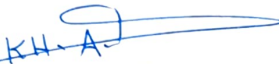# Academic Program Description Form

University Name: Al- Nahrain University
Faculty/Institute: College of Science
Scientific Department: Computer Science
Academic or Professional Program Name: Bachelor in Computer Science
Final Certificate Name: Bachelor in Computer Science
Academic System: Semester System
Description Preparation Date: 12/1/2025
File Completion Date: 12/1/2025

Signature: KH. A.
Head of Department Name:
Assi. Prof. Dr. Khamael Al-Dulaimi
Date:

Signature:
Scientific Associate Name:
Manaf Adnan
Date:

The file is checked by:
Department of Quality Assurance and University Performance
Director of the Quality Assurance and University Performance Department:
Date:
Signature:

Dean of Science College Approval

1. Program Vision

Our vision is that the department with the College will be world-class "educational" "research" and "international" in its programs, curricula, and scientific research and will seek to achieve a prominent place among the relevant departments of Iraqi and international universities by providing and updating modern, distinct programs focusing on labor market requirements and development and that research and scientific activities will be supportive of technological development.

2. Program Mission

The department's mission is to prepare, qualify, and upgrade the labor market with distinguished graduates with the necessary knowledge and practical skills to build computer systems software, possess functional intelligence skills, and equip them to meet the needs of the National Development Plan and support the public and private sectors, and to be able to conduct scientific and applied research, provide advisory services and training in the fields of specialization and keeping pace with today's demands.

3. Program Objectives

The program aims to prepare the students professionally and scientifically to apply what they have learned in the following areas
(Artificial intelligence, database management systems, website development, application development for smartphones, software engineering, computer security, and data mining) in practice through:
1. Acquiring knowledge and skills in the field of computer science along with relevant knowledge and skills in all fields.
2. Possessing communication and learning skills that prepare them to acquire knowledge in the field of the labor market and/or admission to graduate programs.
3. Acquiring good analysis, design and implementation skills required to formulate and address computing problems with an understanding of the processes that support the delivery and management of secure computing-based solutions within a specific application environment.
Integrating an understanding of the general human context with the solutions offered by side-by-side computing as well as strong analytical and critical thinking skills. It will develop graduates' awareness and enable the use of their contributions in a social, business, technical, ethical and humanitarian context.

4. Program Accreditation

Not yet

5. Other external influences

 Deans of Sciences Colleges Committee

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	2	4		
College Requirements	0	0		
Department Requirements	12	24		
Summer Training				
Other				

* This can include notes whether the course is basic or optional.

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
Third Class	COMP 315	Language Translators I	2	2
Third Class	COMP 340	Artificial Intelligence	2	2
Third Class	COMP 360	Digital Image Processing	2	2
Third Class	COMP 330	Database I	2	2
Third Class	COMP 383	Computer Skills IV	-	2
Third Class	UREQ 320	Human Rights	1	-
Fourth Class	COMP 435	Computing Security I	3	-
Fourth Class	COMP 461	Audio & Video Computing	2	2
Fourth Class	COMP 417	Operating System I	2	2
Fourth Class	COMP 437	Computer Networks	2	2
Fourth Class	COMP 441	Machine learning	2	2
Fourth Class	UREQ 425	General Management	1	-
Fourth Class	COMP 490	Project	-	2

8. Expected learning outcomes of the program

Knowledge

1.Enabling students to obtain knowledge and understanding of computer basics 2. Enabling students to obtain knowledge and understanding of computer applications 3. Enabling students to obtain knowledge and understanding of computer programming 4. Enabling students to obtain knowledge and understanding of computer networks 5. Enabling students to obtain knowledge and understanding of multimedia 6. Enabling students to obtain knowledge and understanding of data science and mining	
Skills	
1-Scientific skills in writing project 2. Logical thinking and analysis skills 3. Skills by using modern applications 4. Practical application skills	
Ethics	
1. Teaching students the moral goals of the educational process 2. Teaching students the importance of educational guidance in university studies 3. Teaching students how to interact positively with other colleagues in order to reach a state of academic excellence	

9. Teaching and Learning Strategies

1. Providing students with the basics and additional topics related to the outcomes of logical thinking and analysis.
2. Creating discussion groups during lectures to discuss specialized topics that require thinking and analysis.
3. Asking students a set of thinking questions during lectures, such as what, how, when, and why for specific topics.
4. Giving students homework that requires self-explanation
5. Scientific visiting to work sites, companies and departments and learning how to use computer systems in reality

10. Evaluation methods

1-Quality standardsing
2. Daily exams with self-solved home-based questions.
3. Participation marks for competitive questions related to the academic subject.
4. Specific grades with homework assignments.
5. Small project
6. Monthly exams and quarterly exams

11.Faculty

Faculty Members

Academic Rank	Specialization	Special Requirements/Skills (if applicable)	Number of the teaching staff

	General	Special			Staff	Lecturer
Ban Nadeem Dhannoon Younis	computer	AI and image processing			staff	
Mohammed Sahib Mahdi	physics	Multimedia and Robotics			staff	
AbdulKareem Merhej Radh	physics	AI			staff	
Jamal Mohammed Kadhim Ali	computer	Computer security			staff	
Sawsan Kamal Thamer Mohammed al-ani	computer	AI			staff	
Suhad Abdul-Rahman Yousif	computer	AI			staff	
Safaa Hussain Shwail	computer	AI \ Robot Path Planning			staff	
Zainab Namh Abdula Sultani	computer	Multimedia			staff	
Khameal Abbas Khudhair	computer	AI			staff	
Abeer Khalid Ahmed	computer	AI			staff	
Dalal Naeem Hmood	computer	Computer network			staff	
Nadia Fadhil Ibrahim	computer	AI			staff	
Azhar Mawlod Khathum Meyessar	computer	AI			staff	
Ghassan Abdulhakeem Mohmood	computer	Multimedia			staff	
Haider Majeed Jaber	computer	Computer network and security			staff	
Tiba Zaki Abdulhameed	computer	AI			staff	
Nagwan Abed Hasan	computer	Data security			staff	
Rasool Hisham Abd Al-Rasool	computer	Computer network and security			staff	

Ruaa Abdullah Jaber	computer	Image processing			staff	
Azahar Flaih Hassan zaho	computer	AI			staff	
Hanaa mohammed mushjil zinad	computer	AI			staff	
Assel Basim Sabri Yakoob	computer	AI			staff	
Khairiyah Saied Abd-algabbar Jasim	computer	Digital Image Processing			staff	
Zahraa Abdul hussienjaaz abed	computer	Computer network			staff	
Hasnaa imad abdulsalam	computer	Bioinformatics			staff	
Zainab Haider Ameen	computer	Computer network			staff	
Ehsan Qahtan Ahmed	computer	Computer network			staff	
Israa Husain Ali	computer	Digital Image processing			staff	
Farah Saad Ezz Al-dean	computer	Image processing			staff	
Asad Hussain Thary	computer	AI and Image Processing			staff	
Humam Khalid Jameel	computer	Computer			staff	
Wisam Rafid Dawood	Math	Math			staff	
Zeyad Mohammed Abed	Math	Graph Theory			staff	
Bahera Hani Nayef	physics	Information technology			staff	

Professional Development

Mentoring new faculty members

1- The department head schedules meeting with new faculty members and the rest of the faculty members and gives them information, awareness, and general background about the department and the department's academic program.

2- Workshops have been scheduled for faculty members to support knowledge and skills in teaching, scientific research, and quality assurance.

Professional development of faculty members

- Workshops have been scheduled to clarify the roles of university faculty members
- workshops and training have been scheduled on effective learning

- panel discussion have been scheduled to discuss the role of the academic staff and educational guidance
- conferences and seminars have been scheduled about academic research and how to participate in the professional development of faculty members.

12.**Acceptance Criterion**

System has been established by the Ministry of Higher Education and Scientific Research as a central admission mechanism to be considered

13.**The most important sources of information about the program**

For key sources of information about the academic program, please visit the Department of Computer Science website
https://sc.nahrainuniv.edu.iq/departments_ar.php?did=3

14.Program Development Plan

The program development plan is discussed annually with labour market employers and the department's scientific committee, and the syllabus is developed with updates based on the labour market's vision and the instructions of the Ministry of Higher Education and Scientific Research.

Program Skills Outline

Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
THIRD	COMP 321	Computer Architecture	C	✓	✓	✓	✓	✓	✓				✓	✓	✓
	COMP 315	Language Translators I	C	✓	✓	✓	✓	✓	✓	✓			✓	✓	
	COMP 340	Artificial Intelligence	C	✓	✓	✓		✓	✓				✓	✓	✓
	COMP 360	Digital Image Processing	O	✓	✓	✓		✓	✓				✓	✓	
	COMP 330	Database I	C	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
	COMP 383	Computer Skills IV	C	✓	✓	✓						✓	✓	✓	
FOURTH	COMP 435	Computing Security I	C	✓	✓					✓		✓	✓		
	COMP 461	Audio & Video Computing	O	✓	✓	✓	✓			✓		✓	✓	✓	
	COMP 417	Operating System I	C	✓	✓							✓	✓		
	COMP 437	Computer Networks	C	✓	✓	✓	✓			✓		✓	✓	✓	
	COMP 441	Machine learning	O	✓	✓	✓	✓			✓		✓	✓	✓	

Course Description Form

1. Course Name:
Artificial Intelligence

2. Course Code:
COMP340

3. Semester / Year:
First Semester / Third year

4. Description Preparation Date:
13/10/2024

5. Available Attendance Forms:
Mandatory

6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours (theoretical) + 30 Hours (Practical)

7. Course administrator's name (mention all, if more than one name)
Name: Lecturer. Dr. Sawsan Kamal Thamer Email: sawsan.kamal@nahrainuniv.edu.iq Lab: Assist.Lect: Ruaa Abdullah Jabir   Assist. Lect. : Bahera Hani Nayef

8. Course Objectives	
Course Objectives	The objective of an undergraduate Artificial Intelligence course is to equip students with a comprehensive understanding of the fundamental principles of Artificial intelligence, intelligent agents and search. Students will learn about designing and programming intelligent agents, study different types of search algorithms. And learn how to represent the problem and solve it.

