

**FACULTY OF ENGINEERING  
 DEPARTMENT SOFTWARE ENGINEERING  
 MASTER OF SCIENCE IN SOFTWARE ENGINEERING**

**FIRST YEAR**

<b><u>Course</u></b>	<b><u>Advanced Software Evolution</u></b>
Instructor:	
Contact	
Department	<u>Software Engineering</u>
Year/Semester	<u>FIRST YEAR MASTER/FALL SEMESTER</u>
Head of Department	

**PURPOSE STATEMENTS:**

This course is an Object-Oriented paradigm based fundamentals and programming languages. Students will be introduced to concepts of class, object, relationships, etc. The corresponding UML notations will be introduced as well simultaneously with object-oriented concepts. Basic concepts of UML diagrams and their code generation with forward and reverse engineering approach introduced. Coding and class interactions, Abstraction, hierarchy, encapsulation, aggregation, polymorphism and inheritance will be introduced. Two kind of polymorphism are introduced: using interfaces and the inheritance mechanism. A good introduction to design patterns is presented as well. Students will get exposed in implementing design patterns in different situations.

**COURSE DESCRIPTION**

During this course students will be introduced with the basic concepts of Fundamentals of Programming, UML and Java or other High level programming languages. A significant weight will be given to the modelling with UML and the code build based on diagrams

Lectures: 2 hrs per week  
 Seminars: 1 hr per week  
 Labs: 1 hr per week  
 Credits: 3  
 ECTS: 6  
 Prerequisite: none



<b>Course:</b>	<b>Advanced Algorithms and Data Structures (I) &amp; II</b>
<b>Module:</b>	<b>Advanced Algorithms and Data Structures (II)</b>
Instructor:	
Contact	
Department	Software Engineering
Year/Semester	First YEAR/Spring SEMESTER 2014-2015
Head of Department:	

### **PURPOSE STATEMENTS:**

The main objective of this course is to provide background in different data structures, and algorithms for manipulating them, by using Java programming language. Students will be introduced to concepts of ADT, Linked Lists, Stack and Queues, Binary Trees, Hash Tables, Graphs, etc. Particular emphasis is given to programming techniques for processing such structures: sorting, searching, hashing and recursion as a strategy for improving the running time of these algorithms.

It introduces students to a variety of methods of the evaluation of the data structure needs of particular problems as well as to consider alternative implementations using differing data structures and understand the significance of choosing a particular data structure in a real-world setting. A final project will summarize the knowledge accumulated during the semester.

### **COURSE DESCRIPTION**

During this course students will be introduced with advanced types of data structures, implementation of useful algorithms and detailed information on performance characteristics.

Lectures:	2 hrs per week
Seminars:	1 hr per week
Labs:	1 hr per week
Credits:	3
ECTS:	6
Prerequisite:	none

<u>Course</u>	<u>Communication Skills</u>
Instructor:	
Contact:	
Department:	<u>Software Engineering</u>
Year/Semester:	<u>FIRST YEAR/FALL 2014-2015</u>
Head of Department:	

### **PURPOSE STATEMENT:**

This course presents communication as an integral part of management strategy and as a critical component for success in the workplace. In this class, you will develop a foundation for designing effective messages, both written and oral, from concept to delivery. You will use a strategic communication model to identify objectives, analyze audiences, choose information, and create the most effective arrangement and channel for that message. Particularly, the course emphasizes elements of persuasive communication: how to design messages for diverse and possibly resistant audiences and how to present that information in a credible and convincing way.

Specifically, you will practice drafting and editing clear, precise, and readable written business documents as well as learn to design documents to make information easily accessible to a busy, executive-level reader. In addition, you will develop and deliver an individual presentation, using appropriate and effective visual support, in which you present a persuasive argument that demonstrates relevance and benefits to an audience at different levels of expertise or interest.

Further, because effective group communication is a necessity in today's workplace, you will learn and practice skills in low structure presentations, managing meetings, dealing with conflict, and leveraging the power of diversity, at both the individual and cultural level.

### **COURSE OBJECTIVES**

Upon successful completion of this class, you will be able to:

- Use a strategic communication model and critical thinking to identify objectives, analyze audiences, and choose the most effective structure and style for delivering strategically sound written and spoken messages.
- Practice principles of effective business writing and document design in all written documents.
- Design and deliver a persuasive presentation that convinces the audience of the topic's relevance and overcomes resistance, using appropriate visual support and adhering to a specified time limit.
- Employ principles of effective group communication to cultivate trust and understanding, increase open participation, and strengthen decision making in work groups and teams.
- Build an understanding of different organizational cultures, business practices, and social norms to communicate more effectively in domestic and cross-cultural business contexts.

