



Ministry of Higher Education and Scientific Research Scientific Supervision and
Scientific Evaluation Apparatus Directorate of Quality Assurance and Academic
Accreditation Department

College of Science at Mustansiriyah University
Academic Year 2024-2025

Academic Program and Course Description

2025

University: Mustansiriyah University

College: Science. Department: Computer Science Department

Academic or Professional Program Name: Bachelor of Computer Science

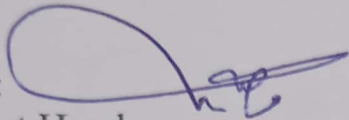
Final Degree Name: Bachelor of Computer Science

Academic System: Courses

Description Preparation Date:

File Completion Date:

Signature:



Department Head:

Asst. Prof. Musaab Riyadh Abdulrazzaq

Date:

The Quality Assurance and University Performance Division reviewed the file.

Signature:

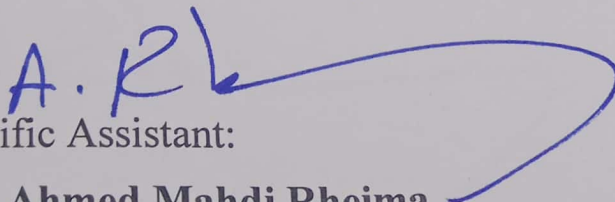


Name of Director of the Quality Assurance and University Performance Division:

Assistant Professor Dr. Ali Jasim Mohammed

Date: // 2025

Signature:

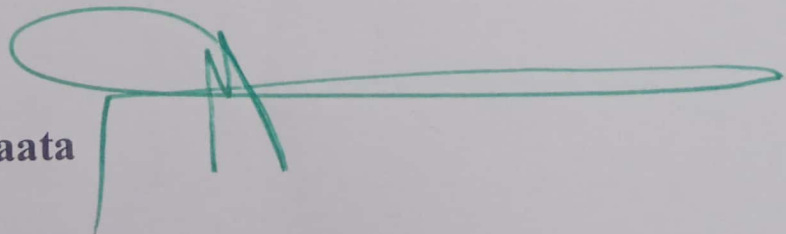


Name of Scientific Assistant:

Asst. Prof. Dr. Ahmed Mahdi Rheima

Approval of the Dean:

Prof. Dr. Methaq Talib Gaata



Signature:

Date:

Description of Academic Program

Description of the academic program

This academic program description summarizes the program characteristics and the learning outcomes students are expected to achieve.

on whether he has made maximum use of the available opportunities. It is accompanied by a description of each course within the program.

Educational institution	Mustansiriyah University
University Department / Center	College of Science/ Department of Computer Science
Academic Program Name	Computer Science
The Name of the final certificate	Bachelor's degree in Computer Science
School System	Semester
Accredited Accreditation Program	ABET
Other External Influences	NA

Required learning outcomes and methods of teaching, learning, and assessment

A. Knowledge & Understanding

1. Understand the essential mathematics relevant to Computer Science.
2. Know & understand a wide range of principles and tools available to the software developer, such as design methodologies, choice of algorithm, language, software libraries, and user interface techniques.
3. Understand the principles of various current applications and research areas, including artificial intelligence, databases, software engineering, networks, and distributed systems.
4. Know & understand a wide range of software and hardware used in the development of computer systems.
5. Know & understand the professional and ethical responsibilities of the practicing computer professional, including understanding the need for quality, security, and computer ethics.

B. Intellectual Skills

1. Analyze a wide range of problems and provide solutions through suitable algorithms, structures, diagrams, and other appropriate methods.

2. Design and implement a software system of significant size.
3. Identify various solutions and critically evaluate and justify proposed design solutions.
4. Practice self-learning by using the e-courses.

C. Teaching and learning methods

1. Lectures and discussions
2. Homework and tasks
3. Projects and Presentations (presentation)
4. Transferable Skills and Personal Qualities
5. Seminars
1. Teamwork projects

D. Evaluation methods

1. Tests
2. Daily exams
3. Offers

E. Subject-Based Skills

1. Plan and undertake a major individual/group project in computer science.
2. Prepare and deliver coherent and structured verbal and written technical reports.
3. Give technical presentations suitable for the time, place, and audience.
4. Use the scientific literature effectively and make discriminating use of Web resources.
5. Design, write, and debug computer programs in appropriate languages.
6. Use appropriate computer-based design support tools.

Program Structure Annex No. (3)
Computer Science 3rd Stage

Lab	Theoretical		Module Code	Module Name	Level One
2	3	هندسة البرمجة الكيانية	50811301	Object-Oriented Software Engineering	Semester 1
2	3	رسم بالحاسب	50811302	Computer Graphics	
2	3	ذكاء اصطناعي	50811303	Artificial Intelligent	
2	3	تصميم و برمجة المواقع	50811304	Web Design and Programming	
2	2	مترجمات	50811305	Language Translator	

Lab	Theoretical		Module Code	Module Name	Level One
2	3	معالجة صور	50811306	Digital Image Processing	Semester 2
2	3	امنية بيانات	50811307	Information Security	
2	3	انظمة ذكية	50811308	Intelligent Systems	
2	3	انظمة مفتوحة	50811309	Open Source System	
2	3	شبكات الحاسوب	50811310	Computer Network	
	2	انكليزي		English	

Program Structure Annex No. (3)
Information Technology 3rd Stage

Lab	Theoretical		Module Code	Module Name	Level One
2	3	تنظيم البيانات والنمذجة	50812301	Data Organization and Modeling	Semester 1
2	3	برمجة تكاملية	50812302	Interactive Programming	
2	3	لغة الاستعلام	50812303	Database Query Language	
2	3	تصميم مواقع	50812304	Web Design and Programming	
2	3	برمجة مرئية	50812305	Advance Programming Constrctes	

Lab	Theoretical		Module Code	Module Name	Level One
2	3	ضمان وأمن المعلومات	50812306	Information Assurance and Security	Semester 2
	3	إدارة معلومات المؤسسة	50812307	Enterprise information management	
	3	صيانة نظم المعلومات	50812308	Maintenance of information systems	
2	3	انظمة مفتوحة	50812309	Open Source Systems	
2	3	شبكات الحاسوب	50811310	Computer Network	
	2	انكليزي		English	

Program Structure Annex No. (3)
Cyber Security 3rd Stage

Lab	Theoretical		Module Code	Module Name	Level One
	3	ادارة المخاطر	50813301	Risk Management	Semester 1
	3	مقدمة عن الامن السيبراني	50813302	Introduction of cyber security	
2	3	انظمة متعددة الوسائط	508133033	Multi-media System	
2	3	كود خبيث	50813304	Malicious code	

Lab	Theoretical		Module Code	Module Name	Level One
	3	التهكير الاخلاقي	50813305	Ethical Hacking	Semester 2
2	3	تشفير	50813306	Cryptography	
2	3	امنية وسائط متعددة	50813307	Multimedia Security	
2	3	شبكات الحاسوب	50813308	Computer Networks	
2	3	الذكاء الاصطناعي	50811303	Artificial Intelligence	



Ministry of Higher Education and Scientific Research
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Course Plan



Course No.: 50811301

Time Division 3 hrs Theoretical and 2 hrs Practical

Course Name: Object Oriented Software Engineering **Semester & Year:** **First, 2024 / 2025**

Course Website:

Course Description:

This course presents the concepts, methods and techniques necessary to efficiently capture software requirements in use cases and transform them into detailed designs in object orientation. It combines object oriented methodologies and the Unified Modeling Language (UML 2.0 or UML 1.0). In this course, students learn how to apply the UML notation

Course Intended Outcomes:

Successful completion of this course should lead to the following learning outcomes:

A- Knowledge and Understanding of

- A1) the principles of object-oriented software construction;
- A2) the software-development process, including requirements analysis, design, programming, testing and maintenance;

B- Intellectual (thinking) skills - able to

- B1) model object-oriented software systems;
- B2) investigate and improve the specification of a software system;
- B3) use and evaluate appropriate tools and techniques

C- Practical skills - able to

- C1) specify, design and construct CASE tools and application software;
- C2) analysis of system requirements and the production of system specifications;
- C3) use appropriate computer-based design support tools.

D- Transferable skills - able to

- D1) effectively participate in team-based activities;
- D2) use IT skills and display mature computer literacy;

Course Outline:

Week	Description depends on the Timing table (Theoretical	& Practical)
1	- What is software engineers - Types of software, Software Quality - Activities common to software projects . - Stakeholders in software engineering	

2	- OO Paradigm: Classes, objects, attributes, operations, methods, encapsulation, inheritance, polymorphism, - UML: Visualization, Specifying, constructing, Documenting, Conceptual model of UML.	Lab: implement inheritance and polymorphic in c#
3	- Domain analysis, Defining the problem and the scope - What is a requirement? - Types of requirements. - Use cases: describing how the user will use the system. - Some techniques for gathering requirements	Lab: implements ATM use case model and object model in StarUML
4		Lab: Represent use case documentation in StarUML
5	- What is UML? - Essentials of UML class diagrams - Associations and multiplicity - Generalization - Object diagrams More advanced features of class diagrams - composition vs aggregation vs inheritance - polymorphism - Implementing class diagrams in Java	Modeling class diagrams in StarUML
6		Lab: Modeling class relation examples in StarUML
7		Lab: implement class relation in C#
8	- Interaction diagram - Sequence diagram - State diagram - Activity diagram	Interaction model
9		Lab: Modeling Sequence diagram in StarUML
10		Lab: Modeling Communication diagram in StarUML
11		
12	Design principles	Behavior model
13		Lab: Modeling State diagram in StarUML
14	EXAM and REVIEWING	Lab: Modeling Activity diagram in StarUML
15		Exam

Textbooks:

[1]: Timothy C. Lethbridge, Robert Laganieri “Object-Oriented Software Engineering, Practical Software Development using UML and Java” Second edition, 2005

Suggested references:

[1]: Bernd Bruegge Allen H. Dutoit “Object-Oriented Software Engineering Using UML, Patterns, and Java” pearson, 3rd edition ,2014

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
26		14		45+15

Assignment/ Project	Description	Due Date	Marking
Test	written exam		3
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Instructor(s) information [معلومات الأستاذ]

Section: (Computer Science) ; Lecture Room:[Online], ; Office No.: ()

Instructor's Name: ***Dr. Mohammed Azeez Abdulhassan, Dr. Huda Haikal Hussein ,and Nadia Mahmood Hussien***

E-Mail: mohammada.abdulhassan@uomustansiriyah.edu.iq, nadia.cs@uomustansiriyah.edu.iq, huda.atmsc@uomustansiriyah.edu.iq

Office Hours : Tue.: [: - :]
Wed.: [: - :]

NOTES:

- Office Hour: Other office hours are available by appointment.
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Course Plan



Course No.: 50811302

Time Division: 3hr Theoretical and 2hr Practical

Course Name: Computer Graphics

Semester & Year: **First, 2024 / 2025**

Course Website:

Course Description:

This subject presents an explanation of the most important algorithms used in the process of drawing shapes, as well as the most important operations that can be performed on these shapes.

Course Intended Outcomes:

At the end of the course, students are expected to learn:

- Line, circle, Ellipse and curve drawing algorithms
- 2 D Geometric and spatial transformations (Affine transformation, Projection transformation)
- 3 D Geometric transformation
- Clipping (Point clipping, Line clipping and Polygon clipping)
- Spline curve (Bezier curve, B-spline curve and Cubic spline curve)
- Normalized (Device coordinates, World coordinates system) [windowing, Viewport mapping]
- Teach the student to deal with three and two -dimension objects (move and zoom rotate, reflection, shearing)

Course Outline:

Week	Description depends on the Timing table (Theoretical	& Practical)
1	Introduction - Applications - Graphics system - CRT (raster scan display, random vector display - Flat panel display (LCD) - Cartesian coordinate system	Introduction about MATLAB language - Command window - Workspace window - History window
2	Vector - Type of vectors - Vector (addition, subtraction, scaling, magnitude) - Vector (normalization, multiplication, cross product, dot product)	Introduction about MATLAB language - M-file - Clc, clear, randint, grid, hold on, figure, subplot.
3	Graphics Output Primitives - Point	Introduction about MATLAB

	- line drawing algorithms (DDA)	language - For, while, if, continue break,
4	line drawing algorithms - Bresenham line algorithm - General Bresenham line algorithm	Line drawing algorithms - DDA - Bresenham line algorithm - General Bresenham line algorithm
5	Circle drawing algorithm - Simple method - Polar representation - Eight-way symmetry	Circle drawing algorithm - Simple method - Polar representation - Eight-way symmetry
6	- Ellipse Drawing Algorithms - Curve –Generation Algorithms	Circle drawing algorithm - Ellipse Drawing Algorithms - Curve –Generation Algorithms
7	Two-dimension geometric transformation - Translation - Scaling - Rotation (specific point, arbitrary line)	Applying the Two-dimension geometric transformation - Translation - Scaling, Rotation
8	Two-dimension geometric transformation - Reflection - Shearing	Applying the Two-dimension geometric transformation - Rotation, Shearing
9	Spatial transformation - Affine transformation - Projection transformation	Applying the Two-dimension geometric transformation - Reflection, Shearing object
10	Clipping - Point clipping - Line clipping (Cohen Sutherland Algorithm) - Polygon clipping	Clipping - Line clipping - Polygon clipping
11	Normalized Device coordinates world coordinates system (windowing, viewport mapping)	Applying the Spatial transformation Affine and projection
12	Three-dimension geometric transformation - Translation - Scaling - Rotation (specific point, arbitrary line)	Applying the Two-dimension geometric transformation - Translation - Scaling
13	- Reflection - Shearing	Applying the three-dimension geometric transformation - Rotation , Reflection.
14	Coordinates system - Cartesian coordinates - Cylindrical coordinates - Spherical coordinates	Applying the three-dimension geometric transformation - Shearing object
15	- Spline curves - Bezier curves - B-spline curve - Cubic spline curve	- Spline curves - Bezier curves - B-spline curve - Cubic spline curve

Textbooks:

[1]: Computer graphic with open GL

[2]: Introduction to computer graphics using java 2D and 3D (author frank K.)

[3]: Computer graphic by lsrđ group

Suggested references:

[1]: <https://link.springer.com/content/pdf/10.1007/978-1-4842-5061-7.pdf>

[2]: <https://www.mathworks.com/help/examples.html>

Marking :

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	14	6	60

Assignment/ Project	Description	Due Date	Marking
project	Project Include interactive interface	2 months duration	4 Marks
Quizzes	four quizzes	During the course	2 Marks

Instructor(s) information [معلومات الأستاذ]

Section: (Computer Graphics); Lecture Room:[], ; Office No.: ()

Instructor's Name: Dr. Farah Qais Abdullah Al-khalidi

E-Mail: farahqaa@uomustansiriyah.edu.iq

Salah Taha Allawi

E-Mail: salah.taha@uomustansiriyah.edu.iq

Dr. Zaid Ali Sabeeh

E-Mail: zaid_aljarah@uomustansiriyah.edu.iq

Office Hours:**NOTES:**

-Office Hour: Other office hours are available by appointment.

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Course Plan



Course No.:

Time Division: 3 hrs Theoretical and 2 hrs Practical

Course Name: Artificial Intelligence

Semester & Year: **Second, 2024 / 2025**

Course Website:

Course Description:

Artificial Intelligence provides a set of tools for solving problems that are difficult or impractical to solve with other methods. These include heuristic search and planning algorithms, formalisms for knowledge representation and reasoning, machine learning techniques, and methods applicable to sensing and action problems such as speech and language understanding, computer vision, and robotics, among others. The student needs to be able to determine when an AI approach is appropriate for a given problem, and to be able to select and implement a suitable AI method.

Course Intended Outcomes:

At the end of the course, students are expected to learn:

- History of artificial intelligence, Philosophical questions, describe the Turing test, and list examples of intelligent systems that depend on models of the world,
- Differentiate the concepts of optimal reasoning and human-like reasoning, and the concepts of optimal behavior and human-like behavior,
- Compare and contrast the most common models used for knowledge representation, highlighting their strengths and weaknesses.
- Explain the operation of the resolution technique for theorem proving,
- Formulate an efficient problem space for a problem expressed in English by expressing that problem space in terms of states, operators, an initial state, and a description of a goal state ,
- Select an appropriate blind search algorithm for a problem, implement it, and characterize its time and space complexities,
- Select an appropriate heuristic search algorithm for a problem and implement it by designing the necessary heuristic evaluation function and describe under what conditions heuristic algorithms guarantee optimal solution.

Course Outline:

Week	Description depends on the Timing table (Theoretical	& Practical)
1	Ch. 1 Overview of AI: What is AI?, Intelligence and the Turing test, History of AI, AI and the fourth industrial revolution, Types of AI (weak AI, strong AI, super AI), Edge and Cloud AI, An overview of some of AI approach applications areas, Applying AI in cybersecurity.	Introduction to Python
2	Ch. 2 Knowledge Representation for Cybersecurity: Logical representation (Propositional logic).	Elementary Python Programming

3	Logical representation (predicate logic): constants, variables, functions, predicates and how to represent English statements using predicate logic, syntax and semantic of predicate logic.	Selection in Python
4	Inference rules (Resolution theorem proving): convert to clause form. Examples of resolution with propositional and predicate logic.	Loops in Python
5	Exam1.	Exam1
6	Network representation: Semantic net and conceptual graphs.	Functions in Python
7	Procedural representation: Production systems, forward and backward chaining, Examples of Production systems.	Lists in Python (1)
8	Structural representation: Frames, frame data structure, Examples of using Frames.	Lists in Python (2)
9	Ch. 3 Problem Solving using State Space: Introductory concepts and state space search, Data driven and goal driven search. Blind search (depth-first search, breadth-first search, depth limited search and iterative deepening search).	State-space problem representation in Python. Implementing blind search algorithms in Python
10	Heuristic search (Hill climbing algorithm, Best first search, A algorithm, and A* algorithm). Properties of heuristic search (Admissibility, monotonicity and informedness).	Implementing heuristic search algorithms in Python
11	Ch4: Expert systems (ES): What is an ES?, The main players in the expert system development team, The design of rule base ES. A high level view of the structure of ES? Expert system shell,	Databases in Python
12	Classifying the different type of ES. Controlling the reasoning strategy	Implementing a simple ES in Python
13	Ch5: Natural language understanding : Stages of language analysis: Morphology, Syntax, Semantic,	String handling in Python
14	Examples of using NLP in cybersecurity (breach protection, identification, Phishing, and Log parsing).	Implementing a simple NLP application in Python
15	Exam2.	Exam2.

Textbooks:

- [1]: George F. Luger, "*Artificial Intelligence, Structures and Strategies for Complex Problem Solving*", Sixth Edition, Addison Wesley, 2009.
- [2]: Alessandro Parisi, "*Hands-On Artificial Intelligence for Cybersecurity: Implement smart AI systems for preventing cyber attacks and detecting threats and network anomalies*", Packt Publishing Ltd, 2019.

Suggested references:

- [1]: Stuart J. Russell and Peter Norvig, "*Artificial Intelligence, a Modern Approach*", Fourth Edition, Prentice Hall, 2021.
- [2]: أساسيات الذكاء الاصطناعي طرق البحث، تمثيل المعرفة والاستنتاج. تأليف: أ.د. أحمد طارق صادق. مكتبة الذاكرة

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	14	6	60

Assignment/ Project	Description	Due Date	Marking
Exercise sheet 1	Solving Several questions about chapter 1, 2 and 3	End of term	3
Exercise sheet 2	Solving Several questions about chapter 4 and 5	End of term	3

Instructor(s) information [معلومات الأستاذ]

Section: (Computer Sciences) ; Lecture Room:[301] , ; Office No.: (5)

Instructor's Name: **Asst. Prof. Dr. Muhanad Tahrir Younis**

E-Mail: mtu@uomustansiriyah.edu.iq

Office Hours : Mon.: [9 :00 am – 2 :00 pm], Wen.: [9 :00 am – 2 :00 pm]

Instructor(s) information [معلومات الأستاذ]

Section: (Computer Science); Lecture Room:[Lab 1] , ; Office No.: (8)

Instructor's Name: **Firas Ali Hashim**

E-Mail: firas70@uomustansiriyah.edu.iq

Office Hours : Tue.: [9 :00 am – 2 :00 pm], Wed.: [9 :00 am – 2 :00 pm]

NOTES:

- Office Hour: Other office hours are available by appointment.
- The content of this syllabus not be changed during the current semester.

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Course Plan



Course No.: 50811304

Time Division: 3 hr Theoretical and 2 hr Practical

Course Name: Web Design and Programming

Semester & Year: First, 2024/ 2025

Course Website:

Course Description:

This subject presents the website design and programming that is essential topic to both Computer Science and Information Technology. This course focuses on fundamentals of design and coding of website using HTML. Scope of this course could summarize by: Editing and Viewing HTML Files, Setting Up the Document Structure, Formatting Text by Using Tags, Using Lists and Backgrounds, Creating Hyperlinks and Anchors, Style Sheets and Graphics, Page Layout and Navigation, Creating Tables, Formatting Tables, CSS for presentation, linking CSS to a web pages and three basic page layout strategies. JavaScript provides a way to validate form's data on the client's computer. Students are requested to design and implement professional website regarding skills of the contents of the topic.

Course Intended Outcomes:

At the end of the course, students are expected to learn:

- Understanding the web design development project lifecycle.
- Identify HTML and create a basic page with these languages.
- Identify the types of images used in modern web design and explain what types are appropriate for different functions.
- Designing and programming to create all required aspects of website, controlling on text, tables, hyperlinks, colors as well as using selected templates to design website. The student will write professional coding to create the above elements.
- Identify the CSS for presentation and add interactivity to website by JavaScript.

Course Outline:

Week	Description depends on the Timing table (Theoretical)	(Practical)
1	Internet Technology The Web Concepts Uniform Resource Locator (URL) Internet Protocols	Introduction to HTML

2	Web Design: Client-Server Architecture Web Browsers Web Operations Site Structure Types of Web Sites Website Design Issues	Basic and concept of HTML markup
3	HTML Document Structure HTML Structure HTML Tags and Attributes HTML Headings HTML Paragraphs HTML Character Entities	HTML markup with examples
4	HTML List Html List Advantages List Types Unordered Lists Ordered Lists Description Lists List Type Selection Nesting Lists	HTML markup with list
5	Images in HTML Introduction Image Types Image Attributes Adding Images	HTML markup with images
6	Links in HTML Linking in HTML Relative and Absolute Path Target attribute External linking Internal linking Directory Linking Hyperlinking to other Content	HTML markup with different types of linking
7	First Exam	First Exam
8	Tables in HTML Introduction Table Element Adding Tables Spanning Cells	HTML markup with table
9	Topic in Web Design: Forms Form Elements Types Forms Attributes Form Controls Input Element Type Attribute (Text, Checkbox, Password) Fieldset and Select Element Form Design	HTML markup with form

10	CSS for Presentation Fundamental and Advantage of CSS Types of CSS (Inline, Embedded and External CSS) Linking CSS to a Web Page Grouped and ID Selectors	HTML markup with CSS
11	CSS for Presentation Formatting Text Formatting Lists Colors and Backgrounds Styling Tables	HTML markup with CSS (images, tables, lists and forms)
12	Page Layout with CSS Page Layout Strategies Fixed Layout, Fluid Layout Elastic Layout, Hybrid Layout	HTML markup with CSS (Contextual Selector)
13	Second Exam	Second Exam
14	JavaScript: Basic Scripting Adding JavaScript to a Page Accessing Nodes Event Driven	Introduction to JavaScript Language
15	JavaScript: Basic Handling Form Validation Regular Expressions Basic Validation Data Format Validation	Form Checking Programs

Textbooks:

[1]: Learning Web Design, 4th Edition, Jennifer Niederst Robbins, 2015.

[2]: HTML & CSS: The Complete Reference, Fifth Edition, Thomas A. Powell, 2010

Suggested references:

[1]: HTML and CSS Design and Build Websites, Jon DuCkeTT, 2011.

[2]: Designing for the Web – free (Online Edition) - <http://designingfortheweb.co.uk>.

[3]: W3Schools Online Web Tutorials <http://www.w3school.com>.

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	14	6	60

Assignment/ Project	Description	Due Date	Marking
Project	Project for each student	After the Assignment Date	3
Quizzes &Homework's	Two or more quizzes Five or more homework's	During the course	3

Instructor(s) information [معلومات الأستاذ]

Section: ; **Lecture Room:**[401, 402] ; **Office No.:** (1)

Theoretical Instructors

Instructor's Name: **Asst.Prof.Dr. Asmaa Sadiq**

E-Mail: asmaasadiq@ uomustansiriyah.edu.iq

Instructor's Name: **Dr. Eman Hato**

E-Mail: emanhato@ uomustansiriyah.edu.iq

Instructor's Name: **Dr. Zaid Ali**

E-Mail: dr.zaid_aljarah@uomustansiriyah.edu.iq

Practical Instructors

Instructor's Name: **lecturer. Zinah Sadeq**

E-Mail: zinahsadeq@uomustansiriyah.edu.iq

Office Hours: Tue.: [8:30 – 10:10]

Sun.: [8:30 – 10:10]

NOTES:

-Office Hour: Other office hours are available by appointment.

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Course Plan



Course No.: 50811305

Time Division: 2hr Theoretical and 2hr Practical

Course Name: Language Translator

Semester & Year: First, 3rd year-CS 2024 / 2025

Course Website:

Course Description:

This subject presents the compiler (language translator) design. The course is intended to teach the students the modern compiler techniques and their application that used in the Compiler Construction. The course will introduce the theory and tools that can be standardly employed in order to perform translation process of a high-level programming language into low-level programming language.

Course Intended Outcomes:

At the end of the course, students are expected to learn:

- Students will have the experience of designing and constructing compiler.
- Developing the Students ability to design and implement compilers for specific purposes.
- Acquire familiarity with basic data structures used in compiler construction such as abstract syntax trees, symbol tables, three-address code, and stack machines.

Course Outline:

Week	Description depends on the Timing table (Theoretical)	(Practical)
1	Introduction to Translators: Compiler, Interpreter Assembler, Linker and Loader	Programming Languages: Types and Features of Programming language
2	Structure of Compiler: Analysis Phases, Construction Phases, Example of Compilation	Types of Errors in source program, Errors Handling, Regular Expression
3	Lexical Analyzer: Role of the Lexical Analyzer, Tasks of Lexical Analyzer, Input Buffering, Symbol Table	Classification of source program using Lexical Analyzer, Tables Management
4	Recognition of Tokens: Token, Lexeme, Pattern Specifications of Tokens, Operations on Languages	Transition Diagrams (TD), Lexical Errors. Assignment (1)
5	Syntax Analysis (Parse): Role of the Parser Interaction of lexical analyzer with parser, Parse Tree	Abstract syntax Tree, Derivation, Syntax Errors
6	Context-Free Grammars (CFG): Ambiguity in Instructions, Regular Expression vs. CFG, Elimination of Left Recursion	Elimination of Left Factoring, Assignment (2)
7	First Exam	Return and Discussions of First exam results
8	Parsing Techniques: Top-Down Parser, Bottom-Up Parser, Compute of FIRST Function	Compute of FOLLOW Function
9	Top-Down Parsing: Backtracking, Predictive Parser, Design Parsing Table	LL(1) Grammar, Conditions of LL(1)

10	Bottom-Up Parsing: Shift-Reduce Parser Operator-Precedence Parser	Table Construction of OPP, Assignment (3)
11	Semantic analysis: Attributes and their computation, Type Checking, Semantic Errors	Run-Time Errors, Assignment (4)
12	Second Exam	Return and Discussions of 2 nd exam results
13	Intermediate Code Generation: Control Structures, Three-Address Code, Operations Within Expressions	Simple Register Allocation, Assignment (5)
14	Code Generation: Issues in the Design of a Code Generator, Object Program, Assembly Controls	Examples of assembly programs.
15	Final Exam	Final Exam

Textbooks:

[1]: Alfred V. Aho, Ravi Sethi and Jeffrey D. Ullman, "Compilers: Principles, techniques, & tools" (2nd edition), 2007.

[2]: Torben Mogensen, "Introduction to Compiler Design," Springer-Verlag London, 2011.

