University of Al-Qadisiyah
جامعة القادسية

First Cycle – Bachelor's Degree (B.Sc.) -Computer Information System

بكالوريوس – علوم في نظم المعلومات الحاسوبية

Table of Contents

1. Overview

This catalogue is about the courses (modules) given by the program of Computer Information System to gain the Bachelor of Science degree. The program delivers (48) Modules with (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

نظره عامه

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج نظم المعلومات الحاسوبية للحصول على درجة بكالوريوس العلوم. يقدم البرنامج (٤٨) مادة دراسية، على سبيل المثال، مع (٦٠٠٠) إجمالي ساعات حمل الطالب و ٢٤٠ إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Courses 2023-2024

Module 1

Code	Course/Module Title	ECTS	Semester
CSI111	Programming Fundamentals	8	1

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	64	136

Description
The objective of course is to introduce a disciplined approach to Problem solving methods and algorithm development. The aim is to teach the syntax and vocabulary of a modern programming language like C++. The significant philosophies and logical programming, including models for I/O, processing, and all related terminology will be taught. Simple programs will be constructed, using a number of different logical, calculation and algorithm.

Module 2

Code	Course/Module Title	ECTS	Semester

IS111	Foundations of Information Systems	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	0	49	101
Description			

Information systems are an integral part of all business activities and careers. This course is designed to introduce students to contemporary information systems and demonstrate how these systems are used throughout global organizations. The focus of this course will be on the key components of information systems - people, software, hardware, data, and communication technologies, and how these components can be integrated and managed to create competitive advantage. Through the knowledge of how IS provides a competitive advantage students will gain an understanding of how information is used in organizations and how IT enables improvement in quality, speed, and agility. This course also provides an introduction to systems and development concepts, technology acquisition, and various types of application software that have become prevalent or are emerging in modern organizations and society.

Module 3

Code	**Course/Module Title**	**ECTS**	**Semester**
CSI112	Mathematics	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	0	47	103
Description			

The topics studied include a number of important ideas of mathematics, including the concepts of rigorous argument, formal proof and the power of abstract formulation of problems. This is combined with the core computer science topics of programming and software engineering, together with the study of mathematical principals underpinning the foundations of computing.

Module 4

Code	**Course/Module Title**	**ECTS**	**Semester**
IS112	Electronic Commerce	4	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	32	68
Description			

The aim of this course is to equip you with a detailed understanding of the major issues regarding the

use of electronic commerce applications within business organizations. This course unit focuses on the business, strategic and technical aspects of electronic commerce. It analyses the technologies used, the models designed to make use of such technologies, and the applications that have resulted from their deployment.

Module 5

Code	Course/Module Title	ECTS	Semester
UNV111	Economy	4	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	32	68
Description			

The aim of this course is to equip you with a detailed understanding of the major issues regarding the organization theories and practice, internal and external accounting methods, international marketing, business process optimization, business strategy, management, and strategic planning of information systems.

Module 6

Code	Course/Module Title	ECTS	Semester
UNV112	Human Rights	2	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	0	17	33
Description			

The aim of this course is to equip you with a detailed understanding of the major issues regarding the human rights such as basic rights that people from around the world have agreed are essential. These include the right to life, the right to a fair trial, freedom from torture and other cruel and inhuman treatment, freedom of speech, freedom of religion, and the rights to health, education and an adequate standard of living.

Module 7

Code	Course/Module Title	ECTS	Semester
CSI121	Programming C++	8	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	64	136

Description
This module introduces object-oriented programming (OOP) features to C. It offers classes, which provide the four features commonly present in OOP (and some non-OOP) languages: abstraction, encapsulation, inheritance, and polymorphism. One distinguishing feature of C++ classes compared to classes in other programming languages is support for deterministic destructors, which in turn provide support for the Resource Acquisition is Initialization (RAII) concept

Module 8

Code	Course/Module Title	ECTS	Semester
IS121	Information Systems	6	2

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	0	49	101

Description
This course provides the students with an introduction to the core concepts in data and information management. It is centered around the core skills of identifying organizational information requirements, modeling them using conceptual data modeling techniques, converting the conceptual data models into relational data models and verifying its structural characteristics with normalization techniques, and implementing and utilizing a relational database using an industrial-strength database management system. The course will also include coverage of basic database administration tasks and key concepts of data quality and data security. In addition to developing database applications, the course helps the students understand how large-scale packaged systems are highly dependent on the use of DBMSs. Building on the transactional database understanding, the course provides an introduction to data and information management technologies that provide decision support capabilities under the broad business intelligence umbrella.

