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

Unmanned Aircraft Systems, Academic Program Course Description

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses/subjects included in the academic program according to the approved learning system (courses , Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name: University of Technology**.**
Faculty/Institute: Electromechanical Eng. Dept.
Scientific Department: Unmanned Aircraft Systems Eng.
Academic or Professional Program Name: Unmanned Aircraft Systems Eng.
Final Certificate Name: Electromechanical Eng. /Unmanned Aircraft Systems Eng.
Academic System: Engineering.
Description Preparation Date: 8/2/2024
File Completion Date: 11/2/2024

Signature:
Head of Department Name:
Date:

Signature:
Scientific Associate Name:
Date:

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

Date:
Signature:

Approval of the Dean

Department Vision

Aiming to build an engineering establishment in the Electromechanical field to be an outstanding one among the top international universities.

1. Department Mission

Preparing an Electromechanical specialist having an outstanding knowledge level, keeping up with the rapid developed trends in this field and complying with the professional moral conduct in serving the work sectors and society.

2. Department Objectives

1- Graduating engineers are highly qualified in the electromechanical field, capable of developing their skills in the engineering knowledge aspects, able to utilize this in the specialized Electromechanical application and mastering the design and implementation of all devices related to this discipline.
2- Feeding the society with the specialists, experts and scientific consultants in electromechanical engineering field.
3- Supporting the research scientific center and engineering industrial projects by the highly capable specialists in their fields.
4- Strengthening the relation with local and international engineering and scientific establishments.

3. Program (Unmanned Aircraft Systems Energies) Mission

1- Prepare our students for successful careers in the Unmanned Aircraft Systems profession.
2- Conduct high quality and innovative research.
3- Serve the community and industry providing educational and research resources.

4. Program Accreditation

The program accreditation under progress in 2023/2024

5. Other external influences

There is no sponsor for the program

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	8	**16**	**0.14**	**Basic**
College Requirements	18	**47**	**0.28**	**Basic**
Department Requirements	31	**82**	**0.543**	**Basic**
Summer Training	yes	**-**	**-**	**-**
Other		-	**-**	**-**

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

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
2024			**theoretical**	**practical**
1st Year, 1st Semester	WSHE106	Workshops	-	6
1st Year, 1st Semester	DEHR105	Democracy and Human Wrights	2	-
1st Year, 1st Semester	EME105	Mathematics I	4	-
1st Year, 1st Semester	PHYS114	Physics I	4	-
1st Year, 1st Semester	ENME116	Engineering Mechanics I	2	1
1st Year, 1st Semester	ENDR115	Engineering Drawing(AutoCAD)	-	1
1st Year, 1st Semester	FEEN117	Fundamentals of Electrical Engineering I	2	-
1st Year, 2nd Semester	EME103	Computer Science I	1	1
1st Year, 2nd Semester	WOSH105	Workshops II	-	2
1st Year, 2nd Semester	EME106	Mathematics II	4	-
1st Year, 2nd Semester	EME108	Physics II	4	-
1st Year, 2nd Semester	EMEE109	Fundamentals of Electrical Engineering (AC + DC)	1	1
1st Year, 2nd Semester	EMEE111	Engineering Mechanics II	2	1
1st Year, 2nd Semester	EMEE113	Fundamentals of Engineering Drawing using AutoCAD	-	1
2nd Year, 1st Semester	EMU2101	Crimes of the Defunct Baath Party	2	-
2nd Year, 1st Semester	EMU2102	Advanced Mathematics I	4	-
2nd Year, 1st Semester	EMU2111	Computer Science II	2	2
2nd Year, 1st Semester	EMU2112	Strength of Materials	2	2
2nd Year, 1st Semester	EMU2113	Thermodynamics	2	2
2nd Year, 1st Semester	EMU2115	Analog Electronic	2	-
2nd Year, 1st Semester	EMU2114	Measurements & Instrument	2	2
2nd Year, 2nd Semester	EMU2201	English Language II	2	-
2nd Year, 2nd Semester	EMU2202	Advanced Mathematics II	4	-
2nd Year, 2nd Semester	EMU2211	Heat Transfer	2	2
2nd Year, 2nd Semester	EMU2212	Composites Materials	2	-
2nd Year, 2nd Semester	EMU2214	Electrical Circuits of Aircraft	2	2
2nd Year, 2nd Semester	EMU2213	Aerodynamics I	2	2
2nd Year, 2nd Semester	EMU2215	Digital Electronic	2	2
3rd Year, 1st Semester	EMU3101	Engineering Analysis	4	-
3rd Year, 1st Semester	EMU3111	Microprocessor and Microcontroller	2	2

