

ING4 (MASTER1)

2017-2018

INFORMATION SYSTEMS CYBERSECURITY AND BIG DATA

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SEMESTER 8	<ol style="list-style-type: none"> 1. Module ING-4S08-JVA Advanced Java <ol style="list-style-type: none"> a. COURSE ING-INF418 : Advanced Java 2. Module Code ING-4S08-MET Machine Learning <ol style="list-style-type: none"> a. COURSE: ING-INF436 : Machine learning 3. Module ING-4S08-MSC Microsoft C# <ol style="list-style-type: none"> a. COURSE: ING-INF412 : Microsoft C# 4. Module Code ING-4S08-RES Computer Networks 2 <ol style="list-style-type: none"> a. COURSE: ING-NET412 Computer Networks 5. Module Code ING-4S08-SEC Computer Security <ol style="list-style-type: none"> a. COURSE: ING-INF432 Computer security 6. Module Code ING-4S08-SYS Mobile Programming <ol style="list-style-type: none"> a. COURSE ING-INF416 : Operating Systems 7. Module LFH-Languages, Communication and Management <ol style="list-style-type: none"> a. COURSE: ING-LFH408 Management of the individual relationship b. COURSE: ING-LFH406 Business management c. COURSE: English 8 8. Module French as foreign language <ol style="list-style-type: none"> a. COURSE :French for beginners b. COURSE :French for intermediate 9. Module French as foreign language <ol style="list-style-type: none"> a. COURSE: French as foreign language courses beginner b. COURSE: French as foreign language courses intermediate 10. Module PPE

SEMESTER 7

COURSE ING-INF413 ING-4S07-BDD	Module: ING-4S07-BDD DATABASE	Référent : Mr Salim NAHLE
Semester: S07	No. of hours: 22	Language of instruction: English
Mode of attendance: courses and projects		BUSCA Jean-Michel

Prerequisites	Computer science Bachelor level
objectives contents	Know how to manipulate and work with databases and the SQL query language
contents	DL: create table, insert, update, delete, mysql tools, MySQLWorkbench and PHPMyAdmin Relational algebra; DML simple: projection, selection, products and joins, NULL value Advanced DML: Subquery, Set Operators Extended Relational Algebra, Advanced DML: Grouping and Aggregation Advanced triggers and constraints: single and multi-attributes, assertions Big data: applications, problems, limitations of RDBMS, solutions Hadoop: HFDS file system, architecture map / reduce
Skills to be learned	Understanding data storage issues, history and state-of-the-art Databases (DBMS), especially Relational DBMS (RDBMS), SQL (Structured Query Language), use it to query and update a relational database. Handling constraints Integrity and triggers, implement them. Being operational on the open source MySQL RDBMS and the MySQLWorkbench and PHPMyAdmin tools. To understand the problems of storing and processing large amounts of data (big data) and Implement the Hadoop framework.
Evaluation	One TP per binome per course. Final examination 2h individual.
Bibliography	Jeffrey D. Ullman (Stanford University, CA) disponible en ligne Page 219

COURSE ING-INF425: Software engineering with UML	Module: ING-4S07-MET Methodology	Salim Nahle
Semester: S07	No. of hours: 30	Language of instruction: English
Mode of attendance: Tutorial Classes		ZIADI Tewfik

Prerequisites	JAVA knowledge
objectives	<p>The current information systems (IS) are increasingly complex and difficult to develop. The mastery of activities related to the development of this type of system becomes an essential requirement for future engineers and project managers. The main objective of this course is to present the main activities related to the development of the IS and to translate them into a complete process ranging from specification of the specifications to the obtaining of source code.</p> <p>In order to manage the complexity of current IS, the approach presented in this course is an approach directed by UML models (UML is an industrial standard for object-oriented modeling). In addition to the presentation of important UML diagrams, this court also shows the Links between these diagrams and the object-oriented source code through the presentation of the various operations related to the generation of code and reverse-engineering.</p> <p>This course also introduces the problems related to software testing with a presentation of a concrete test framework for testing Java code (JUnit). The last part of this course presents a recent approach to versioning and variant management in IS, called Software Product Lines.</p>
contents	<p>The course is organized in 5 sections</p> <p>Section 1: Introduction to IS development issues.</p> <p>Section 2: Requirements modeling with UML use case diagrams.</p> <p>Section 3: Modeling the Structure of an SI with UML Class Diagrams.</p> <p>Section 4: Generating code from UML diagrams and reverse-engineering.</p> <p>Section 5: Modeling the behavior of an IS with UML behavior diagrams.</p> <p>Section 6: Software testing and application with the JUnit framework.</p> <p>Section 7: Management of IS variants with product lines.</p> <p>Each section is presented in the following form:</p> <ul style="list-style-type: none"> • Part 1: A course presenting the concepts. • Part 2: An illustration of a case study. • Part 3: An application on a mini-transversal project. • Part 4: A practical implementation through the use of an industrial UML modeling tool and a Application on Java code. The JUnit framework is also used as well as an Eclipse plugin for managing Product lines.
Skills to be learned	<p>his course of Software Engineering with UML allows students to acquire the following skills:</p> <ul style="list-style-type: none"> • Software development skills. Through the concepts of modeling and code generation, this course gives students a solid foundation of software development from specification of the specifications to the generation of source code through the use of a workshop modelization.

