Total module duration

77 h

Contact hours	Out of class activities
42	35

The equivalent credits  
3 ECTS

Semester 5

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course prepares students to use the Big Data platform and methodologies in order to collect and analyze large amounts of data from different sources. This will require skills in Big Data architecture, such as Apache Hadoop, Ambari, Spark, Big SQL, HDFS, YARN, MapReduce, ZooKeeper, Knox, Sqoop, and HBase.

### Objectives

The objective of the course is to familiarize students with big data analysis as a tool for addressing substantive research questions. The course begins with a basic introduction to big data and discusses what the analysis of these data entails, as well as associated technical, conceptual and ethical challenges. It also provides a first hands-on experience in handling and analyzing large, complex data structures. The course is designed as a primer for anyone interested in attaining a basic understanding of what big data analysis entails. There are no prerequisite requirements for this course.

At the end of this course, the student will be able to set for IBM Big Data engineer certificate.

### 1.2: Prerequisites

It is recommended to have a basic general culture in:

- ✓ Databases
- ✓ Networks
- ✓ SQL (Structured Query Language)

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Introduction to Big Data and Data Analytics	6 hours	Develop an understanding of the complete open-source Hadoop ecosystem and its near-term future directions
<b>Chapter 2</b>	Hadoop: HDFS/MapReduce	9 hours	Master the basics of the technology: Hadoop & HDFS, MapReduce & YARN, Spark
<b>Chapter 3</b>	Hadoop Query Languages	9 hours	Describe and compare the open source programming languages, Pig and Hive
<b>Chapter 4</b>	NoSQL	9 hours	List the characteristics of the four types of NoSQL datastores
<b>Chapter 5</b>	Big SQL	9 hours	Understand how Big SQL fits in the Hadoop architecture

## MODULE DESCRIPTION

### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	24
Practical work (h)	18
Project (h)	0
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work	1->6	20%
Mid-term	1->3	30%
Oral test		
Final exam	1->6	50%

### 3. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

Brian Godsey: Think Like a Data Scientist, Manning Publications, 2017

IBM Big Data Engineer official certification course, IBM Academy Skills; 2018

## Title of the Module

Business Process: Agile Entreprise Solution Design

Code: GINF\_GLID 05 106

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>X</b>			

**Teacher: Hatem Jarraya**

**Grade: Expert**

**Freedom of Dev Services**

**Email :**

**[hjarraya@freedomofdev.com](mailto:hjarraya@freedomofdev.com)**

**Total module duration**

**77 h**

Contact hours	Out of class activities
<b>42 h</b>	<b>35 h</b>

**The equivalent credits**

**3 ECTS**

**Semester 5**



## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course provides the methodology, concepts and technologies required to develop enterprise applications. It offers students an opportunity to apply the concepts of Agile development, as well as project management with AzureDevOps platform. In addition, it improves project quality using agile development approach.

#### Objectives

On the completion of this course, the student will be able to:

- explain the purpose behind common agile practices
- apply agile principles and values to a given situation
- manage projects and address most common problems encountered in adopting Agile methods
- master process modeling and automation using Bonita BPM platform

### 1.2: Prerequisites

- Bonitasoft
- Talend

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Agile Software development	5	- Understand the concepts of Agile development
<b>Chapter 2</b>	Enterprise Architecture	5	- Acquire Software design and architecture capabilities
<b>Chapter 3</b>	Business Process	10	- Acquire Business and functional analysis capabilities
<b>Chapter 4</b>	Enterprise Integration Patterns in practice	10	- Master Software integration mechanisms - Understand integration technologies and styles - Use Talend as integration tool
<b>Chapter 5</b>	Business Process in practice	6	- Master Process modeling and automation using Bonita BPM platform
<b>Chapter 6</b>	Agile ALM DEVOPS workshop	6	- Master the Project management with AzureDevOps platform - Improve project quality using agile testing approach

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	20
Practical work (h)	22
Project (h)	0
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work	All chapters	20%
Mid-term	Chapter 1→Chapter 3	30%
Oral test	-	-
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- BECK, Kent, BEEDLE, Mike, VAN BENNEKUM, Arie, and al. Manifesto for agile software development. 2001.
- Schwaber, Ken, and Mike Beedle. Agile software development with Scrum. Vol. 1. Upper Saddle River: Prentice Hall, 2002.
- Jeston, John, and Johan Nelis. Business process management. Routledge, 2014.