9. Teaching and Learning Strategies	
Strategy	Lectures Hands-on Coding Labs Project-Based Learning Frequent Quizzes

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
W1	2		Introduction of Artificial intelligence	Lecture Slides	
W2	2		AI as Study and Design of Intelligent Agents	Lecture Slides	Paper Quiz
W3	2		AGENTS AND ENVIRONMENTS	Lecture Slides	Paper Quiz
W4	2		THE CONCEPT OF RATIONALITY	Lecture Slides	Paper Quiz
W5	2		THE NATURE OF ENVIRONMENTS	Lecture Slides	Paper Quiz
W6	2		Mid 1 Exam		
W7	2		THE STRUCTURE OF AGENTS -Simple reflex agents -Model based Reflex Agents	Lecture Slides	Paper Quiz
W8	2		-Goal-based Agents - Utility-based Agents	Lecture Slides	Paper Quiz
W9	2		- Learning Agents	Lecture Slides	Paper Quiz
W10	2		PROBLEM SOLVING AGENTS	Lecture Slides	Paper Quiz
W11	2		EXAMPLE PROBLEMS		
W12	2		SEARCHING FOR SOLUTIONS	Lecture Slides	Paper Quiz
W13	2		UNINFORMED SEARCH STRATEGIES(Breadth first search)	Lecture Slides	
W14	2		Mid 2 Exam		
W15	2		-Depth-first search - A* algorithm	Lecture Slides	

11. Course Evaluation

The course evaluation from 100, 25 for mid exams and quizzes,
15 for lab assignments, 10 for final Practical exam, 50 for final exam.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Artificial Intelligence: A Modern Approach, 4th ed. by Stuart Russell and Peter Norvig

Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	Artificial Intelligence: Foundations of Computational Agents, edition by <u>David L. Poole</u> and <u>Alan K. Mackworth</u>

13. Lab tasks description	
Week No.	**Lab Assignments**
1	General introduction for agent
2	Create Customer Class
3	Create Server Class
4	Create Agent Class
5	Connect all of the above classes in one program
6	Make a menu to manage the orders
7	Mid Exam 1
8	Explain how robots work
9	Create the ground floor array
10	Create the vaccum class
11	Methods for the vaccum moves: right, left, up, and down
12	Method to Suck the dirt
13	create different modes for the vaccum work
14	Mid exam 2
15	Review about all the course work

Course Description Form

1. Course Name:	
Computer Architecture	
2. Course Code:	
COMP221	
3. Semester / Year:	
First Semester/ Third Year	
4. Description Preparation Date:	
20/10/2024	
5. Available Attendance Forms:	
- Theory Lectures - Practical Lab	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60/3	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Safaa Hussein Shwail Email: safaa.husseinshwail@nahrainuniv.edu.iq	
8. Practical Teaching	
Dr. Safaa H. Shwail Lec. Farah Saad Ass. Lec. Azhar Fleih	

9. Course Objectives

Course Objectives	• Give a complete knowledge about how to represents data inside the computer system, floating point representation, and error detection method. • How the data transfer between the processor's registers and main memory and how to implement the arithmetic and logic micro-operations. • How to design and organization a basic computer, micro-programmed control, central processing unit, I/O organization, pipeline and vector processing, and multiprocessors.

10.   Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is by explaining lectures in an interactive way by letting the students to participate in the presenting through questions and answers while at the same time refining and expanding their critical thinking skills. This will be achieved through classes and labs.

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
11. Course Structure					
1	2	Fixed-Point Representation Floating-Point Representation Other Binary Codes Error Detection Codes	Data Representation	Theoretical Lectures	quiz
2	2	Register Transfer Bus and Memory Transfers Arithmetic Microoperations Binary Adder Binary Adder-Subtractor	Register Transfer and Microoperations	Theoretical Lectures	quiz
3	2	Binary Incrementor Arithmetic Circuit Logic Microoperations Some Applications Shift Microoperations	Register Transfer and Microoperations	Theoretical Lectures	quiz
4	2	Instruction Codes Stored Program Organization Indirect Address Computer Registers Common Bus System Computer Instructions Instruction Set Completeness	Basic Computer Organization and Design	Theoretical Lectures	quiz
5	2	Timing and Control Instruction Cycle Determine the Type of Instruction Register-Reference Instructions Memory-Reference Instructions Input-Output and Interrupt Complete Computer Description	Basic Computer Organization and Design	Theoretical Lectures	quiz
6	2	Control Memory Address Sequencing	Micro-programmed Control	Theoretical Lectures	quiz
7	2	Conditional Branching Mapping of Instruction Subroutines	Micro-programmed Control	Theoretical Lectures	quiz
8	2		Mid-Course Exam 1		
9	2	General Register Organization Control Word Examples of Microoperations	Central Processing Unit	Theoretical Lectures	quiz
10	2	Stack Organization Reverse Polish Notation	Central Processing Unit	Theoretical Lectures	quiz
11	2	Input-Output Interface I/O Bus and Interface Modules I/O versus Memory Bus	Input-Output Organization	Theoretical Lectures	quiz

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
		Isolated versus Memory-Mapped I/O			
12	2	Example of I/O Interface Asynchronous Data Transfer Asynchronous Serial Transfer Modes of Transfer	Input-Output Organization	Theoretical Lectures	quiz
13	2	Parallel Processing	Pipeline and Vector Processing	Theoretical Lectures	quiz
14	2	Pipelining	Pipeline and Vector Processing	Theoretical Lectures	quiz
15	2		Mid-Course Exam 2		

12. Lab Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	what is assembly language? inside the cpu general purpose registers	what is assembly language? inside the cpu general purpose registers	Examples in Emulator program	Assignment
2	2	segment registers special purpose registers Memory Access	segment registers special purpose registers Memory Access	Examples in Emulator program	Assignment
3	2	MOV instruction Variables	MOV instruction Variables	Examples in Emulator program	Assignment
4	2	Arithmetic instructions	Arithmetic instructions	Examples in Emulator program	Assignment
5	2	logic instructions	logic instructions	Examples in Emulator program	Assignment
6	2		Mid1 Exam		
7	2	Lables,control flow program	Lables,control flow program	Examples in Emulator program	Assignment
8	2	conditional and non conditional jump	conditional and non conditional jump	Examples in Emulator program	Assignment
9	2	Loop instruction	Loop instruction	Examples in Emulator program	Assignment
10	2	Factorial,Power,Summation	Factorial,Power,Summation	Examples in Emulator program	Assignment
11	2	Arrays	Arrays	Examples in Emulator program	Assignment

12	2	Library of common functions - emu8086.inc	Library of common functions - emu8086.inc	Examples in Emulator program	Assignment
13	2	Array exercises	Array exercises	Examples in Emulator program	Assignment
14	2		Mid2_Exam		
15	2		Final Exam		

13. Course Evaluation

10 Quizzes
5 Assignments
15 Lab
10 Report
10 Midterm Exam
50 Final Exam

14. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Computer System Architecture, 3rd edition, by M. Morris Mano
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Computer Skills IV

2. Course Code:

3. Semester / Year:
First semester/ third year

4. Description Preparation Date:
13−9−2024

5. Available Attendance Forms:
Full Time

6. Number of Credit Hours (Total) / Number of Units (Total)
30 h/2 units

7. Course administrator's name (mention all, if more than one name)

Name: Email:

Lec. Dr. Tiba Zaki, tiba.zaki@nahrainuniv.edu.iq

Lec. Dr. Hasnna Imad hasna.imad@nahrainuniv.edu.iq

Asst. Prof. Dr.Nadia Fadhil   nadia.f.al-bakri@nahrainuniv.edu.iq

Asst.Lec. Assel Basim

Asst. Prof. Zahraa A. Jaaz

8. Course Objectives

Course Objectives	*Learn how to prepare and install Windows Operating System and devices.* *- Learn how to Maintain Computer Software.* *- Learn how to secure computer and the types of viruses and data compression.* *Learn how to prepare and install Flutter and programming with Dart*

9. Teaching and Learning Strategies

Strategy	Labs, Reports, and Discussions

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	2		BIOS	Practical	
2	2		Installing Windows and Device Drivers	Practical	Quiz
3	2		Back up and data Compression	Practical	Quiz
4	2		Installing Device Drivers	Practical	Report +Quiz
5	2		Windows Booting	Practical	
6	2		Windows Security a Viruses	Practical	Quiz
7	2		Virtual Machines	Practical	Quiz
8	2		Exam	Practical	Exam
9	2		Mobile application programming introduction	Practical	Questions and answers
10	2		Designing with Figma	Practical	Quiz
11	2		Flutter and Dart	Practical	Questions and answers
12	2		Flutter and Dart	Practical	Quiz
13			Mid exam 1	Practical	
14	2		Widgets	Practical	Quiz
15	2		Widgets	Practical	Quiz
16			Final Exam		

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	▪ Complete CompTIA A+ Guide to IT Hardware and Software 7th Edition o By CHERYL A. SCHMID ▪ Flutter for Beginners
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	https://flutter.dev/docs Dart documentation: https://dart.dev/guides Figma: https://www.figma.com

Course Description Form

1. Course Name:
Database I

2. Course Code:
COMP 330

3. Semester / Year:
First Semester/ Third year

4. Description Preparation Date:
1/10/2024

5. Available Attendance Forms:
Fulltime/Attendance Mandatory

6. Number of Credit Hours (Total) / Number of Units (Total)
60 Hours (30 Theoretical Hours + 30 Practical Hours) / 3 Units

7. Course administrator's name (mention all, if more than one name)
Name: Lecturer Dr.Rasool Hisham Al-Saadi Email: rasool.hisham@nahrainuniv.edu.iq Lab instructors: - Assistant Prof. Dr. Zainab Namh Abdula Sultani - Assistant Prof. Zahraa Abdulhussien - Assistant Lecturer Haider Majeed - Maryam Adnan Hasan

8. Course Objectives	
Course Objectives	• Understanding database management systems principles and it main components • The ability to design and implement databases correctly • Understanding the relational algebra for optimized retrieving data from database • Writing simple to moderate SQL queries

9. Teaching and Learning Strategies	
Strategy	• Theoretical lectures with interactive activities such as brainstorming, asking questions and discussing answers to improve students' analysis and inference strategies. Addition, direct instruction, active learning and problem-based learning are used throughout the course • Practical labs complemented with technology integration and collaborative learning focus on problem solving

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	2	Understanding the meaning of database and its objectives	•Information, Database, Database Management System. •Objectives of DBMS. •File-Based System •Drawbacks of File-Based System	Describe, Discuss, and practice	Class Activity
2	2	Understanding the DBMS approach and ANSI data model	•DBMS Approach Advantages of DBMS (Centralized Data Management, Data Independence, Data Consistency) •ANSI/Spark Data Model, Abstraction, Data Independence, Levels of Abstraction, Database Instances, Database Schema	=	Class Activity and Quiz
3	2	Understanding the basic components of DBMS	•Components and Interfaces of Database Management System (Hardware, Software, Data, Procedure, People Interacting with Database, Data Dictionary)		Class Activity and Quiz
4	2	Understanding Functional Components DBMS and Database Architecture	•Functional Components of Database System Structure •Storage Manager • Database Architecture		Class Activity and Quiz
5	2	The students will be able to design simple databases using ER diagrams	• Overview of Database Design • Data Modeling Using the Entity-Relationship Model • ER Diagram • Classification of Entity Sets • Attribute Classification • Relationship Degree		Class Activity and Quiz