Suggested references:

[1]: Torben Mogensen, "Basics of Compiler Design" DEPARTMENT OF COMPUTER SCIENCE UNIVERSITY OF COPENHAGEN, 2010

[2]: Adesh K. Pandey, "CONCEPTS OF COMPILER DESIGN" Second Edition:2011

[3]: Dilshad Hasan, "Compiler Design", Knowledge Book Distributors, 1st Edition:2010

Marking:

First Semester				
1st exam	2nd exam	Practical	Activity	Final Exam
10	10	14	6	45 theoretical + 15 Practical

Assignment/ Project	Description	Due Date	Marking
H.W. 1	Introduction to Translators and compiler phases.	Week 3	1 Mark
H.W. 2	Pattern Design: regular expression.	Week 5	1 Mark
H.W. 3	NFA to DFA conversion	Week 6	1 Mark
H.W. 4	Elimination of left Recursion and Factoring.	Week 7	1 Mark
H.W. 5	Apply of Shift-Reduce Parser	Week 9	1 Mark
H.W. 6	Design of Three-Address Code	Week 11	1 Mark

Instructor(s) information [معلومات الأستاذ]

Section: (Computer Science) ; Lecture Room:[7], ; Office No.: ()

Instructor's Name: **Dr. Basim Jamil** E-Mail: basimja6nd@uomustansiriyah.edu.iq

Instructor's Name: **Dr. Ismael Abdul Sattar** E-Mail: @uomustansiriyah.edu.iq

Office Hours : Tue.:[: – :]
Wed.:[: – :]

NOTES:

-Office Hour:Other office hours are available by appointment.

-The content of this syllabus not be changed during the current semester.

Lecturer Signature

Dr. Basim Jamil

Lecturer Signature

Dr. Ismael Abdul Sattar

Chairman Signature



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Course Plan



Course No.: 50811306

Time Division: 3hr Theoretical and 2hr Practical

Course Name: Digital Image Processing

Semester & Year: **Second, 2024 / 2025**

Course Website:

Course Description:

This subject presents the Information related to the types of images, the methods of processing and representing them inside the computer, and the most important operations that can be performed on the images

Course Intended Outcomes:

At the end of the course, students are expected to learn:

- C# Language for image.
- How the image representation and implementation.
- How the process can be done of the various types of images.

Course Outline:

Week	Description depends on the Timing table (Theoretical	& Practical)
1	What are images? Optical Image, Image processing, Purpose of digital image processing. Application areas that use digital image processing, Computer image systems, Components of an image processing system, Basic concepts in Sampling and Quantization: digitization, Sampling, and Quantization.	Program: read image and its properties (image width, height, vertical resolution and horizontal resolution), save image.
2	Image types: Binary image, Gray-scale image, Color image, Multispectral Images. Image Representation. Some basic relationships between pixels: Neighbors of a Pixel, Adjacency, Connectivity	Program: separate RGB, convert RGB to gray image
3	Regions, Digital path, Boundaries, Distance Measures.	Program: convert RGB to binary image

4	Basic intensity transformation: Photographic Negative, and Gamma Transform, Image Histogram, Definition of histogram, Cumulative histogram Properties of histogram, Type of histogram	Program: Negative , Gamma and log transform
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5	Histogram modification: Histogram Stretch, Histogram Shrink Histogram Slide, Histogram Equalization, and Histogram Matching,	Program: Image histogram
6	Fundamental of spatial filtering, Smoothing spatial filters, Smoothing linear filters: Average filtering, and Gaussian filtering.	Program: Histogram Equalization and Histogram Stretching
7	Exam1	Exam1
8	Order statistic filters: Median filter, Sharpening filters: Laplacian filter and Difference filters	Program: Mean filter
9	Edge detection: Sobel operator, Combining image enhancement methods	Program: Median Filter.
10	Image analysis model, Preprocessing, Region of interest image geometry, Algebra image (arithmetic and logic operations)	Program Sobel filter.
11	Introduction of Filtering in Frequency Domain, Impulse function and its properties, Sampling and the Fourier transform of sampled function: Sampling / Laplacian filter and Difference filters	Program: Image Arithmetic (two images) (add, subtract, rotate).
12	Fourier transform of sampled function: Sampling theorem 1. Some properties of the 2-D Discrete Fourier transform	Program: Discrete Fourier Transform
13	1. Discrete Fourier Transform 1.1 1-D DFT 2. Extension to functions of two variables 3. The basic of filtering in the frequency domain 4. Image smoothing using frequency domain filters a. Ideal low pass filters b. Butterworth low pass filter c. Gaussian low pass filters	Program: Gaussian low pass filters
14	1. Image sharpening using frequency domain filters a. Ideal high pass filters b. Butterworth high pass filter c. Gaussian high pass filters 2. The Fourier transform of laplacian operator a. Unsharp filter, high boost filtering, and high frequency emphasis filtering b. Frequency domain homomorphic filtering	Program: Gaussian high pass filters
15	Exam2	Exam2

Textbooks:

- [1]: "Digital Image Processing", Huiyu Zhou, Jiahua Wi, and Jiaungu Zhang, 2010.
[2]: "Digital Image Processing", Gonzalez R. C. and Woods E., Addison – Wesley publishing company, 2010
[3]: "Computer Vision and Image Processing", Umbaugh S.E., Prentice-Hall, 1998.

Suggested references:

- [1]:
[2]:

Marking:

Second Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	14	6	60

Assignment/ Project	Description	Due Date	Marking
Writing a program	writing a program including all that the student learned during this semester	1/6/2022	4

Instructor(s) information [معلومات الأستاذ]

Section: (Digital Image processing) ; Lecture Room:[], ; Office No.: ()

Instructor's Name: **Prof. Dr. Jamila Harbi** E-Mail: dr.jameelahharbi@uomustansiriyah.edu.iq
Instructor's Name: **Asst. Prof. Salah Taha** E-Mail: salah.taha@uomustansiriyah.edu.iq
Instructor's Name: **Lecture Rawsam Abdaladheem** E-Mail: rwsabd@uomustansiriyah.edu.iq
Instructor's Name: **Lecture Dina Riadh** E-Mail: dinashibani@uomustansiriyah.edu.iq

Office Hours: Tue.: [: - :]
Wed.: [: - :]

NOTES:

- Office Hour: Other office hours are available by appointment.
- The content of this syllabus not be changed during the current semester.

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Course Plan

Course No.: 50811307

Time Division: 3 hr Theoretical and 2 hr Practical

Course Name: **Information Security** **Semester & Year:** **Second, 2024 / 2025**

Course Website:

Course Description:

This subject presents the information security overview in different techniques (classical and Modern technique), some principle about access control, and Viruses and Malicious Contents.

Course Intended Outcomes:

Course Outline:

Week	Description depends on the Timing table	Practical
1	Introduction to information Security	Introduction Prime Numbers Method, GCD Method
2	Classical Cryptography	Shifted alphabet Caesar Cipher
3	Substitution Techniques: Caesar Cipher, Monoalphabetic Cipher, and Playfair Cipher.	Monoalphabetic Multiplicative Cipher
4	Substitution Techniques: Hill Cipher, and Polyalphabetic Cipher.	Monoalphabetic Affine Cipher
5	First Exam	Polyalphabetic Vigenere Cipher
6	Transposition Techniques: Rail fence, Matrix transposition, Code Book, and Skytale.	Transposition Ciphers Keyed Transposition, Columnar Transposition
7	Stream Cipher and bit-manipulation Cipher	First Exam
8	Introduction to Modern Encryption Techniques	Stream Cipher LFSR Algorithm
9	Simplified Data Encryption Standard (DES), S-DES Structure, and Examinations of the elements of DES	Stream Cipher Stream Cipher Encryption

10	Second Exam	Data Encryption Standard (DES) Substitution Box (S-Box)
11	Introduction to Public key Cryptography	Data Encryption Standard (DES) Round- Key Generator
12	Principles of RSA Algorithm.	Second Exam
13	Message Authentication and Hash Function	Public-Key Cryptography RSA Algorithm
14	Access control: System Access Control, Hints for protecting passwords, and Data Access.	Public-Key Cryptography Application of RSA Algorithm
15	Viruses and Other Malicious Contents: Malicious Software, Trapdoor, Logic, Bomb, Trojan Horse	Review

Textbooks:

[1]: Cryptography and Network Security Principles and Practice, by William Stallings, fifth edition, 2011.

Suggested references:

[1]: principle of information security, by Michael E. Whitman and Herbert J. Mattord (fourth edition)

Marking:

Second Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
8	8	14	10	60
Assignment/ Project	Description		Due Date	Marking
Test	written exam		1/6/2023	5

Instructor(s) information

Section: **(Computer Sciences)**; Lecture Room: **[E-Learning]**; Office No.: ()

Instructor's Name: **Dr. Azhar Hasan Nsaif**

E-Mail: bahar299947@gmail.com

Instructor's Name: **Dr. Eman Hato**

E-Mail: emanhato@uomustansiriyah.edu.iq

Instructor's Name: **Lecturer. Noor Khalid**

E-Mail: noor.kh20@uomustansiriyah.edu.iq

NOTES:

-Office Hour: Other office hours are available by appointment.

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Course Plan



Course No.: 50811308

Time Division: 3hr Theoretical and 2 hr Practical

Course Name: Intelligent Systems

Semester & Year: **Second, 2024 / 2025**

Course Website:

Course Description:

This course introduces students to the field of Intelligent Systems with emphasis on their use to solve real world problems for which solutions are difficult to express using the traditional algorithmic approach. This course explores the essential theory behind methodologies for developing systems that demonstrate intelligent behavior including dealing with natural languages, learning from experience and following problem solving strategies found in nature and in human experts.

Course Intended Outcomes:

At the end of the course, students are expected to learn:

- What are the principles behind intelligent systems? How are they built? What are intelligent systems useful for? How do we choose the right tool for the job?
- Demonstrate good knowledge of basic theoretical foundations of the following common intelligent systems methodologies: Rule-based systems, Natural Language Processing, Planning, Fuzzy logic, Artificial Neural Networks and Evolutionary Computation.
- Determine which type of intelligent system methodology would be suitable for a given type of application problem.
- Demonstrate the ability to design and develop an intelligent system for a selected application.

Course Outline:

Week	Description depends on the Timing table (Theoretical	& Practical)
1	Overview of intelligent System: What is intelligent system (IS)?, The structure of intelligent systems, The Details of the intelligent systems, An overview of some of IS application area.	Visual Prolog's fact sections, Declaring the facts-sections, Using the facts sections, Accessing the facts sections, Adding Facts at Run Time (assert, asserta, and assertz), Loading Facts from a File at Run

		Time (consult), Removing Facts at Run Time (retract and retractall), Saving a database of facts at runtime, some examples.
2	Expert systems (ES): Introduction to knowledge-based intelligent systems. The main players in the expert system development team, The design of rule base ES, A high level view of the structure of ES? Expert system shell?, Classifying the different type of ES , ESs based on simple search and pattern recognition.	A simple keyword matching ES programing (ELIZA program) Expert systems programming classification using forward chaining, classification using backward chaining
3	fuzzy logic with uncertainty	Achieve prolog code to deals with fuzzy sets operation (intersection, union, complements)
4	Fuzzy logic reasoning	Deal with fuzzy real word problem prolog code
5	Artificial neural networks (ANN): Fundamentals of ANN, biological neural networks and ANNs, Features of ANNs, ANNs topologies, ANNs activation function.	A simple VP program that shows the calculations of the output of a neural network (1).
6	Artificial neural networks (ANN): ANNs learning algorithms (backpropagation and Discrete Hopfield net), Major classes of ANNs, Application of ANNS.	A VP program that shows the calculations of the output of a neural network (2).
7	First exam	First exam
8	Symbol based machine learning: What is machine learning?, A framework for symbol-based machine learning	A VP program that implements candidate elimination algorithm (1)
9	Symbol based machine learning: Version space search, candidate elimination algorithm.	A VP program that implements candidate elimination algorithm (2)
10	Intelligent planning: What is planning?, From problem solving to planning.	Intelligent Planning: block world problem program (1)
11	Intelligent planning: The components of planning system, Planning with if –add-delete operators, An example domain (the blocks word).	Intelligent Planning: block world problem program (2)
10	Natural language understanding: What is NL understanding?, Role of knowledge in language understanding.	String-Handling in Visual Prolog, main VP string handling predicates: str_len, fronttoken, and frontchar, frontstr, concat, subchar , substring, searchchar, searchstring and isname. Main VP type conversion predicates (char_int, str_char, str_int, str_real, and upper_lower).
12	Natural language understanding: Stages of language analysis: Morphology, Syntax, Semantic, a Natural language understanding application.	NLP programming: a VP program that parses a natural language sentence using strings and lists.
13	Evolutionary computing: Overview of evolutionary computing	GAs programming: a simple VP program that performs the selection operator

14	Hybrid intelligent systems	Coding hybrid system
15	Second exam	Second exam

Textbooks:

[1]: Michael Negnevitsky "Artificial Intelligence: a Guide to intelligent systems", second edition, Addison Wesley, 2005.

[2]: George F. Luger, "Artificial Intelligence, Structures and Strategies for Complex Problem Solving", Sixth Edition, Addison Wesley, 2009.

Suggested references:

[1]: Rutkowski, Leszek. "Computational Intelligence: Methods and Techniques", 2008.

[2]: Engelbrecht, Andries P. "Computational intelligence: an introduction", John Wiley & Sons, 2007.

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	14	6	60

Assignment/ Project	Description	Due Date	Marking
Exercise sheet	Solving Several questions about each chapter	End of the term	3

Instructor(s) information [معلومات الأستاذ]

Section: (Computer Science) ; Lecture Room:[402], ; Office No.: (7)

Instructor's Name: **Dr. Ismael Abdul Sattar**

E-Mail: ismaelabdul@uomustansiriyah.edu.iq

Office Hours : Tue.: [1 :00 – 2 :00]

Wed.: [1 :00 – 2:45]

Section: (Computer Science) ; Lecture Room:[402], ; Office No.: (2)

Instructor's Name: **Dr. Maha A. Bayati**

Office Hours : Tue.: [10 :30 – 12 :30]

Wed.: [9 :00 – 11:00]

Instructor's Name: Dr. Eqbal Darraji

Instructor's Name: Firas Ali

NOTES:

-Office Hour: Other office hours are available by appointment.

-The content of this syllabus not be changed during the current semester.

Lecturer Signature

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Course Plan



Course No.: 50811309

Time Division: ...3.... hr Theoretical and ...2....hr Practical

Course Name: **Open Source Systems**

Semester & Year: **Second, 2024/ 2025**

Course Website:

Course Description:

(3 credit hours)

Open Source Software is becoming an important resource for development, especially in developing countries. A working understanding of the economical and technical background of the Free / Open Source Software movement (FOSS) is essential for its effective use. including hosting sites, projects, communities, legal frameworks, organizations etc.

Course Intended Outcomes:

- (1). Can identify the licensing of open source systems and make decisions on their use, based on an understanding of the legal, economical and technical issues.
- (2). Can find open source projects related to a given development problem.
- (3). Can install from source code an open source project and start using it.
- (4). Can choose the correct license, development model, and development community for open source projects, and can initiate a new project or join an existing project.
- (5). Can use the major development platforms and tools that are common for open source projects.
- (6). Experience participating in a public open source project.

Course Outline:

Week	Description depends on the Timing table (Theoretical	& Practical)
1	Introduction((discussion and demonstration)): Students will be engaged in a discussion about their perception and understanding of Open Source Software issues..	How to install virtual machine ♣ How to install Ubuntu operating system.
2	History, background, current status((lecture, discussion)): We discuss the emergence of Free Software and Open Source Software movements, using examples and practical issues, some of them from personal experience. We then review how OSS is being used now, discuss areas of success and failure, trends, outlook.	Introduction to python language ♣ How to install and open ♣ Use of gedit and terminal window ♣ Input /output commands

3	Where are the projects?((discussion, demonstrations): We review OSS repositories and development organizations, with emphasis on finding projects and resources relevant to a given development task. Students choose together a topic of common interest and we explore OSS repositories to find resources for it.	Working with condition and nested statements o if...else o if...elif...else ♣ various examples on the use of condition statements
4	Legal and social issues((lecture, discussion)): Starting with the concepts of copyrights and patents for software, we discuss issues like protecting creative work, building up common foundations of culture, freedom of creation and expression, the dilemma of sharing or exclusivity, motivations for contributing etc. Common licensing models for OSS projects will be reviewed and discussed from the point of view of practical consequences of choices for licensing, both for the developer and the user.	Working with loop statements o For ... range o While condition ♣ Examples on the use of looping statements
5	Business issues((lecture, discussion)): How to make money out of free software? We discuss business models for companies, developers and users, including OSS-oriented IT companies, manufacturers developing OSS components for their physical products, service providers, independent consultants and others.	Introduction to python functions and Examples
6	foundations of OSS 1. (lecture, exercises) Some of the important coding conventions and development methodologies of OSS development are explored using examples from Apache and the Linux kernel. We cover the use of version control systems, bug reporting, release control, project organization, developer and user forums.	Introduction to python classes and examples
7	Technical foundations of OSS 2. (lecture, exercises) We review some major development languages, libraries and frameworks that are commonly used in OSS projects. We look at the source code of Apache as an example, discussing issues like naming, commenting ,structuring.	How to install Tkinter Python GUI programming and Tested. ♣ Write simple hello-world program using MPI.
8	Using OSS 1 ((group work,)). Students form working groups, each of which selects a development topic to be solved using OSS. Each group creates a Tankyu chart, setting up a	Write simple hello-world program using TKinter.

	hypothesis for solving the issue, and a plan for finding OSS resources.	
9	Using OSS 2. (group work and discussion): Each group presents their plan and findings, to be reviewed by the class. Points to be checked include relevance of the resources to the problem, maturity of the OSS projects, practical usability of the current release, and the feasibility of joining and adapting the projects.	Write Label tool using TKinter.
10	Everyday OSS (demonstration and discussion): We discuss living with Android, Linux, LibreOffice, Firefox, Thunderbird, and other OSS components, without requiring any non-free software. Who can and who cannot leave the commercial software world? Can a company, a school, a government office, a grandmother standardize on OSS? What are the missing pieces? What are the advantages and pitfalls? What is coming in the near future? How can we contribute?	Exam
11	Using OSS 3. (group work,) Final presentation of the “Using OSS” project.	Write Button tool using TKinter.
12	Developing OSS 1. (group work) The groups select a development topic (might be the same as the “Using OSS” project) that requires a new OSS project for solution. Each group sets up a new OSS project at SourceForge, GoogleCode or another hub and starts development.	Write textbox tool using TKinter.
13	Developing OSS 2. (group work,) The groups present their status, discussing progress and issues that they have encountered.	Write Radio and Checkbox tool using TKinter
14	Developing OSS 3. (group work, 90 min) Final presentation of the “Developing OSS” projects.	Write Background for windows and tools tool using TKinter.
15	Wrap-up (discussion, 90 min) Based on what we have learned in the course, we discuss what each student will do using OSS during their studies and after graduating. We also review the impact of OSS on our countries and the society, and discuss what we can do to contribute.	Write the project for all tools in TKinter.

Textbooks:

[1]: www.gov.pe.ca/photos/original/IPEI_ebiz_oss.pdf

[2]: <http://185.10.129.239:8081.pdf>

Suggested references:

[1]:

[2]:

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	14	6	60

Assignment/ Project	Description	Due Date	Marking
test	written exam	1/6/2021	2
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Instructor(s) information [معلومات الأستاذ]

Section: **(Mathematics)** ; Lecture Room:[], ; Office No.: ()

Instructor's Name: **Dr. Mohammad Aziz & Dr. Zied O. Ahmed**

Ass. Prof. Yasmin M. Mohialden Lecturer. Noor Thamr

E-Mail: mohammada.abdulhassan@uomustansiriyah.edu.iq zied_othman@uomustansiriyah.edu.iq
ymmiraq2009@uomustansiriyah.edu.iq noorthamr@uomustansiriyah.edu.iq

Office Hours : Tue.: [9AM : – 11Am]

Wed.: [1pm – 3pm]

NOTES:

-Office Hour: Other office hours are available by appointment.

-The content of this syllabus not be changed during the current semester.

Lecturer Signature

Chairman Signature



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Course Plan



Course No.: 50811310

Time Division: ...3.... hr Theoretical and 2 hr Practical

Course Name: Computer Networks

Semester & Year: **Second, 2024 / 2025**

Course Website:

Course Description:

This subject presents the

1. Module 1 Networking Basics.
2. Module 2 Cables and Connectors.
3. Module 3 Networking Devices.
4. Module 4 Ethernet.
5. Module 5 Network Implementation.
6. Module 6 Wireless Networking.
7. Module 7 Wide Area Networks – WANS.
8. Module 8 Network Management.
9. Module 9 Troubleshooting.

Course Intended Outcomes:

This is an introductory course on computer networks. The emphasis will be on the basic performance and engineering tradeoffs in the design and implementation of computer networks. To make the issues more concrete, the class includes several multi-week projects requiring significant design and implementation.

The goal is for students to learn not only what computer networks are and how they work today, but also why they are designed the way they are and how they are likely to evolve in the future. We will draw examples primarily from the Internet. Topics to be covered include congestion/flow/error control, routing, addressing, naming, multi-casting, switching, internetworking, and network security. Evaluation is based on homework assignments, projects, and a mid-term and final exam.

Course Outline:

Week	The description depends on the Timing table (Theoretical	& Practical)
1	Uses of Computer Networks, Elements of Computer Networks, Network Criteria, and Categories of Networks (based on the type of Connection, Topology, and Distance).	Introduction to computer networks
2	Protocol Layers: The OSI MODEL, TCP/IP Protocol Suite, Addressing: physical address, logical address, port address, and application-specific address.	How network devices work and what are the appropriate devices
3	Data and Signals: Analog and Digital Data, Periodic, and Nonperiodic Signals, Digital Signals, Transmission	Types of network and cable topologies from a technical point

	Impairment, and Data Rate Limits, Performance.	of view
4	Transmission Media: Guided media, Unguided media, Wireless Transmission, Communication Satellites, Digital Modulation, and Multiplexing	IP addressing
5	Wired LANs: Ethernet, IEEE Standards, Unicast, Multicast, and Broadcast Addresses, Ethernet Evolution, Access Method: CSMA/CD. Wireless LANs: IEEE 802.11, Bluetooth.	IP addressing
6	Exam	Exam
7	POINT-TO-POINT PROTOCOL: 56K Modems, DSL Technology, Cable Modem, HFC Network, T-Lines, SONET. SWITCHED WANS: X.25 protocol, Asynchronous Transfer Mode (ATM), ATM Layers, Connecting Devices: Repeaters, Bridges, Routers.	Packet tracer applications Ring, bus, star
8	Delivery and Forwarding of IP Packets: Delivery (Direct and Indirect), Forwarding, Forwarding Techniques, Forwarding with Subnetting, Forwarding with Classless Addressing, Forwarding Based on Label, and Structure of Router.	Packet tracer applications Switch and wireless lans
9	MOBILE IP: Addressing (Stationary Hosts and Mobile Hosts), AGENTS, THREE PHASES (Agent Discovery, Registration, Data Transfer), Inefficiency In Mobile IP.	Packet tracer applications Router and switch
10	Introduction to the Transport Layer: Transport layer Services, Process-to-Process Communication, Error Control, Congestion Control, Connectionless and Connection-Oriented Services, and Transport-Layer Protocols.	Packet tracer applications Router and switch
11	User Datagram Protocol (UDP): User Datagrams, UDP services, UDP Applications, UDP Features, UDP Package. Transmission Control Protocol (TCP): Segment, TCP Services, TCP Features, TCP Connection, TCP Package.	Packet tracer applications Chang many lan
12	Exam	Exam
13	Introduction to the Application Layer: Client-Server Paradigm, Peer-to-Peer Paradigm. Host Configuration (DHCP): Why we need host configuration? Reverse Address Resolution Protocol, Bootstrap Protocol, Dynamic Host Configuration Protocol, DHCP Operation	Full review
14	Domain Name System (DNS): Need For DNS, Name Space, Distribution of Name Space, DNS in the Internet, DNS Security.	
15	Final Exam	Final Exam

Textbooks:

- [1]: Behrouz A. Forouzan, "Data Communications And Networking", fourth Edition, 2007.
[2]: Andrew S. Tanenbaum, " Computer Networks" 5th Edition, 2011.

Suggested references:

[1]: CCNA Lecturers.

[2]:

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
15%	15%	10%		60%

Assignment/ Project	Description	Due Date	Marking
test	written exam		3
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Instructor(s) information [معلومات الأستاذ]

Section: ; Lecture Room:[], ; Office No.: ()

Instructor's Name: **Dr. Ghassan Muslim Hassan**

E-Mail: gmhalsaddi@uomustansiriyah.edu.iq

Instructor's Name: **Dr. Huda haikal Hussein**

E-Mail: huda.atmsc@uomustansiriyah.edu.iq

Practical Instructor's Name: Mohanad Ali Meteab Al-Obaidi

E-Mail: mohanad.ali613@gmail.com

Practical Instructor's Name: Reyadh Hazim Mahdi

E-Mail: reyadh.hazim@uomustansiriyah.edu.iq

Office Hours :.:[: - :]
.: [: - :]

NOTES:

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Course Plan



Course No.: 50812301

Time Division: 3 hr Theoretical

Course Name: **Data Organization and Modeling** **Semester & Year:** **First, 2024 / 2025**

Course Website: <https://classroom.google.com/c/NTUyMzcxNTc0NjE4>

Course Description:

Data modeling is an essential process for representing information within an enterprise. Without proper data representation, one cannot be assured that database designs will meet corporate goals. The course intended to introduce students to data modeling Essentials.

Course Intended Outcomes:

At the end of the course, students are expected to learn:

- Give a brief history of database models and their evolution.
- Describe and interpret Entity Relationship diagrams.
- Create a simple Entity Relationship diagram.
- Describe the relationship between a logical model and a physical model.
- Describe data integration.
- Describe a data warehouse, its basic structure, etc.

Course Outline:

Week	Description depends on the Timing table (Theoretical
1	Data Modeling: An Overview • Data Model Defined • Information Levels
2	Data Modeling: An Overview • Conceptual Data Modeling • Data Model Quality
3	Methods, Techniques, and Symbols • Data Modeling Approaches • Methods and Techniques
4	Methods, Techniques, and Symbols • Unified Modeling Language
5	DATA MODELING FUNDAMENTALS • Data Model Composition • Creation of Models
6	DATA MODELING FUNDAMENTALS • Logical Model

	Physical Model
7	First Exam
8	Entities - Entity Types or Object Sets - Exploring Dependencies - Generalization and Specialization
9	Attributes and Identifiers - Attributes - Attribute Domains - Constraints for Attributes - Types of Attributes - Identifiers or Keys
10	Relationships - Relationships - Degree of Relationships - Structural Constraints - Dependencies - Maximum and Minimum Cardinalities
11	DATA MODEL to Database Design - Relational Model: Fundamentals - Transition to Database Design - Model Transformation Method
12	Second Exam
13	Data Normalization - Informal Design - Normalization Methodology - Fundamental Normal Forms - Higher Normal Forms - Normalization Summary
14	Modeling for Decision-Support Systems - Decision-Support Systems - Data Warehouse - Dimensional Modeling - OLAP Systems - Data Mining Systems
15	Review Exam

Textbooks:

[1]: Paulraj Ponniah, "DATA MODELING FUNDAMENTALS" WILEY, 2007.

Suggested references:

[1]: " Ramez Elmasri, "FUNDAMENTALS OF Database Systems", SIXTH EDITION, 2011.

[2]: Andy Oppel, "Data Modeling, A Beginner's Guide", First Edition, 2010, McGraw-Hill Professional\

[3]: Andrew J. Oppel, "Databases: A Beginner's Guide", 2009.

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	---	10	70

Assignment/ Project	Description	Due Date	Marking
Assignment1	written exam	21/10/2022	2
Assignment2	written exam	27/10/2022	2
Assignment3	written exam	16/11/2022	2
Assignment4	written exam	9/12/2022	2
Assignment5	written exam	14/12/2022	2
Assignment6	written exam	20/12/2022	2

Instructor(s) information [معلومات الأستاذ]

Section: **(Computer Science)** ; Lecture Room:[--], ; Office No.: ()

Instructor's Name: **Dr. Narjis Mezaal Shati**

E-Mail: *dr.narjis.m.sh@uomustansiriyah.edu.iq*

Office Hours: Mon. :[9:00 – 11: 30]

NOTES:

-Office Hour:Other office hours are available by appointment.

-The content of this syllabus not be changed during the current semester.

Lecturer Signature

Chairman Signature



Ministry of Higher Education and Scientific Research
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Course Plan



Course No.: 50812302

Time Division: 3hr Theoretical and 2hr Practical

Course Name: **Interactive Programming** **Semester & Year:** **First, 2024 / 2025**

Course Website:

Course Description:

This course will begin to learn about Java and fundamental programming techniques with primitive data types, variables, constants, assignments, expressions, and operators, selection statements, mathematical functions, characters, and strings, loops and methods. A large number of exercises with various levels of difficulty are provided for students to practice.

Course Intended Outcomes:

Our goal is to produce a text that teaches problem solving and programming in a broad context using a wide variety of interesting examples. This subject presents the fundamental concepts and techniques of selection statements, loops, methods, and arrays are the foundation for programming. Building this strong foundation prepares students to learn Java programming.