3rd Year, 1st Semester	EMU3112	Theory of Vibration	2	2
3rd Year, 1st Semester	EMU3113	Theory of Radar	2	-
3rd Year, 1st Semester	EMU3114	Theory of Aircraft Engines	2	2
3rd Year, 1st Semester	EMU3115	Performance of Aircraft	2	-
3rd Year, 1st Semester	EMU3116	Aircraft Systems I	2	-
3rd Year, 2nd Semester	EMU3201	Numerical Analysis	4	-
3rd Year, 2nd Semester	EMU3211	Electromagnetic Fields	2	-
3rd Year, 2nd Semester	EMU3212	Theory of Control	2	2
3rd Year, 2nd Semester	EMU3213	Analog Communications	2	2
3rd Year, 2nd Semester	EMU3214	Aircraft Structures	2	-
3rd Year, 2nd Semester	EMU3215	Aircraft Systems II	2	2
3rd Year, 2nd Semester	EMU3216	Aerodynamics II	2	2
4th Year, 1st Semester	EMU4111	Automation systems	2	-
4th Year, 1st Semester	EMU4112	Autopilot and mission planning	2	2
4th Year, 1st Semester	EMU4113	Design of Aircraft	2	-
4th Year, 1st Semester	EMU4114	Computer Aided Design (CAD)	2	2
4th Year, 1st Semester	EMU4115	Signal processing	2	-
4th Year, 1st Semester	EMU4116	Digital Communications	2	2
4th Year, 1st Semester	EMU4117	Project I	-	4
4th Year, 2nd Semester	EMU4211	Real Engineering and Ethics	2	-
4th Year, 2nd Semester	EMU4212	Aircraft Navigation Systems	2	2
4th Year, 2nd Semester	EMU4213	Stability of Aircraft	2	-
4th Year, 2nd Semester	EMU4214	Computer Aided Manufacturing (CAM)	2	2
4th Year, 2nd Semester	EMU4215	Image Processing and Aerial Camera Systems	2	-
4th Year, 2nd Semester	EMU4216	Radar Systems	2	2
4th Year, 2nd Semester	EMU4217	Project II	-	4

8. Expected learning outcomes of the program Graduate Outcomes (GOs) for engineering from ICAEE,

1- An ability to identify, formulates, and solves engineering in Unmanned aircraft systems engineering problems by applying principles of engineering, science, and mathematics.
2- An ability to apply the engineering design process to produce solutions that meet specified needs with consideration for public health and safety, and global, cultural, social, environmental, economic, and other factors as appropriate to the discipline.
3- An ability to develop and conduct appropriate experimentation analyzes and interprets data, and use engineering judgment to draw conclusions.
4- An ability to communicate effectively with a range of audiences.
5- An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
6- An ability to recognize the ongoing need to acquire new knowledge, to choose appropriate learning strategies, and to apply this knowledge.
7- An ability to function effectively as a member or leader of a team that establishes goals, plans tasks, meets deadlines, and creates a collaborative and inclusive environment.

Knowledge	
Learning Outcomes (GO1)	An ability to identify, formulate, and solve engineering in unmanned aircraft systems engineering problems by applying principles of engineering, science, and mathematics.
Learning Outcomes (GO2)	An ability to apply the engineering design process to produce solutions that meet specified needs with consideration for public health and safety, and global, cultural, social, environmental, economic, and other factors as appropriate to the discipline.
Learning Outcomes (GO3)	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
Learning Outcomes (GO6)	An ability to recognize the ongoing need to acquire new knowledge, to choose appropriate learning strategies, and to apply this knowledge.
Skills	
Learning Outcomes (GO4)	An ability to communicate effectively with a range of audiences
Learning Outcomes (GO7)	An ability to function effectively as a member or leader of a team that establishes goals, plans tasks, meets deadlines, and creates a collaborative and inclusive environment.
Ethics	
Learning Outcomes (GO5)	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

9. Teaching and Learning Strategies

Problem Based Learning (PBL) is the new teaching and learning strategies and it is adopted in the implementation of the program in general.