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## Title of the Module

Cross platform

Code: GINF\_GLID 05 104

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Akram Kammoun**

**Grade: expert**

**University: IIT**

**Email:**

**akram.kamoun@gmail.com**

**Total module duration**

**77 h**

Contact hours	Out of class activities
42h	35h

**The equivalent credits**

**3 ECTS**

**Semester 5**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course introduces the basic concepts required to use Xamarin and create cross-platform, mobile applications that run on both iOS and Android devices. It consists in using C# and Xamarin to layout mobile forms to build scrollable lists, interact with device data and present data from web services.

### Objectives

On the completion of this course, the student should be able to:

- learn how to create mobile apps with Xamarin
- build complex views using layouts and advanced controls
- create scrollable lists
- use SQLite local database
- deploy applications to the App store and the Google Play store

### 1.2: Prerequisites

Good knowledge of the .NET and C # environment

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	Presentation of the Xamarin Framework	3	To learn: <ul style="list-style-type: none"> <li>- Introduction to mobile application development techniques</li> <li>- Overview of the mobile techno ecosystem</li> <li>- To Know mobile best practices</li> <li>- Know Xamarin and available platforms</li> <li>- Integration of Xamarin.Forms in Visual Studio 2015 (VS2015)</li> <li>- Installation and configuration of emulators</li> <li>- Understand Xamarin application structure</li> </ul>
<b>Chapter 2</b>	XAML language and hybrid mobile applications	9	To learn: <ul style="list-style-type: none"> <li>- Introduction to XAML for Mobile Interfaces, Markup Extensions, Styles and Resources</li> <li>- To understand XAML vs. C # Interactions</li> <li>- Master platform Specificities via</li> </ul>

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			<p>XAML</p> <ul style="list-style-type: none"> <li>- Introduce and implement the MVVM Pattern</li> <li>- Linking Data</li> </ul>
<b>Chapter 3</b>	Navigating in mobile apps	6	<p>To master:</p> <ul style="list-style-type: none"> <li>- Implementation of a navigation infrastructure</li> <li>- Cells and ListView control</li> <li>- Carousel of images and bitmaps</li> <li>- WebView and BoxView controls</li> <li>- Gesture and specificities</li> </ul>
<b>Chapter 4</b>	Specificity of the different platforms	3	<p>To know:</p> <ul style="list-style-type: none"> <li>- Specificities of Android, Windows Phone 8 and 10 and iOS platforms</li> <li>- Dependency Service</li> <li>- Multimedia capture (sound, image and video)</li> <li>- Geolocation</li> </ul>
<b>Chapter 5</b>	XAMARIN DROID	6	<p>To master:</p> <ul style="list-style-type: none"> <li>- Life cycle of an android application</li> <li>- Graphical interface editor</li> <li>- Different graphic components</li> <li>- Component / code interaction</li> <li>- Dynamic Assets / Static Resources</li> <li>- To understand permissions concepts, Layouts, Navigation between different screens, ListViews, Custom cells</li> <li>- To use different layouts, , Contextual menu, save user preferences</li> </ul>
<b>Chapter 6</b>	XAMARIN IOS and WIN	6	<ul style="list-style-type: none"> <li>- Understand how Xamarin is used for native Windows, Android, and iOS development</li> </ul>
<b>Chapter 7</b>	LocalDB and API Rest and XAMARIN FORMS	6	<ul style="list-style-type: none"> <li>- Use a SQLite local database</li> <li>- Consuming a REST API</li> <li>- Location and application languages</li> </ul>

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	18
Practical work (h)	24
Project (h)	0
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project		
Practical work	All chapters	20%
Mid-term	Chapter 1→Chapter 4	30%
Oral test	-	0
Final exam	All chapters	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Smart, Julian, and Stefan Csomor. Cross-platform GUI programming with wxWidgets. Prentice Hall Professional, 2005.
- Olson, Scott, and al. Professional Cross-Platform Mobile Development in C. John Wiley & Sons, 2012.

## Title of the Module

Data Science

Code: GINF\_GLID 05 109

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Mahdi Louati**

**Grade: Associate Professor**

**University: Sfax National School of Electronics and Telecommunications  
(ENET'Com)**

**Email:**

**Mahdi.louati@enetcom.usf.tn**

**Total module duration**

**77 h**

Contact hours	Out of class activities
42h	35h

**The equivalent credits  
3 ECTS**

**Semester 5**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

Machine learning is involved in decision-making processes and must answer various questions. It should be noted that human experts can be consulted on many of these issues. However, it is desirable to automate this decision-making and thus exclude any human intervention. To do so we must lead a reasoning based on facts describing the problem to be solved and expertise in the form of rules. The goal of machine learning is to produce automatically these rules and human experts are asked to provide their answers on specific cases without having to justify themselves. This course includes studies in predictive analytics, statistics, data mining, machine learning, coding, functional programming and mathematical modeling.