			•Relationship Classification		
6	2		Written exam 1		Written exam
7	2	Understanding the relational model and concepts. The students will be able to design simple relational database	•Relational Model •CODD'S Rules •Relational Model Properties •Relation Schema and Relation Instance •Concept of Key •Relational Integrity and Constraints		Class Activity and Quiz
8	2	The students will be able to write basic relational algebraic expressions	•Relational Algebra •Role of Relational Algebra in DBMS •Relational Algebra Operations •Selection, Projection, Union, Intersection, Difference		Class Activity and Quiz
9	2	The students will be able to write and analyze more advanced relational algebraic expressions	•Cartesian Product Operation • Join Operations • Types of Join Operation • Natural Join • Equi Join • Theta Join • Outer Join Examples of Relational Algebra Queries		Class Activity and Quiz
10	2	The students will be able to write basic DML statement	•Structured Query Language •Introduction •Commands in SQL •Data Manipulation Language •Inserting New Data		Class Activity and Quiz
11	2	The students will be able to write basic DML statement	•Updating Data •The WHERE Clause •The Logical Operators AND and OR •Deleting Data		Class Activity and Quiz
12	2		Written exam 2		Written exam
13	2	Writing basic queries to retrieve data from the	•Extracting Information Using the SELECT Statement •Returning Only Distinct Rows		Class Activity and Quiz

		database and filter the results	•Using Aliases •Filtering Results with the WHERE Clause •Logical Operators •NOT Operator •BETWEEN Operator •LIKE Operator •IN Operator •Ordering Results		
14	2	Understanding data grouping and aggregating using SQL	•INSERT INTO with the SELECT Statement •Grouping and Aggregating Data •Using the HAVING Clause with GROUP BY Statements •Selecting Data from Different Tables (inner join, outer join, union)		Class Activity and Quiz
15	2		Solving more questions and review of semester learning outcome		Class Activity and Quiz

11. Course Evaluation

Weekly quizzes + assignments: 5
Mid written exams: 20
Weekly practical assignments: 15
Final practical exam: 10
Final theoretical exam: 50

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	S. Sumathi, S. Esakkirajan, "Fundamentals of Relational Database Management Systems", Springer, 2007.
Main references (sources)	Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", 4th Edition, Addison Wesley, 2003.
Recommended books and references (scientific journals, reports...)	• Raghu Ramakrishnan , Johannes Gehrke, "Database Management Systems", 3rd Edition, McGraw Hill, 2003. • Paul Wilton, John W. Colby, "Beginning SQL", Wiley Publishing, Inc. 2005.
Electronic References, Websites	

13. Practical Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2		•Lab introduction • MySQL installation	Describe, Discuss,	Lab Activity

				and practice	
2	2		Installing and using MySQL workbench	=	=
3	2		Creating schemas and tables, fields datatypes, character sets	=	=
4	2		•Extracting information using the SELECT statement •Using Aliases •Ordering Results •Returning Only Distinct Rows		
5	2		•Filtering Results with the WHERE Clause •Logical Operators •NOT Operator •BETWEEN Operator •LIKE Operator •IN Operator	=	=
6	2		•Grouping and Aggregating Data •Using the HAVING Clause with GROUP BY Statements	=	=
7	2		Exam	=	=
8	2		•Establishing relationships between tables. •Indices	=	=
9	2		•Selecting Data from more than one table (inner join)	=	=
10	2		Selecting Data from Different Tables (outer join, union)	=	=
11	2		•Inserting, updating and deleting data	=	=
12	2		•INSERT INTO with the SELECT Statement		
13	2		Designing a database	=	=
14	2		Practicing SQL	=	=
15	2		Examples and review	=	=

Course Description Form

1. Course Name:	
Digital Image Processing	

2. Course Code:	
COMP360	

3. Semester / Year:	
First Semester / Third year	

4. Description Preparation Date:	
13/10/2024	

5. Available Attendance Forms:	
Mandatory	

6. Number of Credit Hours (Total) / Number of Units (Total)	
30 Hours (theoretical) + 30 Hours (Practical)	

7. Course administrator's name (mention all, if more than one name)	
Name: Assist. Prof. Dr. Zainab Namh Abdula Email: zainab.namhabdula@nahrainuniv.edu.iq	

8. Course Objectives

Course Objectives	The objective of an undergraduate Digital Image Processing course is to equip students with a comprehensive understanding of the fundamental principles and techniques used to analyse, enhance, and manipulate digital images. Students will learn key concepts like image representation, transformation, and filtering in both spatial and frequency domains, along with methods for image restoration, noise reduction, and compression. Additionally, they will explore techniques for edge detection, and segmentation operations, gaining hands-on experience with tools such as Python and specifically OpenCV.

9. Teaching and Learning Strategies

Strategy	Lectures Hands-on Coding Labs Project-Based Learning Frequent Quizzes

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
W1	2		Digital Image Processing Introduction and Applications	Lecture Slides	
W2	2		Human Visual System overview and Image Representation	Lecture Slides	Oral Questions Homework
W3	2		Image Formation Model Sampling and Quantization	Lecture Slides	Oral Questions
W4	2		Basic Relationships Between Pixels and Introduction to The Basic Mathematical Tools (Affine Transformation)	Lecture Slides	Oral Questions
W5	2		Image Histogram Spatial Filtering Convolution	Lecture Slides	Oral Questions
W6	2		Mid Exam 1		
W7	2		Smoothing (Low-Pass Filter) and Sharpening (High-Pass Filter)	Lecture Slides	Oral Questions and Homework
W8	2		Filtering in Frequency domain Discrete Fourier Transform	Lecture Slides	Oral Questions
W9	2		Discrete Fourier Transform	Lecture Slides and Worked Examples	Paper Quiz
W10	2		Image Segmentation and Edge Detection	Lecture Slides and Worked Examples	Online test
W11	2		Mid exam 2		
W12	2		Image Compression	Lecture Slides and Worked Examples	Oral Questions

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
W13	2		Image Compression	Lecture Slides and Worked Examples	
W14	2		Feature Extraction	Lecture Slides and Worked Examples	
W15	2		Feature Extraction	Lecture Slides and Worked Examples	

11.Course Evaluation
First Mid-Term Exam 15% Second Mid-Term Exam 15% Quizzes and Assignments 7% Attendants 3% Laboratory (15% for Evaluation) Total: 40% Final Lab exam 10% Final Exam 50%

12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Digital Image Processing, 4th edition by Rafael C. Gonzalez • Richard E. Woods
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	https://www.ssla.co.uk/digital-image-processing https://www.sanfoundry.com/1000-digital-image-processing-questions-answers/

- Assist. Prof. Azhar Mawlod
- Lect. Najwan Abed
- Lect. Farah Saad

14.Course Lab Structure

Week	Hours	Unit or subject name	Learning method	Evaluation method
W1	2	Introduce to Python and Anaconda Spyder IDE		
W2	2	Numpy Library, Matplot and OpenCV Introduction RGB Channels Read and Write Images	Write a program to load and display an image, and extract pixel values (in grayscale and color formats	
W3	2	Basic Image Manipulation resizing, cropping, and rotating.		
W4	2	Histograms and Histogram Equalization	Plot the histogram of a grayscale image and apply histogram equalization to enhance contrast.	
W5	2	Image Color Mappings Image Thresholding Blurring and Smoothing	Implement smoothing (mean and median filters) and sharpening filters (Laplacian and high-pass filters) to improve image	

Week	Hours	Unit or subject name	Learning method	Evaluation method
			quality	
W6	2	Mid Lab		
W7 + 8	4	Fourier Transform for Frequency Domain Processing	Implement the 2D Fourier transform of an image, apply a low-pass and high-pass filter, and reconstruct the image.	
W9	2	Image Segmentation and Edge Detection	Apply thresholding, region growing, and k-means clustering for image segmentation.	
W10	2	Image Compression	Implement basic compression techniques such as run-length encoding (RLE) and explore JPEG compression using libraries.	
W11	2	Sepia and Vintage Filters Cartoon Filter Beauty Filter (Instagram and Snapchat Filters)		
W12	2	Project Discussion		
W13	2	Project Discussion		
W14	2	Lab Overview		
W15	2	Final Lab		

Course Description Form

1. Course Name:	
Language translators I	
2. Course Code:	
COMP313a	
3. Semester / Year:	
First semester/third year	
4. Description Preparation Date:	
15/10/2024	
5. Available Attendance Forms:	
Full time	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5 hours (2 Lec.+2 Lab+1 tutorial)	
7. Course administrator's name (mention all, if more than one name)	
Bahera Hani Nayef , Khairiyah S.Aldabas , Ruaa Abdullah	

8. Course Objectives

Course Objectives	The main objective of this chapter is to familiarize students with the fundamen principles of compiler operation. It focuses on virtual programming and emphasiz the mechanism of compilers, which is divided into two stages (analysis a synthesis). The emphasis is on the first stage, where the student becomes acquain with the concept of symbol table and error table, and how to deal with them duri linguistic translator operation.

Teaching and Learning Strategies

Strategy	Interactive theoretical lectures that rely on student participation, in addition laboratory work and discussions. Asking questions that aid students in analysis a inference is also part of the approach.

9. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	Understanding Learning Outcomes and Evaluation: The student will comprehend the expected outputs of the lesson and the assessment methods. Introduction to Programming Language Classification: Students will be introduced to the classification of programming languages.	This lesson plan aims to provide students with a foundational understanding of programming languages, including theoretical concepts and practical applications. Theoretical elements include language components and classification, while the practical exercise involves file manipulation using Java. **Theoretical Topics:** • Elements of language.	Interactive lectures	Participation and daily tests + Daily lab assessment