	<ul style="list-style-type: none"> • Project management skills. The methodology presented in this course makes it possible to Management of a computer project from the specifications
Evaluation	<p>The final evaluation score is divided into two parts:</p> <ul style="list-style-type: none"> • A follow-up note containing (50%): <ul style="list-style-type: none"> ○ A mark of an intermediate test after Section 4 ○ One rated evaluating the cross-cutting mini-project. • A final DS score programmed at the end of the course (50%).
Bibliography	<p>'Object-Oriented Systems Analysis and Design using UML', Simon Benett, Steve McRobb and Ray Farmer</p>

COURSE ING-NET411 : Computer Networks 1	ING-4S07-RES NETWORKS	Salim Nahle
Semester: S07	No. of hours: 30	Language of instruction: English
Mode of attendance: Tutorial Classes / courses	Courses	HATOUM Abbas Antoun, NAHLE Salim

Prerequisites	N/A
objectives	<p>The objectives of the course are as follows.</p> <ul style="list-style-type: none"> • The student will understand the basic concepts of telecommunication and computer networks. The OSI layers will be presented and the following layers will be detailed: physical, data link, networks and transport. Several protocols in each layer will be discussed. • Students will also learn how to set up a wireless network with terminal / point connection access. • The student will master the configuration of a DHCP server, addressing and netmask, basic configuration of a switch / router with multiple VLANs and networks. The different transport protocols, TCP / UDP. BOMs and class of networks. • The student will be operational to configure and implement WiFi access points and configure security with several authentication modes: WPA / PSK / Radius, 802.1X / HTTPS portal.
contents	<p>The course is divided into several parts:</p> <ol style="list-style-type: none"> 1. Introduction: Networks, different categories of networks, PAN, LAN, MAN, RAN, WAN. Access networks and core networks. Type of equipment in networks. IEEE standards and OSI reference models and TCP / IP layers. 2. Physical layer: signal theory, Nyquist and Shannon theorem, band pass and signal quality, different type and mode wired and wireless transmission. Technique of modulation and coding, Time and frequency multiplexing (TDM, FDM). Digital systems. 3. Data link layer: Services, frames and headers. Error detection and corrections, parity bit, CRC. Multiple access protocols, TDMA, FDMA, CDMA / CA / CD. Addressing and ARP. Ethernet frame. Different types equipment. Hub Switch Bridge (Switch, bridge). Concept of VLAN, 802.1Q and network identifier virtual. 4. Wireless networks, WiFi 802.11. The notions of channels. Transmission. Association at access points. Multiple access protocols. 5. Network layer, addressing, address classes. Subnet mask, protocols, and Routing algorithms. 6. The transport layer, TCP / UDP protocols, retransmission, acknowledgments, connected and offline mode. Flow control and congestion.
Skills to be learned	<p>The objectives of the course are as follows.</p> <ul style="list-style-type: none"> • The student will understand the basic concepts of telecommunication and computer networks. The OSI layers will be presented and the following layers will be detailed: physical, data link, networks and transport. Several protocols in each layer will be discussed.

	<ul style="list-style-type: none"> • Students will also learn how to set up a wireless network with terminal / point connection access. • The student will master the configuration of a DHCP server, addressing and netmask, basic configuration of a switch / router with multiple VLANs and networks. The different transport protocols, TCP / UDP. BOMs and class of networks. • The student will be operational to configure and implement WiFi access points and configure security with several authentication modes: WPA / PSK / Radius, 802.1X / HTTPS portal.
Evaluation	<p>Skills acquisition will be assessed through Practical Tasks (PTs) and a final examination.</p> <p>Practical work. This is a group work of up to two students. The subject is communicated in advance, Explained in session if necessary, and finished at home within about a week. There will be 3 TPs to be given by the students.</p> <p>Final exam. This is an individual, non-course session, lasting 2 hours, without Document, and including open-ended questions. It is programmed after the end of the course.</p> <p>Global mark. The overall mark for the course is as follows: Overall score = 60% Final exam + 40% TPs rated</p>
Bibliography	<ul style="list-style-type: none"> • 'Computer Networking: A Top Down Approach', 6th edition, Jim Kurose, Keith Ross, Addison-Wesley, March 2012 • 'Les réseaux' - Edition 2014 - Guy Pujolle - 8e édition • 'Computer Networks' 5th By Andrew S. Tanenbaum

COURSE ING-INF416 : Operating Systems And System Programming	ING-4S07-SYS SYSTEMS	Salim Nahle
Semester: S08	No. of hours: 30	Language of instruction: English
Mode of attendance: Tutorial Classes / courses	Courses	KHOURY Christian

Prerequisites	JAVA
objectives	<p>The objectives of the course are as follows.</p> <ul style="list-style-type: none"> • Understand the constraints of mobile programming • Understand the composition of a mobile operating system • Control the structure of an Android mobile app • Mastering the definition of Android-based interfaces • Mastering the use of sensors
contents	<p>The course consists of 7 sessions.</p> <p>The contents of the course are given below.</p> <p>The main issues addressed are: Processes (visible (HMI) and background tasks), Persistence of data, sensor management and localization, adaptability</p>
Skills to be learned	<p>The objectives of the course are as follows.</p> <ul style="list-style-type: none"> • Understand the constraints of mobile programming • Understand the composition of a mobile operating system • Control the structure of an Android mobile app • Mastering the definition of Android-based interfaces • Mastering the use of sensors
Evaluation	Skills acquisition will be assessed through Practical Works (PT) grades, and a small project application. TPs will account for 50% of the overall mark and the "project" for 50%.
Bibliography	developer.android.com (official site)

COURSE ING-INF421 : Web Technologies	Module Technologies Web (Code ING-4S07-WEB) Web technologies	Salim Nahle
Semester: S07	No. of hours: 30	Language of instruction: English
Mode of attendance: Tutorial Classes / courses	Courses	FALCONNET Julien