Course Outline:

Week	Description depends on the Timing table (Theoretical	& Practical)
1	Introduction to Computers, Programs, and Java.	Writing a Simple Program - Reading Input from the Console
2	the basic syntax of a Java program(create, compile, and run Java programs)	Practice on solving different problems using Java code
3	explain the differences between syntax errors, runtime errors, and logic errors	Practice on programming in Java to solve mathematical expressions
4	Elementary Programming: Write Java programs to perform(simple computations, obtain input from the console, identifiers to name variables, constants, methods, and classes and use variables to store data)	Practice on programming in Java to solve mathematical expressions
5	program with assignment statements and assignment expressions, use constants to store permanent data. name classes, methods, variables, and constants. explore Java numeric primitive data types .	Practice on programming if statement in Java

	perform operations	
6	Perform exponent operations; write integer literals, floating-point literals. evaluate numeric expressions, use augmented assignment operators, avoid common errors and pitfalls.	Practice on programming if statement in Java
7	Selections: implement selection control using if-statement (one-way; two way and multi-way);	First Exam
8	combine conditions using logical operators (!, &&, , and ^). Programming with combined conditions(examples).	Practice on programming switch statement in Java
9	Implement selection control using switch statements; write expressions using the conditional operator.	Practice on programming Mathematical Functions in Java
10	First Exam	Practice on programming Loops in Java
11	Functions: solve mathematical problems by using the methods in the Math class. Represent characters, encode characters, Casting among data types; introduce objects and instance methods.	Practice on programming Methods in Java
12	represent strings using the String object; using the length() and charAt(i) methods. compare strings using the equals and the compareTo methods. format the output.	Second Exam
13	Second Exam	Practice on programming Array in Java
14	Loops: design strategy; do-while statements; for statements ; while loop statement and Nested loop. program control with break and continue .	Practice on programming Objects and Classes in Java
15	Learn loops from a variety of examples (GCD, FutureTuition, and Dec2Hex). write a program that displays prime numbers	Review

Textbooks:

[1]: Y. Daniel Liang (2017) 'Introduction to Java™ Programming and Data Structures'; 11th Edition, Pearson, 330 Hudson Street, NY NY 10013.

[2]: Harry.H.Chaudhary, (2014) 'Introduction to Java Programming', 2nd Edition, Published By Programmers Mind || Createspace Inc. OD Publishing, LLC USA.

Suggested references:

[1]:

[2]:

Marking:

First Semester				
1st exam	2nd exam	Practical	Activity	Final Exam
10	10	14	6	45 Theoretical + 15 Practical

Assignment/ Project	Description	Due Date	Marking
test	written exam	1/12/2021	3
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Instructor(s) information [معلومات الأستاذ]

Section: (Computer Science) ; Lecture Room:[7] , ; Office No.: ()

Instructor's Name: **Dr. Basim Jamil Ali**

E-Mail: basimja6nd@uomustansiriyah.edu.iq

Instructor's Name: **Lecturer Rawsam A. Hassan**

E-Mail: rwsabd@uomustansiriyah.edu.iq

Office Hours : Tue.: [: - :]
Wed.: [8 :30 - 10:10]

NOTES:

- Office Hour: Other office hours are available by appointment.
- The content of this syllabus not be changed during the current semester.

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Course Plan



Course No.: 50812303

Time Division: 3 hr Theoretical and 2 hr Practical

Course Name: Database Query Language

Semester & Year: **Second, 2024/ 2025**

Course Website:

Course Description:

History and motivation for database query language, use of Structure query language, Concepts of object query language and XML languages.

Course Intended Outcomes:

At the end of the course, students are expected to learn:

- Distinguish the database query language,
- Identify major DBMS Query Language,
- Describe the components of a Structured Query Language and give examples of their use,
- Concepts of object query language and XML languages.

Course Outline:

Week	Description depends on the Timing table (Theoretical	& Practical)
1	Database language, DBMSs languages, structured query language.	introduction
2	SQL data definition and data types (Create table command, Attribute data types).	Training
3	Specifying constraints in SQL (not null, unique, check, primary key, foreign key);	DDL in SQL Server. Examples & Training
4	Views in SQL, Schema change statements in SQL (Drop, Alter).	DDL in SQL Server. Examples & Training
5	Insert, Delete statements in SQL, Update statement in SQL, Additional features of SQL.	DML in SQL Server . Examples & Training
6	Retrieval queries in SQL (Select-from-where structure of SQL queries).	Exam(1)
7	Ambiguous attribute names, aliasing and unspecified where clause.	sub query in SQL Server . Examples & Training
8	Tables as sets in SQL, substring pattern matching and arithmetic operators, ordering of query results.	sub query in SQL Server . Examples & Training
9	Comparisons involving Null and three-values logic, Nested (Queries, Tuples , and set), Multiset comparisons.	Examples

10	procedural SQL language, conditional statement, loop statement, cursor	Examples
11	procedural SQL language exceptions, Specifying constraints	Training & Examples
12	Exam2	Training
13	Object query language (OQL)	Training
14	XML languages.	Review.
15	Exam3	Exam (2).

Textbooks:

[1]: Fundamentals of Database Systems, sixth editions, 2011

By: Ramez Elmasri, Shamkant B. Navathe

Suggested references:

[1]: Advanced Database Query Systems: Techniques, Applications and Technologies, 2011

By: Li Yan, Zongmin Ma

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	14	6	60

Assignment/ Project	Description	Due Date	Marking
Test1	written exam	12/3/2023	6
Test2	written exam	9/4/2023	6

Instructor(s) information [معلومات الأستاذ]

Section: () ; Lecture Room: [], ; Office No.: ()

Instructor's Name: **Dr. Narjis Mezaal Shati, Rawsam Abdul Adheem Hassan**

E-Mail: dr.narjis.m.sh@uomustansiriyah.edu.iq,
rwsabd@uomustansiriyah.edu.iq

Office Hours : Tue.: [: - :]
Wed.: [: - :]

NOTES:

-Office Hour: Other office hours are available by appointment.

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Course Plan



Course No.: 50811304

Time Division: 3 hr Theoretical and 2 hr Practical

Course Name: Web Design and Programming

Semester & Year: **First, 2024/ 2025**

Course Website:

Course Description:

This subject presents the website design and programming that is essential topic to both Computer Science and Information Technology. This course focuses on fundamentals of design and coding of website using HTML. Scope of this course could summarize by: Editing and Viewing HTML Files, Setting Up the Document Structure, Formatting Text by Using Tags, Using Lists and Backgrounds, Creating Hyperlinks and Anchors, Style Sheets and Graphics, Page Layout and Navigation, Creating Tables, Formatting Tables, CSS for presentation, linking CSS to a web pages and three basic page layout strategies. JavaScript provides a way to validate form's data on the client's computer. Students are requested to design and implement professional website regarding skills of the contents of the topic.

Course Intended Outcomes:

At the end of the course, students are expected to learn:

- Understanding the web design development project lifecycle.
- Identify HTML and create a basic page with these languages.
- Identify the types of images used in modern web design and explain what types are appropriate for different functions.
- Designing and programming to create all required aspects of website, controlling on text, tables, hyperlinks, colors as well as using selected templates to design website. The student will write professional coding to create the above elements.
- Identify the CSS for presentation and add interactivity to website by JavaScript.

Course Outline:

Week	Description depends on the Timing table (Theoretical)	(Practical)
1	Internet Technology The Web Concepts Uniform Resource Locator (URL) Internet Protocols	Introduction to HTML

2	Web Design: Client-Server Architecture Web Browsers Web Operations Site Structure Types of Web Sites Website Design Issues	Basic and concept of HTML markup
3	HTML Document Structure HTML Structure HTML Tags and Attributes HTML Headings HTML Paragraphs HTML Character Entities	HTML markup with examples
4	HTML List Html List Advantages List Types Unordered Lists Ordered Lists Description Lists List Type Selection Nesting Lists	HTML markup with list
5	Images in HTML Introduction Image Types Image Attributes Adding Images	HTML markup with images
6	Links in HTML Linking in HTML Relative and Absolute Path Target attribute External linking Internal linking Directory Linking Hyperlinking to other Content	HTML markup with different types of linking
7	First Exam	First Exam
8	Tables in HTML Introduction Table Element Adding Tables Spanning Cells	HTML markup with table
9	Topic in Web Design: Forms Form Elements Types Forms Attributes Form Controls Input Element Type Attribute (Text, Checkbox, Password) Fieldset and Select Element Form Design	HTML markup with form

10	CSS for Presentation Fundamental and Advantage of CSS Types of CSS (Inline, Embedded and External CSS) Linking CSS to a Web Page Grouped and ID Selectors	HTML markup with CSS
11	CSS for Presentation Formatting Text Formatting Lists Colors and Backgrounds Styling Tables	HTML markup with CSS (images, tables, lists and forms)
12	Page Layout with CSS Page Layout Strategies Fixed Layout, Fluid Layout Elastic Layout, Hybrid Layout	HTML markup with CSS (Contextual Selector)
13	Second Exam	Second Exam
14	JavaScript: Basic Scripting Adding JavaScript to a Page Accessing Nodes Event Driven	Introduction to JavaScript Language
15	JavaScript: Basic Handling Form Validation Regular Expressions Basic Validation Data Format Validation	Form Checking Programs

Textbooks:

[1]: Learning Web Design, 4th Edition, Jennifer Niederst Robbins, 2015.

[2]: HTML & CSS: The Complete Reference, Fifth Edition, Thomas A. Powell, 2010

Suggested references:

[1]: HTML and CSS Design and Build Websites, Jon DuCkeTT, 2011.

[2]: Designing for the Web – free (Online Edition) - <http://designingfortheweb.co.uk>.

[3]: W3Schools Online Web Tutorials <http://www.w3school.com>.

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	14	6	60

Assignment/ Project	Description	Due Date	Marking
Project	Project for each student	After the Assignment Date	3
Quizzes &Homework's	Two or more quizzes Five or more homework's	During the course	3

Instructor(s) information [معلومات الأستاذ]

Section: ; Lecture Room:[401, 402] ; Office No.: (1)

Theoretical Instructors

Instructor's Name: Asst.Prof.Dr. Asmaa Sadiq

E-Mail: asmaasadiq@ uomustansiriyah.edu.iq

Instructor's Name: Dr. Eman Hato

E-Mail: emanhato@ uomustansiriyah.edu.iq

Instructor's Name: Dr. Zaid Ali

E-Mail: dr.zaid_aljarah@uomustansiriyah.edu.iq

Practical Instructors

Instructor's Name: lecturer. Zinah Sadeq

E-Mail: zinahsadeq@uomustansiriyah.edu.iq

Office Hours: Tue.: [8:30 – 10:10]

Sun.: [8:30 – 10:10]

NOTES:

-Office Hour: Other office hours are available by appointment.

-The content of this syllabus not be changed during the current semester.

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Course Plan



Course No.: 50812305
Practical

Time Division: 3 hr Theoretical and 2hr

Course Name: Advance Programming Constructs **Semester & Year:** First, 2024/ 2025
Course Website:

Course Description:

This course concentrates on writing complex programs using C Sharp .NET concepts and commands. The Content includes: C Sharp, user interfaces, .NET Framework controls, add-ins and utilities, dynamic control and object creation, creating a multiple document interface application (MDI), using the Windows API, Registry and INI files, adding an Online Help system to applications, and deployment of applications

Course Intended Outcomes:

At the end of the course, students are expected to learn: Upon completion of this course, the student will be able to write, test, and document a variety of complex C Sharp .NET programs which include:

1. Numeric and string functions
2. Multi-dimensional data arrays (tables)
3. Save and load array into files
4. Structures and enumerations
5. Use of .NET Framework controls
6. Use of add-ins and utilities
7. Dynamic control and object creation

Multiple document interface applications (MDI)

Course Outline:

Week	Description depends on the Timing table(Theoretical	& Practical)
1	Review of C Sharp: 1. The environment 2. Data Types 3. Arrays 4. Procedures 5. User Interfaces 6. Enumerated Types	array
2	Input Validation and User Interfaces 1. Input Validation 2. Exception Handling 3. ListBox, ComboBox, and CheckedListBox 4. Dates and Times	Radio and check box
3	OpenFileDialog and SaveFileDialog Control	Open and save file
4	DataGridView Control	Display data
5	Design Simple Game I	Matching game

6	Design Simple Game II	Puzzle game
7	Save and load array into files	Save array to file
8	Examination I	
9	Creating controls in run time. Assign event handler in run time	Create button during run time
10	Using .NET Framework objects and methods	Create label during run time
11	Examination II	
12	Coding Multiple Document Interfaces (MDI) 1.	Project
13	Creating a simple MDI program 2	Project
14	. Creating multiple instances of a form 3.	Project
15	Managing parent and child forms 4. Setup Project	Project

Textbooks:

[1]: Beginning C Sharp Programming with Visual Studio 2017, Benjamin Perkins, Jacob Vibe Hammer.

Suggested references:

[1]: Beginning VISUAL C Sharp 2012 PROGRAMMING, Karli Watson.

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	14	6	60

Assignment/ Project	Description	Due Date	Marking
Puzzle game	Design simple puzzle game to practice students programming skills.		3
Matching game	Design simple matching game to practice students programming skills.		3

Instructor(s) information [معلومات الأستاذ]

Section: **(Computer Science)** ; Lecture Room: **[302]** , ; Office No.: **(3)**

Instructor's Name: **Dr. Musaab Riyadh Abdulrazzaq**

E-Mail: m.shaibani@uomustansiriyah.edu.iq

Office Hours : Mon. **[10:30-12:30]**

NOTES:

- Office Hour: Other office hours are available by appointment.
- The content of this syllabus not be changed during the current semester.

Lecturer Signature

Chairman Signature



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Course Plan



Course No.: _____ **Time Division:** 3 hr Theoretical and 2hr Practical
Course Name: Information Assurance and security. **Semester & Year:** 2nd ,2024 / 2025
Course Website: _____

Course Description:

Information Assurance and Security (IAS) is a paramount importance to the profession of IT. The IT students must understand, apply, and manage information assurance and security in computing, communication, and organizational systems. This module will help student to learn most of the new terms in security field and help them to build good knowledge of being aware of avoiding security issues

Course Intended Outcomes:

At the end of this course, *students are expected to learn:*

- Security terms and pillars of security (confidentiality, authentication, integrity and non-repudiation).
- Security policy and Incident response policy
- A good overview of most security mechanism implemented to increase security layers
- Most types of attacks (passive and active) such as DoS, Social engineering and port scan.
- Ip spoofing, email spoofing
- Different types of vulnerabilities that might be exploited by attacker to invade the information system.

Course Outline:

Week	Description depends on the Timing table(Theoretical	& Practical)
1	Information Systems Security: Threats, vulnerabilities, and risk, Tenets of Information Systems Security, The Seven Domains of a Typical IT Infrastructure	Ciphering concept
2	Information Systems Security: Weakest Link in the Security of an IT Infrastructure, IT Security Policy Framework, Foundational IT Security Policies	mono-alphabetic cipher

3	Malicious Attacks, Threats, and Vulnerabilities: Attack Tools, Malicious Attack, Malicious Software	Caesar-shift cipher
4	Malicious Attacks, Threats, and Vulnerabilities:: Social Engineering Attacks, Wireless Network Attacks, Web Application Attacks, and Countermeasure.	Transposition cipher
5	<u>The Drivers of the Information Security Business: Risk Management, BIA, a BCP, and a DRP</u>	<u>Exam 1</u>
6	The Drivers of the Information Security Business:: Business Impact Analysis, Disaster Recovery Plan, Threat Analysis, and Recovery Requirement Documentation	Transposition cipher with key
7	<u>Exam 1</u>	<u>Polyalphabet ciphering</u>
8	Encryption Techniques: Types of Ciphers, Block versus stream ciphers, symmetric and Asymmetric Key Ciphers	The Vigenère cipher I
9	Key distribution and Managements.	The Vigenère cipher II
10	Access Controls: Types of Access Controls, Authorization Policies	Stream ciphering
11	Access Controls: Access Control Models, and Threats to Access Controls	Random key generation I
12	The evolution and challenging of internet of things (IOT).	Exam II
13	<u>The IOT security</u>	Random key generation II
14	<u>Exam 2</u>	<u>Key management</u>
15	<u>Review</u>	<u>Review</u>

Textbooks:

[1]: Fundamentals of Information Systems Security 2018 David Kim | Michael G. Solomon

Suggested references:

[1]: The Basics of Information Security Jason 2011 Andress, Steven Winterfeld

[2]: Computer and Information Security Handbook 2017 by John R. Vacca

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	14	6	40

Assignment/ Project	Description	Due Date	Marking
H.W. 1	Quiz	1-4-2023	3
H.W. 2	Quiz	2-5-2023	3

Instructor(s) information [معلومات الأستاذ]

Section: (information technology) ; Lecture Room:[302] , ; Office No.: ()

Instructor's Name: **Dr. Musaad Riyadh** (theoretical)& **Shatha Jasim** (practical)

E-Mail: m.shaibani@uomustansiriyah.edu.iq & shonash77@uomustansiriyah.edu.iq

Office Hours :Tue.: [8:30 –10:30]

Wed.: [10:30–1:00]

NOTES:

-Office Hour: Other office hours are available by appointment.

-The content of this syllabus not be changed during the current semester.

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Course Plan



Course No.: 50812307

Time Division: hr Theoretical and hr

Practical

Course Name: **Enterprise information management EIM**

Semester & Year: 2nd , 2024 / 2025

Course Website: <https://classroom.google.com/u/0/c/NTU2OTM1MTU5NTY5>

Course Description:

EIM is about how an organization works to better manage records and information, enable customers, automate business processes, aid in the implementation of Big Data practices, and work more efficiently with different technologies.

Course Intended Outcomes:

- Understand what Enterprise Information Management (EIM) is
- Learn why organizations implement and practice EIM
- improved information system security, increased efficiency, improved data quality, and integration of data.

Course Outline:

Week	Description depends on the Timing table (Theoretical	& Practical)
1	Understanding the keywords : Management, information and system	Introduction to the Unified Modeling Language (UML) - Models of Information Systems
2	Management information system (MIS) Definition, evolution of MIS, IT and MIS	- Managing Project
3	Level of information, characteristics of information, information and decision making	The Use Case Diagram: (Use Cases, Actors, Associations)
4	Value chain, how do value chain work, examples, , how to determined IPOF (input, process, output and feedback) for any system	The Use Case Diagram: (Relationships between Actors, Relationships between Use Cases)
5	Types of system in an organization: TPS, MIS, DSS and ESS	1 st exam
6	1 st exam	Creating a Use Case Diagram

7	Business process quality, Datawarehouse and database, the difference, examples of data warehouses	The Class Diagram: (Objects)
8	Diagram representation of business process, business process automation BPA, implementation of BPA, benefit of BPA, case study #1, case study #2	The Class Diagram: (Classes, Notation)
9	The vulnerabilities in information system, the security triad(CIA) : confidentiality , Integrity and availability, how to achieve CIA, Authentication, encryption , access control, firewall , intrusion detection system IDS and physical security	The Class Diagram: (Attributes, Multiplicities)
10	What is the best backup plan for an enterprise information system	The State Machine Diagram - States and State Transitions
11	Business type (Manufacturing, trading and service),Enterprise risk Management (ERM), Understand enterprise information management EIM,	Types of States - Types of State Transitions
12	EIM Special consideration , Barrier for implementing EIM in business, Advantage of EIM, challenges of EM, Application software in any EIM, reengineering, continuous improving techniques for an enterprise to stay competitive	2 nd exam
13	2 nd exam	Introduction to the Unified Modeling Language (UML) - Models of Information Systems
14	the four types of EIM: ERP, SCM,CRM, KMS. Enterprise resource planning delivery model, Best ERP sysem in market for ERP, case study. Supply chain management SCM definitions , model, best SCM software for 2022,	Managing Project
15	Customer relationship management system definition , models , best CRM for 2022, case study Knowledgebase management system , definition , models, big data and BI, best KMS software for 2022	The Use Case Diagram: (Use Cases, Actors, Associations)

Textbooks:

[1]: M.joe zhou , Kamal parekh, “ Build and execute an Enterprise Information system Management(EIM) strategy” , march 2008, san diego CA.

[2]: D.Baglieri, C., Metallo, C., Rossignoli,M., Pezzillo Iacono. “Information Systems, Management, Organization and Control “ , ISBN 978-3-319-07905-9, 2014

Suggested references:

[1]: Rafael Lapiedra Alcamí and Carlos Deveci Caranana, "Introduction to management Information Systems", 2012. http://www.uky.edu/~gmswan3/777/IS_Book.pdf

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	14	6	60

Assignment/ Project	Description	Due Date	Marking
Project	Report FSR Feasibility study	20/12/2022	4
Assignment	General question regarding the class material		2

Instructor(s) information [معلومات الأستاذ]

Section: (Computer Science) ; Lecture Room:[9], ; Office No.: (9)

Instructor's Name: **Dr.Wurood Hasan Albayati**

E-Mail: w.albayati@uomustansiriyah.edu.iq

Office Hours : Tue.: [9 : 00 – 1 : 00]

Wed.: [8 : 30 – 12 : 30]

NOTES:

-Office Hour: Other office hours are available by appointment.

-The content of this syllabus not be changed during the current semester.

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Course Plan



Course No.: 50812308 **Time Division:** ...3.... hr Theoretical and ...2...hr Practical
Course Name: Maintenance of information systems **Semester & Year:** **Second , 2024 / 2025**
Course Website:

Course Description:

the critical role of software maintenance in the software development life cycle. Software maintenance is any work that is done on a software system after it has been delivered to the users. It is an essential part of software engineering that helps to ensure that the software continues to meet the changing needs of its users.

During this course, we will cover various aspects of software maintenance, including the different types of maintenance, the reasons why maintenance is necessary, and the tools and techniques used for maintaining software. We will also discuss the challenges of software maintenance and the strategies that can be employed to overcome them.

Intended Learning Outcomes :

At the end of the course student will gain skills to:

- Understand the importance of maintenance in the software development life cycle
- Identify the different types of maintenance and their characteristics
- Recognize the reasons why maintenance is necessary for information systems
- Identify and apply appropriate tools and techniques for maintaining information systems
- Develop strategies for addressing the challenges associated with maintaining information systems
- Understand the importance of documentation and version control in software maintenance
- Analyze case studies and real-world examples to understand the practical aspects of software maintenance
- Understand basic maintenance terms and know methods and techniques for planning, scheduling, carry out and analyze maintenance. Get information about the most relevant and future maintenance concepts. Be able to carry out risk and vulnerability analyses and to use maintenance optimization models. Demonstrate a practical understanding of basic PC systems
- Install and commission a working standalone PC
 - Demonstrate a practical understanding of data storage devices
 - Students will gain practical experience regarding laptop and pc Hardware maintenance that includes preventive hardware maintenance
 - Practical skills for pc and laptop Corrective maintenance in case system crashed.
-

Course Outline:

Week	Description depends on the Timing table (Theoretical	& Practical)
1	Motivation, - Overview - Benefit of Software Maintenance – computerized maintenance management system (CMMS)	Identification of Components of Desktop PC
2	Context of maintenance - Classification of changes - Lehman's laws - Cost of software maintenance - The Maintenance Framework - Potential solution to maintenance Problem - Decision Making in the context of software maintenance	Assemble and Disassemble VGA Card, LAN Card, Cables, Ports (Parallel, USB, HDMI) Display Devices, Monitor, Printer, Scanner, Data Show, External DVD&HD
3	Maintenance Process Models - Quick-fix model - Boehm's model - Iterative enhancement model - Reuse-oriented model	Periodical computer maintenance and trouble shooting
4	Reverse engineering	HD format and partition
5	Exam	exam
6	Software quality Techniques for program analyzing (static vs. dynamic)	Software / hardware install and uninstall
7	Program comprehension mode - Top-down comprehensive - Bottom-up model	Anti-virus, backups and restore.
8	Issues of program comprehensions Goals of program comprehensions Tools for P. comprehension	System and security of windows
9	Code comprehension tools - Expertise - Cross referencing - Call graph - Data flow and control flow analysis	Removal of junk files and speed up performance (defragmentation)

10	Cont. -Program slicing - examples - maintenance case study(to be solved in class)	continue
11	exam	Desktop remote access for maintenance
12	Distributed system maintenance overview	Cloud maintenance software
13	Cloud maintenance - Maas	review

Textbooks:

[1]: "Effective Software Maintenance and Evolution: A Reuse-Based Approach" by Ali Babar and Alan McGregor -

[2]: Software Maintenance: Concepts and Practice" by Grubb and Takang -, including the different types of maintenance, maintenance models, and methodologies, and maintenance tools and techniques.

Suggested references:

[1]: " IEEE Transactions on Software Engineering - This journal publishes articles on various topics related to software engineering, including software maintenance.

[2]: ACM SIGSOFT - This organization focuses on software engineering and has a special interest group on software maintenance.

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
12	12	14	2	60

Assignment/ Project	Description	Due Date	Marking
test	written exam	1/12/2022	3
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Instructor(s) information [معلومات الأستاذ]

Section: (Computer Science) ; Lecture Room:[], ; Office No.: ()

Instructor's Name: **Dr. Abbas Abdulazeez Abdulhameed**

E-Mail: abbasabdulazeez@uomustansiriyah.edu.iq

Office Hours : Tue.: [: - :]
Wed.: [: - :]

Lab. Instructor's Name: **Mr. Muhannad John**

NOTES:

- Office Hour: Other office hours are available by appointment.
- The content of this syllabus not be changed during the current semester.

Lecturer Signature

Chairman Signature



Ministry of Higher Education and Scientific Research
Mustansiriyah University /College of Science
Department of Computer Science
(الخطة الدراسية للمساق)
Course Plan



Course No.: 50811309

Time Division: ...3.... hr Theoretical and ...2....hr Practical

Course Name: **Open Source Systems**

Semester & Year: **Second, 2024/ 2025**

Course Website:

Course Description:

(3 credit hours)

Open Source Software is becoming an important resource for development, especially in developing countries. A working understanding of the economical and technical background of the Free / Open Source Software movement (FOSS) is essential for its effective use. including hosting sites, projects, communities, legal frameworks, organizations etc.

Course Intended Outcomes:

- (1). Can identify the licensing of open source systems and make decisions on their use, based on an understanding of the legal, economical and technical issues.
- (2). Can find open source projects related to a given development problem.
- (3). Can install from source code an open source project and start using it.
- (4). Can choose the correct license, development model, and development community for open source projects, and can initiate a new project or join an existing project.
- (5). Can use the major development platforms and tools that are common for open source projects.
- (6). Experience participating in a public open source project.

Course Outline:

Week	Description depends on the Timing table (Theoretical	& Practical)
1	Introduction((discussion and demonstration)): Students will be engaged in a discussion about their perception and understanding of Open Source Software issues..	How to install virtual machine ♣ How to install Ubuntu operating system.
2	History, background, current status((lecture, discussion)): We discuss the emergence of Free Software and Open Source Software movements, using examples and practical issues, some of them from personal experience. We then review how OSS is being used now, discuss areas of success and failure, trends, outlook.	Introduction to python language ♣ How to install and open ♣ Use of gedit and terminal window ♣ Input /output commands

3	Where are the projects?((discussion, demonstrations): We review OSS repositories and development organizations, with emphasis on finding projects and resources relevant to a given development task. Students choose together a topic of common interest and we explore OSS repositories to find resources for it.	Working with condition and nested statements o if...else o if...elif...else ♣ various examples on the use of condition statements
4	Legal and social issues((lecture, discussion)): Starting with the concepts of copyrights and patents for software, we discuss issues like protecting creative work, building up common foundations of culture, freedom of creation and expression, the dilemma of sharing or exclusivity, motivations for contributing etc. Common licensing models for OSS projects will be reviewed and discussed from the point of view of practical consequences of choices for licensing, both forthe developer and the user.	Working with loop statements o For ... range o While condition ♣ Examples on the use of looping statements
5	Business issues((lecture, discussion)): How to make money out of free software? We discuss business models for companies, developers and users, including OSS-oriented IT companies, manufacturers developing OSS components for their physical products, service providers, independent consultants and others.	Introduction to python functions and Examples
6	foundations of OSS 1. (lecture, exercises) Some of the important coding conventions and development methodologies of OSS development are explored using examples from Apache and the Linux kernel. We cover the use of version control systems, bug reporting, release control, project organization, developer and user forums.	Introduction to python classes and examples
7	Technical foundations of OSS 2. (lecture, exercises) We review some major development languages, libraries and frameworks that are commonly used in OSS projects. We look at the source code of Apache as an example, discussing issues like naming, commenting ,structuring.	How to install Tkinter Python GUI programming and Tested. ♣ Write simple hello-world program using MPI.
8	Using OSS 1 ((group work,)). Students form working groups, each of which selects a development topic to be solved using OSS. Each group creates a Tankyu chart, setting up a	Write simple hello-world program using TKinter.

	hypothesis for solving the issue, and a plan for finding OSS resources.	
9	Using OSS 2. (group work and discussion): Each group presents their plan and findings, to be reviewed by the class. Points to be checked include relevance of the resources to the problem, maturity of the OSS projects, practical usability of the current release, and the feasibility of joining and adapting the projects.	Write Label tool using TKinter.
10	Everyday OSS (demonstration and discussion): We discuss living with Android, Linux, LibreOffice, Firefox, Thunderbird, and other OSS components, without requiring any non-free software. Who can and who cannot leave the commercial software world? Can a company, a school, a government office, a grandmother standardize on OSS? What are the missing pieces? What are the advantages and pitfalls? What is coming in the near future? How can we contribute?	Exam
11	Using OSS 3. (group work,) Final presentation of the “Using OSS” project.	Write Button tool using TKinter.
12	Developing OSS 1. (group work) The groups select a development topic (might be the same as the “Using OSS” project) that requires a new OSS project for solution. Each group sets up a new OSS project at SourceForge, GoogleCode or another hub and starts development.	Write textbox tool using TKinter.
13	Developing OSS 2. (group work,) The groups present their status, discussing progress and issues that they have encountered.	Write Radio and Checkbox tool using TKinter
14	Developing OSS 3. (group work, 90 min) Final presentation of the “Developing OSS” projects.	Write Background for windows and tools tool using TKinter.
15	Wrap-up (discussion, 90 min) Based on what we have learned in the course, we discuss what each student will do using OSS during their studies and after graduating. We also review the impact of OSS on our countries and the society, and discuss what we can do to contribute.	Write the project for all tools in TKinter.