Module 9

Code	Course/Module Title	ECTS	Semester
CSI122	Discrete Mathematics	6	2

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	0	47	103

Description
Discrete mathematics is the study of mathematical structures that are discrete, separated or distinct; in contrast with calculus which deals with continuous change. It is an important area of pure and applied mathematics, as well as providing the mathematical basis for the understanding of computers and modern computation.

Module 10

Code	Course/Module Title	ECTS	Semester
UNV121	Democracy	2	2

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	0	17	33

Description
This module refers to democratic principles that reflects in all eligible citizens being equal before the law and having equal access to legislative processes. For example, in a representative democracy, every vote has equal weight, no unreasonable restrictions can apply to anyone seeking to become a representative, and the freedom of its eligible citizens is secured by legitimized rights and liberties which are typically protected by a constitution.

Module 11

Code	Course/Module Title	ECTS	Semester
UNV122	Arabic Language	4	2

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	34	66

Description
This module focuses on teaching the write skills at the level of spelling, grammar and morphology, as well as teaching students the method of analysis Literary text by reference to literary texts considered.

Module 12

Code	Course/Module Title	ECTS	Semester
UNV123	English Language (I)	4	2

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	32	68

Description
This module focuses on understanding and using the English language as a means of communication and learning in their specialties. Comprehension of the read material, creating a link between its various components. Use colloquial English in their daily lives

Module 13

Code	Course/Module Title	ECTS	Semester
IS211	Object-Oriented programming	8	3

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	64	136
Description			

Learn the basics of object-oriented programming (class and object) and the basics of programming languages used with the concept of OOP. Moreover, teaching student the difference between an object and a restriction and teaching them the concept of Encapsulation. Programming the concept of inheritance and the concept of Polymorphism

Module 14

Code	Course/Module Title	ECTS	Semester
IS212	Essential Systems Analysis & Design	4	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	32	68
Description			

This course discusses the processes, methods, techniques and tools that organizations use to determine how they should conduct their business, with a particular focus on how computer-based technologies can most effectively contribute to the way business is organized. The course covers a systematic methodology for analyzing a business problem or opportunity, determining what role, if any, computer-based technologies can play in addressing the business need, articulating business requirements for the technology solution, specifying alternative approaches to acquiring the technology capabilities needed to address the business requirements, and specifying the requirements for the information systems solution in particular, in-house development, development from third-party providers, or purchased commercial-off-the-shelf (COTS) packages .

Module 15

Code	Course/Module Title	ECTS	Semester
CSI211	Numerical Methods	6	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	64	86
Description			

Numerical analysis is used to solve mathematical equations that are difficult to solve or require a long time to solve. Saving time and effort, especially in equations that need a lot of repetition in order to reach the result or solution. The ability to collect, classify, tabulate, represent and interpret quantitative and numerical data. Generalizing numerical mathematical superlatives on symbolic expressions. The ability to build mathematical models. Using different thinking methods and the ability to judge the validity and reasonableness of the solution

Module 16

Code	Course/Module Title	ECTS	Semester
IS213	Essential Data Management and Information	6	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	64	86
Description			
The Data Management Essentials course demonstrates various techniques and procedures for managing corporate data and describes which roles combine to provide an effective data management team. The course also covers data and enterprise, data quality and current data management themes.			

Module 17

Code	Course/Module Title	ECTS	Semester
IS214	Data Structure	6	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	64	86
Description			
Understand the principles of databases and methods of design. Understand what are the database management systems. Know the reasons that led to the emergence of distributed databases. Knowledge of what architectures are available and used to build distributed database systems.			

Module 18

Code	Course/Module Title	ECTS	Semester
IS221	Web Development	8	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	64	136
Description			
The purpose of this course is to introduce the students to the fundamental concepts and models of application development so that they can understand the key processes related to building functioning applications and appreciate the complexity of application development. Students will learn the basic concepts of program design, data structures, programming, problem solving, programming logic, and fundamental design techniques for event-driven programs. Program development will incorporate the program development life cycle: gathering requirements, designing a solution, implementing a solution in a programming language, and testing the completed			

application.	