		Analyzing Thought Process for Language Acceptance: The student will analyze their thought process to determine acceptable words in a language. Identifying Basic Sentence Elements: Students will be capable of identifying the basic elements of a sentence. Distinguishing Between Translator Program Designer and Programmer: The student will differentiate between a program designer using a translator and a programmer.	• Classification of programming languages. **Practical Exercise:** • Opening and reading a file using the Java language.		
2	5	1. The student distinguishes between the work of the two main types of translators. The student deduces the advantages of each type, as well as strengths and weaknesses. They can predict the type of translator suitable for the languages they use.	Compiler and interpreter Practical:- Read from text file and eliminating spaces and comments	Interactive lectures	Participation and daily tests + Daily lab assessment
3	5	The student lists the stages of a translator, understands the function of each stage, recalls the sequence of stages through drawing and examples, distinguishes the role of the lexical analyzer, and identifies errors that appear for the programmer in this stage.	١Compiler stages Practical: Start building token table.	Interactive lectures	Participation and daily tests + Daily lab assessment
4	5	The student knows the symbol table, specifies its tasks and types, and applies the concept to one of the programs.	Symbol Table Management Practical :- Complete the token table	Interactive lectures	Participation and daily tests + Daily lab assessment
5	5	The student identifies errors that occur at this stage and the differences.	Semantic analyzer Practical :- Complete the token table	Interactive lectures	Participation and daily tests + Daily lab assessment
6	5	The student can generate intermediate code, determine its features, know three types of intermediate code, define	Intermediate code generation Intermediate code Optimization	Interactive lectures	Participation and daily tests + Daily lab assessment

		its function, learn methods to improve and optimize intermediate code for execution speed, enumerate some points used for code improvement, compare storage and speed for a number of optimized and non-optimized codes performing the same function, and apply optimization with examples.	Practical :- Complete the token table		
7	5	The student lists types of errors, suggests methods for error presentation, critiques the translators they use, compares ways to divide the work of translators, lists language classifications, distinguishes types of programming languages they currently use, compares different languages and their uses.	Theoretical: Error Handling Practical: Completion of creating the word table The grouping of phases into passes Building a table for error messages	Interactive lectures	Participation and daily tests + Daily lab assessment
8		Mid exam 1			
9	5	The student links computational theory, data structures, and programming, reaching a method for programming Deterministic Finite Automata (DFA).	Theoretical: Study of the Lexical Stage Simulating DFA Practical: Initiating the construction of the symbol table	Interactive lectures	Participation and daily tests + Daily lab assessment
10	5	The student infers the advantages of DFA in programming and suggests ways to programmatically convert NFA to DFA.	Theoretical: NFA to DFA Practical: Completion of the symbol table.	Interactive lectures	Participation and daily tests + Daily lab assessment
11	5	The student applies the DFA minimization method, is able to analyze an NFA program,	- Minimizing DFA - Simulating NFA - Algorithm complexity comparison of simulating NFA and DFA - Regular Expression to DFA (review from computation theory) Practical: - Completion of the symbol table.	Interactive lectures	Participation and daily tests + Daily lab assessment
12	5	Can draw a syntax tree, applies word derivation rules to examples, distinguishes Context-Free	The Role of Syntax Analysis CFG (Context-Free	Interactive lectures	Participation and daily tests

					+ Daily lab assessment
		Grammar (CFG), differentiates ambiguous from non-ambiguous rules, analyzes the risk of designing ambiguous rules, defines the type of parsing with Recursive Descent, and understands the requirements for rule form, such as eliminating left recursion and left factoring.	Grammar) Top-Down Parsing Recursive Descent Parsing Ambiguous Grammar Left Factoring Eliminating Left Recursion Practical:- Building DFA (Deterministic Finite Automaton) for decimal numbers and floating points.		
13	5	The student becomes familiar with new languages, acquires presentation skills, and the ability to ask questions and critique presentations	Students presentations for the new languages that they searched for.	Students Presents	Assessing the presentations
14		Mid exam 2			
15		Review and lab final exam			

10. Course Evaluation

1- Daily quizzes
2- Classroom participation
3- Homework assignments and projects, including writing and presenting reports on programming languages not covered in previous stages
4- Writing lecture summaries and sending them to the Google Classroom
5- Monthly and final exams
C. Affective and value goals

11. Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Compiler (principles, techniques, and tools)** second edition Alfred V.Aho Columbia University Monica S.Lam Stanford University Ravi Sethi Avaya Jeffrey D.Ullman
Main references (sources)	
Recommended books and references (scientific journals, reports…)	Cooper, Keith D., and Linda Torczon. *Engineering a Compiler / Keith D. Cooper, Linda Torczon.* Third edition.., Morgan Kaufhann Publishers, 2022.
Electronic References, Websites	https://youtu.be/nv9J5Jb7IxM Intermediate code generation (slideshare.net) https://www.geeksforgeeks.org/analysis-algorithms-big-o-analysis https://www.javatpoint.com/automata-conversion-from-nfa-dfa/

Course Description Form

1. Course Name:
Data Coding and Data Compression

2. Course Code:

3. Semester / Year:
Second Semester/ 2024−2025

4. Description Preparation Date:
13 Oct 2024

5. Available Attendance Forms:
Attendance Study

6. Number of Credit Hours (Total) / Number of Units (Total)
60

7. Course administrator's name (mention all, if more than one name)
Name: Assistant Prof. Abeer Khalid Al-Mashhadany Assistant Lecturers: Zainab Haider, Humam, and Isra Ali Email:

8. Course Objectives

Course Objectives	• The aims of this course are to introduce the principles and applications of information is measured in terms of probability and entropy, and the relation these are used to calculate the capacity of a communication channel, with and • The course will study how information is measured in terms of probability and and joint entropies; how these are used to calculate the capacity of a comm methods. • Ability to design coding for a file with minimum space. • Ability to design and implement java programming that manipulating coding pr

9. Teaching and Learning Strategies

Strategy	• Books, theoretical lectures and references to helpful websites • Providing the electronic presentation of the lecture…as an aid to clarification of • Explanation on the board and solving examples with integrated details • Design and implementation of practical programs for programming algorithms • Solve multiple examples and engage the student by providing quick exerci motivating students to follow up and correct each other. • Homework examples from the article • In addition to homework that focuses on strengthening the student's programm

10. Course Structure

Week		Hours	Required Learning Outcomes	Unit or subject name	Learnir
Week No.	**Date**	**Title**	**Sub-Titles**		**Referen**
1				idle	
2		"Information Theory- Data Coding and Data Compression"	• Data Coding Theory • What is Data Compression? • Why This Course? • Early Examples of Data Compression.	Your TextBook: Introduction [p1..p	
3		Compression Techniques	• Compression and reconstruction • Lossy & lossless Compression	Your Textbook: Compression techn measures, [p3-p6]	
4				Idle	
5		Compression Techniques	• Measures of Performance • Modeling and Coding	Your Textbook: modeling & oding	
6		**Mid 1**			
7		Statistical Methods for Coding Integer Numbers	• Unary Code • Code 1 • Code 2 • Code 3 • Code 4	Reference 2	
8		Introduction to Information Theory (IT)	• Information Theory • Self-Information • Probability • Entropy • Rate of the code • Uniquely Decodable Codes	Your Textbook: A Brief Introduction [p13-p18] Coding, [p27-]	
9		Huffman Coding	• Encoding • Decoding	Your Textbook: Chapter 3 p4 1	
10				idle عيد العمّال عطلة رسمية	
11		Huffman Coding	• Golomb code • Applications	Textbook: Chapter 3 p65 Textbook: Chapter 3 p72	
12		**Mid 2**			
13		Dictionary Techniques	• LZ77 • LZW	Textbook: Chapter 5 p117	
14		Lossless Image Compression	• Run-Length Coding • Relative Encoding • BRL Coding	Textbook: Chapter 7: Run-le gth c	
15				Final Lab Examination	

11. Course Evaluation

preparation, Pre info quiz	02 marks
Weekly Lab ass. Mark	13 marks
5 Quiz per course, written exams	05 marks
Monthly, Two mids, written exams,	18 marks
HW, written examples	02 marks
daily oral, Special marks adding to course mark for active students	+ marks
Final Lab Exam	10 marks
Final Exam	50 marks

12. Learning and Teaching Resources

Required textbo (curricular books, if any	Khalid Sayooo , "Introduction to Data Compression", Elsevier Inc. 200 References:
Main references (sourc	Guy E. Blelloch, "Introduction to Data Compression", Compute University, blellochcs.cmu.edu, 2013.
Recommended books and references (scientific journals, reports…)	Guy E. Blelloch, "Introduction to Data Compression", Compute University, blellochcs.cmu.edu, 2013.
Electronic Referenc Websites	Data Compression Techniques: Integer Codes I.

Course Description Form

1. Course Name:	
	Database II
2. Course Code:	
	COMP 331
3. Semester / Year:	
	Second Semester/ Third year
4. Description Preparation Date:	
	1/10/2024
5. Available Attendance Forms:	
	Fulltime/Attendance Mandatory
6. Number of Credit Hours (Total) / Number of Units (Total)	
	60 Hours (30 Theoretical Hours + 30 Practical Hours) / 3 Units
7. Course administrator's name (mention all, if more than one name)	

Name: Lecturer Dr.Rasool Hisham Al-Saadi
Email: rasool.hisham@nahrainuniv.edu.iq
Lab instructors:
- Assistant Prof. Dr. Zainab Namh Abdula Sultani
- Assistant Prof. Zahraa Abdulhussien
- Assistant Lecturer Haider Majeed
- Maryam Adnan Hasan

8. Course Objectives

Course Objectives	• Understanding and writing complex SQL queries and DDL statements • Understanding data integrity enforcement techniques of the database management systems including transaction managements • Improving database designing ability by eliminating data anomies using database normalization • Understanding database scalability and distribution

9. Teaching and Learning Strategies

Strategy	• Theoretical lectures with interactive activities such as brainstorming, asking questions and discussing answers to improve students' analysis and inference strategies. Addition, direct instruction, active learning and problem-based learning are used throughout the course • Practical labs complemented with technology integration and collaborative learning focus on problem solving

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
		10. Course Structure			
1	2	Writing advanced SQL queries	•Advanced Data Manipulation Language (Queries within Queries) •Subquery Terminology, Subqueries in a SELECT List, Subqueries in the WHERE Clause	Describe, Discuss, and practice	Class Activity
2	2	Writing advanced SQL queries	•Operators in Subqueries, Revisiting the IN Operator, Using the ANY, SOME, and ALL Operators, Using the EXISTS Operator	=	Class Activity and Quiz
3	2	Understating and writing DDL statements	•Data Definition Language, creating a Database, Data types in SQL, Creating, Altering, and Deleting Tables, Ensuring Data Validity with Constraints, NOT NULL Constraint, UNIQUE Constraint •CHECK Constraint, Primary Key and PRIMARY KEY Constraint, Foreign Key, Speeding Up Results with Indexes		Class Activity and Quiz
4	2	Understating database design objectives and the tools that can help in database design	•Database Design, Objectives of Database Design •Database Design Tools, Need for Database Design Tool, Desired Features of Database Design Tools •Advantages of Database Design Tools, Disadvantages of Database Design Tools		Class Activity and Quiz
5	2	The students will be able to identify the potential problems that might occur due to data redundancy	•Redundancy and Data Anomaly •Problems of Redundancy, Insertion, Deletion, and Updating Anomaly, Repeating Group		Class Activity and Quiz
6	2		Written exam 1		Written exam