Textbooks:

[1]: www.gov.pe.ca/photos/original/IPEI_ebiz_oss.pdf

[2]: <http://185.10.129.239:8081.pdf>

Suggested references:

[1]:

[2]:

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	14	6	60

Assignment/ Project	Description	Due Date	Marking
test	written exam	1/6/2021	2
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Instructor(s) information [معلومات الأستاذ]

Section: **(Mathematics)** ; Lecture Room:[], ; Office No.: ()

Instructor's Name: **Dr. Mohammad Aziz & Dr. Zied O. Ahmed**

Ass. Prof. Yasmin M. Mohialden Lecturer. Noor Thamr

E-Mail: mohammada.abdulhassan@uomustansiriyah.edu.iq zied_othman@uomustansiriyah.edu.iq
ymmiraq2009@uomustansiriyah.edu.iq noorthamr@uomustansiriyah.edu.iq

Office Hours : Tue.: [9AM : – 11Am]

Wed.: [1pm – 3pm]

NOTES:

-Office Hour: Other office hours are available by appointment.

-The content of this syllabus not be changed during the current semester.

Lecturer Signature

Chairman Signature



Ministry of Higher Education and Scientific Research
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Course Plan



Course No.: 50811310

Time Division: ...3.... hr Theoretical and 2 hr Practical

Course Name: Computer Networks

Semester & Year: **Second, 2024 / 2025**

Course Website:

Course Description:

This subject presents the

1. Module 1 Networking Basics.
2. Module 2 Cables and Connectors.
3. Module 3 Networking Devices.
4. Module 4 Ethernet.
5. Module 5 Network Implementation.
6. Module 6 Wireless Networking.
7. Module 7 Wide Area Networks – WANS.
8. Module 8 Network Management.
9. Module 9 Troubleshooting.

Course Intended Outcomes:

This is an introductory course on computer networks. The emphasis will be on the basic performance and engineering tradeoffs in the design and implementation of computer networks. To make the issues more concrete, the class includes several multi-week projects requiring significant design and implementation.

The goal is for students to learn not only what computer networks are and how they work today, but also why they are designed the way they are and how they are likely to evolve in the future. We will draw examples primarily from the Internet. Topics to be covered include congestion/flow/error control, routing, addressing, naming, multi-casting, switching, internetworking, and network security. Evaluation is based on homework assignments, projects, and a mid-term and final exam.

Course Outline:

Week	The description depends on the Timing table (Theoretical	& Practical)
1	Uses of Computer Networks, Elements of Computer Networks, Network Criteria, and Categories of Networks (based on the type of Connection, Topology, and Distance).	Introduction to computer networks
2	Protocol Layers: The OSI MODEL, TCP/IP Protocol Suite, Addressing: physical address, logical address, port address, and application-specific address.	How network devices work and what are the appropriate devices
3	Data and Signals: Analog and Digital Data, Periodic, and Nonperiodic Signals, Digital Signals, Transmission	Types of network and cable topologies from a technical point

	Impairment, and Data Rate Limits, Performance.	of view
4	Transmission Media: Guided media, Unguided media, Wireless Transmission, Communication Satellites, Digital Modulation, and Multiplexing	IP addressing
5	Wired LANs: Ethernet, IEEE Standards, Unicast, Multicast, and Broadcast Addresses, Ethernet Evolution, Access Method: CSMA/CD. Wireless LANs: IEEE 802.11, Bluetooth.	IP addressing
6	Exam	Exam
7	POINT-TO-POINT PROTOCOL: 56K Modems, DSL Technology, Cable Modem, HFC Network, T-Lines, SONET. SWITCHED WANS: X.25 protocol, Asynchronous Transfer Mode (ATM), ATM Layers, Connecting Devices: Repeaters, Bridges, Routers.	Packet tracer applications Ring, bus, star
8	Delivery and Forwarding of IP Packets: Delivery (Direct and Indirect), Forwarding, Forwarding Techniques, Forwarding with Subnetting, Forwarding with Classless Addressing, Forwarding Based on Label, and Structure of Router.	Packet tracer applications Switch and wireless lans
9	MOBILE IP: Addressing (Stationary Hosts and Mobile Hosts), AGENTS, THREE PHASES (Agent Discovery, Registration, Data Transfer), Inefficiency In Mobile IP.	Packet tracer applications Router and switch
10	Introduction to the Transport Layer: Transport layer Services, Process-to-Process Communication, Error Control, Congestion Control, Connectionless and Connection-Oriented Services, and Transport-Layer Protocols.	Packet tracer applications Router and switch
11	User Datagram Protocol (UDP): User Datagrams, UDP services, UDP Applications, UDP Features, UDP Package. Transmission Control Protocol (TCP): Segment, TCP Services, TCP Features, TCP Connection, TCP Package.	Packet tracer applications Chang many lan
12	Exam	Exam
13	Introduction to the Application Layer: Client-Server Paradigm, Peer-to-Peer Paradigm. Host Configuration (DHCP): Why we need host configuration? Reverse Address Resolution Protocol, Bootstrap Protocol, Dynamic Host Configuration Protocol, DHCP Operation	Full review
14	Domain Name System (DNS): Need For DNS, Name Space, Distribution of Name Space, DNS in the Internet, DNS Security.	
15	Final Exam	Final Exam

Textbooks:

- [1]: Behrouz A. Forouzan, "Data Communications And Networking", fourth Edition, 2007.
[2]: Andrew S. Tanenbaum, " Computer Networks" 5th Edition, 2011.

Suggested references:

[1]: CCNA Lecturers.

[2]:

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
15%	15%	10%		60%

Assignment/ Project	Description	Due Date	Marking
test	written exam		3
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Instructor(s) information [معلومات الأستاذ]

Section: ; Lecture Room:[], ; Office No.: ()

Instructor's Name: **Dr. Ghassan Muslim Hassan**

E-Mail: gmhalsaddi@uomustansiriyah.edu.iq

Instructor's Name: **Dr. Huda haikal Hussein**

E-Mail: huda.atmsc@uomustansiriyah.edu.iq

Practical Instructor's Name: Mohanad Ali Meteab Al-Obaidi

E-Mail: mohanad.ali613@gmail.com

Practical Instructor's Name: Reyadh Hazim Mahdi

E-Mail: reyadh.hazim@uomustansiriyah.edu.iq

Office Hours :.:[: - :]
.: [: - :]

NOTES:

-Office Hours: Other office hours are available by appointment.

-The content of this syllabus not be changed during the current semester.

Lecturer Signature

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Ministry of Higher Education and Scientific Research
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Course Plan



Course No.: 50813301

Time Division: 3hr Theoretical

Course Name: Risk Management

Semester & Year: First, 2024 / 2025

Course Website:

Dept. : CS, Branch : S, Stage: 3th

Course Description:

This subject presents the goal course that examines risk management practices and principles to improve information security. The course provides education on information security risk identification, evaluation, and related response decisions given resource constraints. Students will learn foundational concepts in risk management and economic valuation and will be introduced to standard risk management approaches for identifying, analyzing, responding, and monitoring risks. Both qualitative and quantitative approaches will be examined.

Course Intended Outcomes:

- Understand the fundamentals of managing information security systems and personnel
- Learn how security and management are interrelated
- Understand the laws and regulations surrounding information security
- Learn how to plan for disaster recovery
- Learn how to conduct security audit

Course Outline:

Week	Description depends on the Timing table (Theoretical	& Practical)
1	Introduction to Cyber Security and Careers, Types of Areas in Cyber Security	
2	Pathway of Cyber Security, Where does Information Security Management Fit?	
3	Cybersecurity Frameworks, Application Security	
4	Challenges - The Risk Management Process	
5	Security information and event management	
6	Real-time Threat Defiance and Management	
7	First Exam In	Return and Discussions

		of First exam results
8	Life Cycle, Security Scopes and Policies	
9	Selecting Security Controls	
10	Operational Responsibilities - IT and Cybersecurity Processes - Functional Area Operational Objectives	
11	Attack Lifecycle - Incident Response Procedures & Determining a Response	
12	Legal Implications, Control Layers	
13	Security Operations Centre	
14	Vulnerability-assessment and penetration-testing, Maintenances	
15	Final Exams	

Textbooks:

[1]: Fundamentals of Risk Management Understanding, evaluating and implementing effective risk management Paul Hopkin FOURTH EDITION

[2]: What FAAs need to know about Cybersecurity Initiatives, Data Protection, Identity Theft and Cybersecurity Risk Management

Dr. Michael Dean, Dr. Linda Wilbanks, and Theon Dam | Nov.-Dec. 2017 U.S. Department of Education 2017 FSA .

[3]: Risk Management & Governance Knowledge Area Issue 1.0 Pete Burnap Cardiff University

Suggested references:

[1]:

[2]:

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
12	12	0	6	70

Assignment/ Project	Description	Due Date	Marking
test	written exam	1/11/2024	3
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Instructor(s) information [معلومات الأستاذ]

Section: (Computer) ; Lecture Room:[], ; Office No.: ()

Instructor's Name: Dr. Abbas Abdulazeez Abdulhameed

E-Mail: abbasabdulazeez@uomustansiriyah.edu.iq

Office Hours : Tue.:[9: 30 - 11:00]
Wed.:[9:30 – 10:30]

NOTES:

- Office Hour:Other office hours are available by appointment.
- The content of this syllabus not be changed during the current semester.

Lecturer Signature

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Course Plan



Course No.: 50813302

Time Division: 3hr Theoretical

Course Name: introduction of cyber security **Semester & Year:** First, 2024 / 2025

Course Website:

Course Description:

The Introduction to Cybersecurity course provides a broad overview of cybersecurity, including how computers and networks are attacked, how the attackers benefit, and how to mitigate attack. The terminology, approaches, and underlying technologies used in cybersecurity are also covered

Course Intended Outcomes:

Assess threat models and their influence on an organization

Compare the various uses and approaches to cryptography

Prepare for and respond to security incidences

Design effective and efficient password schemes

Plan environments that are resistance to malware

Choose an effective set of training experiences for an organization

Prepare a plan to defend from the usual attacks on networks and hosts

Week	Description depends on the Timing table (Theoretical	& Practical)
1	Cyber security overview	
2	Why cyber and what need about cyber security	
3	Attack Victim of cyber Attack	
4	Type of hikers , Malware Analysis: What It Is & How It Works	
5	Cyber security management	
6	Network Security Policy	
7	ips and ids A wireless LAN (WLAN), VPN , password	
8	Exam	
9	Cyber security For Social Networking Sites Issues, Challenges, And Solutions	
10	cyber security with IOT social network theory	K-Means Algorithm
11	social media on internet	
12	spot a fraudulent website programming language required for cyber	

13	AI and cyber security solution	
14	Cyber security; digital signature Cybercrime investigation	
15	Exam	

Textbooks:

[1]: An Introduction to cyber security

[2] cyber security (direction- Analysis- Operation

Suggested references:

[1]: Cyber Security & Training For All Companies

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
13	13		4	70

Assignment/ Project	Description	Due Date	Marking
test	written exam		
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Instructor(s) information [معلومات الأستاذ]

Section: ; Lecture Room:[], ; Office No.: ()

Instructor's Name: **Assist. Prof.Dr. Huda Abdulaali**

E-Mail: :

huda.it@uomustansiriyah.edu.iq

Office Hours : Tue.: [: - :]

Wed.: [: - :]

NOTES:

-Office Hour:Other office hours are available by appointment.

-The content of this syllabus not be changed during the current semester.

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Chairman Signature



Ministry of Higher Education and Scientific Research

Mustansiriyah University /College of Science

Department of Computer Science

الخطوة الدراسية للمساق

Course Plan 2022-2023



Course No.: 508133033

Time Division: 3 hr. Theoretical and 2 hr. Practical

Course Name: Multi Media System **Semester & Year:** First 2024/ 2025

Course Website: <https://classroom.google.com/c/NTU1OTQ3NTYyMTEw>

Course Description: the objective of this course is to describe the fundamentals of Multimedia system, including the fundamentals of text data in multimedia the representation and analysis, the image processing as the second type of multimedia system (representation, analysis, modification, filtering), Video in multimedia system (types, analysis, compression) and audio in multimedia system.

Course Intended Outcomes:

At the end of the course, students are expected to learn:

- skills of about text in multimedia system
- Skills in image processing algorithms and analyze their efficiency.
- To provide further practice with programming about video the ability of building computer programs for manipulation video frames and summarization
- Developing their analytical skills of audio processing

Course Outline:

Week	Description depends on the Timing table Theoretical	Practical
1	Introduction to multimedia	Fundamental about MATALB
2	Multimedia Authoring and Tools, Multimedia data types, and Multimedia applications	Using main instructions of MATLAB in multimedia (1)
3	Image processing in multimedia system 1	Using main instructions of MATLAB in multimedia (2)
4	Image Filtering, resizing, and Arithmetic operation in multimedia system 2	Reading, processing, and writing different image types in MATLAB
5	First mid exam	Preprocessing, partitioning, segmentation, and image representation in MATLAB

6	Fundamental of Video in Multimedia system (1)	First mid exam
7	Video processing and analysis in Multimedia system (2)	Reading, processing, and writing of video in MATLAB
8	Video Compression in Multimedia system (3)	Video Manipulation (summarization, editing, converting, resizing frames) in MATLAB
9	Fundamental of Audio in Multimedia system 1	fundamental about Video Compression in MATLAB
10	Audio and Speech processing and analysis in Multimedia system 2	Reading, processing, and writing of Audio signal in MATLAB
11	Second Mid exam	Audio and speech editing, framing converting and resampling in MATLAB
12	Introduction of Animation in Multimedia system 1	Second Exam
13	Advanced of Animation in Multimedia system 1	Fundamental about Animation in MATLAB
14	Reports presentation	Object Detection in MATALB
15	Summary of multimedia system	Animation of Object in MATLAB

Textbooks:

- [1] MULTIMEDIA SYSTEMS: ALGORITHMS, STANDARDS, AND INDUSTRY PRACTICES by Parag Havaladar and Gérard Medioni
- [2] Computer Vision Algorithms and Applications Second Edition by Richard Szeliski

Suggested references:

1. DIGITAL MULTIMEDIA , T.M.SAVAGE and K.E.VOGEL , JONES AND BARTLETT PUBLISHERS , Massachusetts
2. Multimedia: Computing, Communications and Applications, Steinmetz R. And Nahrstedt K., Prentice Hall, 1995.
3. Fundamentals of Multimedia: Ze-Nian Li, Mark S. Drew. Prentice-Hall,
4. Some useful links: . <http://bmrc.berkeley.edu/courseware/cs294-3/> covers the design and implementation of interactive distributed multimedia applications. . <http://www.cs.utexas.edu/users/vin/cs384m.html>

Marking:

Second Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	14	6	60

Instructor(s) information [معلومات الأستاذ]

Section: (Computer Science) ; Lecture Room:[], ; Office No.: (8)

Instructor's Name:

Dr Jamal Nasir Hasoon

E-Mail: jamal.hasoon@uomustansiriyah.edu.iq

Lecturer: Anwar Hassan Al Saleh

E-Mail: anwar.h.m@uomustansiriyah.edu.iq

Office Hours : Sun.: [: - :]

Wed.: [: - :]

NOTES:

-Office Hour: Other office hours are available by appointment.

-The content of this syllabus is not changed during the current semester.

Lecturer Signature

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Course Plan



Course No.: 50813304

Time Division: 2hr Theoretical and 1 hr. Practical

Course Name: Malicious code

Semester & Year: First, 2024 / 2025

Course Website:

Course Description:

This course will introduce students to the concept of malware code. Malware code will be explained from three perspectives: malware theory, infection code, and user interaction. The course will rest an overview of various malware types, methods, and classic approaches.

Next, students will learn about common paradigms in defense methods such as antivirus, detection computing in an environment with limited resources, and persistence. Students will be introduced to and protect the application frameworks and development environments to reinforce concepts covered in lectures.

Course Intended Outcomes:

- Understand the basics concept of malware
- Understand the infection types and methods
- Understand the bad and malicious instructions.
- Understand the malware family and naming schemes.
- Understanding basic related topics dealing with malware such as operating systems, networks, and computer organization in advance

Course Outline:

Week	The description depends on the Timing table (Theoretical)	Lab & Practical
1	The basic concept of malicious codes	Assembly language in depth
2	Malware attacks /Chapter 1 - Computer virus life cycle - Malware attacks, basic ideas, types, and features	War instructions
3	Types of computer worms, Trojan horse And development	Registers, Mov instruction in deep
4	Examples of worms network Introduction to the methodology of worms infection	Loop instruction: Nested loop, apply example
5	Infected Script code example	Exam 1

	Malware tools Introduction to the keylogger tool, Adware, and spyware	
6	1st exam	Math instruction in advance
7	Chapter2; Computer Malware Naming Scheme	Advance jump instruction
8	Chapter 3: Malicious Code Environments	Advanced jump instruction examples
9	Chapter 4; classification of infection strategy with an introduction to the operating system	Condition instruction
10	Boot virus, master boot virus, DOS BOOT Record (DBR) Infection Techniques	2 conditions with Example
11	Random Overwriting Viruses, Prepending Viruses	Loop conditions
12	Classic Parasitic Virus, 8 Compressing Viruses, Amoeba Infection Techniques, Embedded Decryptor Technique	Exam 2
13	obfuscated Tricky Jump Technique	Debugging and trace code
14	Basic EPO Techniques on DOS, API-Hooking Technique on Win32	Debugging and trace code
15	2 nd exam	Review all views

Textbooks:

[1]: THE ART OF COMPUTER VIRUS RESEARCH AND DEFENSE

Szor, Peter. *The Art of Computer Virus Research and Defense: ART COMP VIRUS RES DEFENSE _p1*. Pearson Education, 2005.

Suggested references:

1. The art and science of computer security, Bishop, Matthew A. "The art and science of computer security." (2002).
2. Some models in the theory of computer virus propagation. Iliev, A., Kyurkchiev, N., Rahnev, A., & Terzieva, T. (2019). *Some models in the theory of computer viruses propagation*. Saarbrücken, Germany: LAP LAMBERT Academic Publishing.

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	14	6	25 theoretical + 15 practical

Instructor(s) information [معلومات الأستاذ]

Section: (Computer Science) ; Lecture Room:[301], ; Office No.: (9)

Instructor's Name: *Lecturer, Dr. Yasamin Hamza*

E-Mail: yhamza@uomustansiriyah.edu.iq

NOTES:

- Office Hour: Other office hours are available by appointment.**
- The content of this syllabus not be changed during the current semester.**

Lecturer Signature

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Course Plan



Course No.: 50813305

Course Name: Ethical Hacking

Course Website:

Time Division: 2 hr Theoretical

Semester & Year: **Second, 2024 / 2025**

Course Description:

Hacking has been a part of computing for almost five decades and it is a very broad discipline, which covers a wide range of topics. The first known event of hacking had taken place in 1960 at MIT and at the same time, the term "Hacker" was originated.

In this course, we will take you through the various concepts of Ethical Hacking and explain how you can use them in a real-time environment. provides an in-depth understanding of ethical hacking phases, various attack vectors, and preventative countermeasures. It will teach how hackers think and act maliciously so you will be better positioned to set up your security infrastructure and defend against future attacks. the ethical use of various "white hat" cyber penetration testing tools and techniques consistent with Ethical Hacking training.

Course Intended Outcomes:

- Research the state of laws that apply to hacking.
- Explore ethical systems and how they apply to hacking.
- Describe the legal and ethical requirements related to ethical hacking.
- Examine the tools for conducting ethical hacking.
- Plan, organize, and perform penetration testing on a simple network.

Course Outline:

Week	Description depends on the Timing table(Theoretical	& Practical)
1	Ethical Hacking – Overview, Hacker Types	
2	Famous Hackers , Ethical Hacking Terminologies	
3	Ethical Hacking – Tools, Skills And Process	
4	Reconnaissance, Footprinting, And Fingerprinting	
5	Sniffing, Sniffing Tools	
6	Arp Poisoning And Dns Poisoning	
7	Exploitation And Enumeration	
8	1st exam	
9	Metasploit And Trojan Attacks	
10	Tcp/Ip Hijacking And Email Hijacking	

11	Password Hacking And Wireless Hacking	
12	Social Engineering And DDOS Attacks	
13	Cross-Site Scripting and Sql Injection	
14	Pen Testing and Review	
15	2nd exam	

Textbooks:

[1]:Ethical Hacking tutorials 2016

[2]: Python Ethical Hacking from Scratch, 2023

Suggested references:

[1]:

[2]:

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
15	15	-----	10	60

Assignment/ Project	Description	Due Date	Marking
test	written exam	1/4/2023	3
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Instructor(s) information [معلومات الأستاذ]

Section: (Computer Science) ; Lecture Room:[] , ; Office No.: ()

Instructor's Name: Assisntent Prof. **Dr.** Karim Hashim Kraidi Al-Saedi

E-Mail: dr.karim@uomustansiriyah.edu.iq

Office Hours :Tue.:[: -:]

Wed.:[: -:]

NOTES:

-Office Hour:Other office hours are available by appointment.

-The content of this syllabus not be changed during the current semester.

Lecturer Signature

Chairman Signature



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Department of Computer Science
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Course Plan



Course No.: 50813306

Time Division: 3hr Theoretical and 2hr Practical

Course Name: **Cryptography**

Semester & Year: **Second , 2024 / 2025**

Course Website:

Course Description:

Covers the fundamentals of data network security. Covers concepts of data security through different algorithms. Different concepts on cryptographic systems (software and hardware) are classified. Shift register sequences and SDES, are introduced. The concepts of public and private key cryptography is developed. Aspects of cryptographic hardware and embedded system design. Digital signature and authentication covered.

Course Intended Outcomes:

After successful completion of the course, the learners would be able to:

1. Provide security of the data over the network.
2. Do research in the emerging areas of cryptography and network security.
3. Implement various networking protocols.
4. Protect any network from the threats in the world.

Course Outline:

Week	Topics depend on the Timing table (Theoretical	(Practical LAB)
1	Definition of cryptography	Background
2	Role of cryptography in cybersecurity	Random number generation
3	Confidentiality, Integrity, and Authenticity (CIA)	Classical encryption 1
4	Information security, data security, network security, and cyber security	Classical encryption 2
5	OSI Security Architecture	Classical encryption 3
6	Basic Number Theory	Multiple Encryption keys
7	Greatest Common Divisor (GCD), MODULAR ARITHMETIC, PRIME NUMBERS, Euler's function	Stream Cipher
8	Cryptography Framework in Cybersecurity	RC4 1
9	ONE TIME PAD ENCRYPTION	RC42
10	First EXAM	EXAM1
11	AFFINE CIPHER, RAIL FENCE ALGORITHM, Double-Columnar Transposition, RC4 (RIVEST CIPHER-STREAM CIPHER),	RSA 1

12	SDES (SIMPLE DATA ENCRYPTION STANDARD-BLOCK CIPHER), Public key cryptography	RSA2
13	AUTHENTICATION AND DIGITAL SIGNATURES	EXAM2
14	Two-factor authentication (2FA), DIGITAL SIGNATURES, Kali Linux for Cybersecurity.	Two ways encryption “symmetric and asymmetric “
15	Second EXAM, Review, Finishing	Review

Textbooks:

[1]: CRYPTOGRAPHY AND NETWORK SECURITY *PRINCIPLES AND PRACTICE*, SEVENTH EDITION, GLOBAL EDITION, William Stallings, 2018.

[2]: Cybersecurity Essentials, Build your career in Cybersecurity by gaining an essential knowledge on Cybersecurity, by Pedro Paulino, 2020.

Suggested references:

[1]: W. Trappe & L. C. Washington. Introduction to Cryptography with Coding Theory, Prentice-Hall, 2002. ISBN: 0-13-061814-4.

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	14	6	

Assignment/ Project	Description	Due Date	Marking

Instructor(s) information [معلومات الأستاذ]

Section: (Cybersecurity) ; Lecture Room:[], ; Office No.: ()

Instructor's Name: **Prof. Dr. Bashar AlEsawi**

E-Mail: bashar_sh77@uomustansiriyah.edu.iq

Practical Lab Dr. Yasamin Hamza at Mustansiriyah university

yhamza@uomustansiriyah.edu.iq

Office Hours : Tue.: [: – :]

Wed.: [: – :]

NOTES:

-Office Hour: Other office hours are available by appointment.

-The content of this syllabus not be changed during the current semester.

Lecturer Signature

Chairman Signature



Ministry of Higher Education and Scientific Research

Mustansiriyah University /College of Science

Department of Computer Science

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Course Plan 2024-2025



Course No.: 50813307

Time Division: 3 hr. Theoretical and 2 hr. Practical

Course Name: **Multimedia Security** **Semester & Year:** **Second, 2022 / 2023** **Course Website:**

<https://classroom.google.com/c/NTk0NTI4Nzg1MDYw>

Course Description: This subject presents the fundamentals of Multimedia security, fundamentals of key generation used for encryption algorithm, studying a set of important algorithms in generation pseudo numbers. The concept about multimedia coding process lossy compression and lossless compression. Also, the course will take two important Approaches in security represented by confusion and diffusion processes. The permutation of data in multimedia such as block permutation, row permutation, column permutation and pixel permutation in image, audio sample permutation, in audio, while frames permutation and all types in image could be applied here. The diffusion process is applied by stream cipher of data in multimedia that depend on generated key. The block cipher are explain by applying Advanced encryption standard (AES), finally the watermarking of multimedia is explaining in details.

Course Intended Outcomes:

At the end of the course, students are expected to learn:

- A set of important algorithms in Multimedia security
- The students should be able to design new algorithms for protected data in multimedia.
- To provide further practice with programming and have the ability to build computer programs for encryption multimedia in different areas.
- Developing a student skill in data security
- Use Confusion and diffusion process to solve multimedia security problems.
- Use key generation method in various algorithms of multimedia security.

Course Outline:

Week	Description depends on the Timing table Theoretical	Practical
1	Introduction to multimedia security concepts	Getting data in various multimedia types
2	Pseudo number generation using linear Congruential Generation (LCG) and Blum-Blum-Shub method	Applying LCG and BBS for Pseudo number generation
3	Pseudo number generation using chaotic map such one dimension (logistic map) and two dimensions (Henon map)	Applying Logistic map and Henon map for generating a specific number
4	Data compression and coding Overview	Processing generated key by converting them into bytes or integer numbers
5	Lossless coding represented by Run length encoding and Huffman coding	Applying RLE and Inverse RLE Applying Huffman encoding and decoding
6	First Exam	First Exam
7	Lossy Compression process overview: Discrete cosine transform, and inverse discrete cosine transform, and Discrete wavelet transform, and inverse discrete wavelet transform	Apply DCT, IDCT, and DWT, IDWT process in one Dimension and two dimensions
8	Image Confusion Process (row permutation, column Permutation, Block Permutation, and pixel Permutations)	Apply row permutation, column Permutation, Block Permutation, and pixel Permutations
9	Audio and video Confusion	Applying the same operation of previous concepts on audio and video
10	Data Diffusion Process: Stream cipher	Applying stream cipher on image
11	Second Mid Exam	Second mid exam
12	Image Diffusion	Applying stream cipher process on image
13	Audio and Video Diffusion	Multistage graph problem Forward Approach
14	Block Cipher (Advanced Encryption Standard)	Apply Sub byte process in AES
15	Multimedia watermarking	Applying polynomial Process in AES

Textbooks:

[1]: Kaiser J. Giri, Shabir Ahmad Parah, Rumaan Bashir, Khan Muhammad, Multimedia Security Algorithm Development, Analysis and Applications, 2021

Suggested references:

[1]: Christine Guillemot, "Multimedia Security: Authentication and data Hiding, 2022 WILY

Marking:

Second Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	14	6	60

Assignment/ Project	Description	Due Date	Marking
Test	written exam	Not fixed	3
Writing a report on techniques in multimedia Security	Students submit a report about a new and modern techniques used in security such as hash function and watermarking	first After exam	2
Test	written exam	Not fixed	2
Quizzes	Two quizzes	During the course	2 Marks

Instructor(s) information [معلومات الأستاذ]

Section: (Computer Science) ; Lecture Room:[], ; Office No.: (8)

Instructor's Name:

Dr Jamal Nasir Hasoon

E-Mail: jamal.hasoon@uomustansiriyah.edu.iq

Assistant Prof: Anwar Hassan Al Saleh

anwar.h.m@uomustansiriyah.edu.iq

Office Hours : Wed.: [: - :]

Wed.: [10 :30 - :]

NOTES:

-Office Hour: Other office hours are available by appointment.