10. Evaluation methods

With lab,
Mid exam 15%, student activities 15%, lab 10%, final exam 60%.
Without lab,
Mid exam 15%, student activities 15%, final exam 70%.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor (1)	Electrical and Electronic Eng.	Communication	-	-	-	-
Prof. Assistance (2)	Electrical and Electronic Eng.	Communication				
Professor (2)	Mechanical Eng.	Applied				
Prof. Assistance (2)	Mechanical Eng.	Applied	-	-	-	-
Prof. Assistance (1)	Mechanical Eng	Thermal	-	-	-	-
Lecturer (2)	Mechanical Eng.	Applied	-	-		-
Prof. assistance (1)	Material Eng.	Behavior of materials		-	-	-
Lecturer (1)	Network and Computer systems Engineering	Software and computer systems	-	-	-	-
Lecturer (1)	Mathematics	Mathematics	-	-	-	-

Professional Development

Mentoring new faculty members

The scientific committee in the department mentors the new faculty by:

1- Enter the class with previous two faculty for two months as observer.
2- Enter a period of training in continuous education center in the university for a month.
3- Mentor by the chair of the branch in the first year.

Professional development of faculty members

The scientific committee in the department have a plan for developing the faculty:

1- Periodically scientific lecture by one of the staff on developing in his professional field for all faculty.
2- Periodically lecture in social field for all faculty and students.
3- Yearly conference in the department with contributions from all faculty (2020, 2021, 2022 and 2023).
4- Contribution in conferences in different universities inside and outside Iraq.
5- Contribution in publishing papers in local, regional and international journals (Scopus and Science Direct).
6- Participates in different committees in university and ministry.
7- Participates in American developing faculty origination (IREX).
8- Participate all faculty in workshop for Problem Based Learning (new teaching method).
9- All faculty contribute in getting the accreditation from ICAEE, so the faculty became a professional in accreditation process.

12. **Acceptance Criterion**

Usually, central enrollment was carried by ministry of higher education based on degree, professional field, location, university requirements.

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

The initiative of the program came as a result of power plant requirements for engineers who can serve as mechanical and electrical workers together. Similar trend was observed globally in power plants. The program source information based on unmanned aircraft systems field. Many international programs were recently created related to unmanned aircraft systems. Our program intends to cover all requirements in unmanned aircraft systems, including communication, design, stability, control, Autopilot, Engines, aircraft performance. It is first and unique program in Iraqi universities. The information of the program were basically from international programs, then with the consultations of industrial advisory board from Science and Technology Ministry and Ministry of Defense , the information were adopted with Iraqi Marketing requirements.

14. Program Development Plan

The field of unmanned aircraft systems is developing with time globally, so some program courses were changed every four years collected between mechanical and electrical courses related to unmanned aircraft systems were added in third and fourth years. For these courses, the syllabus was updated every year gradually. The contents of the courses reviewed will presented on the advisory board every meeting and updated with requirements of related Iraqi ministries.

Program Skills Outline										
				Required program Learning outcomes						
Year/Level	**Course Code**	**Course Name**	**Basic or optional**	**Knowledge**				**Skills**		**Ethics**
				GO1	**GO2**	**GO3**	**GO6**	**GO4**	**GO7**	**GO5**
1st Year	EME105	Mathematics I		*						
	EME106	Mathematics II		*						
	EME107	Physics I							*	
	EME108	Physics II							*	
	EMEE109	Fundamental of Electrical Engineering		*						
	EMEE110	Engineering Mechanics I					*			
	EMEE111	Engineering Mechanics II		*						
	EMEE113	Fundamental of Auto CAD					*			
2nd Year	EMU2102	Advanced Mathematics I		*						

