**DEPARTMENT OF SOFTWARE ENGINEERING**

**Study Program “Master of Science”**

**in**

**Computer Engineering and Information Technology**

**Profile : Multimedia-Design**

**Course Description**

**2021-2022**

**1st Semester**

**Course: User Interface Design**

**Short Description**

The course User Interface Design introduces proper design of user interfaces. We will look at how to design good user interfaces, covering important design principles (learnability, visibility, error prevention, efficiency, and graphic design) and the human capabilities that motivate them (including perception, motor skills, color vision, attention, and human error). This course examines systematic, disciplined and quantifiable approaches to designing high-quality, reliable and usable applications. We will learn techniques for evaluating and measuring interface usability, including heuristic evaluation, predictive evaluation, and user testing. We will learn how to conduct empirical research involving novel user interfaces. Students will develop User Interface design skills in knowledge within the context of established best practice in user interface design. Students are then prepared to 1) evaluate whether or not UI design is a viable career option for them, and 2) to pursue more advanced study in UI design if they choose to do so.

**Course: Advanced Java Programming**

**Short Description**

This course is designed to introduce to students’ the paradigm of generic programming, abstract data types and the concepts, generic classes and functions. As well as, developing skills to use collections in Java. Introducing graphics in Java, as well as design application with GUI.

**Course: Database Design and Administration**

**Short 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.

**Course: Advanced Project Management**

**Short Description**

This course will prepare students to design, manage, and deliver complex project solutions. The course adopts a practitioner’s focus, and is consistent with the principles laid out in the Project Management Professional (PMP) certification

Students commence their study with an investigation into the Project Management Framework from PMI. Topics covered include scoping the project, project planning, and change control. Students then study project communications, the use of project management software, and the use of modeling and analysis tools. Key factors in project success, such as people management and the identification of risk factors, are also studied. Graduates of the course will use their knowledge to successfully implement projects across a range of industry sectors.

**Course: Advanced Research Methods**

**Short Description**

The MSc course provides a comprehensive introduction to research methods and methodologies, and foundational research theories. As such, students enrolled in this course will be provided with sound knowledge in both qualitative and quantitative research as well as the main phases of the writing process and data collection and processing methods. In addition, this course could be regarded as a foundation course for other master courses and thesis writing that students are supposed to submit by the end of their study program. The second part of the course will focus on individual projects and data gathering and analyses procedures. To serve this purpose, students are expected to master some fundamental skills in engineering research ranging from developing a research proposal to understanding research methodology and understanding research methods, populations and sampling, to name a few.

**2nd Semester**

**Course: Desing Principles for Multimedia**

**Short Description**

This course, Design principles for multimedia, teaches the fundamentals of designing Multimedia by using the most widely accessed and preferred modeling editing engine Blender. The intent of this course is to prepare students with the industry related multimedia skills needed for the workplace and higher learning environments. The course focuses on developing competencies in designing and creating interactive multimedia. By the end of this course, they will understand the design planning process, be knowledgeable of industry related careers, and be able to navigate the Blender environment in order to create multimedia models and animations, and 3D content. To serve this purpose, students are expected to master some fundamental skills in Multimedia Design ranging from developing an animation to understanding design and interaction principles, datasets. Students will also learn techniques for visualizing multivariate, temporal, text-based, geospatial, hierarchical, and network/graph-based data. Additionally, students will utilize Matlab,Processing, D3, R and ggplot2, and many other tools to prototype many of these techniques on existing datasets.

**Course: Multimedia Theory**

**Short Description**

The topics are primarily based on signal processing for multimedia application, starting from the basic notions of waveform, frequency, amplitude, phase and spectra. Afterwards digital filters and 1D, 2D Fourier Transforms are introduced along with the Nyquist's theorem. After having considered the general properties of audio and video data, a number of compression algorithms are presented and discussed.