-The content of this syllabus is not changed during the current semester.

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Course Plan



Course No.: 50813308 **Time Division:** ...3.... hr Theoretical and ...1...hr Practical
Course Name: Computer Networks_ **Semester & Year:** **Second , 2024 / 2025**
Course Website:

Course Objectives:

This is an introductory course to computer networks. The emphasis will be on the basic performance and engineering tradeoffs in the design and implementation of computer networks. To make the issues more concrete, the class includes several multi-week projects requiring significant design and implementation.

The goal is for students to learn not only what computer networks are and how they work today, but also why they are designed the way they are and how they are likely to evolve in the future. We will draw examples primarily from the Internet. Topics to be covered include: congestion/flow/error control, routing, addressing, naming, multi-casting, switching, internetworking, and network security. Evaluation is based on homework assignments, the projects, and a mid-term and final exam.

Course Description:

Course Introduction, including the Learning Lab.

1. Module 1 Networking Basics.
2. Module 2 Cables and Connectors.
3. Module 3 Networking Devices.
4. Module 4 Ethernet.
5. Module 5 Network Implementation.
6. Module 6 Wireless Networking .
7. Module 7 Wide Area Networks – WANS.
8. Module 8 Network Security.
9. Module 9 Network Management.
10. Module 10 Troubleshooting.

This course is designed to cover several design issues in the emerging networks. The types of emerging networks that we intend to cover include: Wireless Networks, Asynchronous Transfer Mode (ATM), Fibre Channel, Gigabit Ethernet, and future optical networks. New applications which can primarily benefit from these emerging networks will also be covered. Then we will focus the discussions on protocol design, routing, flow and congestion control in MAC-, Network- and Transport-layer for these emerging networks.

Intended Learning Outcomes :

Successful completion of this course should lead to the following learning outcomes :

A- Knowledge and Understanding of

- A1) An ability to understand advanced background on computer networking topics.
- A2) Understand the main abstract concepts related to the layered communication architecture.
- A3) To understand the principles and functionality of mobile IP.
- A4) To debate the current trends and leading research in the computer networking area.

B- Intellectual (thinking) skills - able to

- B1) Given a network problem, create appropriate topology and draw wiring diagrams
- B2) Analyze and implement some of the most advanced routing and congestion control algorithms.
- B3) Evaluate the performances of computer networks.

C- Practical skills - able to

- C1) Configure servers, switches and routers.
- C2) Create subnets and super nets.
- C3) Create routing tables, NAT.
- C4) Setup static IP address as well as DHCP based addresses.
- C5) Setup a DNS, VLAN, VPN.

D- Transferable skills - able to

- D1) Practice network simulators.

Course Outline:

Week	Topics	Topic Details (Theoretical & Practical)	Reference (chapter)	Assessment
1	Introduction to Computer Networks	Uses of Computer Networks, Elements of Computer Network, Network Criteria, Categories of Networks (based on type of Connection ,Topology, and Distance).	chapter 1	
2	The OSI Model and the TCP/IP Protocol Suite	Protocol Layers: The OSI MODEL, TCP/IP Protocol Suite, Addressing: physical address, logical address, port address, and application-specific address.	chapter 2	
3	Physical Layer and Media	Data and Signals: Analog and Digital Data, Periodic and Nonperiodic Signals, Digital Signals, Transmission Impairment, Data Rate Limits, Performance.	[1] chapter 3	
4	Physical Layer and Media	Transmission Media: Guided media , Unguided media, Wireless Transmission, Communication Satellites, Digital Modulation and Multiplexing.	[2] chapter 2	
5	Underlying Technologies Physical Layer and Data Link	Wired LANs: Ethernet, IEEE Standards, Unicast, Multicast, and Broadcast Addresses, Ethernet Evolution, Access Method: CSMA/CD. Wireless LANs: IEEE 802.11, Bluetooth.	chapter 3	

6	Underlying Technologies Physical Layer and Data Link	POINT-TO-POINT PROTOCOL: 56K Modems, DSL Technology, Cable Modem, HFC Network, T-Lines, SONET. SWITCHED WANS: X.25 protocol, Asynchronous Transfer Mode (ATM), ATM Layers, Connecting Devices: Repeaters, Bridges, Routers.	chapter 3	
9	Network Layer	Delivery and Forwarding of IP Packets: Delivery (Direct and Indirect), Forwarding, Forwarding Techniques, Forwarding with Subnetting, Forwarding with Classless Addressing, Forwarding Based on Label, Structure of Router.	chapter 6	
10	Network Layer	MOBILE IP: Addressing (Stationary Hosts and Mobile Hosts), AGENTS, THREE PHASES (Agent Discovery, Registration, Data Transfer), Inefficiency In Mobile IP.	chapter 10	
11	Exame			
12	Transport Layer	Introduction to the Transport Layer: Transport layer Services, Process-to-Process Communication, Error Control, Congestion Control, Connectionless and Connection-Oriented Services, Transport-Layer Protocols.	chapter 13	
13	Transport Layer	User Datagram Protocol (UDP): User Datagrams, UDP services, UDP Applications, UDP Features, UDP Package. Transmission Control Protocol (TCP): Segment, TCP Services, TCP Features, TCP Connection, TCP Package.	chapter 14 chapter 15	
14	Application Layer	Introduction to the Application Layer: Client-Server Paradigm, Peer-to-Peer Paradigm. Host Configuration (DHCP): Why we need host configuration?, Reverse Address Resolution Protocol, Bootstrap Protocol, Dynamic Host Configuration Protocol, DHCP Operation.	chapter 17 chapter 18	
15	Application Layer	Domain Name System (DNS): Need For DNS, Name Space, Distribution of Name Space, DNS in the Internet, DNS Security.	chapter 19	
16	Final Exam			

Textbooks:

[1]: Tanenbaum • Feamster • Wetherall, "Computer Networks", Sixth Edition, McGraw-Hill, 2021.

[2]: Behrouz A. Forouzan, "Data Communications And Networking", fourth Edition, 2014

Suggested references:

[1]: Larry L. Peterson and Bruce S. Davie., "Computer Networks a systems approach", Sixth Edition, 2022

[2]:] CCNA Lecturers

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
12	12	14	2	60

Assignment/ Project	Description	Due Date	Marking
test	written exam	1/12/2022	3
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Instructor(s) information [معلومات الأستاذ]

Section: (Computer Science) ; Lecture Room:[], ; Office No.: ()

Instructor's Name: **Dr. Abbas Abdulazeez Abdulhameed**

E-Mail: abbasabdulazeez@uomustansiriyah.edu.iq

Office Hours : Tue.: [: - :]
Wed.: [: - :]

Lab. Instructor's Name: **Mr. Muhanad Ali Mutaab**

neros2210@uomustansiriyah.edu.iq

NOTES:

- Office Hour: Other office hours are available by appointment.
- The content of this syllabus not be changed during the current semester.

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Course Plan



Course No.: 50811303 **Time Division:** 3 hrs Theoretical and 2 hrs Practical
Course Name: Artificial Intelligence **Semester & Year:** **Second, 2024 / 2025**
Course Website:

Course Description:

Artificial Intelligence provides a set of tools for solving problems that are difficult or impractical to solve with other methods. These include heuristic search and planning algorithms, formalisms for knowledge representation and reasoning, machine learning techniques, and methods applicable to sensing and action problems such as speech and language understanding, computer vision, and robotics, among others. The student needs to be able to determine when an AI approach is appropriate for a given problem, and to be able to select and implement a suitable AI method.

Course Intended Outcomes:

At the end of the course, students are expected to learn:

- History of artificial intelligence, Philosophical questions, describe the Turing test, and list examples of intelligent systems that depend on models of the world,
- Differentiate the concepts of optimal reasoning and human-like reasoning, and the concepts of optimal behavior and human-like behavior,
- Compare and contrast the most common models used for knowledge representation, highlighting their strengths and weaknesses.
- Explain the operation of the resolution technique for theorem proving,
- Formulate an efficient problem space for a problem expressed in English by expressing that problem space in terms of states, operators, an initial state, and a description of a goal state ,
- Select an appropriate blind search algorithm for a problem, implement it, and characterize its time and space complexities,
- Select an appropriate heuristic search algorithm for a problem and implement it by designing the necessary heuristic evaluation function and describe under what conditions heuristic algorithms guarantee optimal solution.

Course Outline:

Week	Description depends on the Timing table (Theoretical	& Practical)
1	Ch. 1 Overview of AI: What is AI?, Intelligence and the Turing test, History of AI, AI and the fourth industrial revolution, Types of AI (weak AI, strong AI, super AI), Edge and Cloud AI, An overview of some of AI approach applications areas, Applying AI in cybersecurity.	Introduction to Python
2	Ch. 2 Knowledge Representation for Cybersecurity: Logical representation (Propositional logic).	Elementary Python Programming

3	Logical representation (predicate logic): constants, variables, functions, predicates and how to represent English statements using predicate logic, syntax and semantic of predicate logic.	Selection in Python
4	Inference rules (Resolution theorem proving): convert to clause form. Examples of resolution with propositional and predicate logic.	Loops in Python
5	Exam1.	Exam1
6	Network representation: Semantic net and conceptual graphs.	Functions in Python
7	Procedural representation: Production systems, forward and backward chaining, Examples of Production systems.	Lists in Python (1)
8	Structural representation: Frames, frame data structure, Examples of using Frames.	Lists in Python (2)
9	Ch. 3 Problem Solving using State Space: Introductory concepts and state space search, Data driven and goal driven search. Blind search (depth-first search, breadth-first search, depth limited search and iterative deepening search).	State-space problem representation in Python. Implementing blind search algorithms in Python
10	Heuristic search (Hill climbing algorithm, Best first search, A algorithm, and A* algorithm). Properties of heuristic search (Admissibility, monotonicity and informedness).	Implementing heuristic search algorithms in Python
11	Ch4: Expert systems (ES): What is an ES?, The main players in the expert system development team, The design of rule base ES. A high level view of the structure of ES? Expert system shell,	Databases in Python
12	Classifying the different type of ES. Controlling the reasoning strategy	Implementing a simple ES in Python
13	Ch5: Natural language understanding : Stages of language analysis: Morphology, Syntax, Semantic,	String handling in Python
14	Examples of using NLP in cybersecurity (breach protection, identification, Phishing, and Log parsing).	Implementing a simple NLP application in Python
15	Exam2.	Exam2.

Textbooks:

- [1]: George F. Luger, "*Artificial Intelligence, Structures and Strategies for Complex Problem Solving*", Sixth Edition, Addison Wesley, 2009.
- [2]: Alessandro Parisi, "*Hands-On Artificial Intelligence for Cybersecurity: Implement smart AI systems for preventing cyber attacks and detecting threats and network anomalies*", Packt Publishing Ltd, 2019.

Suggested references:

- [1]: Stuart J. Russell and Peter Norvig, "*Artificial Intelligence, a Modern Approach*", Fourth Edition, Prentice Hall, 2021.
- [2]: أساسيات الذكاء الاصطناعي طرق البحث، تمثيل المعرفة والاستنتاج. تأليف: أ.د. أحمد طارق صادق. مكتبة الذاكرة

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	14	6	60

Assignment/ Project	Description	Due Date	Marking
Exercise sheet 1	Solving Several questions about chapter 1, 2 and 3	End of term	3
Exercise sheet 2	Solving Several questions about chapter 4 and 5	End of term	3

Instructor(s) information [معلومات الأستاذ]

Section: (Computer Sciences) ; Lecture Room:[301] , ; Office No.: (5)

Instructor's Name: **Asst. Prof. Dr. Muhanad Tahrir Younis**

E-Mail: mtu@uomustansiriyah.edu.iq

Office Hours : Mon.: [9 :00 am – 2 :00 pm], Wen.: [9 :00 am – 2 :00 pm]

Instructor(s) information [معلومات الأستاذ]

Section: (Computer Science); Lecture Room:[Lab 1] , ; Office No.: (8)

Instructor's Name: **Firas Ali Hashim**

E-Mail: firas70@uomustansiriyah.edu.iq

Office Hours : Tue.: [9 :00 am – 2 :00 pm], Wed.: [9 :00 am – 2 :00 pm]

NOTES:

- Office Hour: Other office hours are available by appointment.
- The content of this syllabus not be changed during the current semester.

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Program Structure Annex No. (3)
Computer Science 4th Stage

Lab	Theoretical		Module Code	Module Name	Level One
2	3	امنية شبكات	50811401	Network Security	Semester 1
	2	منهجية بحث	50811410	Research methodology	
2	3	حوسبة تطويرية	50811403	Evolutionary Computing	
2	3	استرجاع معلومات	50811404	Information Retrieval	
2	3	نظم تشغيل	50811405	Operating System	

Lab	Theoretical		Module Code	Module Name	Level One
2	3	وسائط متعددة	50811406	Multimedia	Semester 2
2	3	حوسبة سحابية	50811407	Cloud computing	
2	3	الوكيل الذكي	50811408	Intelligent Agent	
	2	انكليزي		English	

Program Structure Annex No. (3)
Information Technology 4th Stage

Lab	Theoretical		Module Code	Module Name	Level One
	3	انظمة موزعة	50812401	Distributed Information Systems	Semester 1
2	3	حوسبة موبايل	50811401	Mobile Computing	
2	3	نظم تشغيل	50811405	Operating System	
	2	منهجية بحث	50811410	Research methodology	

Lab	Theoretical		Module Code	Module Name	Level One
2	3	انظمة امنية المعلومات	50812405	Information Systems Security	Semester 2
2	3	جرائم رقمية	50812404	Digital Forensic	
2	3	وسائط متعددة	50811406	Multimedia	
2	3	حوسبة سحابية	50811407	Cloud computing	
	2	انكليزي		English	

Program Structure Annex No. (3)
Cyber Security 4th Stage

Lab	Theoretical		Module Code	Module Name	Level One
2	3	امنية مواقع البيانات		Website security	Semester 1
2	3	امنية الحوسبة السحابية		Cloud computing security	
	1	منهجية بحث	50811410	Research Methodology	
2	3	امنية الشبكات	50811401	Network security	

Lab	Theoretical		Module Code	Module Name	Level One
2	3	نظم تشغيل	50811405	Operating System	Semester 2
2	3	جرائم رقمية	50812404	Digital Forensic	
2	3	اخفاء البيانات و العلامة المائية		Data hiding and watermarking	
2	3	امنية قواعد البيانات		Database security	



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Course Plan



Course No.: 50811401

Time Division: 3 hr Theoretical and 1 hr Practical

Course Name: Network Security

Semester & Year: **First, 2024 / 2025**

Course Website: N/A

Course Description:

This subject presents the theory and practice of computer security, focusing in particular on the security aspects of the web and Internet. It surveys cryptographic tools used to provide security, such as encryption and digital signature. It then reviews how these tools are utilized in the internet protocols and applications such as SSL/TLS, IPSEC, PGP, S/MIME, others (including wireless). Network monitoring such as intrusion, and firewalls.

Course Intended Outcomes:

At the end of the course, students are expected to learn:

- Security of network essentials and major specific attacks against networks.
- Dealing with different types of protocols and security weaknesses.
- Knowing the most popular network attacks and countermeasure against it.

Course Outline:

Week	Description depends on the Timing table (Theoretical	& Practical)
1	Introduction: Computer Networks, And security	Stream Cipher
2	Spoofing & Sniffing	Linear Feedback Shift Register
3	Traffic analysis; Routing Attacks & Traffic Redirection	Linear Congruential Generators
4	Message Integrity Attacks and protection against it (hash Function),	Blum Blum Shub Generators
	Exam1	
5	denial of service attack and protection against it	RC4 algorithm
6	Use of cryptography for data and network security (SSL)	Monthly Exam
7	Exam 2	RSA algorithm

8	Secure Channels & Isolation	RSA algorithm
9	Secure Routing Protocols	Diffie-Hellman key exchange
10	Secure DNS & VPNs	Block cipher principles programs
11	Anonymous Communication Protocols	Hash function: Message Digest, version 5 (MD5)
12	Network Monitoring; Intrusion Detection; firewalls	Hash function: Message Digest, version 5 (MD5)
13	Spoofing & DoS Protection Email spoofing Protection	Review
14	Honeypots and Trackbacks	Monthly Exam.
15	Exam 3	homework assignment

Textbooks:

[1]: William Stallings, “Cryptography and network security”, 5th Edition Prentice, Inc. 2013.

[2]: Mark A. Dye, Rick McDonald, Antoon W. Ruff, “Network Fundamentals, CCNA Exploration Companion Guide”, 2008

[3]: Mat Bishop, “Introduction to computer security”, 2005

Suggested references:

[1]: Tanase, M. (2003). IP Spoofing: An Introduction. <http://www.symantec.com/connect/articles/ip-spoofing-introduction>

[2]: William Stallings, “Cryptography and network security”, 6th Edition Prentice, Inc. 2014. (Electronic Copy Version)

[3]: Infrastructure Security Architecture for Effective Security Monitoring, “SANS Institute InfoSec Reading Room” 2015. <https://www.sans.org/reading-room/whitepapers/bestprac/infrastructure-security-architecture-effective-security-monitoring-36512> accessed on 10/9/2017

[4]: Feiyi Wang, B. V. (n.d.). Secure Routing Protocols: Theory and Practice
<https://pdfs.semanticscholar.org/6fb9/80832510e40cae925df94e9a796c62816b83.pdf>

[5]: Reeshma Mathews. (2016). How to secure DNS server. <https://bobcares.com/blog/how-to-secure-dns-server/>

[6]: Ferrell, R. G. (2002). The five different types of firewalls.
<http://searchsecurity.techtarget.com/feature/The-five-different-types-of-firewalls>

[7]: Smurf IP Denial-of-Service Attacks. (2000). <https://www.cert.org/historical/advisories/CA-1998-01.cfm>

[8]: Northcutt, S. (2014). Traffic Analysis. Security Laboratory: Methods of Attack Series,
<https://www.sans.edu/cyber-research/security-laboratory/article/traffic-analysis>.

[9]: Timothy Shimeall. (2016, September 16). CERT Network Situational Awareness.
https://insights.sei.cmu.edu/sei_blog/2016/09/traffic-analysis-for-network-security-two-approaches-for-going-beyond-network-flow-data.html

[10]: Fatemeh Shirazi, M. S. (2016). A Survey on Routing in Anonymous. Arxiv Cornell University Library. <https://arxiv.org/abs/1608.05538>

[11]: Spitzner, L. (2003, July). Honeypot technology: How honeypots work in the enterprise. Retrieved 9 2017, from <http://searchsecurity.techtarget.com/feature/Honeypot-technology-How-honeypots-work-in-the-enterprise>

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
8	8	14	10	40

Assignment/ Project	Description	Due Date	Marking
Exam 1	exam	16-11-2022	8
Seminar	Scientific report & presentation		10
Exam 2	exam	17-12-2022	8

Instructor(s) information

Section: (Network Security) ;

Instructor's Name: **Dr. Azhar Hasan Drebee**

E-Mail: bahar299947@uomustansiriyah.edu.iq

Evening class instructor:

Instructor's Name: **Dr. Azhar Hasan Drebee**

E-Mail: bahar299947@uomustansiriyah.edu.iq

E- Mail : Shatha jasim mohammed , Shonash77@uomustansiriyah.edu.iq

Office Hours : Wed.: [12 :10 – 13 : 30 and 1:30 – 3:00]

NOTES:

-Office Hour: Other office hours are available by appointment.

-The content of this syllabus not be changed during the current semester.

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Course Plan



Course No.:50811410**Time Division:**1hr Theoretical

Course Name:Research methodology**Semester & Year:**First,2022 / 2023

Course Website:

Course Description:

This course introduces and discusses approaches, strategies, and data collection methods relating to research in computer science. Students will consider how to select the appropriate methodology for use in a study to be performed. Additionally, these students will learn how to collect data based on different data collection methods, construct these tools, and pilot them before they become ready for use. Finally, this course elucidates the requirements for an academic work, considering aspects related to language, writing style, and layout. To culminate this final stage, students will learn to write a comprehensive research proposal that may be conducted in the future.

Course Intended Outcomes:

At the end of the course, students are expected to learn:

- Enable students understand what research is and what is not.
- Raise awareness of crucial aspect of the nature of Knowledge and the value of scientific method.
- Introduce the concept at the heart of every research project –the research problem- and to discuss what a researchable problem is.
- Evaluate literature, form a variety of sources, pertinent to the research objectives.
- Identify and justify the basic components of the research framework, relevant to the tackled research problem.
- Explain and justify how researchers will collect research data.
- Discuss how to cite sources, using different citation methods such as the American Psychological Association (APA).
- Consider the kind of language to use in an academic written work.
- Put forward a credible research proposal.
- Warn the common mistakes in the field of research methodology.

Course Outline:

Week	Description depends on the Timing table(Theoretical)
1	A review of the Fundamentals: Meaning of Research, Definitions of Research, Objectives of Research, Motivation in Research, General Characteristics of Research, Criteria of Good Research and Types of Research.

2	General viewpoint of scientific research methodology: Impact Factor, Research Criteria, Format of Paper, Example of Paper Template.
3	Selection of Topic: Topic of the Study, Basic Research and Some Examples, Applied Research and Some Examples
4	Clarity of Abstract and Conclusion: Abstract, Some Examples of Informative Abstract, Conclusion, Some Examples of Conclusion, grammar used in abstract and conclusion.
5	Exam1.
6	The Research Problem: What is a Research Problem, Selecting the Problem, Sources of the Problem, Defining a Problem, Statement of a Problem, Delimiting a Problem and Evaluation of a Problem.
7	The Review of Literature: Meaning of Review of Literature, Need of Review of Literature, Objectives of Review of Literature, Sources of Literature, The Functions of Literature, How to Conduct the Review of Literature, Some Hints for the Review of Literature, Precautions in Library Use and Reporting the Review of Literature.
8	The Research Approach: Experiment Method, Examples of Experiment Method, Design and Construction, Examples of Design and Construction, Quantitative and Qualitative Methods.
9	Data Collection Methods: Questionnaires, Interviews, Focus Groups and Observation.
10	Sampling: Meaning and Definition of Sampling, Functions of Population and Sampling, Methods of Sampling, Characteristics of a Good Sample, Size of a Sample, The Sample Cycle.
11	Data Analysis of Report: Results and Discussion, Table Format, Example of table, Figure Format, Examples of figures, Equation Format, Examples of Results and Discussion.
12	Research Ethics: Ethics, Plagiarism Checker, Example of Research Paper Compared by Plagiarism Checker
13	Presentation Format: Oral Presentation, Examples of Oral Presentation, Poster Presentation, Examples of Poster Presentation, Research Proposal, Examples of Research Proposal.
14	Exam2.
15	Review

Textbooks:

Kitsakorn Locharoenrat, "*Research methodologies for beginners*". CRC Press, 2017.

Suggested references:

[1]: Vinayak Bairagi and Mousami V. Munot (editors), "*Research methodology: A practical and scientific approach*", CRC Press, 2019.

[2]: Ranjit Kumar, "*Research methodology: A step-by-step guide for beginners*", Sage, 2018.

Marking:

First Semester			Final Exam
1st exam	2nd exam	Activity	
12	13	5	70

Assignment/ Project	Description	Due Date	Marking
Exercise sheet	Solving Several questions about each chapter	End of term	5

Instructor(s) information [معلومات الأستاذ]

Section: (Computer Science) ; Lecture Room:[401] , ; Office No.: (6)

Instructor's Name:Dr. Amel H. Abbas

E-Mail:*dr.amelhussein2017@uomustansiriyah.edu.iq*

Office Hours :Monday:[10:20 –12:00]

Section: (Computer Science) ; Lecture Room:[401] , ; Office No.: (1)

Instructor's Name:Dr. Hazam

E-Mail:

Office Hours :Sunday:[13 :00 – 17 :00]

NOTES:

-Office Hour:Other office hours are available by appointment.

-The content of this syllabus not be changed during the current semester.

Lecturer Signature

Chairman Signature



Ministry of Higher Education and Scientific Research
Mustansiriyah University/College of Science /Department of Computer Science
Course Plan



Course No.: 50811403

Course Name: Evolutionary Computing

Time Division:

3hr Theoretical and 2hr Practical

Course Website:

Semester & Year:

First , 202 4 /202 5

Course Description (3 credit hours, Prerequisite: 50811303 Artificial Intelligence)

Evolutionary Computing is the collective name for a range of problem-solving techniques based on principles of biological evolution, such as natural selection and genetic inheritance. These techniques are being increasingly widely applied to a variety of problems, ranging from practical applications in industry and commerce to leading-edge scientific research. This course presents a complete overview of this field aimed directly at undergraduate students. It is meant to apply evolutionary computing to a particular problem or within a given application area. It presents EC as something to be used rather than just studied. It also presents quick-reference information on the current state-of-the-art in a wide range of related topics. It is a subfield of artificial intelligence (more particularly computational intelligence) that can be defined by the type of algorithms it is concerned with. These algorithms, called evolutionary algorithms, are based on adopting Darwinian principles. The course presents the history of evolutionary computation; major areas: genetic algorithms, evolution strategies, evolution programming, genetic programming, classifier systems; constraint handling; multi-objective cases; dynamic environments; parallel implementations.

Course Intended Outcomes

At the end of the course, students are expected to learn:

- To develop knowledge of evolutionary computation techniques and methodologies set in the context of modern heuristic methods.
- To gain experience in matching various evolutionary computation methods and algorithms for particular classes of problems.
- To gain experience in applying various evolutionary computation methods and algorithms as a part of software development.
- To develop knowledge and experience in developing evolutionary algorithms for real-world applications.

Course Outline

Week(s)	Description depends on the Timing Table (Theoretical)	Practical
1	Introductory Overview of EC (Ref.1 Chapter 1)	- Introduction for Learning Python
2-3	Introduction to Evolutionary Algorithm (Ref.1 Chapter 2)	- Learning Python
4-5	Genetic Algorithms (Ref.1 Chapter 3)	- Generation Population for Evolutionary algorithms - make Mutation for Genetic Algorithm
First Exam		
6-7	Evolution Strategies (Ref.1 Chapter 4)	- Make Crossover for Genetic Algorithm - Calculate Fitness for Genetic Algorithm
8-9	Evolutionary Programming (Ref.1 Chapter 5)	- Solve Problem 8-queen By Genetic Algorithm
10-11	Genetic Programming (Ref.1 Chapter 6)	- Make Types Mutation for Genetic Algorithm
Second Exam		
12-13	Learning Classifier Systems (Ref.1 Chapter 7)	- Make Types Crossover for Genetic Algorithm
14-15	Multimodal Problems (Ref.1 Chapter 9)	- Make Types Crossover for Genetic Algorithm
Final Exam		

Textbooks

- [1]. A. E. Eiben, J. E. Smith, "Introduction to Evolutionary Computing", 2nd Ed. , Springer 2015.

Suggested references:

- [1]. Introduction to Genetic Algorithms by S.N. Sivanandam, S. N. Deepa, Springer 2008.
- [2]. Soft Computing and Intelligent System Design by Fakheddine O. Karray, Clarence De Silva, Addison Wesley 2004.

Marking:

First Semester				Final Exam
1 st Exam	2 nd Exam	Practical	Activity	45
10	10	14	6	

Assignments and/or Projects

Assignment/Project	Description	Due Date	Marking
H.W. 1	Implement Magic Box problem	One week duration	2 Marks
H.W. 2	Programming Project on 8-Queens	One week duration	2 Marks
Quizzes	Two or more quizzes	During the course	2 Marks

Instructor(s) information [معلومات الاستاذ]

Section:(1) Lecture Room: [] Time:

Instructor's Name:	E-Mail:	Lecture room.:	Office Hours:
<i>Dr. Muhanad Tahrir Younis</i>	mtty@uomustansiriyah.edu.iq	401	Tuesday: [10:20 – 12:00 pm]
<i>Dr.Bassam Basim AlKindy</i>	dr.balkindy@uomustansiriyah.edu.iq	401	Wednesday: [03:10 – 4:40 pm]

Practical Instructor's Name:	E-Mail:	Lab No.:	Lecture Hours:
<i>Lec. Firas Ali Hashim</i>	firas70@uomustansiriyah.edu.iq	5	Monday: [08:30 – 10:10 am]
<i>Lec. Noor Thamer</i>	dr.balkindy@uomustansiriyah.edu.iq	5	Sunday: [01:30 – 3:00 pm]

NOTES:

- Office Hours: other office hours are available by appointments.
- The content of this syllabus may not be changed during the current semester.