	EMU2202	Advanced Mathematics II					*			
	EMU2212	Composites Materials		*						
	EMU2213	Aerodynamics I		*						
	EMU2113	Thermodynamics		*						
	EMU2115	Analog Electronic		*						
	EMU2215	Digital Electronic				*				
	EMU2214	Electrical Circuits of Aircraft				*				
	EMU2112	Strength of Materials			*					
	EMU2111	Computer Science II					*			
	EMU2201	English Language II						*		
3rd Year	EMU3201	Numerical Analysis		*						
	EMU3101	Engineering Analysis		*						
	EMU3111	Microprocessor and Microcontroller					*			
	EMU3212	Theory of Control		*						
	EMU3116	Aircraft Systems I		*						

	EMU3216	Aerodynamics II		*						
	EMU3114	Theory of Aircraft Engines		*						
	EMU3112	Theory of Vibration		*						
	EMU3113	Theory of Radar		*						
	EMU3211	Electromagnetic Fields		*						
	EMU3213	Analog Communications				*				
	EMU3214	Aircraft Structures		*						
	EMU3215	Aircraft Systems II		*						
	EMU3115	Performance of Aircraft		*	*					
4th Year	EMU4211	Real Engineering and Ethics								*
	EMU4113	Design of Aircraft			*					
	EMU4117	Project I						*	*	
	EMU4111	Automation systems		*						
	EMU4112	Autopilot and mission planning		*						

	EMU4114	Computer Aided Design (CAD)			*					
	EMU4115	Signal processing		*						
	EMU4217	Project II						*	*	
	EMU4116	Digital Communications			*					
	EMU4212	Aircraft Navigation Systems		*						
	EMU4213	Stability of Aircraft			*					
	EMU4214	Computer Aided Manufacturing (CAM)				*				
	EMU4215	Image Processing and Aerial Camera Systems					*			
	EMU4216	Radar Systems					*			

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation.**

Course Description Forms

Second Year

Course Description Form

1. Course Name:	
The crimes of The Baath regime in Iraq	
2. Course Code:	
EMU2101	
3. Semester / Year:	
2nd Year, 1st Semester	
4. Description Preparation Date:	
2023	
5. Available Attendance Forms: in presence	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30 hours/ 2 hours a week	
7. Course administrator's name (mention all, if more than one name)	
Name: Assi. Lect. Sajed qasim gadbahan Email: 11536@uotechnology.edu.iq	
8. Course Objectives	
Course Objectives	• Making this generation aware of the crimes committed by the Baathist regime • The extent of human rights violations publicly • Spreading awareness of the extent of violation of Sharia and law.
9. Teaching and Learning Strategies	
Strategy	Delivering theoretical lectures, opening the door to discussion, participation, asking questions, and getting to know each other The extent of human rights violations committed by the Baath regime in Iraq over a long period of time during which the Iraqi people suffered from the scourges of wars, mass graves etc. One of the heinous crimes at the international level

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	2	Rejecting Baathist	Concept of crimes	Theoretical	Class activity
Second	2	thought in all its forms	Effects of crimes	Theoretical	Quiz
Third	2	Recognizing the ugliness	Violations of law	Theoretical	Report
Fourth	2	crimes committed	Violations decisions	Theoretical	Midterms
Fifth	2	Violations committed	Prison and detention places	Theoretical	
		For the sake of humanity			
		Oppressing. And	Environmental crimes		
Sixth	2	exterminating. The people	Destruction of cities and	Theoretical	
Seventh	2	Cruelty, intimidation and	villages	Theoretical	
Eighth	2	torture	Mass grave crimes	Theoretical	
Ninth	2	Politics of repression	Genocide cemeteries events	Theoretical	
Tenth	2	Reject the idea of change	The events of the Shaabani	Theoretical	
Eleventh	2	And expressing an	uprising	Theoretical	
Twelfth	2	opinion	Genocide cemeteries	Theoretical	
Thirteenth		Burying crime scenes	Kurdish cemeteries	Theoretical	
Fourteenth	2	Killing and slaughtering	Cemeteries of the Shaabaniya	Theoretical	
Fifteenth	2	the Shiite Kurds	Intifada	Theoretical	
	2	Concealing the evidence	Chronological classification		
		of crimes	Cemetery sites		
		Continuous killing			
		Hiding signs of genocide			
		Collective the people			

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)	A methodological book (Crimes of the Baath Regime in Iraq) Ministry of Higher Education and Scientific Research
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1.Course Name:

Analog Electronic

2.Course Code:

EMU2115

3.Semester / Year

2nd Year, 1st Semester

4.Description Preparation Date:

11/2/2024

5.Available Attendance Forms:

Attendance list

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

2 Theoretical 2 /2

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

Name: Buraq Abdul Hadi Awad
Email: 50050@uotechnology.edu.iq

8.Course Objectives

Course Objectives	1. Develop and understanding of the fundamental laws and elements of electrical circuits. 2. Learn the properties of electric elements and the techniques to measure voltage and current. 3. Develop the ability to apply circuit analysis to DC and AC circuits.

9.Teaching and Learning Strategies

Strategy	• Boosting students' interest through interactive lesson delivery improves learning. • Improving teacher and students relationship improves learning. • Encouraging students to participate freely in lesson delivery improves learning. • Provision of efficient laboratories and workshops makes students to improve in their learning.

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2 3 4,5 6 7 8 9 10 11 12 13 14 15	2	**GO1**	• Bipolar Junction Transistor (BJT) Circuits**:** • BJT as an Amplifier • DC Biasing Circuits (Design, Analysis, and Stability)**.** • The BJT Inverter (Transistor as a Switch)**.** • Small-Signal BJT Amplifiers • BJT Modeling (hybrid and re)**.** • Graphical Determination of the h-Parameters ,Voltage Gain Power Gain and Current Gain, • Field-Effect Transistor (FET) Circuits: • Small-Signal FET • Amplifiers FET	Traditional education enhanced by examples from public life	Midterm exam 15% Quiz and other activities 15% Final exam 70%

			Modeling		

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)	1. Thomas L. Floyd , "ELECTRONIC DEVICES" , Tenth Edition,2018 2. Charles K. Alexander, Matthew N. O. Sadiku, "Fundamental of Electric Circuits", fifth Edition, 2009. 3. ياسين احمد الشبول ،"اللاكترونيات المعاصرة" ،الجزء الاول ، 2004
Main references (sources)	Electric Circuits, 9th edition, J. Nilsson and S. Riedel, Prentice Hall, 2011
Recommended books and references (scientific journals, reports...)	Any book in the field
Electronic References, Websites	Educational video

1. Course Name:

Computer Science II

2. Course Code:

EMU2111

3. Semester / Year:

2nd , 1st Semester

4. Description Preparation Date:

2023

5. Available Attendance Forms:

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

2 units

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

Name: Yaser Ali
Email: 50111@uotechnology.edu.iq

8. Course Objectives

Course Objectives	• Introduction & Basics • Selection • Iteration • Functions • Arrays • Pointers • Strings • Files

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2 3,4 5,6 7,8 9,10 11 12 13		GO6	• Pre-Increment & post - increment operators. • Conditional operator • Switch. • Loops. • Standard functions. • References • Classes	PBL	Report, Quiz, Mid Exam, Final Exam

11. Course Evaluation

Mid exam 15%, student activities 15%, lab 10%, final exam 60%.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• PROGRAMMING WITH C++, JOHN R. HUBBARD, SCHAUM'S OUTLINE SERIES, McGRAW-HILL, 2000.
Main references (sources)	-
Recommended books and references (scientific journals, reports...)	-
Electronic References, Websites	-

1. Course Name:

Advanced mathematics I

2. Course Code:

EMU2102

3. Semester / Year:

1st Semester, 2nd Year

4. Description Preparation Date:

2023

5. Available Attendance Forms:

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

4 units

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

Name: Mayada Taki Wazi
Email: Mayada.t.wazi @uotechnology.edu.iq

8. Course Objectives

Course Objectives	• Partial derivative • Line Integral. • Double Integral • Triple integral. • Second Order Differential Equations • Vector.