#### Objectives

The objective of this course is:

- To prepare students to extract knowledge from either unstructured data or structured by certain systems and processes.
- To learn how to use statistical methods to study the association between (multiple) determinants and the occurrence of a result event.
- To understand the most effective machine learning techniques and become familiar with their implementation and work.

### 1.2: Prerequisites

- Probabilities
  - ✓ Gaussian distribution
  - ✓ Student distribution
  - ✓ Chi2 distribution
  - ✓ Fisher distribution
- Statistics
  - ✓ Estimation
  - ✓ Correlation
  - ✓ Statistical tests
- Linear Algebra
  - ✓ Rank theorem
  - ✓ Inverse of matrix
- Python programming
  - ✓ Use of the Libraries
  - ✓ Importation of the dataset
  - ✓ Manipulation of the tables

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
Chapter 1	Introduction		To understand the importance of machine Learning To master installation of Python and Anaconda



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<b>Chapter 2</b>	Data Preprocessing		<ul style="list-style-type: none"> <li>- Know importation of the Libraries and the data.</li> <li>- Master preprocessing the data.</li> </ul>
<b>Chapter 3</b>	Regression Models		To master: <ul style="list-style-type: none"> <li>- Simple Linear Regression</li> <li>- Multiple Linear Regression</li> <li>- Polynomial Regression</li> <li>- Support Vector Regression</li> <li>- Decision Tree Regression</li> <li>- Random Forest Regression</li> <li>- Evaluation Regression Models</li> </ul>
<b>Chapter 4</b>	Classification		To master: <ul style="list-style-type: none"> <li>- logistic Regression</li> <li>- Confusion Matrix</li> <li>- K-Nearest Neighbors</li> <li>- K-Means</li> <li>- Support Vector Machine</li> <li>- Kernel SVM</li> <li>- Naïve Bayes</li> <li>- Decision Tree classification</li> </ul>
<b>Chapter 5</b>	Clustering		<ul style="list-style-type: none"> <li>- Understand the K-Means, Clustering Algorithm, the disadvantages of the K-Means Clustering</li> <li>- Implement Algorithm</li> </ul>

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	22
Practical work (h)	16
Project (h)	4
Visits (h)	0

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### 3. EVALUATION :

Type	Covering which Chapter (s)	In which week ?	The weighting factors
Project	All chapters	Last week	20%
Practical work	-	-	-
Mid-term	Chapter 1+Chapter 2+Chapter 3	6th week	30%
Oral test	-	-	-
Final exam	All chapters	Last week	50%

### 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Gareth James, Daniela Witten, Trevor Hastie et Robert Tibshirani, *An Introduction to Statistical Learning*, Springer Verlag, coll, 2013.
- Trevor Hastie, Robert Tibshirani et Jerome Friedman, *The Elements of Statistical Learning: Data Mining, Inference, and Prediction*, 2009, second edition.
- Christopher M. Bishop, *Pattern Recognition and Machine Learning*, Springer, 2006.

## Title of the Module

Internet of Things  
Code: GINF\_GLID 05 103

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
X			

**Teacher: Abdellatif Lassoued**

**Expert**

**Email:**

**abdellatif.lassoued2017@gmail.com**

**Total module duration**

**70 h**

Contact hours	Out of class activities
35h	35h

**The equivalent credits**  
**3 ECTS**

**Semester 5**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course gives a foundation in the Internet of Things (IoT), including the components, tools, and analysis by teaching the concepts behind the IoT and a look at real-world solutions and applications. In addition, it consists in developing an IOT gateway and using IOT platforms.

### Objectives

At the end of the session the student must:


- Learn the IOT basics
- Acquire the embedded electronics basics
- Acquire the embedded computing basics
- Acquire the IOT platforms basics

### 1.2: Prerequisites

The student must control the concepts of development in C ++.