Lecture Signature
Dr. Muhanad Tahrir Younis

Lecture Signature
Dr. Bassam Basim AlKindy

Chairman Signature



Ministry of Higher Education and Scientific Research
Mustansiriyah University /College of Science
Department of Computer Science
(الخطة الدراسية للمساق)
Course Plan



Course No.: 50811404

Time Division: 3hr Theoretical and 2hr Practical

Course Name: Information Retrieval (IR)

Semester & Year: First, 2024 / 2025

Course Website:

<http://nlp.stanford.edu/IR-book/pdf/irbookonlinereading.pdf>

Course Description:

This course will cover traditional material as well as recent advances in information retrieval (IR), the study of the processing, indexing, querying, organization, and classification of textual documents, including hypertext documents available on the world-wide-web.

Course Intended Outcomes:

- Periodical reading assignments from the text and recent research papers will be given and should be read **before** the corresponding lecture. Students will be held responsible for all information presented either in class or in the reading assignments.
- Class lectures will use Power point presentations. This should allow students to focus on understanding the material during class and reduce the need for taking notes; however, simply reading the slides is no substitute for attending class in which additional explanation and discussion is presented.
- Prompt attendance at class is required. Attendance will be taken at the very beginning of every class period and a student's attendance record will count as part of the course grade.

Course Outline:

- Goals and history of IR. The impact of the web on IR
- Boolean and vector-space retrieval models; ranked retrieval; text-similarity metrics; TF-IDF (term frequency/inverse document frequency) weighting; cosine similarity.
- Simple tokenizing, stop-word removal, and stemming; inverted indices; efficient processing with sparse vectors
- Performance metrics: recall, precision, and F-measure; Evaluations on benchmark text collections.
- Word statistics; Zipf's law; Porter stemmer; morphology; index term selection
- Search engines; spidering; metacrawlers; directed spidering; link analysis.

Week	Description depends on the Timing table (Theoretical	& Practical)
1	Boolean retrieval	Review
2	The term vocabulary and postings lists	C# vs. VB.NET
3	Index Compression	LZW compression Algorithm

4	Spelling correction	LZW compression Algorithm
5	Text Classification	Linear Least Squares
6	Support vector machines	Support Vector Machine
7	Support vector machines	Support Vector Machine
8	Exam	Support Vector Machine
9	Flat clustering	K-Means Algorithm
10	Flat clustering	K-Means Algorithm
11	Hierarchical clustering	Exam
12	Web search basics	Search Algorithm
13	Web crawling and indexes	Internet Application
14	Link analysis	Internet Application
15	Exam	Exam

Textbooks:

[1]: An Introduction to Information Retrieval

Suggested references:

[1]: PATTERN RECOGNITION Sergios Theodoridis Konstantinos Koutroumbas

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
5	5	7	3	60
6	6		3	70

Assignment/ Project	Description	Due Date	Marking
test	written exam	1/12/2018	3
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Instructor(s) information [معلومات الأستاذ]

Section: ; Lecture Room:[], ; Office No.: ()

Instructor's Name: **Huda Abdulaali Abdulbaqi & Dr. Zied O. Ahmed**

E-Mail: :

huda.it@uomustansiriyah.edu.iq

zied_othman@yahoo.com

Office Hours : Tue.: [: - :]
Wed.: [: - :]

NOTES:

- Office Hour:Other office hours are available by appointment.
- The content of this syllabus not be changed during the current semester.

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Course Plan



Course No.: 50811405 **Time Division:** 3 hr Theoretical and 1 hr Practical
Course Name: Operating Systems **Semester & Year:** **First, 2024 / 2025**
Course Website:

Course Description:

Introduction to Operating Systems, Hardware & Software Concepts, Process Concepts, Thread Concepts, Asynchronous Concurrent Execution, Concurrent Programming, Deadlock, and Indefinite Postponement, Processor Scheduling, Real Memory Organization and Management, Virtual Memory Organization, Virtual Memory Management, Disk Performance Optimization (and RAID), File and Database Systems, Performance and Processor Design, Multiprocessor Management, Introduction to Networking, Distributed Systems and Web Services, Security, Case Study: Linux and Case Study: Windows XP.

Course Intended Outcomes:

In This course of Operating Systems, we will introduce the core operating system concepts and design considerations. To complement the discussion of operating system concepts, so readers working through the chapter material can refer to each case study to see how a particular topic is handled in either Linux or Windows XP. Using Java code to illustrate key points, Operating Systems introduces processes, concurrent programming, deadlock and indefinite postponement, mutual exclusion, physical and virtual memory, file systems, disk performance, distributed systems, multithreading, and extensive treatments of distributed computing, multiprocessing, performance, and computer security.

Course Outline:

Week	The description depends on the Timing table (Theoretical)	(Practical)
1	<i>Introduction to operating systems:</i> ❑ what is an operating system ❑ early history 1940's and 1950's, 1960's ❑ operating system thinking ❑ history of the internet and world wide web ❑ The 1990's, 2000 and beyond ❑ application bases, OS environment, components and goals, architecture	Background (Iteration Statements, Function, One Dimension Array)

2	<i>Hardware and Software Concepts</i> ☐ introduction, the evolution of hardware devices ☐ hardware components ☐ operating system thinking, caching, main memory, secondary storage, buses, DMA. ☐ legacy hardware and software ☐ peripheral devices ☐ Hardware support for OS, processor ☐ OS thinking: principle of least privilege, protection ☐ caching and buffering and SW overview ☐ application programming interface API, compiling, linking, and loading. ☐ caching and buffering and SW overview ☐ application programming interface API, compiling, linking, and loading.	Device Directly Introduction + Prompt (' C:\>')
3	<i>Process Concepts</i> ☐ introduction, operating system thinking: customers ultimately want applications ☐ definition of the process, process states: the life cycle of a process, process management ☐ Process operations ☐ Interrupts and interposes communication	Create File (MF) + Make Directory (MD)
4	<i>Thread Concepts</i> ☐ introduction, OS thinking: concurrency ☐ definition of thread, motivations, OS thinking: parallelism ☐ thread states: the life cycle of a thread ☐ Thread operations ☐ Threading models: user-kernel level ☐ thread implementation considerations ☐ POSIX and P-threads ☐ OS thinking: scalability	Remove File (RF) + Remove Directory (RD)
5	<i>Asynchronous Concurrent Execution</i> ☐ introduction ☐ mutual exclusion, critical sections ☐ Implementing mutual exclusion primitives ☐ SW solutions to the mutual exclusion problem ☐ HW solutions to the mutual exclusion problem and semaphores	Print Data (Dir)
6	<u><i>First Exam</i></u>	Testing

7	<i>Concurrent Programming</i> ☐ Introduction ☐ Monitors, OS thinking: information hiding ☐ Monitor examples, multithreading case	CPU Scheduling algorithms First - Come – First – Serves (FCFS)
8	<i>Processor Scheduling</i> ☐ introduction ☐ scheduling levels, preemptive vs. nonpreemptive scheduling ☐ OS thinking: overhead priorities ☐ scheduling objectives, OS thinking: predictability, fairness ☐ scheduling criteria	Short Job – First – Serves (SJFS)
9	<i>Processor Scheduling</i> ☐ Scheduling algorithms FIFO, RR, SPF, HRRN, SRT ☐ Multilevel feedback queues, fair share scheduling ☐ Deadline scheduling	Priority
10	<u>Second Exam:</u> <i>And its solutions</i>	Round – Robin scheduling
11	<i>Deadlock and Indefinite Postponement</i> ☐ introduction ☐ examples of deadlock, simple resource deadlock ☐ OS thinking: waiting ☐ deadlock and indefinite postponement, spooling sys. a related problem, indefinite postponement, resource concepts	Testing
12	<i>Deadlock and Indefinite Postponement</i> ☐ Deadlock solutions, deadlock prevention ☐ Denying the non-preemptive condition ☐ Deadlock avoidance Dijkstra's algorithm ☐ Deadlock detection ☐ Deadlock recovery	memory management
13	<i>Virtual memory organization</i> ☐ Introduction ☐ OS thinking: virtualization, virtual memory concepts ☐ Block mapping, paging, ☐ OS thinking: empirical results: locality-based heuristics, lazy allocation ☐ Segmentation and paging system	empty memory print memory

14	Virtual memory organization ☐ Secondary storage files and databases ☐ Disk performance optimization	save memory delete memory
15	Testing and Reviewing	Testing

Textbooks:

[1]: operating systems, third edition, Harvey M. Deitel, Paul J. Deitel (Author), David R. Choffnes

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	

Assignment/ Project	Description	Due Date	Marking
H.W. 1	Solve the chapter questions		2 Marks
H.W. 2	Solve scheduling problem		2 Marks
Quizzes	Two quizzes	During the course	2 Marks

Instructor(s) information

Section: **Computer Sciences**; Lecture Room: **[401,402]** , ; Office No.: **(9)**

Instructor's Name: Dr. Abbas Aram Khursheed

LecTurer Reyad Hazem

LecTurer Samira Abdul-kader Hussain

E-Mail:

abbasarab2000@uomustansiriyh.com

jamal.hasoon@uomustansiriyah.edu.iq

reyadh.hazim@uomustansiriyah.edu.iq

samira.hussain1212@gmail.com

NOTES:

-Office Hour: Other office hours are available by appointment.

-The content of this syllabus not be changed during the current semester.




Lecturer Signature

Chairman Signature



Ministry of Higher Education and Scientific Research

Mustansiriyah University /College of Science

Department of Computer Science

(الخطة الدراسية للمساق)

Course Plan



Course No.: 50811406

Course Name: Multimedia

Course Website:

Time Division 3 hr Theoretical and 2 hr Practical

Semester & Year: **Second , 2024 / 2025**

Course Description:

This course focuses on computer generated media, text, graphics, sound, animation and Software development cycle of computer generated multimedia application.

The course introduce the principles, structures, elements, formats and software's for each multimedia elements introduced in the first week

Course Intended Outcomes:

At the end of the course, students are expected to learn and improve their skills in:

- Multimedia concepts, professional level. Also a professional approach of editing most of multimedia applications, particularly processing of Images, Video, and Sound
- Multimedia file formatting technical approach.
- Multimedia components (Image, Sound, and video)
- Building multimedia applications, particularly developing 3D movies using MAYA Scripting (MEL).

Course Outline:

Week	Description depends on the Timing table (Theoretical	& Practical)
1	Introduction to Multi-Media - Definition of Multimedia - Elements of Multi-Media - Classification of media types - Multimedia Authoring Tools - Using of Multimedia - Benefits and problems in multimedia	Introduction to 3D Animation
2	Text and Images in Multimedia -Text in Multi Media Text Structure Text Elements Advantages and disadvantages of text in multimedia	3D Building Algorithm

	Text Format - Graphics and Images in multimedia - Graphics in Multimedia Types of graphics Graphics and Image Editing software	
3	- Computer vision - Color Models (RGB, CMYK and HSV) - Image Restoration - Image Enhancement - Image Compression	Installing the Maya program, explaining the basics, and designing the first model
4	First Exam	First Exam
5	Computer Vision and Image Processing - Computer Image System - Image Representation - Image Resolution - Images Types - Images Format	The Modeling in 3D Animation
6	Digital Audio -Digitization of Sound - Nyquist Theorem - Sampling and Quantizing audio Sampling rate Encoding	Build a three-dimensional model through the Polygons
7	Digital Audio - Quantization of Audio - Signal to Noise Ratio (SNR) - Pulse Code Modulation PCM	Build a three-dimensional model through the curves
8	Video - Analog Video - Digital Video - Basics of Video - Using Video On PC - Broadcast video standards	The Texturing in 3D Animation
9	Video - Digitization of Analog Video to Digital Video - Video Formats - Software for Capturing and Editing Videos - Video Capture Media and Instruments:	Create Custom Texture
10	Second Exam	The Rigging - Building Character in 3D Animation (Build skeleton)
11	Animation - History and background of animation - Animation work - Frame-by-Frame Animation - Bitmap Graphics	The Animation using curve

	- Vector Graphics	
12	Animation - Bitmap versus Vector - Keyframe-based Animation - Tweening	The Animation using keyframes and timeline
13	Animation - Morphing - Particle Systems - Flocking Systems	Cameras in 3D Animation
14	Example of Morphing	Lighting in 3D Animation
15	Example about Particle Systems	Rendering in 3D Animation

Textbooks:

[1]: Fundamentals of Multimedia Second Edition by Ze-Nian Li • Mark S. Drew Jiangchuan Liu

[2]: digital multimedia , t.m.savage and k.e.vogel , jones and bartlett publishers , massachusetts

Suggested references:

[1]: *Multimedia: Computing, Communications and Applications*, Steinmetz R. And Nahrstedt K., Prentice Hall,

[2]: *Fundamentals of Multimedia: Ze-Nian Li, Mark S. Drew*. Prentice-Hall,

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	60
10	10	14	6	40

Assignment/ Project	Description	Due Date	Marking
test	written exam	15/3/2023	3
Report		1/5/2023	3

Instructor(s) information [معلومات الأستاذ]

Section ; Lecture Room:[], ; Office No.: ()

Theory instructor's Name:

Dr. Karim Kasim karim.qh@ uomustansiriyah.edu.iq

Dr. Asmaa Sadiq asmaasadiq@uomustansiriyah.edu.iq

Dr. Hassan Kassim hassan@uomustansiriyah.edu.iq

Practical instructor's Name :

muna abdul hussain muna.ali@ uomustansiriyah.edu.iq

samera abdul kader samiracs@ uomustansiriyah.edu.iq

Office Hours : Tue.:[: – :]
Wed.:[: – :]

NOTES:

- Office Hour: Other office hours are available by appointment.**
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Course Plan



Course No.: 50811407

Time Division: 3hr Theoretical and 1hr Practical

Course Name: **Cloud Computing**

Semester & Year: **Second 2024 / 2025**

Course Website: None

Course Description:

This project-based course will give students a theoretical foundation and hands-on experience with the various technologies of the cloud computing paradigm. Cloud computing is the delivery of computing as a service, whereby distributed resources are provided by appropriate service suppliers and leased, rather than owned, by an end user as a utility (similar to electricity and water) over a network (typically the Internet). Cloud computing services are becoming ubiquitous and are being adopted by a growing number of fields. Organizations are recognizing the benefits of this new computing paradigm in terms of increased flexibility, elasticity as well as reduced upfront costs and carbon footprint.

The lectures will cover topics related to three cloud service types SAAS types like google drive, PAAS types like Microsoft Azure and IAAS like (Amazon S3). Also, the students will understand cloud computing, the different models and architectures and study about the services offered by cloud, software plus services and understand about virtualization of cloud and various examples of cloud computing.

Course Intended Outcomes:

At the end of the course, students are expected to learn:

1. Students will Understand need of cloud computing, cloud essentials, benefits, challenges, limitations, usage and applications, business models.
2. Discuss the meaning of cloud computing, understand **cloud models**, cloud application architecture, cloud computing **architecture** and various infrastructure models.
3. Students will Understand the various **cloud services**.
4. Students will Get knowledge of **virtualization** to know about virtual machines and types of virtualizations.
5. Students will Get knowledge of **Cloud Storage AND Security** of cloud computing.

Course Outline:

Week	Theoretical	Practical
1	-Introduction to paradigm of computing	Introduction to cloud, google cloud
2	-Fundamental of cloud computing: Historical view -Similarities and difference between Cloud Computing and Mainframes -Definition of cloud computing -Roots of cloud computing	Google doc, create, get link, share, email
3	-Key Properties of cloud computing -limitation of cloud computing -benefits of cloud computing	Google forms, create, adjust the setting, get the link, share, email
4	- Overview of a Cloud architecture: Cloud Components, -5-4-3 Principles of Cloud computing -five Essential Characteristics	Google slides, create, ...
5-6	-Cloud computing models 1) Infrastructure as a Service (IaaS): Benefits of IaaS. 2) Platform as a Service (PaaS): Benefits of the PaaS model include: 3) Software as a Service (SaaS): Benefits of the PaaS model include, Drawbacks of SaaS - Summary of the different cloud service models	Exam1
7	First Exam	Google apps script (intro+ examples)
8-9	Cloud Computing Models: 1) Private cloud: Characteristics, Suitability, not suitable, Advantages and Disadvantages 2) Public cloud: Characteristics, Suitability, not suitable, Advantages and Disadvantages 3) Community cloud: Characteristics, Suitability, not suitable, Advantages and Disadvantages 4) Hybrid cloud: Characteristics, Suitability, not suitable, Advantages and Disadvantages	Cont.+ wrap up the previous information

10	Second Exam	Google website
11	- Technologies related ; Explain some technologies that are attached to cloud computing. - Implementation's providers : Define and explain different implementation such as google, amazon, Microsoft Online Services.	Colab -introduction, benefit, how to use (text cell, code cell, scripting, share notebook,)
12	Cloud Storage for Cloud Computing	Colab programing with python
13	Virtualization and type of virtualization	Examples
14	Cloud Computing Security	Exam2
15	Project Discussion	Project Discussion
Final exam		

Textbooks:

- [1] Chandrasekaran, K. *Essentials of cloud computing*. CRC Press, 2014.
- [2] Velte, Anthony T., et al. *Cloud computing: a practical approach*. New York: McGraw-Hill, 2010.
- [3] Hill, Richard, et al. "Enterprise cloud computing." *Guide to Cloud Computing*. Springer London, 2013. 209-222.
- [4] Jurg van Vilet and Flavia Paganelli, *Programming Amazon EC2*, O'Reilly Media, 2011
- [5] Jothy Rosenberg and Arthur Mateos, *The Cloud at Your Service*, Manning Publications, 2010
- [6] Sean Owen, Robin Anil, Ted Dunning and Ellen Friedman, *Mahout in Action*, Manning Publications, 2011

Marking:

second Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	14	6	60

Assignment/ Project	Description	Due Date	Marking
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Instructor(s) information [معلومات الأستاذ]

Section: **(Computer Science)**; Lecture Room: [], ; Office No.: ()

Instructor's Name: **Dr. Rafaa Ismael Yahya**

E-Mail: rafaa_ismaeel79@uomustansiriyah.edu.iq

Instructor's Name: *Zeyad Farooq*

E-Mail: Zeyadfa6@uomustansiriyah.edu.iq

Office Hours: Sun: [: – :]

Mon:[: – :]

Thu: [: – :]

NOTES:

-Office Hour: Other office hours are available by appointment.

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Course Plan



Course No.: 50811408

Time Division: ...3.... hr Theoretical and ...2...hr Practical

Course Name: **intelligent agent**

Semester & Year: **2nd, 2022 / 2023**

Course Website:

Course Description:

IN This subject we describe what I mean by the term *agent*, present some *abstract architectures* for agents. That is, we discuss some general models and properties of agents without regard to how such agents might be implemented. discuss *concrete architectures* for agents.

The various major design routes that one can follow in implementing an agent system are outlined in this course. In particular, *logic-based architectures*, *reactive architectures*, *belief-desire-intention architectures*, and finally, *layered architectures* for intelligent agents are described. introduces some prototypical programming languages for agent systems..

Course Outline: the student must be able to:

Choose and implement methods for rational decision making in software agents, based on decision processes and AI planning techniques

Understand the fundamental concepts in the study intelligent agents.

Be familiar with the basic concepts, methods, techniques, and tools for the use of intelligent agents in computer-based systems.

Understand the components and functions of intelligent agents.

Apply the principles and methods of intelligent agents to a small-scale practical problem within the framework of a term project.

Be prepared for further study in the design, implementation, and application of agent-based systems.

Implement systems of software agents using agent platforms

Week	Topics	LAB
1	What are Agent and Environment? The concept of rationality	Agent in the Jade overview Installing the Software
2	Performance measure, rationality, learning and autonomy	Creating Jade agents- the agent class
3	The structure of agents Agent programs, simple reflex Agent, Model-based reflex Agents Goal-based Agents, Utility-based Agents, Learning Agents	Passing arguments to an Agent

4	Intelligent Agents Agents and Objects, How do you design an intelligent agent?, Components of a Software Agent, game theory	Agent Tasks -The Behavior Class
5	How to solve problems? define state space, tree, search algorithms, game theory	Agent Behaviors Scheduling and Execution
6	Search algorithms and games examples	One-Shot Behaviors
7	Basic types of agents Purely Reactive Agents, Perception, Agents with the state	Cyclic Behaviors
8	Exam 1	Exam1
9	Logic-based Architectures, Reactive Architectures, Belief-Desire-Intention Architectures	Agent Communication Language (ACL) Messages
10	More examples- Architectures for Intelligent Agents Agents for simulating the world: Multi-Agent System	GRAPHICAL USER INTERFACE TO MANAGE AND MONITOR THE AP ACTIVITY (Remote Monitoring Agent)
11	Properties of multi-agent systems Agent Based Programming Agent Programming Languages	GRAPHICAL USER INTERFACE TO MANAGE AND MONITOR THE AP ACTIVITY (Remote Monitoring Agent) 2
12	Agent-oriented programming	Dummy Agent, Sniffer Agent, Introspection Agent
13	EXAM 2	Exam2
14	REVIEW	Review 1
15		Review2

Textbooks:

[1]: Introduction to information retrieval 2009

[2]: Guide to information retrieval: information retrieval process 2017

Suggested references:

[1]:

[2]:

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	14	6	60

Assignment/ Project	Description	Due Date	Marking
Test	written exam		3
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Instructor(s) information [معلومات الأستاذ]

Section: (Computer Science) ; **Lecture Room:**[401-402], ; **Office No.:** (6)

Instructor's Name: Dr. Abbas Akram Khorsheed

E-Mail: abbasarab2000@uomustansiriyah.edu.iq

{practical lecturer}

dr. Yasamin Algrash yhamza@uomustansiriyah.edu.iq

dr. Iqbal Mussa Eqbal.darraji@uomustansiriyah.edu.iq

Office Hours : Mon.:[10 :00 – 3 : 10]

Tue.:[10:00 : – 3 :10]

NOTES:

-Office Hour: Other office hours are available by appointment.

-The content of this syllabus not be changed during the current semester.

Lecturer Signature

Chairman Signature



Ministry of Higher Education and Scientific Research
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Course Plan



Course No.: 50812401

Time Division: 3hr Theoretical

Course Name: Distributed Information Systems

Semester & Year: First, 2024 / 2025

Course Website:

Dept. : CS, Branch : IT, Stage: 4th

Course Description:

This subject presents the The goal of this course is to introduce an overview of *distributed information systems*, where data, computation, and resources are distributed across a network. We will study several internet-based applications which illustrate good distributed systems design. This course is preferred to follow up courses on network communication and system programming.

Course Intended Outcomes:

Intro to Distributed Systems and Definitions

Primitives for Distributed Computation

Common Problems and challenges of Distributed Systems

Advantages and motivations of Distributed Systems

Types and Architectures of Distributed Systems

Application layers of Distributed system

The Internet and Internet Applications as a Distributed Information System

Cloud Computing.

Course Outline:

Week	Description depends on the Timing table (Theoretical	& Practical)
1	Concepts and Intro to Distributed Information Systems Definitions	
2	Main challenges & Advantages of Distributed Information Systems	
3	Types of Distributed Information Systems	
4	Architectures of Distributed Information Systems	
5	Distributed Information system application layers	
6	Naming Entities.	

7	First Exam In	Return and Discussions of First exam results
8	Discuss an examples of Distributed Information System	
9	The Internet and Internet Applications as a Distributed Information System	
10	Reviewing the Goals of Distributed Information Systems	
11	Making resources available	
12	Distribution transparency	
13	Openness, Middleware	
14	Scalability	
15	Final Exams	

Textbooks:

[1]: The material for the course is taken from a variety of sources include Tanenbaum, Kurose and Ross, Coulouris, et. al,

[2]: Tanenbaum and Van Steen, and research papers from the academic literature on the topic.

[3]: Mvsteen-distributed.systems.3rd.preliminary.version.3.01pre.2017.170215

Suggested references:

[1]:

[2]:

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
12	12	0	6	70

Assignment/ Project	Description	Due Date	Marking
test	written exam	15/2/2021	3
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Instructor(s) information [معلومات الأستاذ]

Section: (**Computer**) ; Lecture Room:[], ; Office No.: ()

Instructor's Name: Dr. Abbas Abdulazeez Abdulhameed

E-Mail: abbasabdulazeez@uomustansiriyah.edu.iq

Office Hours : Tue.:[9:30 - 11:00]
Wed.:[9:30 – 10:30]

NOTES:

-Office Hour:Other office hours are available by appointment.

-The content of this syllabus not be changed during the current semester.

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Course Plan



Course No.: 508114 01

Time Division: 2hr Theoretical and 2hr

Practical

Course Name: **Mobile Computing (IT)** **Semester & Year:** **First, 2024 / 2025**

Course Website:

Course Description:

This course will introduce students to mobile computing and mobile application development – Android in particular. Mobile computing will be discussed from three perspectives: mobile technology, application development, and user interaction. The course will rest overview various mobile computing applications, technologies and wireless communication. Students will be introduced to and use mobile application frameworks and development environments to reinforce concepts covered in lectures. User interface and user experience will be discussed and application development guidelines from various vendors will be discussed and analyzed. Lastly, the course will look at some current research in mobile computing. Students will be expected to learn many mobile applications particularly the major target how to link Java Android with APIs. An introduction to.

Course Intended Outcomes:

- Understand the basics of mobile computing (Framework , Operating System)
- Understand the XML languages as the user interface (GUI)
- Understand the java programing in the Android studio environment.
- Understand how ti implement native android applications using Java.
- Understanding how to connect a mobile app to the APIs

Course Outline:

Week	Description depends on the Timing table (Theoretical	& Practical)
1	Mobile Computing Principles/ Introduction to Mobile Computing	Introduction
2	Overview of OOP concepts in Java (refreshing students knowledge)	Practice the OOP concepts in Java
3	Mobile Development Introduction to Mobile development	Applications Component (XML+JAVA) Hello world example
4	Mobile Development Introduction to Android and activities	Create android application Android application files. The main activity file, the manifest file the strings file

		The R file the layout file Running the application
5	Mobile Computing Mobile Development Introduction to Intents and intents filter	Practice the concepts in the lab- develop the login page and simple calculator
6	Introduction to broadcast receiver	Accessing resource in code Example implement messages and menus
7	1 st exam	1 st exam
8	Mobile Development Introduction to Android User Interface (UI)	Accessing resource in code Example use canvas and list view
9	Push notification	Practice push notifications
10	Threads in Java	Practice threads an AsyncTask
11	Connecting to APIs	Implement a mobile app to fetch the data from an API to display it in the screen
12	Geo- fence and Location access	Practice location access
13	Second Exam	Second Exam
14	Using Cameras	Practice using cameras in an android app
15	Project support	Project support

Textbooks:

[1]: **Mobile computing principles** , Reza B'Far / Sixth Edition ,CAMBRIDGE UNIVERSITY PRESS

Suggested references:

1. MOBILE COMPUTING by Tomasz Imielinski, Rutgers University, and Henry F. Korth
2. Android Tutorial (Simply Easy Learning by tutorialspoint.com):
<https://www.tutorialspoint.com/test/index.htm>
3. Android developers website : <https://developer.android.com/docs>

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	14	6	25 theoretical + 15 practical

Assignment/ Project	Description	Due Date	Marking
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Mobile application project			
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Instructor(s) information [معلومات الأستاذ]

Section: (Computer Science) ; Lecture Room:[], ; Office No.: ()

Instructor's Name: Dr. Alaa Sinan Abbas

E-Mail: Alaa.alkhafaji@uomustansiriyah.edu.iq

Office Hours :[: - :]
:[: - :]

NOTES:

-Office Hour:Other office hours are available by appointment.

-The content of this syllabus not be changed during the current semester.

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Course Plan



Course No.: 50811405 **Time Division:** 3 hr Theoretical and 1 hr Practical
Course Name: Operating Systems **Semester & Year:** **First, 2024 / 2025**
Course Website:

Course Description:

Introduction to Operating Systems, Hardware & Software Concepts, Process Concepts, Thread Concepts, Asynchronous Concurrent Execution, Concurrent Programming, Deadlock, and Indefinite Postponement, Processor Scheduling, Real Memory Organization and Management, Virtual Memory Organization, Virtual Memory Management, Disk Performance Optimization (and RAID), File and Database Systems, Performance and Processor Design, Multiprocessor Management, Introduction to Networking, Distributed Systems and Web Services, Security, Case Study: Linux and Case Study: Windows XP.