7	2	Understating and analyzing the function dependencies between the attributes	•Functional Dependency, Functional Dependency Inference Rules (Armstrong's Axioms) •Reflexivity, Augmentation, Transitivity, Pseudotransitivity, Union, Decomposition		Class Activity and Quiz
8	2	Understating the normalization process and normalizing the relations to 1NF	•Normalization, Purpose of Normalization, Steps in Normalization •Unnormal Form to First Normal Form		Class Activity and Quiz
9	2	Normalizing the relations to 2NF and 3NF	•First Normal Form to Second Normal Form •Second Normal Form to Third Normal Form • Exercises and practicing for a complete normalization process		Class Activity and Quiz
10	2	Understating the transaction processing and the ACID properties of DBMS	•Transaction Processing, Key Notations in Transaction Management, Concept of Transaction Management •ACID Properties of DBMS, Atomicity and Durability, Consistency and Isolation		Class Activity and Quiz
11	2	Understating the anomalies due to interleaved transactions and how this problem can be solved	•Serial Scheduling, Anomalies due to Interleaved Transactions •WR Conflicts, RW Conflicts, WW Conflicts •Lock-Based Concurrency Control, Need for Concurrency Control		Class Activity and Quiz
12	2	Understating the lock-based concurrency control and the problems that could happen while using it	•Lock-Based Concurrency Control, Key Terms in Lock-Based Concurrency Control, Locking Protocol, Strict Two-Phase Locking (Strict 2PL), Deadlock •Methods to Overcome Deadlock, Recovery Mechanism		Class Activity and Quiz
13	2		Written exam 2		Written exam

| 14 | 2 | Understating the DDBMS and its types | •Distributed Database, Architectural Models for Distributed DBMS
•Types of Distributed DBMS Architecture, Client/Server Systems, Peer-to-Peer Distributed Systems
•Distributed Data Storage, Data Replication, Data Fragmentation | | Class Activity and Quiz |
| 15 | 2 | The students will be familiar with different questions and solutions related to what the learned during this course | Solving more questions and review of semester learning outcome | | Class Activity and Quiz |

11. Course Evaluation

Weekly quizzes + assignments: 5
Mid written exams: 20
Weekly practical assignments: 15
Final practical exam: 10
Final theoretical exam: 50

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	S. Sumathi, S. Esakkirajan, "Fundamentals of Relational Database Management Systems", Springer, 2007.
Main references (sources)	Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", 4th Edition, Addison Wesley, 2003.
Recommended books and references (scientific journals, reports...)	• Raghu Ramakrishnan , Johannes Gehrke, "Database Management Systems", 3rd Edition, McGraw Hill, 2003. • Paul Wilton, John W. Colby, "Beginning SQL", Wiley Publishing, Inc. 2005.
Electronic References, Websites	

13. Practical Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2		•Revisiting basic SQL clauses and practicing them	Describe, Discuss, and practice	Lab Activity

2	2		•Writing advanced queries using MySQL	=	=
3	2		•Creating a database and tables using DDL	=	=
4	2		•Introduction to C# programming language		
5	2		•Installing Visual Studio MySQL dependencies (required .NET Framework, MySQL .NET connecter) •Creating Windows Form application and establishing MySQL database connection	=	=
6	2		Exam 1	=	=
7	2		•Retrieving data from database using data reader object • Inserting and deleting data from database through MySQL .NET connecter	=	=
8	2		Working with Command object and passing parameter to SQL	=	=
9	2		GUI integration in database systems (binding GUI controls)	=	=
10	2		Developing a simple library management database project using Windows Form application	=	=
11	2		Adding user authentication to the project	=	=
12	2		Exam 2		
13	2		Working with transactions	=	=
14	2		Finalizing the project	=	=
15	2		Examples and review	=	=

Course Description Form

1. Course Name:
Language Translator II

2. Course Code:

3. Semester / Year:
Second Semester/ Third Year

4. Description Preparation Date:
2025−2024

5. Available Attendance Forms:
On Campus Full Time

6. Number of Credit Hours (Total) / Number of Units (Total)
5 hours (2 Lec.+2 Lab+1 tutorial) *15= 60

7. Course administrator's name (mention all, if more than one name)

Name: Dr. bahera Hani Nayef, bahera.hani@nahrainuniv.edu.iq

Lab   Khairiyah S.Aldabas ,   khairiyah.s.aldabas@nahrainuniv.edu.iq
        Ruaa Abdullah   ruaa.abdullah@nahrainuniv.edu.iq
        Dr. Hasnaa Imad Abdulsalam hasna.imad@nahrainuniv.edu.iq
        Esraa Husain Ali esraa.hussien@nahrainuniv.edu.iq

8. Course Objectives

Course Objectives	A. Cognitive goals
In this semester, the student continues buildi[ng] the language translator they started in the fir[st] semester. Then, they study different types of parsers.	A1- Understanding the fundamental differences between types of parsers. A2- Reading various algorithms related to language processing and understanding them based on the student's self-capabilities. A3- Continuing work on building a translator for a simple language. B. The skills goals special to the course. B1- Enhancing the student's scientific language proficiency. B2- Improving the student's ability to solve problems using programming methods. B3- The capability to search for information and find it easily. B4- The ability to read references in English and comprehend them.

9. Teaching and Learning Strategies

Strategy	

Interactive theoretical lectures that rely on student participation, (such as Jigsaw, think pair share, and Brainstorming through asking questions that aid students in analysis and inference strategies.)
In addition to laboratory work and discussions

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	The student realizes the importance of the topic and its connection to previous knowledge.	They review and warm up by introducing the upcoming curriculum. • Compiler phases • Recursive descent parser • Left recursion elimination • Left Factoring • NFA DFA Optimization	Then, they tackle questions on a sheet from the previous material. The students solve them and engage in discussions	The teacher assesses the level of participation and understanding
2	5	Student evaluate having various resources that explore same algorithms but in different writing style. Student have general understanding of First and Follow sets	First, and Follow sets	The text of First and Follow set extraction algorithms from 2 books is distributed so that students are divided into small groups, with each group assigned a portion of the text containing First and Follow algorithms. Group members	The teacher evaluates the level of participation and so on. Contributions and overall understanding of the material are observed and evaluated by the teacher through assessing the level of interaction and problem-solving.

				collaborate to understand the algorithms and apply them to the given question. The Jigsaw strategy is used where each individual in the group is assigned to understand a specific part of the text, then returns to the original group to provide an explanation to everyone. The question is solved with the participation of all group members, exchanging ideas and conclusions.	
3	5	Student can produce First and Follow set with and without having an algorithm	Continue to illustrate First and Follow while linking it sentential form Lab: continue programming the Recursive descent parser	Active learning	Evaluate discussions and Quiz
4	5	Student is able to build predictive table and trace LL1 parser	LL1 parser, Building LL1 predictive table	Active learning	Evaluate oral discussions
5	5	Student can identify the difference between	Bottom Up Vs. Top Down Left most derivation Vs. Rightmost derivation	Active learning	Evaluate oral discussions

		solving a problem in Top-down or bottom-up strategy			
6	5	Student can trace bottom-up shift reduce parser, and able to compare with top-down LL1 parser	Bottom-up parser, Shift reduce parser, Shift-reduce conflict, reduce-reduce conflict	Active learning	Evaluate oral discussions
7	5		Mie Exam 1		
8		Student remember LR parsing structure.	LR parsing	Active learning	Evaluate oral discussions
9	5	Student Links the parsing with automaton	LR(0) canonical items, DFA, and table	Active learning (read alone pare, and share)	Evaluate discussions and Quize
10	5	Can produce and read SLR table in various books formats.	SLR table	Active learning	Evaluate oral discussions
11	5	Able to identify LR(1) and compare complexity with SLR	LR(1)	Active learning	Evaluate oral discussions
12	5	Able to trace LALR. And be able to identify reasons for preferring this algorithm over others.	LALR	Active learning	Evaluate discussions and Quiz
13	5	Conclude various ready to use parsers generating tools and compare between them.	Students presentations of selected parsing Auto-generating tools	Active learning	

		Improve presentation skills. Exposed to open ideas. Think outside the box			
14	5		Mid Exam 2		
15	5		Review		

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student as following:
Theoretical daily preparation 5% Practical lab daily preparation 5%
daily oral   2%,
written exams Theoretical monthly15% monthly Practical lab 10%,
Presentations 3%
Final Theoretical 50% practical lab 10%

12. Learning and Teaching Resources

Required textbooks (curricular boc if any)	**Compiler (principles, techniques, and tools)** second edition Alfred V.Aho Columbia University Monica S.Lam Stanford University
Main references (sources)	Cooper, Keith D., and Linda Torczon. *Engineering a Compiler / Keith D. Cooper, Linda Torczon.* Third edition.., Morgan Kaufhann Publishers, 2022.
Recommended books and references (scientific journals, reports…)	Torben Ægidius Mogensen. *Introduction to Comp Design,* British Library Cataloguing
Electronic References, Websites	https://www.jntua.ac.in/gate-online-classes/registration/downloads/material/a159280508451.pdf https://www.cs.princeton.edu/courses/archive/spring20/cos320/LR0/ https://techblogmu.blogspot.com/2017/12/difference-between-ll-parser-vs-lr.html **https://www.gatevidyalay.com/tag/first-and-follow-**

	examples-in-compiler-design-ppt/

Course Description Form

1. Course Name:
Research Methodology

2. Course Code:

3. Semester / Year:
Second Semester 2024-2025

4. Description Preparation Date:
1-2-2025

5. Available Attendance Forms:
Traditional Attendance (in-person), Blended Attendance

6. Number of Credit Hours (Total) / Number of Units (Total)

7. Course administrator's name (mention all, if more than one name)
Dr. Suhad A. Yousif Email: suhad.a.yousif@nahrainuniv.edu.iq

8. Course Objectives

Course Objectives	- Develop a comprehensive understanding of the research process, including problem identification, literature review, research design, and data collection methods. - Equip students with knowledge of qualitative and quantitative research techniques and their appropriate applications. - Enhance students' ability to critically evaluate existing research studies. - Introduce students to tools for managing references and formatting research papers, including Overleaf for LaTeX-based writing. - Foster collaboration and teamwork skills through group research projects.

9. Teaching and Learning Strategies

Strategy	**Interactive Lectures**: Introduce key research concepts and methodologies with practical examples. **Hands-On Labs**: Demonstrate the use of tools like Overleaf, Mendeley, and SPSS for research preparation. **Project-Based Learning**: Guide students in designing and conducting their research projects. **Group Discussions**: Facilitate peer learning and critical analysis of research articles.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction to Research Methodology	Overview of Research Process	Lectures	Class Participation
2	2	Problem Identification and Objectives	Defining Research Problems	Lectures and Activities	Assignment
3	2	Literature Review Techniques	Finding and Analyzing Sources	Lectures and Labs	Research Article Analysis

4	2	Research Design Basics	Types of Research Designs	Lectures	Quiz
5	2	Data Collection Methods	Surveys, Interviews, and Experiments	Hands-On Lab	Assignment
6	2	Introduction to Overleaf	Writing Research Papers with LaTeX	Lab	Lab Exercise
7	2	LaTeX Basics	Document Formatting in Overleaf	Lab	Lab Exercise
8	2	Advanced LaTeX Features	Tables, Figures, and Citations	Lab	Assignment
9	2	Advanced Office Tools	Excel for Data Analysis, PowerPoint for Presentation Design	Lab	Assignment
10	2	Managing References	Using EndNote	Lab	Assignment
11	2	Qualitative Research Techniques	Content Analysis, Case Studies	Lectures and Labs	Lab Exercise
12	2	Writing the Research Proposal	Proposal Structure and Presentation	Lab	Proposal Submission
13-14	4	Research Project Work Sessions	Developing and Finalizing Projects	Guided Labs	Project Feedback
15	2	Final Presentations	Research Findings and Discussion	Presentations	Grading and Feedback

11. Course Evaluation

- 20% for the formal final written exam
- 20% for practical assignments and lab exercises
- 60% for the final project evaluation

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	"Research Design: Qualitative, Quantitative, and Mixed Methods Approaches" by John W. Creswell Focus: Comprehensive overview of research designs and methodologies.
Main references (sources)	The Craft of Research" by Wayne C. Booth, Gregory G. Colomb, and Joseph M. Williams Focus: Practical advice on crafting strong research papers.
Recommended books and references (scientific journals, reports…)	- Journal of Research Methodology - Articles on advances in qualitative and quantitative research methods.
Electronic References, Websites	Overleaf (https://www.overleaf.com) Collaborative LaTeX editor for writing and formatting research papers.