Module 19

Code	Course/Module Title	ECTS	Semester
IS222	Systems Analysis & Design	4	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	32	68
Description			

This course examines the systems analysis and design process from understanding what a system should do through how a system should be implemented. Topics include the System Development Life Cycle (SDLC); the roles of the Systems Analyst and Designer; an introduction to requirements gathering, including identifying user stories, use cases, use of modeling tools; and system design, user interface design, and database design. The course encourages interpersonal skill development with clients, users, and personnel involved in development, operation, and maintenance of a system. Quality issues such as software testing, configuration management, quality management, and process improvement are addressed throughout the course.

Module 20

Code	Course/Module Title	ECTS	Semester
IS223	Data Management and Information	6	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	64	86
Description			

This module of data management and information encompasses various concepts, techniques, algorithms and technologies, including data modeling, data integration and ingestion, transactional data management, query languages, query optimization, physical data storage, data structures, analytical techniques (including On-Line Analytical Processing – OLAP), as well as service creation and orchestration. Data management technologies are core components of every information system, either centralized or distributed, deployed in an on-premise hardware architecture or in a cloud ecosystem

Module 21

Code	Course/Module Title	ECTS	Semester
CSI221	Statistics and Probability	4	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**

2	0	32	68

Description

This course aims to provide the student with an overview of the principles and concepts of statistics and probability.
• The student will be able to differentiate between quantitative and qualitative data and how to represent them.
• Enable the student to know the types of distribution such as the normal distribution and use it to represent the types of probabilities.
• Introducing students to modern topics in the principles of statistics and probability.

Module 22

Code	Course/Module Title	ECTS	Semester
UNV221	English II	4	4

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	32	68

Description

Learn the basic skills of the English language
• Learn the basics of reading skill
• Learn the basics of writing skill
• The ability to listen
• Understanding the meanings and adding new vocabulary
• Learn to speak and discuss using language vocabulary

Module 23

Code	Course/Module Title	ECTS	Semester
IS224	Analysis & Algorithm Design	4	4

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	34	66

Description

1. Introduction to algorithms.
2 Apply the concepts of algorithms.
3 Realizing the importance of algorithms in practical life.
4. Analyzing algorithms and preferring them over others.
5. Professional design of algorithms

Module 24

Code	Course/Module Title	ECTS	Semester

Code	Course/Module Title	ECTS	Semester
IS311	Artificial Intelligence	6	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	64	86
Description			

• This course aims to introduce students to the field of artificial intelligence and its relationship to computer science in a logical and practical way
• Familiarize students with artificial intelligence algorithms.
• Explain and clarify the challenges that we face when building smart systems.
• It gives models and examples of smart systems and what are the basic technologies used in these systems.

Module 25

Code	Course/Module Title	ECTS	Semester
IS312	Computer Network	6	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	64	86
Description			

• The course aims to increase the student's knowledge of computer networks (their advantages and disadvantages).
• Learn more about the components of the network.
• Identify the classification of the network.
• Advantages and disadvantages of network topologies.

Module 26

Code	Course/Module Title	ECTS	Semester
IS313	Secure Computing	4	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	32	68
Description			

Demonstrate the need for a trusted computing base (TCB) and how it helps protect resources in a computer system. Analyze how hardware supported memory protection enables isolation of TCB and of untrusted programs. Develop, implement and evaluate authentication and access control in computer systems. Understand and evaluate security in distributed systems. Apply security concepts to protect data stored in database systems

Module 27

Code	Course/Module Title	ECTS	Semester
IS314	IS Project Management	4	5

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	32	68

Description

This course discusses the processes, methods, techniques and tools that organizations use to manage their information systems projects. The course covers a systematic methodology for initiating, planning, executing, controlling, and closing projects. This course assumes that project management in the modern organization is a complex team-based activity, where various types of technologies (including project management software as well as software to support group collaboration) are an inherent part of the project management process. This course also acknowledges that project management involves both the use of resources from within the firm, as well as contracted from outside the organization.