Course Intended Outcomes:

In This course of Operating Systems, we will introduce the core operating system concepts and design considerations. To complement the discussion of operating system concepts, so readers working through the chapter material can refer to each case study to see how a particular topic is handled in either Linux or Windows XP. Using Java code to illustrate key points, Operating Systems introduces processes, concurrent programming, deadlock and indefinite postponement, mutual exclusion, physical and virtual memory, file systems, disk performance, distributed systems, multithreading, and extensive treatments of distributed computing, multiprocessing, performance, and computer security.

Course Outline:

Week	The description depends on the Timing table (Theoretical)	(Practical)
1	<i>Introduction to operating systems:</i> ☐ what is an operating system ☐ early history 1940's and 1950's, 1960's ☐ operating system thinking ☐ history of the internet and world wide web ☐ The 1990's, 2000 and beyond ☐ application bases, OS environment, components and goals, architecture	Background (Iteration Statements, Function, One Dimension Array)

2	<i>Hardware and Software Concepts</i> ☐ introduction, the evolution of hardware devices ☐ hardware components ☐ operating system thinking, caching, main memory, secondary storage, buses, DMA. ☐ legacy hardware and software ☐ peripheral devices ☐ Hardware support for OS, processor ☐ OS thinking: principle of least privilege, protection ☐ caching and buffering and SW overview ☐ application programming interface API, compiling, linking, and loading. ☐ caching and buffering and SW overview ☐ application programming interface API, compiling, linking, and loading.	Device Directly Introduction + Prompt (' C:\>')
3	<i>Process Concepts</i> ☐ introduction, operating system thinking: customers ultimately want applications ☐ definition of the process, process states: the life cycle of a process, process management ☐ Process operations ☐ Interrupts and interposes communication	Create File (MF) + Make Directory (MD)
4	<i>Thread Concepts</i> ☐ introduction, OS thinking: concurrency ☐ definition of thread, motivations, OS thinking: parallelism ☐ thread states: the life cycle of a thread ☐ Thread operations ☐ Threading models: user-kernel level ☐ thread implementation considerations ☐ POSIX and P-threads ☐ OS thinking: scalability	Remove File (RF) + Remove Directory (RD)
5	<i>Asynchronous Concurrent Execution</i> ☐ introduction ☐ mutual exclusion, critical sections ☐ Implementing mutual exclusion primitives ☐ SW solutions to the mutual exclusion problem ☐ HW solutions to the mutual exclusion problem and semaphores	Print Data (Dir)
6	<u><i>First Exam</i></u>	Testing

7	<i>Concurrent Programming</i> ☐ Introduction ☐ Monitors, OS thinking: information hiding ☐ Monitor examples, multithreading case	CPU Scheduling algorithms First - Come – First – Serves (FCFS)
8	<i>Processor Scheduling</i> ☐ introduction ☐ scheduling levels, preemptive vs. nonpreemptive scheduling ☐ OS thinking: overhead priorities ☐ scheduling objectives, OS thinking: predictability, fairness ☐ scheduling criteria	Short Job – First – Serves (SJFS)
9	<i>Processor Scheduling</i> ☐ Scheduling algorithms FIFO, RR, SPF, HRRN, SRT ☐ Multilevel feedback queues, fair share scheduling ☐ Deadline scheduling	Priority
10	<u>Second Exam:</u> <i>And its solutions</i>	Round – Robin scheduling
11	<i>Deadlock and Indefinite Postponement</i> ☐ introduction ☐ examples of deadlock, simple resource deadlock ☐ OS thinking: waiting ☐ deadlock and indefinite postponement, spooling sys. a related problem, indefinite postponement, resource concepts	Testing
12	<i>Deadlock and Indefinite Postponement</i> ☐ Deadlock solutions, deadlock prevention ☐ Denying the non-preemptive condition ☐ Deadlock avoidance Dijkstra's algorithm ☐ Deadlock detection ☐ Deadlock recovery	memory management
13	<i>Virtual memory organization</i> ☐ Introduction ☐ OS thinking: virtualization, virtual memory concepts ☐ Block mapping, paging, ☐ OS thinking: empirical results: locality-based heuristics, lazy allocation ☐ Segmentation and paging system	empty memory print memory

14	Virtual memory organization ☐ Secondary storage files and databases ☐ Disk performance optimization	save memory delete memory
15	Testing and Reviewing	Testing

Textbooks:

[1]: operating systems, third edition, Harvey M. Deitel, Paul J. Deitel (Author), David R. Choffnes

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	

Assignment/ Project	Description	Due Date	Marking
H.W. 1	Solve the chapter questions		2 Marks
H.W. 2	Solve scheduling problem		2 Marks
Quizzes	Two quizzes	During the course	2 Marks

Instructor(s) information

Section: **Computer Sciences**; Lecture Room: **[401,402]** , ; Office No.: **(9)**

Instructor's Name: Dr. Abbas Aram Khursheed

LecTurer Reyad Hazem

LecTurer *samira.hussain*

E-Mail:

abbasarab2000@uomustansiriyh.com

jamal.hasoon@uomustansiriyah.edu.iq

reyadh.hazim@uomustansiriyah.edu.iq

samira.hussain1212@gmail.com

NOTES:

-Office Hour: Other office hours are available by appointment.

-The content of this syllabus not be changed during the current semester.




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Course Plan



Course No.:50811410**Time Division:**1hr Theoretical

Course Name:Research methodology**Semester & Year:**First,2024 / 2025

Course Website:

Course Description:

This course introduces and discusses approaches, strategies, and data collection methods relating to research in computer science. Students will consider how to select the appropriate methodology for use in a study to be performed. Additionally, these students will learn how to collect data based on different data collection methods, construct these tools, and pilot them before they become ready for use. Finally, this course elucidates the requirements for an academic work, considering aspects related to language, writing style, and layout. To culminate this final stage, students will learn to write a comprehensive research proposal that may be conducted in the future.

Course Intended Outcomes:

At the end of the course, students are expected to learn:

- Enable students understand what research is and what is not.
- Raise awareness of crucial aspect of the nature of Knowledge and the value of scientific method.
- Introduce the concept at the heart of every research project –the research problem- and to discuss what a researchable problem is.
- Evaluate literature, form a variety of sources, pertinent to the research objectives.
- Identify and justify the basic components of the research framework, relevant to the tackled research problem.
- Explain and justify how researchers will collect research data.
- Discuss how to cite sources, using different citation methods such as the American Psychological Association (APA).
- Consider the kind of language to use in an academic written work.
- Put forward a credible research proposal.
- Warn the common mistakes in the field of research methodology.

Course Outline:

Week	Description depends on the Timing table(Theoretical)
1	A review of the Fundamentals: Meaning of Research, Definitions of Research, Objectives of Research, Motivation in Research, General Characteristics of Research, Criteria of Good Research and Types of Research.

2	General viewpoint of scientific research methodology: Impact Factor, Research Criteria, Format of Paper, Example of Paper Template.
3	Selection of Topic: Topic of the Study, Basic Research and Some Examples, Applied Research and Some Examples
4	Clarity of Abstract and Conclusion: Abstract, Some Examples of Informative Abstract, Conclusion, Some Examples of Conclusion, grammar used in abstract and conclusion.
5	Exam1.
6	The Research Problem: What is a Research Problem, Selecting the Problem, Sources of the Problem, Defining a Problem, Statement of a Problem, Delimiting a Problem and Evaluation of a Problem.
7	The Review of Literature: Meaning of Review of Literature, Need of Review of Literature, Objectives of Review of Literature, Sources of Literature, The Functions of Literature, How to Conduct the Review of Literature, Some Hints for the Review of Literature, Precautions in Library Use and Reporting the Review of Literature.
8	The Research Approach: Experiment Method, Examples of Experiment Method, Design and Construction, Examples of Design and Construction, Quantitative and Qualitative Methods.
9	Data Collection Methods: Questionnaires, Interviews, Focus Groups and Observation.
10	Sampling: Meaning and Definition of Sampling, Functions of Population and Sampling, Methods of Sampling, Characteristics of a Good Sample, Size of a Sample, The Sample Cycle.
11	Data Analysis of Report: Results and Discussion, Table Format, Example of table, Figure Format, Examples of figures, Equation Format, Examples of Results and Discussion.
12	Research Ethics: Ethics, Plagiarism Checker, Example of Research Paper Compared by Plagiarism Checker
13	Presentation Format: Oral Presentation, Examples of Oral Presentation, Poster Presentation, Examples of Poster Presentation, Research Proposal, Examples of Research Proposal.
14	Exam2.
15	Review

Textbooks:

Kitsakorn Locharoenrat, "*Research methodologies for beginners*". CRC Press, 2017.

Suggested references:

[1]: Vinayak Bairagi and Mousami V. Munot (editors), "*Research methodology: A practical and scientific approach*", CRC Press, 2019.

[2]: Ranjit Kumar, "*Research methodology: A step-by-step guide for beginners*", Sage, 2018.

Marking:

First Semester			Final Exam
1st exam	2nd exam	Activity	
12	13	5	70

Assignment/ Project	Description	Due Date	Marking
Exercise sheet	Solving Several questions about each chapter	End of term	5

Instructor(s) information [معلومات الأستاذ]

Section: (Computer Science) ; Lecture Room:[401] , ; Office No.: (6)

Instructor's Name:Dr. Amel H. Abbas

E-Mail:*dr.amelhussein2017@uomustansiriyah.edu.iq*

Office Hours :Monday:[10:20 –12:00]

Section: (Computer Science) ; Lecture Room:[401] , ; Office No.: (1)

Instructor's Name:Dr. Hazam

E-Mail:

Office Hours :Sunday:[13 :00 – 17 :00]

NOTES:

- Office Hour:Other office hours are available by appointment.
- The content of this syllabus not be changed during the current semester.

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Course Plan



Course No.: 50812403

Time Division: 3hr Theoretical and 2hr Practical

Course Name: Information Systems Security **Semester & Year:** Second, 2024 / 2025

Course Website:

Course Description:

This subject introduces the student to information security systems, especially with regard to the protection techniques of information systems. Topics include security attacks, mechanisms, and services, information cryptography, key management and distribution, user authentication, and security of communication system.

Course Intended Outcomes:

Upon completing this course, students will able to:

- Have an understanding of information system security and its protection techniques and mechanisms.
- Understand the threats and security of network system.
- Understand and explain the basic security problems that are addressed by information systems security.
- Understand and explain principles for security solutions for information systems security.
- Isolate and identify security problems that arise with the use of information in computers and communication between them.
- Understand different approaches for solving the above mentioned problems
- Suggest and explain appropriate measures that are commonly deployed to secure data when being process, stored or communicated.
- Explain the consequences of practical measures that are employed to secure data and computer systems

Course Outline:

Week	Description depends on the Timing table (Theoretical & Practical)	
	Theoretical	Practical
1	Introduction to Information Systems Security	Prime Numbers
2	Cryptographic System Categories	GCD Algorithm
3	Classical Encryption Techniques- Monoalphabetic Substitution	Caesar Cipher
4	Classical Encryption Techniques- Polyalphabetic Substitution and Transposition Techniques.	Multiplicative Cipher
5	Block Ciphers Algorithms	Keyword Transposition
6	Block Cipher Modes	Vigenere Cipher
7	Stream Ciphers and Pseudorandom Number Generation	LFSR Algorithm
8	Public Key Cryptography and RSA Algorithm	RSA Algorithm
9	First Exam	First Exam

10	Key Management and Distribution	Diffie-Hellman
11	Hash Functions- Message Authentication Code	Digital Signatures
12	Network Security –Transport Level Security	SSL Protocol
13	Network Security - Electronic Mail Security	PGP Protocol
14	Second Exam	Second Exam
15	review	review

Textbooks:

[1] Stallings, William. *Cryptography and network security*, 7/E. Pearson Education, 2016.

[2] Stamp, Mark. *Information security: principles and practice*. John Wiley & Sons, 2011.

Suggested references:

[1] Andress, Jason. *Foundations of Information Security: A Straightforward Introduction*. No Starch Press, 2019.

[2] Stinson, Douglas R and Paterson, Maura B. *Cryptography: theory and practice*. 4/E, CRC, 2019.

Marking:

Second Semester				Final Exam
1st Exam	2nd Exam	Practical	Activity	
10	10	14	6	60

Assignment/ Project	Description	Due Date	Marking
Quizzes	Two or more quizzes	During the course	2
Homework	Solving some homework sheets	During the course	4

Instructor(s) information [معلومات الأستاذ]

Section: **Computer Science** Lecture Room: 204

Office No.: 5

Instructor's Name: **Dr. Muhanad Tahrir Younis**

E-Mail: mty@uomustansiriyah.edu.iq

Office Hours: **Sunday (9:00 – 11:00)**

Wednesday (9:00 – 11:00)

Section: **Computer Science** Lecture Room: Lab 5

Office No.: 5

Instructor's Name: **Shatha Jassim Mohamad**

E-Mail: shonash77@uomustansiriyah.edu.iq

Office Hours: **Wednesday (8:30 – 10:00)**

NOTES:

-Office Hour: Other office hours are available by appointment.

-The content of this syllabus not be changed during the current semester.

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Course Plan



Course No.: 50812404

Time Division: 3 hr Theoretical and 2 hr Practical

Course Name: **Digital Forensics**

Semester & Year: **Second , 2024 / 2025**

Course Website: NA

Course Description:

This subject presents the importance to the profession of IT and Programmers. Programmers should learn the a lot about different storage media hierarchy and how to access and collect information from these storage medias while IT students must understand, apply, and manage to use the latest application in the field. This module will help student to learn most of the new terms in Digital Forensics field and help them to build good knowledge of being well prepared to work as Digital Forensic detectives

Course Intended Outcomes:

Digital Forensics is a paramount importance to the profession of IT and Programmers. Programmers should learn the a lot about different storage media hierarchy and how to access and collect information from these storage medias while IT students must understand, apply, and manage to use the latest application in the field. This module will help student to learn most of the new terms in Digital Forensics field and help them to build good knowledge of being well prepared to work as Digital Forensic detectives.

Course Outline:

Week	Description depends on the Timing table (Theoretical	& Practical)
1	Introduction to the Digital Forensics; Legal Aspects of Computer Forensics Digital Evidence	Introduction to the Digital Forensics Lab's tools. Design systems with forensic needs in mind 1- install forensics applications 2- General overview for Digital Forensics Tools
2	Design systems with forensic needs in mind Rules of Evidence	Event Viewer Browsing security issues in operating system Discovering who used your computer without your consent
3	The principles of digital evidence	Event Viewer

		Login in & login out
4	Search and Seizure of evidence: legal and procedural requirements Chain of Custody	Event Viewer Create custom view
5	Computer Forensics And Investigation Methodology	Computer Forensics And Investigation Methodology 1- Open new digital case 1- Setup the final image for the collected data
6	Techniques and standards for Preservation of Data	Techniques and standards for Preservation of Data 1- Collection digital data (for certain folder) and save to an image Collection digital data (for certain Drive) and save to an image
7	Legal and Reporting Issues including working as an expert witness (Responsibilities for Digital detectives)	Techniques and standards for Preservation of Data 2- Collection digital data (for certain Disk drive as whole) and save to an image 3- Collection digital data (for certain External Storage device) and save to an image Collection digital data (for certain RAM as Volatile data) and save to an image
8	Exam 1	Exam 1
9	OS/File System Forensics (Metadata, using a file system, How File System Works)	Techniques and standards for Preservation of Data Using FTK application to investigate Windows registry keys
10	Web Forensics (Server Side Forensics, mail and web browser forensics for client side)	Techniques and standards for Preservation of Data Investigate the integrity of original data using Hash Function
11	Network Forensics (Approaches and Ethernet layer investigation, Saving Network Data; Re-Creating an Event from Traffic)	Network Forensics Logging data to file using wire shark
12	Mobile Device Forensics(Mobile Device Characteristics, Types of evidence, Forensic process, Seizure, Acquisition, Examination and analysis)	Firewall log
13	Anti-forensics (Data Hiding, Obfuscation and Encryption , HPA Area, Use of Slack Space, Bad Sector, Steganography, Data)	Ip scanner 1

14	Review	Review
15	Exam 2	Exam 2

Textbooks:

[2]: Computer Forensics for Dummies, by Linda Volonino & Reynaldo Anzaldua, 2008

[3]: The Basics of Digital Forensics “second Edition” , John Sammons, Elsevier 2018

Suggested references:

[1]: Ethical issues in being an expert witness“, by JOSEPH B. KADANE†, 2005
<https://lpr.oxfordjournals.org/content/4/1-2/21.full.pdf> Accessed on 10/1/2016

[2]: Recovering Deleted and Wiped Files: A Digital Forensic Comparison of “FAT32 and NTFS File Systems using Evidence Eliminator”, Phil Nabity & Brett J. L. Landry, Accessed on 1/10/2016

http://www.academia.edu/1342298/Recovering_Deleted_and_Wiped_Files_A_Digital_Forensic_Comparison_of_FAT32_and_NTFS_File_Systems_using_Evidence_Eliminator

[3]: FACTS ABOUT SEARCH AND SEIZURE OF DIGITAL EVIDENCE,
<http://criminal.laws.com/computer-crime/doj-computer-crime-and-intellectual-property-section/search-and-seizure-of-digital-evidence>

Access date 15/8/2016

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	14	6	60

Assignment/ Project	Description	Due Date	Marking
Test 1	written exam	28/3/2023	10
Test 2	written exam	2/5/2023	10

Instructor(s) information

Section: (Computer Science) ; **Lecture Room:**[lab 3], ; **Office No.:** (8)

Instructor's Name: **L. Haider Hameed al-Mahmood**

E-Mail: *haideritsec@gmail.com*

Office Hours: Tue.: [8: 30 – 13:00]

Wed.: [8:30 - 13 –00]

NOTES:

-Office Hour: Other office hours are available by appointment.

-The content of this syllabus not be changed during the current semester.

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Department of Computer Science

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Course Plan



Course No.: 50811406

Course Name: Multimedia

Course Website:

Time Division 3 hr Theoretical and 2 hr Practical

Semester & Year: **Second , 2024 / 2025**

Course Description:

This course focuses on computer generated media, text, graphics, sound, animation and Software development cycle of computer generated multimedia application.

The course introduce the principles, structures, elements, formats and software's for each multimedia elements introduced in the first week

Course Intended Outcomes:

At the end of the course, students are expected to learn and improve their skills in:

- Multimedia concepts, professional level. Also a professional approach of editing most of multimedia applications, particularly processing of Images, Video, and Sound
- Multimedia file formatting technical approach.
- Multimedia components (Image, Sound, and video)
- Building multimedia applications, particularly developing 3D movies using MAYA Scripting (MEL).

Course Outline:

Week	Description depends on the Timing table (Theoretical	& Practical)
1	Introduction to Multi-Media - Definition of Multimedia - Elements of Multi-Media - Classification of media types - Multimedia Authoring Tools - Using of Multimedia - Benefits and problems in multimedia	Introduction to 3D Animation
2	Text and Images in Multimedia -Text in Multi Media Text Structure Text Elements Advantages and disadvantages of text in multimedia	3D Building Algorithm

	Text Format - Graphics and Images in multimedia - Graphics in Multimedia Types of graphics Graphics and Image Editing software	
3	- Computer vision - Color Models (RGB, CMYK and HSV) - Image Restoration - Image Enhancement - Image Compression	Installing the Maya program, explaining the basics, and designing the first model
4	First Exam	First Exam
5	Computer Vision and Image Processing - Computer Image System - Image Representation - Image Resolution - Images Types - Images Format	The Modeling in 3D Animation
6	Digital Audio - Digitization of Sound - Nyquist Theorem - Sampling and Quantizing audio Sampling rate Encoding	Build a three-dimensional model through the Polygons
7	Digital Audio - Quantization of Audio - Signal to Noise Ratio (SNR) - Pulse Code Modulation PCM	Build a three-dimensional model through the curves
8	Video - Analog Video - Digital Video - Basics of Video - Using Video On PC - Broadcast video standards	The Texturing in 3D Animation
9	Video - Digitization of Analog Video to Digital Video - Video Formats - Software for Capturing and Editing Videos - Video Capture Media and Instruments:	Create Custom Texture
10	Second Exam	The Rigging - Building Character in 3D Animation (Build skeleton)
11	Animation - History and background of animation - Animation work - Frame-by-Frame Animation - Bitmap Graphics	The Animation using curve

	- Vector Graphics	
12	Animation - Bitmap versus Vector - Keyframe-based Animation - Tweening	The Animation using keyframes and timeline
13	Animation - Morphing - Particle Systems - Flocking Systems	Cameras in 3D Animation
14	Example of Morphing	Lighting in 3D Animation
15	Example about Particle Systems	Rendering in 3D Animation

Textbooks:

[1]: Fundamentals of Multimedia Second Edition by Ze-Nian Li • Mark S. Drew Jiangchuan Liu

[2]: digital multimedia , t.m.savage and k.e.vogel , jones and bartlett publishers , massachusetts

Suggested references:

[1]: *Multimedia: Computing, Communications and Applications*, Steinmetz R. And Nahrstedt K., Prentice Hall,

[2]: *Fundamentals of Multimedia: Ze-Nian Li, Mark S. Drew*. Prentice-Hall,

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	60
10	10	14	6	40

Assignment/ Project	Description	Due Date	Marking
test	written exam	15/3/2023	3
Report		1/5/2023	3

Instructor(s) information [معلومات الأستاذ]

Section ; Lecture Room:[], ; Office No.: ()

Theory instructor's Name:

Dr. Karim Kasim karim.qh@ uomustansiriyah.edu.iq

Dr. Asmaa Sadiq asmaasadiq@uomustansiriyah.edu.iq

Dr. Hassan Kassim hassan@uomustansiriyah.edu.iq

Practical instructor's Name :

muna abdul hussain muna.ali@ uomustansiriyah.edu.iq

samera abdul kader samiracs@ uomustansiriyah.edu.iq

Office Hours : Tue.:[: – :]
Wed.:[: – :]

NOTES:

- Office Hour: Other office hours are available by appointment.**
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Course Plan



Course No.: 50811407

Time Division: 3hr Theoretical and 1hr Practical

Course Name: **Cloud Computing**

Semester & Year: **Second 2024 / 2025**

Course Website: None

Course Description:

This project-based course will give students a theoretical foundation and hands-on experience with the various technologies of the cloud computing paradigm. Cloud computing is the delivery of computing as a service, whereby distributed resources are provided by appropriate service suppliers and leased, rather than owned, by an end user as a utility (similar to electricity and water) over a network (typically the Internet). Cloud computing services are becoming ubiquitous and are being adopted by a growing number of fields. Organizations are recognizing the benefits of this new computing paradigm in terms of increased flexibility, elasticity as well as reduced upfront costs and carbon footprint.

The lectures will cover topics related to three cloud service types SAAS types like google drive, PAAS types like Microsoft Azure and IAAS like (Amazon S3). Also, the students will understand cloud computing, the different models and architectures and study about the services offered by cloud, software plus services and understand about virtualization of cloud and various examples of cloud computing.

Course Intended Outcomes:

At the end of the course, students are expected to learn:

1. Students will Understand need of cloud computing, cloud essentials, benefits, challenges, limitations, usage and applications, business models.
2. Discuss the meaning of cloud computing, understand **cloud models**, cloud application architecture, cloud computing **architecture** and various infrastructure models.
3. Students will Understand the various **cloud services**.
4. Students will Get knowledge of **virtualization** to know about virtual machines and types of virtualizations.
5. Students will Get knowledge of **Cloud Storage AND Security** of cloud computing.

Course Outline:

Week	Theoretical	Practical
1	-Introduction to paradigm of computing	Introduction to cloud, google cloud
2	-Fundamental of cloud computing: Historical view -Similarities and difference between Cloud Computing and Mainframes -Definition of cloud computing -Roots of cloud computing	Google doc, create, get link, share, email
3	-Key Properties of cloud computing -limitation of cloud computing -benefits of cloud computing	Google forms, create, adjust the setting, get the link, share, email
4	- Overview of a Cloud architecture: Cloud Components, -5-4-3 Principles of Cloud computing -five Essential Characteristics	Google slides, create, ...
5-6	-Cloud computing models 1) Infrastructure as a Service (IaaS): Benefits of IaaS. 2) Platform as a Service (PaaS): Benefits of the PaaS model include: 3) Software as a Service (SaaS): Benefits of the PaaS model include, Drawbacks of SaaS - Summary of the different cloud service models	Exam1
7	First Exam	Google apps script (intro+ examples)
8-9	Cloud Computing Models: 1) Private cloud: Characteristics, Suitability, not suitable, Advantages and Disadvantages 2) Public cloud: Characteristics, Suitability, not suitable, Advantages and Disadvantages 3) Community cloud: Characteristics, Suitability, not suitable, Advantages and Disadvantages 4) Hybrid cloud: Characteristics, Suitability, not suitable, Advantages and Disadvantages	Cont.+ wrap up the previous information

10	Second Exam	Google website
11	- Technologies related ; Explain some technologies that are attached to cloud computing. - Implementation's providers : Define and explain different implementation such as google, amazon, Microsoft Online Services.	Colab -introduction, benefit, how to use (text cell, code cell, scripting, share notebook,)
12	Cloud Storage for Cloud Computing	Colab programing with python
13	Virtualization and type of virtualization	Examples
14	Cloud Computing Security	Exam2
15	Project Discussion	Project Discussion
Final exam		

Textbooks:

- [1] Chandrasekaran, K. *Essentials of cloud computing*. CRC Press, 2014.
- [2] Velte, Anthony T., et al. *Cloud computing: a practical approach*. New York: McGraw-Hill, 2010.
- [3] Hill, Richard, et al. "Enterprise cloud computing." *Guide to Cloud Computing*. Springer London, 2013. 209-222.
- [4] Jurg van Vilet and Flavia Paganelli, *Programming Amazon EC2*, O'Reilly Media, 2011
- [5] Jothy Rosenberg and Arthur Mateos, *The Cloud at Your Service*, Manning Publications, 2010
- [6] Sean Owen, Robin Anil, Ted Dunning and Ellen Friedman, *Mahout in Action*, Manning Publications, 2011

Marking:

second Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	14	6	60

Assignment/ Project	Description	Due Date	Marking
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Instructor(s) information [معلومات الأستاذ]

Section: (Computer Science); Lecture Room: [], ; Office No.: ()

Instructor's Name: **Dr. Rafaa Ismael Yahya**

E-Mail: rafaa_ismaeel79@uomustansiriyah.edu.iq

Instructor's Name: **Zeyad Farooq**
E-Mail: Zeyadfa6@uomustansiriyah.edu.iq

Office Hours: Sun: [: – :]
Mon:[: – :]
Thu: [: – :]

NOTES:

- Office Hour: Other office hours are available by appointment.
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Course Plan

Course No.:

Time Division: 3 hr Theoretical and 2 hr Practical

Course Name: Website Security

Semester & Year: First, 2024 / 2025

Course Website:

Course Description:

This course provides an introduction to website security, covering fundamental concepts and practices for protecting web applications from vulnerabilities and cyber threats. Topics include secure coding, authentication, encryption, and defense against attacks like SQL injection, XSS, and CSRF. Students will gain practical skills to enhance website resilience and maintain user trust.

Course Intended Outcomes:

Student at the end of course must be able to:

- Identify common vulnerabilities in websites and web applications.
- Apply secure coding practices to prevent security breaches.
- Implement authentication and authorization mechanisms to protect user data.
- Utilize encryption techniques to ensure data confidentiality and integrity.
- Detect and mitigate web-based attacks, such as SQL injection, XSS, and CSRF.
- Conduct security assessments and recommend measures to improve website security.
- Understand the principles of ethical hacking and penetration testing in web environments.
- Differentiate between Attack and Threat.
- Differentiate between types of Risks.

Course Outline:

Week	Description depends on the Timing table	Practical
1	Introduction to Website Security Overview of web security principles and threats Importance of protecting web applications	Introduction to HTML language Part1
2	Cryptography Fundamentals Encryption, decryption, and key management Symmetric and asymmetric cryptography in web security.	HTML language tags Part 2
3	Authentication and Session Management User authentication mechanisms Securing session cookies and tokens	CSS language
4	Access Control and Authorization Role-based access control (RBAC) Managing permissions and secure APIs.	basics of PHP languages
5	Web Application Architectures and Vulnerabilities Common vulnerabilities Secure web development practices	Connect PHP with MySQL
6	First Exam	First Exam
7	Secure Coding Techniques Input validation and sanitization Preventing injection attacks (SQL, XSS, etc.)	Login interface the user into the webpage using PHP with MYSQL
8	Cross-Site Attacks and Defenses Cross-Site Scripting (XSS) Defense mechanisms and prevention strategies	Injection Issues HTML Injection - Stored Iframe Injection
9	Web Communication Security Secure Sockets Layer (SSL) and Transport Layer Security (TLS) HTTPS and certificate management	OS Command Injection PHP Code Injection Server Side Includes Injection (SSI)
10	Web Server and Database Security Securing server configurations and file permissions Preventing database-related attacks	SQL Injection AJAX SQL Injection Authentication Bypass SQLite Injection
11	Client-Side Security Protecting against malware and phishing Browser security features and Content Security Policy (CSP)	XPATH Injection Cross Site Scripting (XSS) Issues Reflected XSS (Back Button)
12	Security Testing and Vulnerability Assessment Penetration testing for web applications Automated tools for vulnerability scanning	Reflected XSS eval() XSS Reflected HREF XSS PHP_SELF
13	Second Exam	Second exam
14	Incident Response and Recovery Handling web security breaches Backup strategies and recovery planning	Sensitive Data Exposure HTML5 Web Page Storage Text Files (Accounts)
15	Finalization and Reviewing	Text Files (Accounts)

Textbooks:

[1]: CRYPTOGRAPHY AND NETWORK SECURITY PRINCIPLES AND PRACTICE, by William Stallings, 7th edition, 2017.