Course Description Form

1. Course Name:
Software Engineering

2. Course Code:

3. Semester / Year:
Third stage − 2nd semester / 2024−2025

4. Description Preparation Date:
1\10\2024

5. Available Attendance Forms:
Attendance is mandatory

6. Number of Credit Hours (Total) / Number of Units (Total)
45 H - 4 H (2 theoretical, 2 practical) / 3

7. Course administrator's name (mention all, if more than one name)
Name: Zahraa A. Jaaz Email: zahraa.jaaz@nahrainuniv.edu.iq Practical staff (Assistant Prof. Zahraa A. Jaaz)

8. Course Objectives

Course Objectives	➢ Preparing graduates with experience in the m concepts of software engineering. ➢ Introducing the student to the models used in softwa engineering and the ethics of software work. ➢ Introducing the student to the Visual Ba programming language

9. Teaching and Learning Strategies

Strategy	1-Knowledge of the basics of software engineering and t principles related to how to deal with it
	2-Focusing education on the visual basic programming langua through software related to the subject 3- Develop and design high-quality software that meets us customizations and requirements at all levels. 4- Paying attention to configuring the program from its early stag while analyzing the problem, then designing and writing t program until piloting it, testing it, installing it on devices, a carrying out its maintenance process.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1+2	2+2	Introduction to software engineeri	'software crisis'& introduction to software	Methodical book + theoretical lectures	Class discussion
4+3	2+2	Software operation	Software Processe	Methodical book + theoretical lectures	Daily testing
6+5	2+2	Engineering requirements	Requirements Engineering	Methodical book + theoretical lectures	Daily testing
7	2+2	First month exam			
9+8	2+2	Modeling system	System Modeling	Methodical book + theoretical lectures	Homework
11+10	2+2	Architectural Desi	Architectural Desi	Methodical book + theoretical lectures	Daily testing
12	2+2	Design and implementation	Design and Implementation	Methodical book + theoretical lectures	Daily testing
14+13	2+2	Software testing	Software Testing	Methodical book + theoretical lectures	
15					

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

- ➢ Monthly exams + daily surprise tests + homework
- ➢ Class contributions and discussions
- ➢ Daily evaluation of practical performance in the laboratory
- ➢ Determine a grade for daily attendance
- ➢ Creating software packages for projects

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	SOFTWARE ENGINEERINGNinth Edition k (Ian Sommerville)
Main references (sources)	
Recommended books and references (scientific journals, reports…)	Making small practical projects
Electronic References, Websites	Everything related to VB.Net programs

Lab course description

Hours	Week	Subject
1+2	2+2	Introduction to VB.Net
4+3	2+2	Explanation and examples of loop types in VB.Net
6+5	2+2	Create a database within VB and link it to the User and Password window
7	2+2	Connect an Access database with VB.Net
		Mid-term exam
9+8	2+2	Create code to save, modify, delete, and search
11+10	2+2	Performing mathematical operations on the database
12	2+2	Connecting MySQl to VB.Net
14+13	2+2	Create code to save, modify, delete, and search
15	2+2	Simner Enterprises

Course Description Form

1. Course Name:	
Web Design and Programming	
2. Course Code:	
3. Semester / Year:	
2/ 2024−2025	
4. Description Preparation Date:	
2024−03−17	
5. Available Attendance Forms:	
Full Time	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 / 3	

7. Course administrator's name (mention all, if more than one name)

Name: Lect.Assist. Haider Majeed Jaber
Email: haider.m.jabe@narainuniv.edu.iq

8. Course Objectives

Course Objectives	• Basic knowledge about web programming. • Website Design concepts. • Focus on learning web technologies (HTML, CSS, Javascript, and PHP). • Learning how website ranked in results of a search engine. • Teamwork when building website.

9. Teaching and Learning Strategies

Strategy	- Explaining the subjects and relating it to real-life scenarios by providing practical examples. - Practicing through basic and complex web pages. - Group Project

10. Course Structure

Week	Hours (Theo+Lab)	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4		- Introduction to Internet technology and how it works	Describe, Discuss, and practice	
2	4		- Introduction to the Internet services	Describe, Discuss, and practice	Assignments, Quizes, and Exam
3	4		- Web design	Describe, Discuss, and practice	Assignments, Quizes, and Exam
4-5	8		- HTML	Describe, Discuss, and practice	Assignments, Quizes, and Exam
			- Mid1 Test	Exam	Mid
7-8	8		- CSS Basics	Describe, Discuss, and practice	Assignments, Quizes, and Exam
9-10	8		- Javascript Basics	Describe, Discuss, and practice	Assignments, Quizes, and Exam
11-13	8		- PHP Basics	Describe, Discuss, and practice	Assignments, Quizes, and Exam
14-15			- Projects submission and presentation	Self-Learining and Discuss	

11. Course Evaluation

Assignments: 5
Quizzes: 5
Exam: 15
Project: 15
Final Exam: 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	http://www.tutorialspoint.com http://www.w3schools.com

Course Description Form

1. Course Name:
Computer Networks

2. Course Code:

3. Semester / Year:
1st / Fourth Year

4. Description Preparation Date:
12−11−2024

5. Available Attendance Forms:
Compulsory

6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours (Theory) + 30 Hours (Practical) / 3 Units

7. Course administrator's name (mention all, if more than one name)
Name: Dr. Jamal M. Kadhim Email: jamal.mohammedkadhim@nahrainuniv.edu.iq Dr. Rasool Hisham, Dr. Bahera Al-Aosi, Haidar Majeed, Zharaa Abdulhussain

8. Course Objectives

Course Objectives	• Understanding Computer networks. • Understanding 7-model layers. • Understanding protocols of each layer and packet journey from source to destination. • Understanding host addressing through IPv4.0 and IPv6.0.

9. Teaching and Learning Strategies

Strategy	Lectures, problem classes

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2+2		Introduction to computer Networking.	Formal Lectures	Class Activity
2	=		Application Layer.	=	Class Activity

3	=		Application Layer.	=	Class Activity
4	=		Transport Layer.	=	Class Activity
5	=		Transport Layer.	=	Class Activity
6	=		Client-server and wireshark program	=	Class Activity
7	=		First Mid-Exam	=	
8	=		Network Layer	=	Class Activity
9	=		Network Layer	=	Class Activity
10	=		Data Link Layer	=	Class Activity
11	=		Data Link Layer	=	Class Activity
12	=		Second mid-exam	=	Class Activity
13	=		Physical layer	=	Class Activity
14	=		Networking Tools	=	Class Activity

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Computer networking : a top-down approach / James F. Kurose, Keith W. Ross.—6th ed.
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Computing Security I

2. Course Code:
COMP300

3. Semester / Year:
Second semester/ four year

4. Description Preparation Date:
10-11-2024

5. Available Attendance Forms:
Full Time

6. Number of Credit Hours (Total) / Number of Units (Total)
60 h(30 theoretical +30 practical) /4 units

7. Course administrator's name (mention all, if more than one name)
Name: Asst. Prof. Dr. Dalal N. Hamood Email: dalal.naeem@nahrainuniv.edu.iq Assist Lecturer Ruaa bdullah Assist Lecturer Humamm

8. Course Objectives

Course Objectives	The main aim of the course is to introduce the students to the principles of computing security. It focuses on explain the abbreviations of the computing security, also explain the using techniques for achieving the best data security. In this semester, focuses on the common techniques for authentication, and Encryption, the types of the hackers and the techniques that used by the hackers.

9. Teaching and Learning Strategies

Strategy	Book, Lectures, Quizzes, Exam & homework's.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2		* **1.**Data Security Principles 1. Security 2. Confidentiality	* Lecturer	Quiz & activity

	2		3. Integrity 4. Availability 5. Authentication 6. Accountability (Non-Repudiation)		
2	2		Security Attack 1. Passive Attacks 2. Active Attacks	* Lecturer	Quiz & activity
3	2		**1-**Basic Terminology 1-Basic Cryptographic Algorithms	* Lecturer	Quiz & activity
4	2		* Mathematics • Greatest Common Divisor(GCD) • (LCM) Least Common Multiple • Modular • Euler Function : • Inverse Algorithm (inv)	* Lecturer	Quiz & activity
5	2		* Block cipher Historically Symmetric Cipher Model Feistel Mode	* Lecturer	Quiz & activity
6	2		Confusion and Diffusion Substitution (S-boxes) Permutation (P-boxes) Substitution-Permutation Network	* Lecturer	Quiz & activity
7	2		EXAM1	* Lecturer	Quiz &

					activity
8	2		Block Cipher Mode • ECB Operation Mode • CBC Operation Mode • Cipher FeedBack (CFB) • Output Feedback Mode (OFM)	* Lecturer	Quiz & activity
9	2		Stream cipher • Stream Cipher Structure • Important element for design a stream cipher • Types of stream ciphers ▪ Synchronous stream ciphers ▪ Self-synchronizing stream ciphers	* Lecturer	Quiz & activity
10	2		* Public-Key Cryptography Public-Key Characteristics Public-Key Applications Security of Public Key Schemes RSA description and algorithm Key Generation Algorithm Examples VIRUSES and OTHER MALICIOUS CONTENT Introduction Trapdoor Logic Bomb Trojan Horse	* Lecturer	Quiz & activity

			Zombie Bacteria Viruses Virus Operation.		
11	2		* Types of Viruses Boot Sector Viruses Executable Viruses Macro Viruses E-Mail Viruses Anti-Virus Software • first-generation • second-generation • third-generation fourth-generation Chapter Seven : Firewall Firewall Definition: Firewall Concept, Conditions, • *Firewall Concept.* • *Firewall Conditions.*	* Lecturer	Quiz & activity
12	2		* Data Hiding Steganography and Watermarking The Need for Data Hiding Issues in Data Hiding Steganography	* Lecturer	Quiz & activity
13	2		* Steganography types: 1- Pure Steganography: 2- Secret Key Steganography. 3 Public Key Steganography. Least significant bit (LSB) insert Watermarks	* Lecturer	Quiz & activity
14	2		EXAM 2	* Lecturer	Quiz & activity