Module 28

Code	Course/Module Title	ECTS	Semester
IS315	User Interfaces Design	6	5

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	64	86

Description

 understanding of the critical importance of user interface design. You will also learn industry-standard methods for how to approach the design of a user interface and key theories and frameworks that underlie the design of most interfaces you use today.

Module 29

Code	Course/Module Title	ECTS	Semester
IS316	Operation Research	4	5

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	32	68

Description

an analytical method of problem-solving and decision-making that is useful in the management of organizations. In operations research, problems are broken down into basic components and then solved in defined steps by mathematical analysis.

Module 30

Code	Course/Module Title	ECTS	Semester
IS321	Enterprise Projects	4	6

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	32	68

Description

Provide students with a comprehensive introduction to software engineering.
• Provide students with the types of activities needed to produce the system.
• Study the important stages of software development.
• Building a high-quality software system.
• Explain the system build life cycle.
• Acquisition of knowledge at every stage of building the system.
• Understanding of applying software engineering principles to a project.

Module 31

Code	Course/Module Title	ECTS	Semester
IS322	Business Information Systems	4	6

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	32	68

Description

In this course students will be introduced to key concepts and approaches to business process management and improvement. The main focus of this course is both understanding and designing business processes. Students will learn how to identify, document, model, assess, and improve core business processes. Students will be introduced to process design principles. The way in which information technology can be used to manage, transform, and improve business processes is discussed. Students will be exposed to challenges and approaches to organizational change, domestic and offshore outsourcing, and inter-organizational processes.

Module 32

Code	Course/Module Title	ECTS	Semester
IS323	Data and Information Visualization	8	6

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	64	136

Description

the graphical representation of information and data. By using visual elements like charts, graphs, and

maps, data visualization tools provide an accessible way to see and understand trends, outliers, and patterns in data

Module 33

Code	Course/Module Title	ECTS	Semester
IS324	Decision Support Systems	4	6

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	32	68

Description
Decision Support Systems module description Decision making, information theory, knowledge representation and knowledge systems, retrieval concepts and languages, decision support systems and development methodologies.

Module 34

Code	Course/Module Title	ECTS	Semester
IS325	Development and Applications Programming	4	6

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	32	68

Description
● To provide students with a disciplined understanding of the state of the art of application development in terms of development technologies, development platforms and toolsets, risk assessment and security in the broader context of the IT industry business.   ● To consolidate the techniques and concepts introduced in earlier programming modules in order for students to be able to employ them in an integrated fashion in realistic application development projects.   ● To introduce students to a major contemporary software development platform, including its programming languages and toolsets for application development.   ● To train and equip students with necessary hands-on skills in using a major development platform and environment to design and implement a significant software application.

Module 35

Code	Course/Module Title	ECTS	Semester
IS326	Information Retrieval and search web	6	6

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)

3	0	49	101

Description

The course aims to teach the student the basics of information retrieval. The course aims to introduce students to the basics of primary treatment. Giving the student an overview of the components of the information retrieval system. The course aims to introduce students to the mechanism of search engines.

Module 36

Code	Course/Module Title	ECTS	Semester
IS327	Distributed Database	4	6

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	32	68

Description

• Understand the principles of databases and methods of design.
• Understand what database management systems are.
• Know the reasons that led to the emergence of distributed databases.
• Knowledge of what architectures are available and used to build distributed database systems.

Module 37

Code	Course/Module Title	ECTS	Semester
IS411	Internet of Things	6	7

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	32	118

Description

students will be able to
 Understand the basics of IoT.
Implement the state of the Architecture of an IoT.
Understand design methodology and hardware platforms involved in IoT.
Understand how to analyze and organize the data.
Compare IOT Applications in Industrial & real-world.

Module 38

Code	Course/Module Title	ECTS	Semester
IS412	Mobile Applications	8	7

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	64	136
Description			

The aims of this module are:
● Understand unique aspects of mobile application programming
● Design and prototype sophisticated mobile applications
● Develop Android applications that take advantage of advanced phone features and deploy them in the marketplace

Module 39

Code	Course/Module Title	ECTS	Semester
IS413	Operating Systems	4	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	32	68
Description			

Identify the operating system and its importance and advantages and the benefit of the continuous development of these systems
• Learn about the functions of the operating system.
• Learn about the structure of the operating system.
• Learn about operations management and scheduling methods.
• Identify the important functions in the operating system.