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2 3,4 5,6 7,8 9,10 11,12		GO1	• Application of partial derivative • Application of line integration. • Application of double integration. • Application of triple integration. • Learn many methods to solve 2nd ODE. • Application of vectors.	PBL	Quiz, Mid Exam Final Exam

11. Course Evaluation

Mid exam 15%, student activities 15%, final exam 70%.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Advanced Engineering Mathematics.K.A.Stroud,2003 • Advanced Engineering Mathematics, H.K. DASS. 2009
Main references (sources)	-
Recommended books and references (scientific journals, reports...)	-
Electronic References, Websites	-

1. Course Name:

measurement and instruments

2. Course Code:

EMU2114

3. Semester / Year:

1st Semester, 2nd Year

4. Description Preparation Date:

6/2/2024

5. Available Attendance Forms:

Theoretical lecture + laboratory

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

30 h/5units

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

Name: Dr. Rasha Fahim Nadhim
Email: rasha.f.nahdim@uotechnology.edu.iq

8. Course Objectives

Course Objectives	• Definition of the measurement process and units of measurement • Definition of measurement errors, their causes, and analysis • Study the basics of indicating devices and design ammeters and voltmeters • Study the types of bridges used to measure resistance and impedance. • Study of Transducer and its types • Study digital measuring devices

9. Teaching and Learning Strategies

Strategy	

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understand the definit of measurement proce The main parts of measuring devices	Introduction to measurement	Theoretical explanation	An oral and written test and given Duties
		Understand and analyze units of measurement	Basic and derived units o measurement	Theoretical explanation + problem solving	Written test and assignments
		Understanding and analyzing measurement errors	Measurement errors	Theoretical explanation + problem solving	Written test and assignments
		Understanding and studying the basics of analogue indicating measuring devices	Analogue measuring devices	Theoretical explanation + problem solving	Written test and assignments
		Design of voltmeter and ammeter	Analogue current and voltage measuring devices	Theoretical explanation + problem solving	Written test and assignments
		Understanding and analyzing bridges, their types and applications	Bridges and their applications	Theoretical explanation + problem solving	Written test and assignments
		Understanding and			

		analyzing Transducer, it types and applications Signal analysis + understanding digital current and voltage measuring devices Understanding measurin devices for oil and gas testing	Transducer Signal analysis + digital devices Measuring devices for oi and gas testing	Theoretical explanation + problem solving Theoretical explanation + problem solving Theoretical explanation + problem solving	Written test and assignments Written test and assignments Written test and assignments

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
Exam score of 15 marks
Daily exam, 5 marks
Lab 10 degrees
Rating: 10 marks
Final exam 60 marks

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	1-Electronic measurement systems. U.A.Bakshi 2- Electrical instrument and measurement techniques.W.D.cooper
Recommended books and references (scientific journals, reports...)	Electronic and electrical measurement and instrumentation. J.BGupta
Electronic References, Websites	

1. Course Name:

Thermodynamic

2. Course Code:

EMU2113

3. Semester / Year:

2nd Year, 1st Semester

4. Description Preparation Date:

2023

5. Available Attendance Forms:

Attendance

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

3 units

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

Name: Husham Asse
Email: Husham Asse @uotechnology.edu.iq

8. Course Objectives

Course Objectives	brief description of the content of the course (catalog description) Students will learn: • Analysis and demonstration of thermodynamic principles including parameters, units, and definitions • Analysis of the 1st, 2nd, 3rd, and zero laws of the thermodynamic and their application on the idea gas processes, cycles, steam, enthalpy, and entropy.

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10		GO1	• properties of system (P, V, and T) • Thermodynamic laws (1st, 2nd, 3rd, zero) • Energy balance • Open and close system • Ideal gas • Ideal gas processes • Heat engine and heat pump • Gas cycles (Carnot cycle for gas) • Steam plant (Carnot and Rankine) • Ideal gas cycles (Diesel, Otto, Daul)	PBL	Quiz, Mid exam, Final Exam

11. Course Evaluation

Mid exam 15%, student activities 15%, 10% lab, final exam 60%.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Thermodynamic an Engineering Approach, Yunus A. Cengel, Michael A. Boles, 5th edition 2004
Main references (sources)	-
Recommended books and references (scientific journals, reports...)	-
Electronic References, Websites	-

1. Course Name:

Strength of Materials

2. Course Code:

EMU2112

3. Semester / Year:

2nd Year, 1st Semester

4. Description Preparation Date:

2023

5. Available Attendance Forms:

Attendance

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

3 units

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

Name: Ass. Prof. Dr. Huda Akram Zainal
Email: 50286@uotechnology.edu.iq

8. Course Objectives

Course Objectives	• Introduces the fundamental concepts in mechanics of materials by study of the behavior of solid bodies under loads and deflections. • Study the simple bending theory for beams and the simple torsion theory for shafts (circular) and non-circular, deflection of beams, complex stresses, compounds beam. • Illustration and discussion the principles of free & forced vibrations and definition with and without damping. • Proceeding to the Student free & forced vibrations of single degree of freedom and two degree of freedom.