**Course: Data Visualization**

**Short Description**

This course will introduce students to the field of data visualization. Students will learn basic visualization design and evaluation principles, and learn how to acquire, parse, and analyse large datasets. Students will also learn techniques for visualizing multivariate, temporal, text-based, geospatial, hierarchical, and network/graph-based data. Additionally, students will utilize Matlab,Processing, D3, R and ggplot2, and many other tools to prototype many of these techniques on existing datasets.

**Course: Network Programming**

**Short Description**

The purpose of this course is to provide a solid understanding of Network Programming and automation and Security concerns implementation. Moreover, it aims at providing solid knowledge in TCP/IP set of protocols as well as ARQ protocols and their programming with emphasis in socket programming. Network programming is based on Java and Python language. Meanwhile in Security, implementations based on Kali linux will be studied such as: Policy Rules in IPTABLES, Vulnerability Assessment in WEB and FTP, Scanning with Nmap tool, Reverse Engineering, Password Cracking, Wireless Cracking, Logging Spyware, Intrusion and Backdoor penetration etc Although emphasis will be put on all main tools of Kali Linux, special emphasis will be paid to penetration testing and ethical hacking tools.

**3rd Semester**

**Course: 3 D Animation and Virtual Space**

**Short Description**

This course 3D Animation and Virtual Spaces using UNITY course teaches the fundamentals of designing a 3D UNITY using the most widely accessed and preferred editing engine in the world. The intent of this course is to prepare students with the industry related skills needed for the workplace and higher learning environments. By the end of this course, they will understand the design planning process, be knowledgeable of industry related careers, and be able to navigate the Unity environment in order to create 3D environments, animations, 3D games, and 3D content. To serve this purpose, students are expected to master some fundamental skills in 3D ranging from developing an animation to understanding composition, light and interaction of objects and understanding programming events of objects.

**Course: Introduction to Multimedia Imaging**

**Short Description**

This subject presents various aspects of creating a digital multimedia image. During the lectures, the process of creating and using digital imaging will be effectively defined and students will thus gain an understanding of the theory and support the inclusion of digital images in multimedia production. Students will be involved in project ventures that explore a wide range of technical masterpieces and design concepts to incorporate digital images into multimedia production.

**Course: Web Engineering**

**Short Description**

The course Web Engineering introduces a structured methodology utilized in software engineering to Web development projects. The course addresses the concepts, methods, technologies, and techniques of developing Web sites that collect, organize and expose information resources. Topics covered include requirements engineering for Web applications, design methods and technologies, interface design, usability of web applications, accessibility, testing, metrics, operation and maintenance of Web applications, security, and project management. Specific technologies covered in this course include client-side (HTML, JavaScript, and CSS) and server-side (PhP). Many applications continue to be developed in an ad-hoc way, contributing to problems of usability, maintainability, quality and reliability. This course examines systematic, disciplined and quantifiable approaches to developing of high-quality, reliable and usable web applications. The course introduces the methodologies, techniques and tools that support their design, development, management, evolution, and evaluation.

**Course: Response Web Design**

**Short Description**

The course will focus on in depth knowledge of HTTP / HTTPS protocols, FTP and other server configurations needed in the design of responsive client server web applications. The course, moreover, will deal with the three main ingredients of a responsive design—flexible grids, fluid images, and media queries—designers, agencies, and large organizations alike have been based for producing stellar responsive designs, pushing the concept forward, including focusing on state of the art research. The course will have full projects and directly affect the design of web applications, web development frameworks, and programming techniques. Apart from in depth analysis of needed web protocols in client server applications, the course will focus on dynamic HTMS, CSS, Javascript, Servlets and advanced PHP programming. Students will be able to write, check, publish, and maintain web software in a fully functional and responsive web application state by the end of this course. Students will have a clear idea of how client server applications work in depth. A work environment in the Internet will be installed locally where application and database will be available. Learn about techniques and management for web software testing. Before completing the course, students will be able to publish their project as web application and migrate the database to the server on the web.