Prerequisites	N/A
objectives	<p>The objectives of the course are as follows.</p> <ul style="list-style-type: none"> • Students will understand the context of web site and application development. In particular, the languages of representation (HTML, CSS), development (PHP / Mysql, Javascript), but also server technologies: Apache, GNU / Linux and network protocols. • The student will be able to develop a complete website, whether static or dynamic. He will understand the importance of Standards and will apply them. • The student will be fluent in the following languages: HTML, CSS, PHP. As well as Mysql in collaboration with the course corresponding. Javascript technologies (client side) and development framework (server side) will be used. The student will understand the main structuring axes of a web application, relying on a pattern MVC. • The student will be operational on the most used web technologies and aware of the problems of the Internet.
contents	The course is divided into two parts: (i) Client side technologies (Client), (ii) Server side technologies (Server).
Skills to be learned	<p>The objectives of the course are as follows.</p> <ul style="list-style-type: none"> • Students will understand the context of web site and application development. In particular, the languages of representation (HTML, CSS), development (PHP / Mysql, Javascript), but also server technologies: Apache, GNU / Linux and network protocols. • The student will be able to develop a complete website, whether static or dynamic. He will understand the importance of Standards and will apply them. • The student will be fluent in the following languages: HTML, CSS, PHP. As well as Mysql in collaboration with the course corresponding. Javascript technologies (client side) and development framework (server side) will be used. The student will understand the main structuring axes of a web application, relying on an MVC pattern. • The student will be operational on the most used web technologies and aware of the problems of the Internet.
Evaluation	<p>Skills acquisition will be assessed through two small TP projects, one Written Interview (IE), and one Supervised Duty (DS).</p> <ul style="list-style-type: none"> • Project 1. This is an individual project that will sanction the first 3 sessions. A cv made in

	<p>HTML / CSS / JS</p> <ul style="list-style-type: none">• Project 2. This is a three-pupil group work that will take place on the second part of the program. <p>The topic will be presented at the first session and the following sessions will address the problem areas.</p> <p>Realization of a multiplayer game in php / mysql</p> <ul style="list-style-type: none">• Guarded duty. This is an individual, non-course session, with a duration of 2 hours, without a document.
Bibliography	<ul style="list-style-type: none">• http://www.w3schools.com/ pour toutes la partie cliente.• http://jquery.com/ pour le javascript avancé• http://php.net/manual/en/ pour le PHP.• http://cakephp.org/ pour le framework (version 3 utilisée) <p><i>Page 229 / 602</i></p>

Module Code ING-LFH – Languages, Communication and Management

COURSE ING-LFH405 - Budget management	Module: LFH ING-4S07	Referent : TURZI-TRIPODI Francesco
Semester: S07	No. of hours: 32	Language of instruction: English
Mode of attendance: Tutorial Classes		

Prerequisites	Knowledge of the elements provided in financial analysis and economic analysis.
objectives contents	- Ability to develop, in a simple way, the budget of a service or an SME. - In addition, students acquire the ability to locate the activity for which they can be Of the overall budget management of a large company.
contents	- Linkages between policy, strategy and budget. - Budget management: principle and methodology. - Different budgets by function, per management unit ... - Financing problems. - Budgets by responsibility centers. - Budget control and gap analysis.
Skills to be learned	To dominate the financial tools (balance sheet, profit and loss account, financial flows). Build the ratios and be able to provide an analytical look.
Evaluation	Case study (no document is allowed.) Only a so-called operational calculator Be accepted.)
Bibliography	Course materials: The LDE Handout "Budget Management"

Module Code ING-LFH – Languages, Communication and Management

COURSE ING-LFH403 – team management	Module: LFH ING-4S07	Référent : DACHER Nicolas
Semester: S07	No. of hours: 18	Language of instruction: English
Mode of attendance: Tutorial Classes	Courses	

Prerequisites	None
objectives contents	Acquire methods of team management, meeting management and conflict management.
contents	<ul style="list-style-type: none"> - Session 1: Management at Google. - Session 2: History of Management Theories and Motivation. - Session 3: The art of teamwork. - Session 4: Roles of the manager & know how to communicate effectively. - Session 5: Facilitating a productive meeting. - Session 6: Managing and preventing conflicts
Skills to be learned	To anticipate. Motivate. Organize. Give instructions and delegate. Coordinate a team. Control the work. Conduct professional interviews. Manage conflicts
Evaluation	Exam (1h30)
Bibliography	<p>Le management chez Google (documentaire France 5)</p> <ul style="list-style-type: none"> - 100 ans de management - Bruno Jarrosson, Dunod - L'avenir du management - Peter Drucker, Village mondial - L'art de la guerre - Sun Tzu, Flammarion - Les illusions du management - Jean-Pierre Le Goff, La découverte - Le principe de Peter - Jean Peter, Livre de poche - Le Manager Minute - Ken Blanchard, Eyrolles - Le chef de projet efficace - Alain Fernandez, Editions d'Organisation - Le management pour les nuls - Bob Nelson <p>Page</p>

Module Code ING-LFH – Languages, Communication and Management

COURSE ING-LFH401 : English 7	module : ING-4S07-LFH Module Langues et Formations Humaines	Referent : BINI TISSIER Kristen
Semester : 07	Hours : 11	Language of instruction: English
Mode of attendance : tutorials		

Prerequisites	English 6 or equivalent
objectives contents	<p>Fine tune linguistic abilities and develop fluency in English. (Oral and Written)</p> <p>Explore moral problems and look at ethical issues from a practical standpoint. (Learning to argue your point of view and develop concrete arguments)</p> <p>Work on presentation skills.</p> <p>Explore moral problems and look at ethical issues from a practical standpoint. (Learning to argue your point of view and develop concrete arguments)</p> <p>Work on presentation skills.</p>
contents	<p>As an engineer, your job will be to create and improve technology. But over the course of your career, you'll face not only technical challenges; you'll also encounter moral and ethical dilemmas, sometimes on a daily basis. How you resolve those dilemmas will inform your contribution to the future, for better or worse. What role will you play in shaping the future: your own future, the future of technology, the future of the planet? In this course, we will use communication techniques to develop your skills in articulating and defending your inherent values.</p> <p>Expectations: This course will focus on in-class role-play exercises, presentations, listening exercises, and debates, as well as a substantial, written case study. Class participation is essential for your success in this course, as well as your full participation in group work.</p>
Skills to be learned	Reading, writing, speaking and listening in English. Negotiation, Ethics training. Public Speaking, Argumentation and debate skills.
Evaluation	<p>NS: (coefficient 3)</p> <p>In-class activities: 60%</p> <p>Role-plays, debates, presentations, oral activities: 40%</p> <p>Quizzes, questionnaires, writing assignments: 20%</p> <p>Response and research writing assignments: 40%</p> <p>DS: (coefficient 1)</p>
Bibliography	Campus web page