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10		GO2	• Simple stress and strain • Shearing force and bending moment diagrams • Bending Theory of the beam • Deflection of beams • Torsion Theory for Circle Shaft. • Free vibration of single degree of freedom system • Forced vibration of single degree of freedom system • Free vibration with damping • Forced vibration two degree of freedom • Forced vibration with damping	PBL	Quiz, Mid Exam, Final Exam

11. Course Evaluation

Mid exam 15%, student activities 15%, 10% lab, final exam 60%.

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	• Mechanics of Materials I., E. J. HEARN, THIRD EDITION, 2007. • Strength of materials, G. G. Jon, 2009. • Mechanical vibration by S.S. Rao.
Main references (sources)	-
Recommended books and references (scientific journals, reports...)	-
Electronic References, Websites	-

1. Course Name:
Digital Electronics
2. Course Code:
EMU2215
3. Semester / Year:
2nd Year, 1st Semester
4. Description Preparation Date:
2023
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
3 units
7. Course administrator's name (mention all, if more than one name)
Name: Mohammed Qasim Mohammed Sulttan Email: Mohammed Qasim @uotechnology.edu.iq
8. Course Objectives

Course Objectives	• Access to Logic Technology, Digital & Analog Quantities, Digital Electronic concepts, Number Systems, Number-Based Conversion, Signed Number Representation. • Logic Gates (NOT gate, AND gate, OR gate, NAND gate, NOR gate, XOR gate, XNOR gate). • Boolean Algebra and Logic Simplification, Boolean Operations & Expressions, Laws & Rules of Boolean Algebra. • De Morgan's Theorem, Boolean Expression for Logic Circuits, Simplification Using Boolean Algebra, Standard Form of Boolean Expression. • Karnaugh Map, Karnaugh Map SOP Minimization, Karnaugh Map POS Minimization. • Combinational Logic Analysis: Basic Combinational Logic Circuits, Implementing Combinational Logic. • Functions of Combinational Logic, Basic Adders, Comparators, Decoders, Encoders, Multiplexers, Demultiplexers.

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2 3,4 5,6 7,8 9,10		GO1	• Logic Technology • Logic Gates • Boolean Algebra. • De Morgan's Theorem. • Combinational Logic-	-	-

11. Course Evaluation

Mid exam 15%, student activities 15%, lab 10%, final exam 60%.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Introduction to Digital Electronics by John Crowe and Barrie Hayes Gill
Main references (sources)	-
Recommended books and references (scientific journals, reports...)	-
Electronic References, Websites	-

1. Course Name:
English Language II
2. Course Code:
EMU2201
3. Semester / Year:
Second Year / 2nd semester
4. Description Preparation Date:
1−2−2024
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
15 hours / 2 units
7. Course administrator's name (mention all, if more than one name)
Name: Yaser Ali Email: 50111@uotechnology.edu.iq

8. Course Objectives

Course Objectives	The aims which can be achieved during teaching this course program are as follows: Proceeding to the Student the benefits of studying English Language as Second language Giving Knowledge about using the Technical Terminologies in their studies Understanding of using the scientific English language in the Academic Program Giving Knowledge of how to write, describe, typing the reports in English

9. Teaching and Learning Strategies

Strategy	Lecturer – presentation and PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	4	Building grammar skil	Introduction: Building Grammar Skills, Sentence Construction (Subject, Verb, Object), Things to remember about subject verb agreement, Irregular Verbs, Vocabulary, Exercise 1. **Adjectives:** Types of Adjectives = Common Adjectives,	Examinatio ,Quizzes	Lecture &p.p Show