Module 40

Code	Course/Module Title	ECTS	Semester
IS414	Cloud Computing	4	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	32	68
Description			

• This course aims to provide students with an overview of the concepts and basics of cloud computing. Topics covered include: general concepts, cloud computing models, cloud computing fundamentals, cloud computing architecture and management, cloud deployment models, technology drivers of cloud computing, cloud service models, virtualization, programming models for cloud computing, software development in the cloud, networking for computing cloud, cloud service providers, open source cloud support, security in cloud computing, advanced concepts in cloud computing.

Module 41

Code	Course/Module Title	ECTS	Semester
IS415	IT Security	8	7

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	64	136

Description

This course provides an introduction to the fundamental principles and topics of Information Technology Security and Risk Management at the organizational level. Students will learn critical security principles that enable them to plan, develop, and perform security tasks. The course will address hardware, software, processes, communications, applications, and policies and procedures with respect to organizational IT Security and Risk Management.

Module 42

Code	Course/Module Title	ECTS	Semester
IS421	Data Mining	8	8

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	64	136

Description

Gain an understanding of what data mining is all about.
-    Be able to perform the data preparation tasks and understand the implications.
-    Demonstrate an understanding of the alternative knowledge representations such as rules, decision trees, decision tables, and Bayesian networks.
-     Demonstrate an understanding of the basic machine learning algorithmic methods that support knowledge discovery.
-    Be able to evaluate what has been learned through the application of the appropriate statistics.
-    Be able to discuss alternative data mining implementations and what might be most appropriate for a given data mining task.
-    Become proficient in the use of a set of data mining tools.

Module 43

Code	Course/Module Title	ECTS	Semester
IS422	Research Project	6	8

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
0	3	45	105

Description

This section includes a description of the module, 100-150 words		

Module 44

Code	Course/Module Title	ECTS	Semester
IS423	Software Engineering	4	8

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	32	68

Description
This course is designed to provide students with an understanding of the theoretic and practical issues related to the application of enterprise systems within organizations. The main focus of this course is to demonstrate how enterprise systems integrate information and organizational processes across functional areas with a unified system comprised of a single database and shared reporting tools. Enterprise systems, by their multi-dimensional integrative nature, offer the depth of functionality and breadth of integration to demonstrate how global operations of organizations are managed. Thus, students will gain an appreciation of the scope of enterprise systems and the motivation for implementing them. [Optional: Example software will be used to illustrate how enterprise systems work. An integrated project, which requires the application of conceptual as well as technical (software) skills of students, will be required.]

Module 45

Code	Course/Module Title	ECTS	Semester
IS424	Modeling and simulation	4	8

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	32	68

Description
. This module aims to familiarize graduate students with advanced topics in this area, especially modeling and simulation of transient processes. Dynamic models resulting from real-life examples of transient processes along with solution methods are discussed. Also, common techniques for plant-wide process simulation in both steady and dynamic states are presented.

Module 46

Code	Course/Module Title	ECTS	Semester
IS425	Geographic Information Systems	4	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)

2	0	32	68
Description			

This course will give you an in-depth understanding of the elements and principles of geographic information systems. It is hoped that the knowledge would equip you with the conceptual and technical issues on the practical applications of the science and technology of geographic information systems.

Module 47

Code	Course/Module Title	ECTS	Semester
IS426	Machine Learning	4	8

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	32	68

Description			

This module aims to:
1-Recognize the characteristics of Machine Learning techniques that enable to solve real world problems
2. Recognize the characteristics of machine learning strategies
3. Apply various supervised learning methods to appropriate problems
4. Identify and integrate more than one techniques to enhance the performance of learning
5. Create probabilistic and unsupervised learning models for handling unknown pattern
6. Analyze the co-occurrence of data to find interesting frequent patterns

Module 48

Code	Course/Module Title	ECTS	Semester
IS427	Distributed Systems	4	8

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	0	32	68

Description			

The module aims to:
• Apply knowledge of distributed systems technologies and methodologies.
• Explain the design and development of distributed systems and their applications
• Using the application of basic computer science methods and algorithms in the development of distributed systems and their applications in distributed systems.
• Knowledge of the various concepts and mechanisms used in building communication networks between different types of distributed systems.

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