4S07-FLE- French as a foreign language (FLE)

COURSE: 4S07-FLE- French as a foreign language (FLE) Beginner Level		Référent : Mrs. Patricia Farioli
Semester: S07	No. of hours: 30	Language of instruction: English
Mode of attendance: courses		Mrs. Caroline Langer / Mr. Sylvain Lerouillois

Prerequisites	N/A
objectives contents	<p>The main objective is to give students the fundamental elements for the progressive mastery of the language to communicate adequately in the contexts of personal, social and academic life and to be comfortable in the language. It is designed to assimilate the fundamental bases of the language.</p> <p>In a general way: understanding and adapting your communication in French according to the interlocutors, the contexts and the supports, taking into account the permanent evolution of the language.</p> <p>The general objectives are based on the progression of the ability to produce and understand personal information in short exchanges. Interact in simple dialogues by establishing social contacts in the different contexts of daily life (restaurant, grocery store, cafe etc.). As well as gradually participating with autonomy in conversations and understanding simple oral and written texts.</p>
contents	<p>A1: Discovering French</p> <ul style="list-style-type: none"> - Greetings, take leave, introduce yourself - Ask and give personal information - Talk about your preferences, tastes and hobbies - Nationality / country - Say the time, give instructions, - Talk about your habits and activities
Skills to be learned	<ul style="list-style-type: none"> - Linguistic skills (lexical, semantic, grammatical, phonological, orthographic) - Sociolinguistic skills, socio-cultural and intercultural skills (politeness, knowledge of society and culture, understanding of relationships). - Pragmatic-functional skills (ability to manage and structure sentences to communicate appropriately)
Evaluation	<p>On the one hand, the evaluation is done summatively through repetitive questions / answers for an intuitive and immediate appropriation, written as well as oral, interspersed with grammatical points. On the other hand formative, through the reading and understanding of the press, authentic documents videos, films that allow them a reflection on their own learning. Cultural outings prepared upstream, then returned as written reports, are also part of the evaluation.</p>
Bibliography	<p>C., Hugot, V.M., Kizirian, M., Waendendries, A., Berthet, E., Daill. (2012). Alter Ego +. Niveau A1. Méthode de Français. Hachette Français Langue Etrangère.</p> <p>V., Petitmengin, C., Fafa (2017). La grammaire en jeux. PUG FLE.</p> <p>Ressources Internet : http://www.bonjourdefrance.com/index/indexpedago.htm http://www.ciep.fr/assistants-francais-a-letranger/ressources-pedagogiques</p>

4S07-FLE- French as a foreign language (FLE)

COURSE: 4S07-FLE- French as a foreign language (FLE) Intermediate Level	5 ects	Référent : Mrs. Patricia Farioli
Semester: S07	No. of hours: 30	Language of instruction: English
Mode of attendance: courses		Mrs. Caroline Langer / Mr. Sylvain Lerouillois

Prerequisites	A1 LEVEL of French
objectives contents	<p>The main objective of this course is to use the language in situations close to the life of the learner and to enable him/her to develop essential skills to any successful communication.</p> <p>The various activities offered are a reflection of authentic situations and thus promote learner motivation and involvement in learning French. Many opportunities are offered to interact creatively and playfully according to his/her feelings, his /her experience and his/her culture.</p> <p>The guiding thread of the course booklets corresponds rigorously to the competences described by the Common European Framework of Reference for Languages (CEFR).</p> <p>In general, the objective is to train the students to use the language more fluently and a mastered understanding in order to pass in the final year the DELF B2.</p>
contents	<ul style="list-style-type: none"> - Talk about your daily activities - Tell stories in the past - To give advice - Describe the character of a person - Express feelings - Make projects - Describe places - Express your opinions and argue
Skills to be learned	<ul style="list-style-type: none"> - Linguistic skills (lexical, semantic, grammatical, phonological, orthographic) - Sociolinguistic skills, socio-cultural and intercultural skills (politeness, knowledge of society and culture, understanding of relationships). - Pragmatic-functional skills (ability to manage and structure sentences to communicate appropriately)
Evaluation	This course is 100% validated by continuous monitoring. During the semester, several evaluations are planned. A mark for attitude and oral participation in the course is also awarded. The average of these grades is the final grade.
Bibliography	<ul style="list-style-type: none"> . Alter ego + A2, Hachette, 2012 . Communication progressive du français, Niveau intermédiaire, Clé International, 2014 . https://www.lepointdufle.net/ressources_fle/exercices_de_francais.htm . http://apprendre.tv5monde.com/fr/niveaux/a2-elementaire

ING-PRJ409: Multidisciplinary Team Project

COURSE: Multidisciplinary Team Project	ING-PRJ409: Multidisciplinary Team Project	Referent : BOUCHEZ David-Olivier
Semester: S07	No. of hours:	Language of instruction: English
Mode of attendance:		

Prerequisites	A reflection prior to the launch of the project (ideation) to convince cluster leaders of the interest in technological project with regard to socio-economic expectations.
objectives contents	On a development schedule of the PPE in agile mode (sprint weeks). In the first semester: - convince a jury of the EPP approach - define a valuation method - structure the project (specifications and functional and technical specifications).
contents	Project management in multidisciplinary team.
Skills to be learned	Soft skills / Hard skills.
Evaluation	- Pitch - Available CDC - Evaluation of the project management by the mentor
Bibliography	Literature, MOOC and course on project management + creativity and ideation.