- Analyze a company's communication processes or key messages and recommend changes that can help advance communication as an integral part of that organization's management strategy.
- As a team, design and deliver a presentation that both informs and persuades, using an appropriate visual support strategy and adhering to a specified time limit.
- Analyze communication situations and audiences to make choices about the most effective and efficient way to communicate and deliver messages
- Conduct research that includes the use of electronic library resources and the Internet; use the results of that research to complete written and oral reports
- Provide feedback, accept feedback, and use feedback to improve communication skills
- Develop effective interpersonal communication skills
- Use communication technology appropriately and effectively.

Lecture Hours:	2 hours per week
Seminars:	2 hours per week
Credits:	3
ECTS:	6
Prerequisite:	none

<b>Course</b>	<b>INTELLECTUAL PROPERTY LAWS FOR ENGINEERS</b>
Instructor:	
Contact	
Department	Software Engineering
Year/Semester	First YEAR/Spring SEMESTER 2014-2015
Head of Department:	

### **COURSE DESCRIPTION**

This course will focus on intellectual property laws pertaining to the field of software engineering by dwelling in detail about patent, copyright, trademark, confidential information and chip design protection. The course focuses on teaching the software engineers on understanding the software as property and learning the relevant law related issues such as patents, confidential information, registered trademarks and copyright issues.

<b>Lecture Hours</b>	<b>:</b>	<b>2 hours per week</b>
<b>Tutorial Hours</b>		<b>2</b>
<b>ECTS Credits</b>	<b>:</b>	<b>6</b>
<b>Prerequisite(s):</b>		<b>None</b>

<u>Course</u>	<b>Computer &amp; Network Security</b>
Instructor:	
Contact:	
Department:	Software Engineering
Year/Semester:	First YEAR/Spring SEMESTER 2014-2015
Head of Department:	

### **PURPOSE STATEMENTS:**

This course deals with contemporary computer and network security, and cryptography.

### **COURSE DESCRIPTION**

Topics include computer and network security including protection, disaster planning and recovery, risk analysis and security plans, cryptography, database security and web security. The course discusses applications which need various combinations of confidentiality, availability, integrity and covertness properties; mechanisms to incorporate these properties in systems, including discussions on pertinent policy and legal issues.

Lectures:	2 hrs per week
Seminars:	1 hr per week
Labs:	1 hr per week
Credits:	3
ECTS:	6
Prerequisite:	none

<u>Course</u>	<b>Soft Computing &amp; Intelligent Systems</b>
Instructor:	
Contact:	
Department:	Software Engineering
Year/Semester:	First YEAR/Spring SEMESTER 2014-2015
Head of Department:	

### **PURPOSE STATEMENTS:**

The main focus in this course will be on applying in practice knowledge and principles surrounding the field of Data Intelligence, such as obtaining, synchronising and maintaining the data, cleaning and structuralising the data, posing questions that are useful and answerable, analysing and evaluating results and understanding the applicability of data mining and machine

learning. Specific focus is on techniques such as artificial neural networks, genetic algorithms and their combinations.

### **COURSE DESCRIPTION**

The course will be composed of two major parts. The first part will consist of presentation of data mining concepts, algorithms and tools. We will discuss anomaly detection, learning of association rules, clustering, classification and regression. We will also state a problem, based on real world situation that will form the basis for the following parts. In the second part, students will analyse the given problem, and apply different methods and algorithms in an attempt to solve it. Working in groups, they will have a chance to try different solutions and evaluate how well do they work and later be able to discuss their findings.

Lectures: 2 hrs per week  
 Seminars: 1 hr per week  
 Labs: 1 hr per week  
 Credits: 3  
 ECTS: 6

<b><u>Course</u></b>	<b><u>Advanced Java Programming</u></b>
Instructor:	
Contact	
Department	<u>Software Engineering</u>
Year/Semester	First YEAR/Fall SEMESTER 2014-2015
Head of Department:	

### **PURPOSE STATEMENTS:**

The purpose of this course is to provide knowledge on programming with applets in Java. Learn what an applet is, how it works, where and how we can implement them.

### **COURSE DESCRIPTION**

During this course students will be introduced with a project that is build using applets. The project will be built step by step with experiments using the knowledge taken from the lectures. Students will have to complete some tasks after each experiment.

Lectures: 2 hrs per week  
 Seminars: 1 hr per week  
 Labs: 1 hr per week  
 Credits: 3  
 ECTS: 6  
 Prerequisite: none **SECOND YEAR**





to maintain. Today refactoring requires considerable design know-how, but once tools become available, all programmers should be able to improve their code using refactoring techniques.