11. Course Evaluation

Mid   10
Quizzes 10
HW   10
Activities (or report)   10

Final exam 50
Final Lab 10

<table>
<tr><td colspan="2">12. Learning and Teaching Resources</td></tr>
<tr><td>Required textbooks (curricular books, if any)</td><td></td></tr>
<tr><td>Main references (sources)</td><td>Cryptography And Network Security Principles And Practice
Fifth Edition
William Stallings
2015</td></tr>
<tr><td>Recommended books and references (scientific journals, reports…)</td><td></td></tr>
<tr><td>Electronic References, Websites</td><td></td></tr>
</table>

Course Description Form

1. Course Name:
Machine Learning

2. Course Code:
COMP441

3. Semester / Year:
Fourth / First

4. Description Preparation Date:
1/10/2024

5. Available Attendance Forms:
Attendance Mandatory

6. Number of Credit Hours (Total) / Number of Units (Total)
60 Hours (2 Hours Theoretical + 2 Hours Practical)*15/ 3 Credit

7. Course administrator's name (mention all, if more than one name)
Name: Assistant Professor Dr. Khamael Al-Dulaimi Email :khamail.abbass@nahrainuniv.edu.iq

8. Course Objectives

Course Objectives	• Introduce the students to the concept of machine learning • Introduce the students to the reasons that make us resort to machine learning • Give a brief and adequate explanation of the main types of machine learning • Giving a brief and adequate explanation of most of the main headings within machine learning • Draw the student's attention to the applications of machine learning and its relationship to human activities • Strengthening the student's programming skills by designing and implementing machine learning algorithms

9. Teaching and Learning Strategies

Strategy	Explain theoretical lectures, discussions, and asking questions that help the student to analyze and conclude and create group and individual activities to accommodate different abilities, skills, learning rates and styles that allow every student to participate and to achieve some degree of success. Using quizzes, assessment, small project to check student understanding.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	2	Identify and understand the term machine learning and its various applications	What is Machine Learning?	Lectures	Questions during the lecture
2	2	A review of the most important Machine learning topics in	Basic Concepts of Machine learning types	Lectures	Questions during the lecture
3+4	4	Identify the different types of supervised machine learning and explain in detail the method of finding continuous outputs for one or several variables and then measuring the quality of the linear equation.	Supervised Learning Linear Regression (one and multiple variables)+nova table + polynomial +multiple linear regression	Lectures + Examples	Questions during the lecture+ Quiz
5+6	2	Students know how to classify the data outputs using a supervised machine learning algorithm	Correlation Coefficient and Coefficient of Determination +Supervised Learning K-Nearest Neighbor	Lectures + Examples	Questions during the lecture
7	2	Mid 1			
8	2	Students know how to classify	Supervised Learning	Lectures + Examples+	Questions during the lecture

		outputs using a supervised machine-learning algorithm	Support vector machine	Group Work	
9	4	Students Learn ways to solve various machine learning problems and apply cross-validation methods data in an effective way	Regularization and Model Selection (Overfitting + Underfitting)	Lectures + Examples+ Group Work	Quiz
10	2	Students Learn ways to measure model quality using different units	Model Evaluation (Confusion Matrix, Precision and Recall)	Lectures + Examples + Group work	Questions during the lecture
11+12	4	Students Learn ANN term and its applications	Artificial Neural Network Architecture	Lectures + Example	Questions during the lecture
13	2	Mid 2			
14+15	4	Learn to update the ANN weights and produce output	Backpropagation algorithm	Lectures + Examples+ Group Work	Quiz

11. Course Evaluation

Assessment Type	Marks
Quizzes	5
HomeWorks	5
Attendance	5
Mid Exam	10
Lab Mid Exam	10
Lab Attendance and Assessment	5
Lab Final Exam	10
Final Exam	50
Total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Stanford University Machine Learning CS229 Lecture notes by Andrew Ng

	Machine Learning Yearning, by Andrew Ng, 2018
Main references (sources)	Hands-On Machine Learning with Scikit-Learn and TensorFlow Concepts, Tools, and Techniques to Build Intelligent Systems, Orielly, 2017
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	Youtube –Andrew Ng

Lab Structure

Instructors: Assist. Prof. Dr.Khamael Al-Dulaimi, Dr. Sawsan Kamal, Lecturer Azhar Mawlood, Basheer Nahedh

Week	Subject Name
1	Python Introduction
2	Python Introduction
3 +4	Supervised Learning - Linear Regression
5+6	Supervised Learning - K-Nearest Neighbor Classification
7	Supervised Learning - K-Nearest Neighbor Regression
8	Mid 1
9	Supervised Learning -Support Vector Machine
10+11	Artificial Neural Network Architecture
12+13	Project
14	Review
15	Final Lab

Course Description Form

1. Course Name:
Operating Systems I
2. Course Code:
3. Semester / Year:
Semester 1 / 2024-2025
4. Description Preparation Date:
2024-8-25
5. Available Attendance Forms:
Full Time on campus
6. Number of Credit Hours (Total) / Number of Units (Total)
(30 hour lecture + 30 hour lab) / 15
7. Course administrator's name (mention all, if more than one name)
Name: Lect. Ghassan Abdulhakeem Email: Ghassan.alnuaimi@nahrainuniv.edu.iq Lab instructors: Farah Saad, Zainab Haider

8. Course Objectives

Course Objectives	• Introduce OS services to the students. • learn the importance of the OS functions to a developer, administrator, and end user. • Learn basic interaction with OS services by programming. • Learn the design and main components of the OS.

9. Teaching and Learning Strategies

Teaching Strategy	- Weekly face-to-face lectures and practicals, work group assignment, and incorporate hands-on exercises, use visual aids and analogies, and encourage collaboration and discussion.
Learning	- Students engage in class discussion, students presenting their reflection about different topics, focusing on applications, and explore basics and different OSes using VM.

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
			10. Course Structure		
1	2		Introduction to OS	Lecture slides	
2	2		Operating system operations	Lecture slides & class discussion.	Quizzes,
3	2		OS components	Lecture slides & class discussion.	Assignments, and quizzes
4	2		Operating system services	Lecture slides & class discussion.	Oral examination
5	2		OS structure and design	Lecture slides & class discussion.	
6	2		System calls and services	Lecture slides & class discussion.	Quizzes
7	2		Mid Exam 1		Written exam
8	2		Process management and concept	Lecture slides & class discussion.	Oral examination
9	2		Process scheduling	Lecture slides & class discussion.	Quizzes
10	2		Interprocess communication	Lecture slides & class discussion.	
11	2		Threads & Concurrency	Lecture slides & class discussion.	Oral examination
12	2		Multithreading models	Lecture slides & class discussion.	
13	2		Mid Exam 2		Written exam
14	2		Implicit threading	Lecture slides & class discussion.	Quizzes
15	2		Threading issues	Lecture slides & class discussion.	Quizzes

11. Course Evaluation

Quizzes: 5%
Oral examination: 5%
Exam: 15%
Practical part: 15%
Final Lab exam 10%
Final Exam: 50%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Operating Systems Concepts, 10th Edition, Abraham Silberschatz
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	https://codex.cs.yale.edu/avi/os-book/OS1 global/slide-dir/index.html

Course Description Form

1. Course Name:
Computing Security II

2. Course Code:
COMP300

3. Semester / Year:
First semester/ four year

4. Description Preparation Date:
10−11−2024

5. Available Attendance Forms:
Full Time

6. Number of Credit Hours (Total) / Number of Units (Total)
60 h/4 units

7. Course administrator's name (mention all, if more than one name)
Name: Asst. Prof. Dr. Dalal N. Hamood Email: dalal.naeem@nahrainuniv.edu.iq

8. Course Objectives

Course Objectives	The main aim of the course is to introduce the students to the principles of computing security. It focuses on explain the abbreviations of the computing security and Encryption algorithms.

9. Teaching and Learning Strategies

Strategy	Book, Lectures, Exam, Quizzes & homework's.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2		* **1.**Data Security Principles 1. Security 2. Confidentiality 3. Integrity	* Lecturer	*Quiz & activity

			4. Availability 5. Authentication 6. Accountability (Non-Repudiation)		
2	2		Ceaser Algorithm Atbash Algorithm	* Lecturer	*Quiz & activity
3	2		**1-**Keyword Cipher Polybious cipher	* Lecturer	*Quiz & activity
4	2		Additive Cipher Multiplicative Ciphers Affine Ciphers	* Lecturer	*Quiz & activity
5	2		Pigpen / Masonic Cipher Polyalphabetic Ciphers	* Lecturer	*Quiz & activity
6	2		Vigenère Cipher Gronsfeld cipher	* Lecturer	*Quiz & activity
7	2		EXAM1	* Lecturer	*Quiz & activity
8	2		Beaufort Cipher Autokey Cipher	* Lecturer	*Quiz & activity
9	2		Running Key Cipher Polygraphic Ciphers	* Lecturer	*Quiz & activity
10	2		Playfair Cipher Hill Cipher	* Lecturer	*Quiz & activity
11	2		Bifid Cipher Trifid Cipher	* Lecturer	*Quiz & activity
12	2		* Keyed Transposition Ciphers Double Column Transposition	* Lecturer	*Quiz & activity
13	2		Data Encryption Standard (DES) Simplified DES	* Lecturer	*Quiz & activity
14	2		EXAM 2	* Lecturer	*Quiz & activity

11. Course Evaluation

Mid   10
Quizzes   10
HW   10
Activities   10
Final exam 50
Final Lab   10

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	**Cryptography And Network Security Principles And Practice** Fifth Edition William Stallings 2015
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	Computer Lab + Java Language

Course Description Form

1. Course Name:
Data Mining

2. Course Code:
COMP446

3. Semester / Year:
Fourth / Second

4. Description Preparation Date:
17/12/2024

5. Available Attendance Forms:
Attendance Mandatory

6. Number of Credit Hours (Total) / Number of Units (Total)
60 Hours (2 Hours Theoretical + 2 Hours Practical)*15/ 3 Credit

7. Course administrator's name (mention all, if more than one name)
Name: Assistant Professor Dr. Zainab Namh Abdula Email: zainab.namhabdula@nahrainuuniv.edu.iq

8. Course Objectives	
Course Objectives	The course aims to introduce the students to the methods used in data mining and to describe its needs. The course also aims to process data, prepare the data, and understand the relationships between the inputs to make a specific decision. In addition to introducing the students to the concept of data science and its methodology followed by real examples