SEMESTER 8

COURSE ING-INF418 : Advanced Java	Module Advanced Java (Code ING-4S08-JVA)	Salim Nahle
Semester: S08	No. of hours: 30	Language of instruction: English
Mode of attendance: Tutorial Classes / courses	Courses	CROS Olivier

Prerequisites	Basics of Java programming (object paradigm, inheritance, overload, instantiation, ...),
objectives	<ul style="list-style-type: none"> - To deepen the object development in Java by studying the specificities of the language and its limits. - Manipulate specific concepts, specific libraries in order to have a more global knowledge of the language. - Professionalising and industrializing its Java development process. - Learn how to create complete distributed applications.
contents	<ul style="list-style-type: none"> - Quick revisions on Java bases (keywords, syntactic bases, object paradigm) - Manipulating sets and consumers with Java Generics - Study fundamental design patterns (Factory, Observer, MVC) and know how to implement them in a Java project architecture - Design a simple and dynamic GUI with JavaFX - Understand the stakes of parallel programming through the study of Threads and concurrent access management solutions - Understand and apply functional programming models - Discover the specific features of Java 8 (Lambdas and Streams) - Know the basics of TCP / IP communication in Java - Know how to apply standards and "development guidelines" on a Java project
Skills to be learned	<ul style="list-style-type: none"> - Develop in Java in a constructed and thoughtful way - Designing a Java project architecture - Professionalising and industrializing its Java development process. - Learn how to create complete distributed applications.
Evaluation	Regular TP reports on the various themes seen in progress. (Coefficient: 6) Theoretical examination (2h): Formalism and practice by exercises (coefficient: 4)
Bibliography	Bibliographie <ul style="list-style-type: none"> - https://www.java.com/fr/ - https://docs.oracle.com/javase/tutorial/ - https://www.jmdoudoux.fr/accueil_java.htm - Course slides. - Thinking in Java, Bruce Eckel - Object Primer : Agile Modeling with the the UML, Scott Ambler

COURSE ING-INF436 : Machine learning	Module Machine Learning (Code ING-4S08-MET)	Salim Nahle
Semester: S08	No. of hours: 31	Language of instruction: English
Mode of attendance: Tutorial Classes / courses	Courses	JUN KIM Jae Yun, ZARAKET Toufic

Prerequisites	Linear algebra, probability computation, matrix analysis, and programming
objectives	To describe mathematically the problems to solve and to solve them algorithmically. Completely implement several Machine Learning algorithms (from scratch)
contents	<ol style="list-style-type: none"> 1) Introduction to Data Science, Big Data, and Machine Learning <ul style="list-style-type: none"> - Types of Machine Learning - Machine Learning Methods - Machine Learning Tools 2) Linear regression (simple and multiple) <ul style="list-style-type: none"> - Introduction to regression - Linear regression models - Regularization methods - Evaluation of the performance of the models (overfitting, bias-variance, corossfolding, ...) 3) Logistic regression <ul style="list-style-type: none"> - Introduction to Classification - Classification methods - Logistic regression models (models, cost benefits, decision boundaries) - Evaluation of models (overfitting, bias-variance, corossfolding, ...) 4) Decision trees <ul style="list-style-type: none"> - Intorductuion to decision trees - Bagging & Boosting - Random Forest, adaboost 5) Evaluation of models (overfitting, bias-variance, corossfolding, ...) 6) Direct neural network <ul style="list-style-type: none"> - Network of biological neurons vs. Artificial neural network - Direct propagation - Reverse propagation 7) Recurring neural network <ul style="list-style-type: none"> - Recurrent neural network Elman and recurrent neural network Jordan - Direct propagation - Reverse propagation - Resilient propagation 8) Enhanced Learning <ul style="list-style-type: none"> - Markov decision process - Value function and policy function - Bellman Equations - Optimal value function and optimal policy function - Value iteration algorithm and policy iteration algorithm 10) Unsupervised Learning <ul style="list-style-type: none"> - K-means algorithm

	- Principal Component Analysis
Skills to be learned	<ul style="list-style-type: none"> - Understand the meaning of automatic learning and its applications - Learn the basic algorithms of Machine Learning - Learning to build automatic learning systems (Model ML) with concrete examples - Learn how to use Python: a powerful programming language to apply the ML - Learn how to analyze the results of an ML model, derive from conclusions, and improve - To describe mathematically the problems to be solved and to solve them algorithmically. - Completely implement several Machine Learning algorithms (from scratch) with MATLAB and Octave.
Evaluation	<p>Regular TP reports on the different themes seen in progress (coef 6)</p> <p>DS (2h): Formalism and practice by exercises (coef 4)</p>
Bibliography	<p>P. Norvig and S. J. Russell, Artificial Intelligence : A Modern Approach, 3rd Ed., Pearson, 2009</p> <p>T. Mitchell, Machine Learning, McGraw-Hill, 1997</p> <p>Page</p>

COURSE ING-INF412 : Microsoft C#	Module Microsoft C# (Code ING-4S08-MS)	Salim Nahle
Semester: S08	No. of hours: 30	Language of instruction: English
Mode of attendance: Tutorial Classes / courses	Courses	BALERE Yannick, JOUBERT Thierry

Prerequisites	Object concept & vocabulary associated with the OOP
objectives	The objectives of the course are as follows. - Introduction to .Net and C # - Notion of framework and garbage collection - Implementation of a component and model architecture MVC or MVVM - Address multithreading concepts - Project approach
contents	4h sessions: 1. Introduction to the ".NET world", C # language, Development tool 2. Overview XML, serialization 3. WinForms I (basic properties & components, delegates, listview) 4. WinForms II (Timer, FileDialog, UserControl) 5. Threading & Synchro I 6. Threading & Synchro II Sessions of 3h: 7. Project I 8. Project II
Skills to be learned	<ul style="list-style-type: none"> • Students will be able to develop .NET applications • The student will master C # • The student will understand the implementation of the architecture of an application with concepts of technical module And factorization of components with reusability objectives • The student should acquire a first level of consideration of execution contexts as part of the Implementation of a software architecture
Evaluation	<p>he acquisition of skills will be assessed by means of mini-projects realized in TP and a Supervised Duty (DS).</p> <ul style="list-style-type: none"> • Projects: This is a work in groups of three students proposed to the students in the form of a specification. It takes place on the second part of the program. • Supervised Assignment: This is an individual, non-course session, with a duration of 2 hours, without a document.
Bibliography	-