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	IoT presentation	5	<ul style="list-style-type: none"> <li>- Understand the definition and significance of the Internet of Things</li> <li>- Know the applications of IOT: environment and industry, monitoring and e-health, Smart counter and smart grid, Smart City, Agriculture and Livestock, Automation, Trade, Transport and logistics</li> </ul>
<b>Chapter 2</b>	IoT networks	10	<ul style="list-style-type: none"> <li>- Understand the main concepts of LAN networks, Mobile networks, LPWAN networks, Gateways, SIGFOX network, LORA network, Development kits</li> <li>- Developing an IOT gateway and using an IOT platforms.</li> </ul>
<b>Chapter 3</b>	Tutorials	10	<ul style="list-style-type: none"> <li>- Present the Aduino card</li> <li>- Present the electronic components</li> <li>- Present the Arduino development environment</li> <li>- Understanding Lighting, ON / OFF, dimming, RGB led, Buzzer, push button</li> <li>- Create an IOT gateway</li> </ul>

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<b>Chapter 4</b>	IoT platforms	10	- Create an IoT dashboard - Control by mobile application	

## 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	15
Practical work (h)	15
Project (h)	5
Visits (h)	0

## 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	All chapters	20%
Practical work	All chapters	10%
Mid-term	Chapter 1→Chapter 3	20%
Oral test	-	0
Final exam	All chapters	50%

## 4. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Bahga, Arshdeep, and Vijay Madisetti. Internet of Things: A hands-on approach. Vpt, 2014.
- Fortino, Giancarlo, and Paolo Trunfio, eds. Internet of things based on smart objects: Technology, middleware and applications. Springer Science & Business Media, 2014.

# MODULE DESCRIPTION

## Title of the Module

Advanced software architecture: J2EE

Code: GINF\_GLID 05 107

Specialty Modules	Basic Modules	Engineering Sciences and Techniques	Preparation for Professional Career
<b>X</b>			

**Teacher: Riadh Ben Halima**

**Grade: Assistant Master**

**University: ENIS**

**Email:**

**riadh.benhalima@enis.tn**

**Total module duration**

**77 h**

Contact hours	Out of class activities
<b>42</b>	<b>35</b>

**The equivalent credits**

**3 ECTS**

**Semester 5**

## 1. DESCRIPTION OF COURSE AND SKILLS COVERED:

### 1.1: Course Description

This course provides a comprehensive presentation of the JEE platform. It begins with a presentation of the evolutionary history of development approaches. Then, he explains the fundamental concepts of this specification in order to clearly control his results. Then, the technologies associated with this architecture are presented by focusing on the business layer and manipulating concrete cases. At the end of this course, participants will be able to understand JEE architecture and related technologies.

### Objectives

Thanks to this course, the student will be able to:

- understand the JEE architecture and associated technologies, including SpringBoot, JPA, etc.
- develop Spring-Boot applications with respect of recommendations from software architects.

### 1.2: Prerequisites

The student must have an understanding of the following concepts:

- The oriented object-oriented design
- The Java development language

### 1.3: Learning Outcomes

Chapter	Title	Duration	Learning Outcomes
<b>Chapter 1</b>	History	3h	To learn: - Introduction & limits of the distributed object oriented approach - EJB component: 1.0, 2.x and 3.x
<b>Chapter 2</b>	Bean Session - Singleton Dependency injection (IoC)	6h	- To understand the difference between the types of session-EJB - Illustration on Eclipse
<b>Chapter 3</b>	Entity Bean (JPA)	6h	To learn: - JPA introduction - Entity - Relations between entities
<b>Chapter 4</b>	Implementation of an application in accordance with the EJB architecture	6h	To learn: - Entity - Session - Controller - JavaScript/JQuery/ Ajax/Bootstrap
<b>Chapter 5</b>	Spring-Boot	21 h	To learn: - Architecture of a SpringBoot application - SpringData - SpringSecurity

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### 2. METHODOLOGY:

The contact hours consist of:

Integrated Course (h)	21
Practical work (h)	21
Project (h)	0
Visits (h)	0

### 3. EVALUATION :

Type	Covering which Chapter (s)	The weighting factors
Project	-	-
Practical work	All chapters	20%
Mid-term	Chapter 1→Chapter 3	30%
Oral test	-	-
Final exam	All chapters	50%

### 3. RECOMMENDED BIBLIOGRAPHY AND LOGISTICS:

- Burke, Bill, and Richard Monson-Haefel. *Enterprise JavaBeans 3.0*. " O'Reilly Media, Inc.", 2006.
- Hutton, D. M. "Clean Code: A Handbook of Agile Software Craftsmanship." *Kybernetes* (2009).
- official website of Spring-boot : <https://spring.io/projects/spring-boot>