9. Teaching and Learning Strategies	
Strategy	Theoretical books and lectures, in addition to laboratory work, discussion, and asking questions help the student to analyze and make conclusions. Active learning and practical projects by creating groups of students to solve practical problems during the lecture, in addition to providing workshops on modern topics in data mining.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	2	Recognize and understand the term data mining and the data used	Introduction to Data Mining, Data for Data Mining	Lectures	Questions during the lecture
2	2	Understand data science methodology	Data Science Methodology	Lectures	Questions during the lecture
3	2	Data cleaning, transformation, and integration.	Data Understanding & Preprocessing	Lectures	Quiz
4	2	Recognizing the different types of data and understanding the difference between them, in addition to measuring the central tendency and measure of dispersion.	Getting to Know Your Data – Chapter 2 Data, Attribute Types, Central Tendency, Measure of Dispersion, Proximity and Distance Measurements	Lectures + Examples	Questions during the lecture
5	2	The student knows how to cluster the data sets using an unsupervised machine-learning algorithm	K-Means Clustering	Lectures + Examples	Questions during the lecture
6	2	Mid 1			
7	2	The student knows how to classify the data outputs using a supervised machine learning algorithm	Decision Trees ID3	Lectures + Examples+ Group Work	Questions during the lecture

8+9	4	PCA, feature selection, and extraction.	Dimensionality Reduction	Lectures + Examples+ Group Work	Quiz
10+11	4	The student's knowledge of the association rules by finding the frequent itemsets	Frequent Itemset Mining and Association Rules	Lectures + Examples + Group work	Questions during the lecture
12	2	Mid 2			
13	2	The student's knowledge of text analysis and how to extract useful information and then classify them	Text Analysis	Lectures + Examples	Quiz
14	2	Final Project Presentations			

11.Course Evaluation

Assessment Type	Marks	
Quizzes	5	
Seminar	5	
Attendance	5	
Mid Exam	10	
Lab Mid Exam	7	
Lab Attendance and Assessment	8	
Lab Final Exam	10	
Final Exam	50	
Total	100	

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Data Mining, Concepts and Techniques,** Jiawei Han, Micheline Kamber and Jian Pei, **Elsevier, 2023**
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	Youtube –Andrew Ng

Lab Structure

Instructors: Assist. Prof. Dr. Zainab Namh, Lecturer Azhar Mawlood, Assistant Lecturer Aseel Basim, and Assistant Lecturer Israa Hussein

Week	Subject Name
1+2	Install and set up Python Run sample scripts reading data and plotting
3	Preprocessing on Numeric Data and Exploration
4	Central Tendency and Similarity Measure
5	K Means Clustering
6	Mid Lab
7	Supervised Learning: Decision Tree (Classification)
8	Supervised Learning: Decision Tree (Regression)
9	Dimension Reduction
10+11	Association Rules
12+13	Text Analysis and Feature Extraction
14	Model Evaluation and Cross-Validation
15	Final Exam

Course Description Form

1. Course Name:
Distributed Systems

2. Course Code:

3. Semester / Year:
2nd / Fourth Year

4. Description Preparation Date:
12-11-2024

5. Available Attendance Forms:
Compulsory

6. Number of Credit Hours (Total) / Number of Units (Total)
45 Hours (Theory) / 3 Units

7. Course administrator's name (mention all, if more than one name)
Name: Dr. Jamal M. Kadhim Email: jamal.mohammedkadhim@nahrainuniv.edu.iq

8. Course Objectives

Course Objectives	*Understanding Computer distributed systems (e.g., Internet).* *- Understanding how to write distributed applications and how they work.*

9. Teaching and Learning Strategies

Strategy	Lectures, problem classes

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3		Introduction	Formal Lectures	Class Activity
2	=		Systems Models	=	Class Activity
3	=		System Models	=	Class Activity
4	=		Networking Review	=	Class Activity

5	=		Interprocess Comm.	=	Class Activity
6	=		Interprocess Comm.	=	Class Activity
7	=		First Mid-Exam	=	
8	=		Remote Invocation	=	Class Activity
9	=		Remote Invocation	=	Class Activity
10	=		Distributed Objects components	=	Class Activity
11	=		Web Services	=	Class Activity
12	=		Second mid-exam	=	Class Activity
13	=		Peer-to-peer systems	=	Class Activity
14	=		Distributed File Syste and Name Services	=	Class Activity

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	(Distributed.Systems.Concepts.and.Design,.5ed).Coulouris,.Dollimore,.Kindberg,.Blair
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name:
Game Design and Programming

2. Course Code:

3. Semester / Year:
Second Semester/ Fourth Year

4. Description Preparation Date:
20/10/2024

5. Available Attendance Forms:
- Theory Lectures - Practical Lab

6. Number of Credit Hours (Total) / Number of Units (Total)
60/3

7. Course administrator's name (mention all, if more than one name)
Name: Dr. Safaa Hussein Shwail Email: safaa.husseinshwail@nahrainuniv.edu.iq

8. Practical Teaching
Dr. Safaa Hussein Shwail Lect. Azhar Mawlood Ass. Lec. Aseel Basim

9. Course Objectives	
Course Objectives	• Give a complete knowledge about what the player want and expect in the game, also the skills needed in a game designer. • Explain the development concept that should be included in any game. • Show the main steps that should be follow in the project life cycle with the pre and post design concept. • Explain the genre-specific game design and level design. • Explain the including of the math and logic in the game design.

10. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is by explaining lectures in an interactive way by letting the students to participate in the presenting through questions and answers while at the same time refining and expanding their critical thinking skills. This will be achieved through classes and labs.

11. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	A Brief History of Computer Games Chronology	Introduction	Theoretical Lectures	Quiz
2	2	What players want What Do Players Expect What Skills Does a Game Designer Need	What players want and expect-designer skills	Theoretical Lectures	Quiz
3	2	Concept Development Genres	Concept Development and Genres	Theoretical Lectures	Quiz
4	2	The Game Proposal Document	Concept Development and Genres	Theoretical Lectures	Quiz
5	2	Preproduction The Game Design Document The Art Production Plan The Technical Design Document The Project Plan	Project Lifecycle	Theoretical Lectures	Quiz
6	2	Development Alpha, Beta, Code Freeze, Patches Upgrades	Project Lifecycle	Theoretical Lectures	Quiz
7	2		Mid-Course Exam 1		
8	2	Action Games Role–playing games	Genre-Specific Game Design Issues I	Theoretical Lectures	Quiz
9	2	Adventure Games Strategy Games	Genre-Specific Game Design Issues I	Theoretical Lectures	Quiz

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
10	2	Simulations Sports Games Fighting Games	Genre-Specific Game Design Issues II	Theoretical Lectures	Quiz
11	2	Casual Games God Games Educational Games Puzzle Games	Genre-Specific Game Design Issues II	Theoretical Lectures	Quiz
12	2	Building the Level Gameplay	Level Design	Theoretical Lectures	Quiz
13	2	Structure and Progression Flow Control Degree of Difficulty Balance Puzzles	Level Design	Theoretical Lectures	Quiz
14	2	Probability and Statistics Randomization in Games Random Number Generators Percentages	Math and Logic in Games	Theoretical Lectures	Quiz
15	2		Mid-Course Exam 2	Theoretical Lectures	Quiz

12.Practical Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Painting the main craft	Board Drawing	Programming in java	Program complete
2	2	Drawing the main board	Board Drawing	Programming in java	Program complete
3	2	Showing the craft inside the board	Board Drawing	Programming in java	Program complete
4	2	Moving the main craft inside the	Craft Moving	Programming in java	Program complete
5	2	board by keyboard arrows	Craft Moving	Programming in java	Program complete

6	2		Craft Moving	Programming in java	Program complete
7	2	Painting the missiles Make the craft shooting missiles using keyboard key	Shooting Missiles	Programming in java	Program complete
8	2		Shooting Missiles	Programming in java	Program complete
9	2		Shooting Missiles	Programming in java	Program complete
10	2	Painting the Aliens craft	Drawing Aliens	Programming in java	Program complete
11	2	Drawing a specified number of Aliens crafts inside the board	Drawing Aliens	Programming in java	Program complete
12	2		Drawing Aliens	Programming in java	Program complete
13	2	Make the missiles destroy the Alien crafts by collision detection	Collision	Programming in java	Program complete
14	2		Collision	Programming in java	Program complete
15	2		Mid term Exam		

13. Course Evaluation

10 Quizzes
5 Assignments
15 Lab
10 Report
10 Midterm Exam
50 Final Exam

14. Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Fundamentals Of Game Design, 3rd edition, by Ernest Adams**
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name: Operation Systems II

2. Course Code:

3. Semester / Year: 2nd Semester/ 2024

4. Description Preparation Date: 22/10/2024

5. Available Attendance Forms: Mandatory / on campus

6. Number of Credit Hours (Total) / Number of Units (Total): (30 hour lecture + 30 hour lab) / 15

7. Course administrator's name (mention all, if more than one name)
Name: Ghassan Abdulhakeem Mahmood Email: Ghassan.alnuaimi@nahrainuniv.edu.iq Lab instructors: Farah Saad, Zainab Haider

8. Course Objectives

Course Objectives	• Understand the main mechanisms like process management and process synchronization, • Explore the main and virtual memory management strategies • Understand the file system and how it is implemented.

9. Teaching and Learning Strategies

Strategy	• Lecture-based learning • Technology-based learning • Individual learning • Inquiry-based learning

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Understanding essential facts, concepts, and theories relating to process scheduling	Process scheduling, Part 1	Lecture and Inquiry-based learning	-
2	4		Process scheduling, Part 2	Lecture and Inquiry-based learning	

3	4		Process scheduling, Part 3	Lecture and Inquiry-based learning	Quiz
4	4	Understanding Tools and methodologies used in synchronization	Synchronization, Part 1	Lecture and Individual-based learning	
5	4		Synchronization, Part 2	Lecture and Inquiry-based learning	
6	4		Mid 1 exam		
7	4	Knowing the problem and plan strategies for their solution	Deadlocks	Lecture and Individual-based learning	Quiz
8	4	Understanding essential facts, concepts, and theories relating to memory management	Memory Management, Part 1	Lecture and Individual-based learning	
9	4		Memory Management, Part 2	Lecture and Individual-based learning	
10	4		Memory Management, Part 3	Lecture and Individual-based learning	Quiz
11	4	Knowing essential facts, concepts, and theories relating to file system interface	File System Interface, Part 1	Lecture, Technology and Individual-based learning	Final report submission
12	4		Mid 2 exam		
13	4		File System Interface, Part 2	Lecture, Technology and Individual-based learning	
14	4	Understanding the modeling and design of file systems.	File System implementation	Lecture, Technology and Individual-based learning	Quiz
15	4	Understanding the basic facts about I/O systems	I/O Systems	Lecture, Technology and Individual-based learning	

11.Course Evaluation

Mid exams: 10%
Quiz: 8 %
Lab exam: 15%
Report: 7%
Final Exam: 50%
Final Lab Exam: 10%

12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Operating Systems Concepts, 10th Edition, Abraham Silberschatz
Main references (sources)	Operating Systems Concepts, 10th Edition, Abraham Silberschatz
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	https://codex.cs.yale.edu/avi/os-book/OS10-global/slide-dir/index.html