COURSE ING-NET412 Computer Networks	Module Computer Networks 2 (Code ING-4S08-RES)	Salim Nahle
Semester: S08	No. of hours: 30	Language of instruction: English
Mode of attendance: Tutorial Classes / courses		NAHLE Salim, FAYAD Achraf

Prerequisites	Know the different layers of the OSI model, the IP addressing, the notions of cryptography, the Linux operating system.
objectives	<ul style="list-style-type: none"> - Understand the basics of a Local Area Network (LAN) with associated protocols, security through VLANs and protocols used STP and VTP for proper LAN management - Understanding Static Routing and Routing Routing Protocol - Introduce the protocol 'IPv6. - Understand the basics of cryptography, securing Internet flows through the IPSec VPN. - Master the securing of WEB exchanges with certificates and understanding of a PKI architecture. - Understand how to speed up and secure Internet browsing through an HTTP Proxy-Cache.
contents	<ol style="list-style-type: none"> 1) Routing and Switching <ul style="list-style-type: none"> • VLANs (access and trunk modes) • Configuring VLANs • VTP (Operation, different modes, and configuration) • Routing protocol: RIP (Operation, configuration) 2) Introduction to IPv6 <ul style="list-style-type: none"> • The fundamentals of IPv6 • Understand the IPv6 addressing architecture • Autoconfiguration in IPv6 • Manipulation with the new IP protocol concept for a small network 3) Cryptography <ul style="list-style-type: none"> • The main security services. • Symmetric and asymmetric algorithms • Hash functions. • Electronic signature • A secure exchange scenario 4) IPSec VPN <ul style="list-style-type: none"> • Introductions to VPN. • The concept of a safety association • The management of security associations • The different phases to establish an IPSec tunnel • The ESP / AH Protocols. 5) PKI and SSL / TLS Architecture <ul style="list-style-type: none"> • Principle of PKI • The X509 standard • Certification Authority • Different models of trust authority • Fundamentals of SSL / TLS

	<ul style="list-style-type: none"> • The different versions SSL / TLS, • TLS protocols (Handshake, Alerts, CCS, Record) • Implementation of a PKI architecture <p>6) HTTP Proxy / Cache</p> <ul style="list-style-type: none"> • Concept of a proxy • http cache architectures • http / https filtering with Proxy • Setting up a SQUID proxy with authentication <p>7) Virtual Networks with VMware Workstation</p> <ul style="list-style-type: none"> • Understand the different operating modes of VMware • Build and interconnect multiple virtual networks • Manage static routing on a Debian linux machine • Install and manage DHCP, FTP, and HTTP servers in a virtualized environment.
Skills to be learned	<ul style="list-style-type: none"> • Understand network operation, dynamic routing, secure networks with VLANs and VTP utility to facilitate VLAN management • Understand the addressing architecture of IPv6 and know how to manipulate IPv6 in a small network. • Understand the principles of encryption and manipulate with the OpenSSL tool to encrypt and sign documents. • Understand the PKI architecture, the signature of X509 electronic certificates, the securing of websites by SSL (https). • Understand the principle and utility of VPN and the security of exchanges via Internet. • Understand the look and feel of an HTTP proxy.
Evaluation	Regular TP reports and mini Projects
Bibliography	<ul style="list-style-type: none"> • www.cisco.com • Cisco Networking Academy (S Ward Abingdon and Witney College) • IPv6 Fundamentals, Design, and Deployment – Cisco • Basic IPv6 – Course Training – RIPE NCC • Cryptography : An Introduction (3rd Edition) : Nigel Smart • Understanding Cryptography : Christof Paar · Jan Pelzl • IPsec – An Overview – Somesh Jha - University of Wisconsin • Understanding IPsec - Yusuf Bhaiji - Cisco • http://www.squid-cache.org/

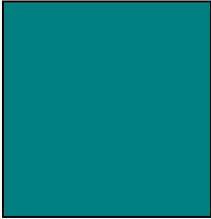
COURSE COURSE ING-INF432 : Computer security	Module Informatique Module Computer Security (Code ING-4S08-SEC)	Salim Nahle
Semester: S08	No. of hours: 30	Language of instruction: English
Mode of attendance: Tutorial Classes / courses		HAMON Baptiste, EL-MOHIB Salma

Prerequisites	Networks, Systems and Programming
objectives	<p>Know the basics of cryptography and take over the encryption tools. Set up network filtering. Set up a network attack: ARP spoof. Know the main vulnerabilities affecting web applications. Exploit the vulnerabilities. Know the countermeasures to be put in place. Evaluate the security of a web application by referring to the OWASP.</p>
contents	<p>1) Network Filtering - Reminder on the notions of networks - Risk analysis - Positioning and operation of the firewall - Decision of the filtering system</p> <p>2) Attacks - Players - Malware - The attacks - How can we protect ourselves?</p> <p>3) Authentication and access control - Definitions - Example of architecture - Proxy servers - Reverse Relay - SSL VPN</p> <p>4) Cryptography - Vocabulary and history - Transposition and permutation - Symmetric Cryptography - Asymmetric Cryptography - Signature and certification authority</p> <p>5) Web Applications: Managing Authentication and Sessions - Authentication - Authorization - Management of session identifiers - Configuring cookies - Session finalization TP: Manipulation of session identifiers contained in cookies on a web application. Configuration and Manipulation of the web proxy Burp to intercept and alter HTTPS requests</p> <p>6) Web applications: Vulnerabilities, exploitation and countermeasures</p>