Suggested references:

[1]: Stuttard, D., & Pinto, M. (2011). The web application hacker's handbook: Finding and exploiting security flaws (2nd ed.). Wiley.

Marking:

Second Semester				Final Exam
1st exam	2nd exam	Practical	Activity	

Assignment/ Project	Description	Due Date	Marking
Quizzes	Two or more quizzes	During the course	2
Homework	Solving some homework sheets	During the course	4

Instructor(s) information

Branch: (Cybersecurity); Lecture Room:[401]; Office No.: (Floor-3)

Instructor's Name: Dr. Bashar M. Nema, and DR. Ayman Majid

E-Mail: bashar_sh77@uomustansiriyah.edu.iq,
aymanmajid@uomustansiriyah.edu.iq

Office Hours: Tue.: [9:00-10:00] Thr.: [9:00-11:00]

NOTES:

-Office Hour: Other office hours are available by appointment.

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Course No.: 1

Time Division: 3hr Theoretical and 1hr Practical

Course Name: Cloud Computing Security

Semester & Year: First (2024 / 2025)

Course Website: None

Course Description:

This course will provide students with a theoretical foundation to learn the basic concepts in cloud computing security, in addition to give them a practical experience in dealing with secure storage of data and documents within the cloud environment. Students can also learn about the most important services provided by cloud computing and how to set a strict Identity and Access Management (IAM) System to use these services. This course presents, in its theoretical aspect, types of cloud computing deployment models and the security breaches that each type may be exposed to. This course also explains the most prominent internal and external threats in the cloud environment so that students have the ability to understand the most important security requirements and practices that must be followed to achieve safe use of cloud computing services.

The practical lectures will cover topics related to using Google Cloud Platform convenient, easy-to-use tools and provide a secure access to the systems, data and resources. The students will be able to protect the personal files from the hands of fraudsters and those who want to use them without permission. Also they can encrypt and protect cloud documents from any cyber criminals by using extensions tools such as *DocSecrets* add-on which help them to design a secure Google sites to any organization.

This subject presents the cloud computing security

The course is meant to introduce students to the field of cloud computing security. Students will understand and appreciate some of the current challenges and tradeoffs when mapping different applications to the cloud.

The course has three main goals:

- To learn the core concepts and principles of cloud computing security as well as identify and explore some of the emerging cloud security risks and their relevant security controls.
- To gain hands-on experience in using cloud computing services and tools securely by designing, developing and deploying applications on cloud infrastructures.
- To work on a large research project in cloud computing security.

Course Intended Outcomes:

At the end of the course, students are expected to learn:

1. Students will explain the core concepts of the cloud computing security.
2. Students will understand the risks and responsibilities of using a cloud service provider.
3. Students will be able to prevent unauthorized users from accessing sensitive data and resources.
4. Students will be able to protect users' cloud-based accounts from takeover.

Course Outline:

Week	Theoretical	Practical
1	-Introduction to cloud computing security	Working on Google Cloud Platform (GCP) tools
2	-Fundamental of cloud computing -Definition of cloud computing -components of cloud computing	Working on Google apps as free (SaaS)
3	- Cloud Computing Security Architecture - Evolution of Cloud Computing - History of Cloud Service Providers - Cloud Computing Characteristics	Get started with Google Drive, Upload and create different files types and edit them online
4	- Introduction to Security of Cloud Computing Services - Software as a Service Security - Challenges in SaaS Security	Securing Google Docs by restrict the access to them, give different rules to the data owner
5-6	- Platform as a Service Security - PaaS Security Elements - Infrastructure as a Service Security - Cloud Service Provider (CSP) Responsibilities	Sharing options for cloud data, identification of document authenticity using online tools
7	First Exam	First Exam
8-9	- Cloud Computing Deployment Models: - Private Cloud - Public Cloud - Hybrid Cloud -Hybrid Cloud Security Challenges, different between Private cloud security and public cloud security - Community Cloud - Service level Agreements (SLA)	Preferences manage in Google Docs, Adding and Managing Signatures in Google Docs, Google Docs Notification Settings, Activity dashboard analysis, change privacy setting.
10	- Cloud Computing Security Risk. - Cloud computing Threats	Google doc protection, encrypt with Microsoft office, encrypt data on a Google doc with a third party app
11	Second Exam	Second Exam
12	- Cloud security practices - Select a Secure Cloud Service Provider - Understand the Risks and Responsibilities of Using a Cloud Provider	Steps to use the <i>DocSecrets</i> add-on, use it online to hide sensitive information on Google Docs

	- Set a Strict Identity and Access Management (IAM) System - How Does Cloud Security Work?	
13-14	- Virtualization Security in Cloud Computing - Types of Virtualization in Cloud Computing - Benefits of Virtualization technology - Advantages of Virtualization - Disadvantages of Virtualization - Virtualization Security	Working on Google sites, add subpages, section layout, Buttons, YouTube, encrypted Docs, Add Google Custom Search Engine (CSE), Manage and publish Google site online in a secure manner
15	Project Discussion	Working on Google Apps Script using cloud-based scripting coding language (using JavaScript that runs in the cloud)
Final exam		

Textbooks:

- [1] Thomas Erl, Eric Barceló Monroy, “**Cloud Computing Concepts, Technology, Security & Architecture**” second edition, Arcitura Education Inc., **2024**.
- [2] Huawei Technologies Co., Ltd., “**Cloud Computing Technology**”, Official Textbooks for Huawei ICT Academy, **2023**.
- [3] William Stallings, “**Cryptography And Network Security Principles And Practice**”, Eighth Edition, **2020**.

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
10	10	14	6	60

Assignment/ Project	Description	Due Date	Marking
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Instructor(s) information [معلومات الأستاذ]

Section: (computer science department); Lecture Room: [9]; Office No.: (2)
Instructor's Name: **Dr. Ethar Abdul Wahhab**

E-Mail: *ethar201124@uomustansiriyah.edu.iq*

Office Hours: Sun: [10:00 – 11:20]

Mon: [11:30 – 12:50]

Thu: [11:30 – 12:50]

NOTES:

-Office Hour :Other office hours are available by appointment.

-The content of this syllabus not be changed during the current semester.

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Course Plan



Course No.: **Time Division:** 2hr Theoretical and 1 hr. Practical
Course Name: **Network security** **Semester & Year:** **First, 2024/ 2025**
Course Website:

Course Description:

This course presents the theory and practice of network security, focusing on web and Internet security. It reviews how these tools are utilized in internet protocols and applications such as SSL/TLS, IPSEC, PGP, S/MIME, and others (including wireless). Network monitoring, such as intrusion and firewall

Course Intended Outcome

At the end of the course, students are expected to learn: • Security of network essentials and major-specific attacks against networks. • Dealing with different types of protocols and security weaknesses. • Knowing the most popular network attacks and countermeasures against them.

Course Outline:

Week	The description depends on the Timing table (Theoretical)	Lab & Practical
1	- Ch1: - Network edge: hosts, access network, physical media - Network core: packet/circuit switching, internet structure - Performance: loss, delay, throughput - Security - Protocol layers, service models .	What is Wireshark program and how it works
2	Ch2: Application layer: overview Principles of network applications Web and HTTP E-mail, SMTP, IMAP The Domain Name System DNS P2P applications	Install Wireshark on Windows and learn the basics of Wireshark
3	Ch2: socket programming with UDP and TCP	Capture the traffic of Networks using Wireshark

4	▪ Exam1	Exam1
5	Ch3:Transport layer ▪ Transport-layer services ▪ Multiplexing and demultiplexing ▪ Connectionless transport: UDP Principles of reliable data transfer	Capture Network Remotly. Introduction to Filters Explain OSI models
6	▪ Ch3: Connection-oriented transport: TCP ▪ Principles of congestion control ▪ TCP congestion control ▪ Evolution of transport-layer functionality	Display filters Rules How to display filters Save and edit display filters
7	Exam 2	Exam2
8	Chapter 4: network security policy	Address display filters IP with or display filter IP with And logical operator IP with not logical operator
9	Chapter 5: firewall	NPcap instead of winpacp Comparison operator
10	Chapter 6: firewall tools	Contains filters Match filter
11	Exam 3	Port display filter Source and destination
12	Chapter 7: IDS	Wireshark network analysis Wirshark packet filter IP mac port
13	Exam 3	Exam 3
14	Chapter 8: Spoofing & DoS Protection Email spoofing Protection	Tshark Network capture CLI
15	Honeypot and drawbacks	examples

Textbooks:

[1]: *Computer Networking: A Top-Down Approach*

8th edition

Jim Kurose, Keith Ross

Pearson, 2020

[2] William Stallings, “Cryptography and network security”, 5th Edition Prentice, Inc. 2013.

Suggested references:

Marking:

First Semester	Final Exam
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1st exam	2nd exam	Practical	Activity	
10	10	14	6	25 theoretical

Instructor(s) information [معلومات الأستاذ]

Section: (Computer Science) ; Lecture Room:[lab4], ; Office No.: (9)

Instructor's Name: *Lecturer, Dr. Yasamin Hamza*

E-Mail: yhamza@uomustansiriyah.edu.iq

Section: (Computer Science) ; Lecture Room:[lab4], ; Office No.: (4)

Instructor's Name: *Lecturer, Dr. Ayman Majid Hamid*

E-Mail: aymanmajid@uomustansiriyah.edu.iq

NOTES:

-Office Hour: Other office hours are available by appointment.

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Course Plan



Course No.: 50811405 **Time Division:** 3 hr Theoretical and 1 hr Practical
Course Name: Operating Systems **Semester & Year:** **First, 2024 / 2025**
Course Website:

Course Description:

Introduction to Operating Systems, Hardware & Software Concepts, Process Concepts, Thread Concepts, Asynchronous Concurrent Execution, Concurrent Programming, Deadlock, and Indefinite Postponement, Processor Scheduling, Real Memory Organization and Management, Virtual Memory Organization, Virtual Memory Management, Disk Performance Optimization (and RAID), File and Database Systems, Performance and Processor Design, Multiprocessor Management, Introduction to Networking, Distributed Systems and Web Services, Security, Case Study: Linux and Case Study: Windows XP.

Course Intended Outcomes:

In This course of Operating Systems, we will introduce the core operating system concepts and design considerations. To complement the discussion of operating system concepts, so readers working through the chapter material can refer to each case study to see how a particular topic is handled in either Linux or Windows XP. Using Java code to illustrate key points, Operating Systems introduces processes, concurrent programming, deadlock and indefinite postponement, mutual exclusion, physical and virtual memory, file systems, disk performance, distributed systems, multithreading, and extensive treatments of distributed computing, multiprocessing, performance, and computer security.

Course Outline:

Week	The description depends on the Timing table (Theoretical)	(Practical)
1	<i>Introduction to operating systems:</i> ❑ what is an operating system ❑ early history 1940's and 1950's, 1960's ❑ operating system thinking ❑ history of the internet and world wide web ❑ The 1990's, 2000 and beyond ❑ application bases, OS environment, components and goals, architecture	Background (Iteration Statements, Function, One Dimension Array)

2	<i>Hardware and Software Concepts</i> ☐ introduction, the evolution of hardware devices ☐ hardware components ☐ operating system thinking, caching, main memory, secondary storage, buses, DMA. ☐ legacy hardware and software ☐ peripheral devices ☐ Hardware support for OS, processor ☐ OS thinking: principle of least privilege, protection ☐ caching and buffering and SW overview ☐ application programming interface API, compiling, linking, and loading. ☐ caching and buffering and SW overview ☐ application programming interface API, compiling, linking, and loading.	Device Directly Introduction + Prompt (' C:\>')
3	<i>Process Concepts</i> ☐ introduction, operating system thinking: customers ultimately want applications ☐ definition of the process, process states: the life cycle of a process, process management ☐ Process operations ☐ Interrupts and interposes communication	Create File (MF) + Make Directory (MD)
4	<i>Thread Concepts</i> ☐ introduction, OS thinking: concurrency ☐ definition of thread, motivations, OS thinking: parallelism ☐ thread states: the life cycle of a thread ☐ Thread operations ☐ Threading models: user-kernel level ☐ thread implementation considerations ☐ POSIX and P-threads ☐ OS thinking: scalability	Remove File (RF) + Remove Directory (RD)
5	<i>Asynchronous Concurrent Execution</i> ☐ introduction ☐ mutual exclusion, critical sections ☐ Implementing mutual exclusion primitives ☐ SW solutions to the mutual exclusion problem ☐ HW solutions to the mutual exclusion problem and semaphores	Print Data (Dir)
6	<u><i>First Exam</i></u>	Testing

7	<i>Concurrent Programming</i> ☐ Introduction ☐ Monitors, OS thinking: information hiding ☐ Monitor examples, multithreading case	CPU Scheduling algorithms First - Come – First – Serves (FCFS)
8	<i>Processor Scheduling</i> ☐ introduction ☐ scheduling levels, preemptive vs. nonpreemptive scheduling ☐ OS thinking: overhead priorities ☐ scheduling objectives, OS thinking: predictability, fairness ☐ scheduling criteria	Short Job – First – Serves (SJFS)
9	<i>Processor Scheduling</i> ☐ Scheduling algorithms FIFO, RR, SPF, HRRN, SRT ☐ Multilevel feedback queues, fair share scheduling ☐ Deadline scheduling	Priority
10	<u>Second Exam:</u> <i>And its solutions</i>	Round – Robin scheduling
11	<i>Deadlock and Indefinite Postponement</i> ☐ introduction ☐ examples of deadlock, simple resource deadlock ☐ OS thinking: waiting ☐ deadlock and indefinite postponement, spooling sys. a related problem, indefinite postponement, resource concepts	Testing
12	<i>Deadlock and Indefinite Postponement</i> ☐ Deadlock solutions, deadlock prevention ☐ Denying the non-preemptive condition ☐ Deadlock avoidance Dijkstra's algorithm ☐ Deadlock detection ☐ Deadlock recovery	memory management
13	<i>Virtual memory organization</i> ☐ Introduction ☐ OS thinking: virtualization, virtual memory concepts ☐ Block mapping, paging, ☐ OS thinking: empirical results: locality-based heuristics, lazy allocation ☐ Segmentation and paging system	empty memory print memory

14	Virtual memory organization ☐ Secondary storage files and databases ☐ Disk performance optimization	save memory delete memory
15	Testing and Reviewing	Testing

Textbooks:

[1]: operating systems, third edition, Harvey M. Deitel, Paul J. Deitel (Author), David R. Choffnes

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	

Assignment/ Project	Description	Due Date	Marking
H.W. 1	Solve the chapter questions		2 Marks
H.W. 2	Solve scheduling problem		2 Marks
Quizzes	Two quizzes	During the course	2 Marks

Instructor(s) information

Section: **Computer Sciences**; Lecture Room: **[401,402]** , ; Office No.: **(9)**

Instructor's Name: Dr. Abbas Aram Khursheed

LecTurer Reyad Hazem

LecTurer *Samira Abdul-kader Hussain*

E-Mail:

abbasarab2000@uomustansiriyh.com

jamal.hasoon@uomustansiriyah.edu.iq

reyadh.hazim@uomustansiriyah.edu.iq

samira.hussain1212@gmail.com

NOTES:

-Office Hour: Other office hours are available by appointment.

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Course Plan

Course No.:

Time Division: 3 hr Theoretical and 2 hr Practical

Course Name: Digital Forensic

Semester & Year: 2nd , 2024 / 2025

Course Website:

Course Description:

Digital Forensics is a specialized field focused on the application of scientific methods to preserve, recover, and investigate digital evidence in the context of cybercrimes and digital incidents. This course provides a comprehensive understanding of the principles, processes, and tools used in Digital Forensics, covering topics such as digital evidence collection, data recovery, forensic analysis, and legal considerations. Students will explore various types of Digital Forensics, including computer, network, mobile device, and cloud forensics, while gaining hands-on experience with industry-standard tools. By the end of the course, students will be equipped with the skills to conduct thorough digital investigations, maintain evidence integrity, and present findings effectively in legal settings.

Course Intended Outcomes:

Student at the end of course must be able to:

1. **Understand Digital Forensics Fundamentals:**

- Define Digital Forensics, its scope, and its role in investigating digital crimes, while recognizing legal and ethical considerations.

2. **Apply Forensic Principles and Techniques:**

- Preserve, collect, and analyze digital evidence using scientifically proven methods, ensuring integrity and chain of custody.

3. **Utilize Forensic Tools and Technologies:**

- Operate industry-standard tools (Data acquisition, recovery, and analysis in various scenarios).

4. **Conduct Systematic Forensic Investigations:**

- Perform end-to-end Digital Forensic investigations, including evidence identification, examination, documentation, and presentation in legal contexts.

5. **Analyze and Solve Real-World Cases:**

- Evaluate real-world case studies and apply critical thinking to address complex digital crimes using appropriate forensic methodologies.

Course Outline:

Week	Description depends on the Timing table
1	Introduction to Digital Forensics ○ Definition and scope of Digital Forensics ○ History and evolution of Digital Forensics ○ Importance of Digital Forensics in modern investigations ○ Legal and ethical considerations
2	Elements of a Digital Crime ○ Understanding digital crimes (cybercrime, fraud, hacking, etc.) ○ Components of a digital crime scene ○ Role of digital devices in crimes
3	Goals of Digital Forensic Investigation ○ Primary objectives of Digital Forensic investigations ○ Preserving evidence integrity ○ Recovering deleted or hidden data ○ Presenting findings in court
4	Classification of Digital Forensics and Types of Digital Forensics: (Computer Forensics, Network Forensics, Mobile Device Forensics, Cloud Forensics, Multimedia Forensics)
5	Fundamental principles of Digital Forensics: (Integrity, Chain of custody, Authenticity, Reproducibility)
6	First Exam
7	Steps in a Digital Forensic investigation: (Identification, Preservation, Collection, Examination, Analysis, Documentation, Presentation)
8	Data Acquisition and Preservation (Methods of data acquisition (bit-by-bit imaging, live acquisition), Techniques for preserving digital evidence, Challenges in data acquisition)
9	Data Recovery and Analysis (Techniques for recovering deleted or corrupted data, File system analysis (FAT, NTFS, EXT, etc.), Timeline analysis and keyword searches)
10	Network Forensics (Introduction to Network Forensics, Capturing and analyzing network traffic, Identifying network-based attacks)
11	Mobile Device Forensics (Challenges in mobile device forensics, Extracting data from smartphones and tablets, Analyzing call logs, messages, and app data)
12	Cloud Forensics (Introduction to Cloud Forensics, Challenges in cloud-based investigations, Techniques for acquiring evidence from cloud environments)
13	Second Exam
14	Case Studies and Practical Applications (Real-world case studies in Digital Forensics, Hands-on practice with forensic tools, Review and discussion of key concepts)
15	Finalization and Reviewing

Textbooks:

[1]: Fundamentals of Digital Forensics: A Guide to Theory, Research and Applications

Authors: Joakim Kävrestad, Marcus Birath, Nathan Clarke, <https://link.springer.com/book/10.1007/978-3-031-53649-6>

Suggested references:

[1]: Handbook of Digital Forensics and Investigation,

https://www.vector.edu.jm/download/Resources/books/handbook_of_digital_forensics_and_investigation.pdf

[2]: Introduction to Digital Forensics (Academic Paper),

https://www.academia.edu/37613861/Introduction_to_Digital_Forensics

Marking:

Second Semester				Final Exam
1st exam	2nd exam	Practical	Activity	

Assignment/ Project	Description	Due Date	Marking
Quizzes	Two or more quizzes	During the course	2
Homework	Solving some homework sheets	During the course	4

Instructor(s) information

Branch: **(Cybersecurity)**; Lecture Room:**[401]**; Office No.: **(Floor-3)**

Instructor's Name: **Prof. Dr. Bashar M. Nema, and DR. Ayman Majid**

E-Mail: bmn774@uomustansiriyah.edu.iq,
aymanmajid@uomustansiriyah.edu.iq

Office Hours: Tue.: [**9:00-10:00**] Thr.:**[9:00-11:00]**

NOTES:

-Office Hour: Other office hours are available by appointment.

-The content of this syllabus not be changed during the current semester.

Lecturer Signature

Chairman Signature



Ministry of Higher Education and Scientific Research
Mustansiriyah University /College of Science
Department of Computer Science
(الخطة الدراسية للمساق)
Course Plan



Course No.: **Time Division:** three hours Theoretical and
One hour Practical

Course Name: **Data hiding and watermarking**

Semester & Year: **Second, 2024 / 2025**

Course Website:

Course Description:

The course focuses on information concealment, including digital watermarking, steganography, and steganalysis. This course is focusing on their theoretical foundations, principles with practical application. It explores the principles of embedding, extracting, and analyzing hidden information in images with an emphasis on imperceptibility, robustness, and security.

Course Intended Outcomes:

Course Outline:

Week	Description depends on the Timing table (Theoretical	Text book	& Practical)
1	DIGITAL RIGHTS MANAGEMENT 1.2 DIGITAL WATERMARKING 1.3 CLASSIFICATION OF COPYRIGHT MARKING 5 1.4 GENERAL FRAMEWORK OF DIGITAL WATERMARKING	[1]	
2	1.5 PERFORMANCE CRITERIA 12 1.6 PERFORMANCE METRICS 15 Chapter2 (Advance Watermarking Techniques 2.1 Introduction 2.2 WATERMARKING IN THE SPATIAL DOMAIN 2.2.1 Least-Significant-Bit Substitution Technique	[1]	
3	Chapter 4	[2]	

	Digital Watermarking Fundamentals 4.1.1 SubStitutive Watermarking in the Spatial Domain 4.1.2 Additive Watermarking in the Spatial Domain		
4	4.2 FREQUENCY DOMAIN WATERMARKING 4.2.1 SubStitutive Watermarking in the Frequency Domain 4.2.2 multiplicative Watermarking in the Frequency Domain	[2]	
5	2.4 WATERMARKING IN THE DISCRETE COSINE TRANSFORM 34	[1]	
6	2.5 WATERMARKING IN THE DISCRETE WAVELET TRANSFORM 37	[1]	
7	3.4 DISCRETE WAVELET TRANSFORM	[2]	
8	Chapter 5 Watermarking Attacks and Tools 5.1.1 Attack by Filtering	[2]	
9	3.6 CHAOTIC MAP	[1]	
10	3.2 Types of Steganography 3.3 Domain-Based Classification of Steganography	[3]	
11	3.3.1.5 Hash Function-Based Steganography in Spatial Domain	[3]	
12	Discrete Cosine Transformation-Based Reversible Encoding,	[3]	
13	Steganography and Steganalysis	2	
14	Steganography and Steganalysis	2	

Textbooks:

[1]: Digital Image Watermarking Theoretical and Computational Advances, Surekha Borra, Rohit Thanki, and Nilanjan Dey, CRC Press Taylor & Francis Group, 2019

[2]: Digital Watermarking and Steganography: Fundamentals and Techniques, Frank Y. Shih, CRC Press Taylor & Francis Group (Second Edition), 2017

[3] Reversible Steganography and Authentication via Transform Encoding, Jyotsna Kumar Mandal, springer, 2020

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Suggested references:

[1]: Watermarking Techniques for Copyright Protection of Videos, Ashish M. Kothari ,Vedvyas Dwivedi, Rohit M. Thanki, springer, 2019

[2]:

Marking:

First Semester				Final Exam
1st exam	2nd exam	Practical	Activity	
12	12		8	30

Assignment/ Project	Description	Due Date	Marking
test	written exam		3
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Instructor(s) information [معلومات الأستاذ]

Section: ; Lecture Room:[301], ; Office No.: ()

Instructor's Name: Dr.Saad Najim Alsaad E-Mail: dr.alsaadcs@uomustansiriyah.edu.iq

Instructor's Name: Muthana Salih E-Mail: muthanasalih007@gmail.com

Office Hours : Mon.: [11:30 – 12 :50]
Wed : [10:40- 11:20]

NOTES:

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Lecturer Signature

Chairman Signature



Ministry Of Higher Education and Scientific Research

AL-Mustansaria University\ College of science\ Computer science dept.

Course Plan 2025

**Course No.:**

Course Name: Database security

Time Division:

3hr Theoretical and 2hr Practical

Semester & Year:

Two , 4th year CYB 2024-2025

Course Description

3 (credit hours, Prerequisite [1- principal of database, 2- Introduction to Cyber security])

This course investigates into the critical aspects of securing database systems, a cornerstone of modern information technology. Students will gain a comprehensive understanding of the vulnerabilities, threats, and countermeasures associated with relational databases, NoSQL databases, and other data storage systems. The software used in lab is MySQL server. There will be two exams, two quizzes and group work.

Course Intended Outcomes

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

- Identify and assess common database security threats and vulnerabilities.
- Implement and evaluate database security controls.
- Design and implement secure database architectures.
- Respond effectively to database security incidents.
- Analyze and interpret database security logs and audit trails.
- Stay current with emerging threats and technologies in database security.

Course Outline

Week	topic	description
1	Fundamentals of Database Security	• Database security principles and objectives (confidentiality, integrity, availability) • Assets (database assets) and threats • Threat modeling and risk assessment for database systems
2	Fundamental od Database	• Database Security and Compliance • Legal and regulatory compliance (e.g., GDPR, HIPAA) • Database security versus DBMS security • Security issues faced by enterprises (team work analysis to different scenario)

3	Database Vulnerabilities	Threats to Database (Un authorized modification, unauthorized disclosure and loss of availability) • SQL injection and other common attacks • Data breaches and their impact
4	Database Vulnerabilities Cont.	• Insider threats and data exfiltration • Malware and ransomware attacks targeting databases
5	Database Security Controls	• Access control mechanisms (authentication, authorization, least privilege) Access Control Models: MAC, DAC, RBAC • Data encryption and key management
6	<i>Database security Controls Cont.</i>	• Data masking and de-identification techniques (Dynamic Data Masking (DDM) in my sql server) • Virtual Private Databases (VPDs)
7	Exam1	
8	Database security controls Cont.	Intrusion detection and prevention systems (IDS/IPS) for databases • Common Threats Detected and Prevented by Database IDS/IPS: • Benefit and challenge of (IDS/IPS)
9	Database security controls cont.	Auditing and logging of database activity • Benefit of database auditing • Challenges • Tools and techniques
10	Watermarking in Relational Database	• Challenge of watermarking in Relational database • Approaches to Watermarking Relational Databases:
11	Encryption in database	• Transparent Data Encryption • Other Encryption Methods • Key Management • Other Data Protection Mechanisms • Choosing the Right Encryption Mechanism

	Cloud Database Security	• Security considerations for cloud-based databases (AWS, Azure, GCP) • Shared responsibility models and security best practices
13	Cloud Database Security	• Data protection in cloud environments • Quiz
14	Exam2	
15	emerging Threats and Technologies: Technologies:	• Security challenges of big data and NoSQL databases • Blockchain and its implications for database security • Artificial intelligence and machine learning for database threat detection

Textbooks and references

- "Database Security Problems and Solution", Christopher Diaz, 1th edition, David Pallai, Mercury Learning and Information., 2022.
https://api.pageplace.de/preview/DT0400.9781683926627_A49425169/preview-9781683926627_A49425169.pdf
- Thuraisingham, B., 2005. Database and applications security: Integrating information security and data management. Auerbach Publications.

Marking

First Exam	20 marks	Second Exam	20 marks
practical	14 marks	Final Exam	60 marks

Assignments and/or Project

Assignment/Project	Description	Marking
Group work	Students asked to analyze and solved a case study related to database security , this is a group work , 15-20 minutes is given to student to perform the task and deliver a suitable solution to security problem in hand.	2 Marks
H.W. 1	Student will be asked to search for more than three topics related to database security	2Marks
Quizzes	Two quizzes	2 Marks

Instructor(s) information[]

Section: 2

Lecture Room: 402

Time: : 10 am

Office No.:9

Instructor's Name: Wurood Albayati

E-Mail: w.[albayati@uomustansiriyah.edu.iq](mailto:w.albayati@uomustansiriyah.edu.iq)

Office Hours: : Other office hours are available by appointment.

Important: The content of this syllabus may not be changed during the current semester.