### **COURSE DESCRIPTION**

During this course students will be introduced with the basic concepts of refactoring techniques and improve existing code. *Refactoring* is sure to be essential reading for anyone who writes or maintains object-oriented software

Lecture Hours:	2 hours per week
Labs:	2 hour per week
ECTS:	6
Credits:	3
Prerequisite:	none

<b><u>Course Module:</u></b>	<b><u>Information &amp; Communication Security and Database Design and Administration</u></b> <b><u>Database Design and Administration</u></b>
Instructor:	
Contact	
Department	<u>Software Engineering</u>
Year/Semester	Second YEAR/Fall SEMESTER 2014-2015
Head of Department:	

### **PUORPOSES STATMENT**

The purpose of this course is to provide a solid understanding of data normalization and an introduction to the design and use of database systems and in particular relational databases, discuss the key issues in building and administrating such systems.

### **COURSE DESCRIPTION**

During this course students will be introduced with the basic concepts of data modelling and in particular the entity relationship model, schema normalization for and optimization, relation algebra and the database query language. To conclude, some database administrative aspects will be discussed.

Lecture Hours:	2 hours per week
Labs:	2 hour per week
ECTS:	6
Credits:	3
Prerequisite:	none

<b><u>Course Module:</u></b>	<b><u>Information &amp; Communication Security and Database Design and Administration</u></b> <b><u>Information &amp; Communication Security</u></b>
Instructor:	
Contact	
Department:	Software Engineering
Year/Semester:	Second YEAR/Fall SEMESTER 2014-2015
Head of Department:	

### **PURPOSE STATEMENTS:**

The purpose of this course is to provide a solid understanding of security data and an introduction to the cryptography, authentication, standards, electronic mail and use of system devices which can implement data security. Practical solutions of Network Communication and Security data are the integral part of labs with students.

### **COURSE DESCRIPTION**

During this course students will be introduced with the basic concepts of cryptography elements such as keys and Hash algorithms. Hot topics such as authentication tokens, integrity, encryption of Data and concepts of Strong Password included during the Lessons and Labs too. An interesting point of view for students is the Real Time Communication security and algorithms attached with it. Finally the e-mail security extensions and standards will cover the subject.

Lectures:	2 hrs per week
Seminars:	1 hr per week
Labs:	1 hr per week
Credits:	3
ECTS:	6

<b><u>Course:</u></b>	<b>Robotics</b>
Instructor:	
Contact	
Department	Software Engineering
Year/Semester	Second YEAR/Fall SEMESTER 2014-2015
Head of Department:	

### **PURPOSE STATEMENTS:**

This course will focus on topics in Robotics including the mathematical background and the various computer issues for robotics.

### **COURSE DESCRIPTION**

This course provides a good introduction to all computational aspects in mobile robotics such as locomotion, robot perception, hardware, sensors, planning, reasoning and poise.

Lectures: 2 hrs per week  
 Seminars: 1 hr per week  
 Labs: 1 hr per week  
 Credits: 3  
 ECTS: 6  
 Prerequisite: none

<b>Course</b>	<b><u>Web Engineering</u></b>
Instructor:	
Contact	
Department	<u>Software Engineering</u>
Year/Semester	<u>SECOND YEAR/FALL SEMESTER</u>
Head of Department	

### **PURPOSE STATEMENTS:**

The course will focus on knowing basic knowledge on web protocols HTTP/ HTTPS, FTP and other server configurations. The course will have a full and hands on design of the web application, web development frameworks and programing technics. Students will be able by the end of this course to write, debug, publish and maintain full web software. Students will have a clear picture how web application works. A real web environment will be locally installed and the application and database implemented. Once that everything will be up and running, students will learn about debugging and testing the software. Before the end of the course students will be able to publish the web application and migrate the local database to the remote server on the web. Basic concepts of ORM, DAO (Data Access Object), RBAC (Role Base Access Control) and TDD (Test Driven Development) will be used for the course

### **COURSE DESCRIPTION**

During this course students will be introduced with the basic concepts of web application development in term of design and basic functionalities. A significant weight will be given to the framework based development using HTML5 and CMS or PHP frameworks such as ZEND and Yii Framework.

15 weeks (2 hrs per week) of lectures  
 15 weeks (2 hrs per week) of lab

- Lectures,
- Assignments,
- Tests
- Lab sessions
- Exam

<b>Course:</b>	<b>Wireless Networks - LANs &amp; WANs</b>
Instructor:	
Contact	
Department	Software Engineering
Year/Semester	Second YEAR/Fall SEMESTER 2014-2015
Head of Department:	

### **PURPOSE STATEMENTS:**

This course provides a comprehensive understanding of the fundamentals of Wireless LANs and WANs. Specific areas of attention include concepts and principles behind wireless technologies and their implementation in wireless networks. Special focus is on the areas of design, planning, implementation, operation, and troubleshooting.

### **COURSE DESCRIPTION**

Topics include wireless and cellular radio technology, satellite, cellular and cordless networks, IEEE standards, wireless equipment's, wireless network setup and their security and management.

Lectures:	2 hrs per week
Seminars:	1 hr per week
Labs:	1 hr per week
Credits:	3
ECTS:	6
Prerequisite:	none