	<p>OWASP TOP 10</p> <ul style="list-style-type: none"> - Error management - Log management <p>7) Reminders Networks and Attack Methodology</p> <ul style="list-style-type: none"> - Protocols: UDP / TCP / ARP - Attack ARP spoof - Identification of open ports through transport protocols - Resilient propagation <p>8) Enhanced Learning</p> <ul style="list-style-type: none"> - Markov decision process - Value function and policy function - Bellman Equations - Optimal value function and optimal policy function - Value iteration algorithm and policy iteration algorithm <p>10) Unsupervised Learning</p> <ul style="list-style-type: none"> - K-means algorithm - Principal Component Analysis <p>Attack Methodology</p> <ul style="list-style-type: none"> - Recognition and footprinting - Network scans and Nmap manipulation <p>1) Conducting Intrusion Tests</p> <ul style="list-style-type: none"> - Compromising vulnerable machine from vulnerabilities on a web application - Setup of a vulnerable virtual machine in the same network as the attacking machine (Kali Linux). - Identification of the IP address of the target machine - IP scanning and identification of open ports and turning services - Attack of the web application hosted on the server based on the OWASP: SQLi, XSS, LFI, directory traversal, bypass protection .htaccess ... etc. - Breakdown of recovered passwords and gain of access on the ssh server. - Access to mailboxes
Skills to be learned	<ul style="list-style-type: none"> - Learn how to secure a server by setting up firewalls and activating HTTPS - Learn the encryption modes and algorithms used in cryptography - Acquire the ability to synthesize research subjects in security - Understand vulnerabilities affecting web applications by referring to OWASP - Exploiting web vulnerabilities - Acquire the methodology of attack of a remote machine hosting a vulnerable web application - Take the Nmap tool for port scanning
Evaluation	<p>A follow-up note (coef 1): 2 mini projects carried out in pairs. A DS (coef 1): Theoretical examination (2h)</p>
Bibliography	<p>-</p>

COURSE ING-INF416 : Operating Systems	Module Mobile Programming (Code ING-4S08-SYS)	Salim Nahle
Semester: 7	No. of hours: 30	Language of instruction: English
Mode of attendance: Tutorial Classes / courses		KHOURY Christian

Prerequisites	N/A
objectives	<p>The objectives of the course are as follows.</p> <ul style="list-style-type: none"> • Students will understand the breakdown into operating system modules: Process Management, Memory Management, File Management, and I / O Management • Students will understand that each module takes place at different levels in the execution of an application, Hence the interest of studying these modules from different angles: Programmer View, and System View • User view: The student will understand the operation of the system user commands that allow Manage processes, memory, files, and I / O. • Programmer view: The student will master the system programming through the implementation of commands used and seen during the study of the user view. • System view: The student will have an overall understanding of the internal operation of an operating system (algorithms)
contents	<p>The course is divided into two complementary parts: (i) User view & programmer (5 sessions), (ii) View System (5 sessions).</p> <p>The content of the course is given below (dates are the Monday of each session).</p>
Skills to be learned	<p>The objectives of the course are as follows.</p> <ul style="list-style-type: none"> • Students will understand the breakdown into operating system modules: Process Management, Memory Management, File Management, and I / O Management • Students will understand that each module takes place at different levels in the execution of an application, Hence the interest of studying these modules from different angles: Programmer View, and System View • User view: The student will understand the operation of the system user commands that allow Manage processes, memory, files, and I / O. • Programmer view: The student will master the system programming through the implementation of commands used and seen during the study of the user view. • System view: The student will have an overall understanding of the internal operation of an operating system (algorithms)
Evaluation	The acquisition of skills will be assessed through Practical Works (PT) scored, and a Supervised Duty (DS). TPs will account for 50% of the overall mark and the duty monitored for 50%.
Bibliography	Slide supports

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- Written notes by students
 - TP statements and their solutions
 - The man pages
 - The site "gnu.org"
 - Operating Systems Concepts (Silberschatz)
 - Operating Systems Design and Implementation (Tanenbaum)

Module Code ING-LFH – Languages, Communication and Management

ING-LFH408 : Management of the individual relationship	Module: LFH ING-4S08	Référent : DACHER Nicolas
Semester: S08	No. of hours: 13	Language of instruction: English
Mode of attendance: Tutorial Classes		

Prerequisites	N/A
objectives contents	Acquire methods of team management, meeting management and conflict management
contents	- Session 1: Introduction and tests. - Session 2: Analysis tools (introduction to NLP. - Session 3: Transactional Analysis / Evaluation.
Skills to be learned	Identify intellectual, personal and professional profiles. Practice the basics of NLP and transactional analysis.
Evaluation	1h30 test
Bibliography	

Module Code ING-LFH – Languages, Communication and Management

ING-LFH406: Business Management	ING-4S08	Référent : TURZI-TRIPODI Francesco
Semester: S08	No. of hours: 24	Language of instruction: English
Mode of attendance: Tutorial Classes	Courses	

<u>Prerequisites</u>	None, this module is specific for students who have no management training.
objectives contents	Encourage them to deepen for themselves all these new notions for them so that they do not "lose foot" in the "Budget Management" module.
contents	A summary (modules treated with ING2 and ING3) is made as follows: - 6 hours for the module "Manage, it's simple ..." - 6 hours for the "Financial Analysis" module - 6 hours for the module "Economic Analysis"
Skills to be learned	Know how to pilot and follow the management tools of a company
Evaluation	Realize a file
Bibliography	

Module Code ING-LFH – Languages, Communication and Management

ING-LFH401 : English 8	module : ING-4S08-LFH Module Langues et Formations Humaines	Referent : BINI TISSIER Kristen
Semester : 08	Hours : 11	Language of instruction: English
Mode of attendance : tutorials		

Prerequisites	English 7
objectives contents	<p>Fine tune linguistic abilities and develop fluency in English. (Oral and Written)</p> <p>Explore moral problems and look at ethical issues from a practical standpoint. (Learning to argue your point of view and develop concrete arguments)</p> <p>Work on presentation skills.</p> <p>Explore moral problems and look at ethical issues from a practical standpoint. (Learning to argue your point of view and develop concrete arguments)</p> <p>Work on presentation skills.</p>
contents	<p>What will the world be like 30 years from now? What will your life be like? What role will you play in shaping this future? As an engineer, your job will be to create and improve technology. Over the course of your career you'll face not only technical challenges; you'll also encounter moral and ethical dilemmas. How you resolve those dilemmas will inform your contribution to the future, for better or worse. In this course we will work in the intersection of science fiction and ethics in order to imagine possible futures—and your part in building the kind of world you want to live in, and to pass on to your children.</p> <p>This course will focus on group and solo presentations, listening exercises, debates, and role plays.</p>
Skills to be learned	<p>Reading, writing, speaking and listening in English. Negotiation, Ethics training.</p> <p>Public Speaking, Argumentation and debate skills.</p>
Evaluation	<p>NS: (coefficient 3)</p> <p>Student-led lesson 50%</p> <p>Written work (quizzes, listening comprehension, etc.): 20%</p> <p>Class participation: 30%</p> <p>DS: (coefficient 1)</p>
Bibliography	Campus course page

4S08-FLE- French as a foreign language (FLE)

COURSE: 4S08-FLE- French as a foreign language (FLE) Beginner Level		Référent : Mrs. Patricia Farioli
Semester: S08	No. of hours: 30	Language of instruction: English
Mode of attendance: courses		Mrs. Caroline Langer / Mr. Sylvain Lerouillois

Prerequisites	N/A
objectives contents	<p>The main objective is to give students the fundamental elements for the progressive mastery of the language to communicate adequately in the contexts of personal, social and academic life and to be comfortable in the language. It is designed to assimilate the fundamental bases of the language.</p> <p>In a general way: understanding and adapting your communication in French according to the interlocutors, the contexts and the supports, taking into account the permanent evolution of the language.</p> <p>The general objectives are based on the progression of the ability to produce and understand personal information in short exchanges. Interact in simple dialogues by establishing social contacts in the different contexts of daily life (restaurant, grocery store, cafe etc.). As well as gradually participating with autonomy in conversations and understanding simple oral and written texts.</p>
contents	<p>A1: Discovering French</p> <ul style="list-style-type: none"> - Greetings, take leave, introduce yourself - Ask and give personal information - Talk about your preferences, tastes and hobbies - Nationality / country - Say the time, give instructions, - Talk about your habits and activities
Skills to be learned	<ul style="list-style-type: none"> - Linguistic skills (lexical, semantic, grammatical, phonological, orthographic) - Sociolinguistic skills, socio-cultural and intercultural skills (politeness, knowledge of society and culture, understanding of relationships). - Pragmatic-functional skills (ability to manage and structure sentences to communicate appropriately)
Evaluation	<p>On the one hand, the evaluation is done summatively through repetitive questions / answers for an intuitive and immediate appropriation, written as well as oral, interspersed with grammatical points. On the other hand formative, through the reading and understanding of the press, authentic documents videos, films that allow them a reflection on their own learning. Cultural outings prepared upstream, then returned as written reports, are also part of the evaluation.</p>
Bibliography	<p>C., Hugot, V.M., Kizirian, M., Waendendries, A., Berthet, E., Daill. (2012). Alter Ego +. Niveau A1. Méthode de Français. Hachette Français Langue Etrangère.</p> <p>V., Petitmengin, C., Fafa (2017). La grammaire en jeux. PUG FLE.</p> <p>Ressources Internet : http://www.bonjourdefrance.com/index/indexpedago.htm http://www.ciep.fr/assistants-francais-a-letranger/ressources-pedagogiques</p>

4S08-FLE- French as a foreign language (FLE)

COURSE: 4S08-FLE- French as a foreign language (FLE) Intermediate Level		Référent : Mrs. Patricia Farioli
Semester: S08	No. of hours: 30	Language of instruction: English
Mode of attendance: courses		Mrs. Caroline Langer / Mr. Sylvain Lerouillois

Prerequisites	A1 LEVEL of French
objectives contents	<p>The main objective of this course is to use the language in situations close to the life of the learner and to enable him/her to develop essential skills to any successful communication.</p> <p>The various activities offered are a reflection of authentic situations and thus promote learner motivation and involvement in learning French. Many opportunities are offered to interact creatively and playfully according to his/her feelings, his /her experience and his/her culture.</p> <p>The guiding thread of the course booklets corresponds rigorously to the competences described by the Common European Framework of Reference for Languages (CEFR).</p> <p>In general, the objective is to train the students to use the language more fluently and a mastered understanding in order to pass in the final year the DELF B2.</p>
contents	<ul style="list-style-type: none"> - Talk about your daily activities - Tell stories in the past - To give advice - Describe the character of a person - Express feelings - Make projects - Describe places - Express your opinions and argue
Skills to be learned	<ul style="list-style-type: none"> - Linguistic skills (lexical, semantic, grammatical, phonological, orthographic) - Sociolinguistic skills, socio-cultural and intercultural skills (politeness, knowledge of society and culture, understanding of relationships). - Pragmatic-functional skills (ability to manage and structure sentences to communicate appropriately)
Evaluation	This course is 100% validated by continuous monitoring. During the semester, several evaluations are planned. A mark for attitude and oral participation in the course is also awarded. The average of these grades is the final grade.
Bibliography	<ul style="list-style-type: none"> . Alter ego + A2, Hachette, 2012 . Communication progressive du français, Niveau intermédiaire, Clé International, 2014 . https://www.lepointdufle.net/ressources_fle/exercices_de_francais.htm . http://apprendre.tv5monde.com/fr/niveaux/a2-elementaire

ING-PRJ410 : Projet Pluridisciplinaire en Equipe 2

COURSE: Multidisciplinary Team Project	ING-PRJ410 : Projet Pluridisciplinaire en Equipe 2	Referent : BOUCHEZ David-Olivier
Semester: S08	No. of hours:	Language of instruction: English
Mode of attendance:		

Prerequisites	Master the project management team.
objectives contents	On a development schedule of the PPE in agile mode (weeks of sprints): In the second semester, realize a functional technical prototype and expose the valuation arguments.
contents	Develop a project in a multidisciplinary team to produce a functional technical prototype and expose its added value.
Skills to be learned	Soft skills / Hard skills
Evaluation	<ul style="list-style-type: none"> - Livrable Specs - Evaluation de la gestion de projet par le mentor - Soutenance finale
Bibliography	Literature, MOOC and course on project management + creativity and ideation.