			Proper Adjectives, Article Adjectives (Definite, Indefinite). **Adverb:** Types of Adverbs = Ending with –ly Adverbs, Non-ly Adverbs, Conjunctive adverbs; Adverb to describe a verb, Adverb to describe an adjective, Adverb to describe another adverb. **Possessive Nouns:** With singular nouns, with plural nouns ending in s, with plural nouns not ending in s. **Plural Nouns, Listening, Speaking, Vocabulary, Exercise 2.**		
3-5	6	Distinguishing betwee times	**Tenses:** Present Tense = Present Simple, Present Continuous, **Tenses:** Past Tense = Past Simple, Past Continuous, Past Perfect, F Perfect Continuc **Listening, Speaking, Vocabulary, Exercise 4.**,**Tenses:**Future Tense = Fut Simple, Fut	Examinatio ,Quizzes	Lecture &p.p Show

			Continuous, Fut Perfect, Fut Perfect Continuc **Listening, Speaking, Vocabulary, Exercise 5.**		
6-7	4	Applying conditional sentences in writing ar verbally	**Conditional:** First Conditional, Second Conditional Third Conditional, Mixed Conditional. Using Wish (Present, Past); Even Though Vs Even If; Any Longer Vs Anymore Vs No Longer. **Listening, Speaking, Vocabulary, Exercise 6. Midterm Exam**	Examinatior ,Ques	Lecture &p.p Show
8-9	4	Using numbers and countable in writing ar verbally	**Used To Vs Be Used To Vs Get Used To. Countable or Uncountable:** Irregular Plural, Nouns that can be countable or uncountable, Nouns that can change from uncountable to countable **Listening, Speaking, Vocabulary, Exercise 7.** Think Vs Hope, Too Vs Too Much Vs Too Many, Enough + Noun & Adjective +	Examinatior ,Quizzes	Lecture &p.p Show

			Enough, Both Vs Either Vs Neither, Dare & Need as Auxiliary Verbs. **Listening, Speaking, Vocabulary, Exercise 8.**		
10-12	6	Use verbs of feeling in writing and verbally	Verb After Preposition; Subject Questions; Verbs of Feeling. Because Vs Because of, Beside Vs Besides. **Listening, Speaking, Vocabulary, Exercise 9.** **Writing:** Avoid long sentences, avoid overusing the to be verbs, Avoid ambiguity, English Capitalization Rules. **Exercise 10.** **Writing:** English Punctuation Marks = Period, Comma, Semicolon. Applying Tenses, Subject-verb Agreement, and Conjunctions or Connectors on Writing; Who Vs. Whom. **Exercise 11.**	Examination ,Quizzes	Lecture &p.p Show
13-14	4	Focus on the literature	Literature Focus: Writing an Essay =	Examination ,Quizzes	Lecture &p.p Show

			Agree or Disagree, Preferences, and Description Essay Questions., **Phonetic Symbols:** Consonants, Vowels, Diphthongs (Two Vowels Together).		
15	2	Exam	Exam	Examination ,Quizzes	Lecture &p.p Show

11. Course Evaluation
Mid exam 15%, student activities 15%, final exam 70%.

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Soars, John, and Liz Soars. New Headway-PreIntermediate. Oxford University, 2003.
Main references (sources)	Soars, John, and Liz Soars. New Headway-PreIntermediate. Oxford University, 2003.
Recommended books and references (scientific journals, reports…)	Soars, John, and Liz Soars. New Headway-PreIntermediate. Oxford University, 2003.
Electronic References, Websites	

1. Course Name:
Aerodynamics I
2. Course Code:
EMU2213
3. Semester / Year:
2nd Year, 2nd Semester

4. Description Preparation Date:

12\02\2024

5. Available Attendance Forms:

Attendance

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

2

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

Name: Prof Dr Muhammad.A.R Yass
Email: 50251@uotechnology.edu.iq

8. Course Objectives

Course Objectives	**Movement of air** **Parameters of air** **Equation of movemoment.....**

9. Teaching and Learning Strategies

Strategy	Air behavior movement , Its parameter and air equation

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
	2+1 2+1 2+1 2+1 2+1 2+1 2+1	Atmospherics Mach No + Reynolds No Continuity Equation Bernoulli's Equation Boundary layers Navier Stocks Equation UAV Drag		Class + Discussion + Notes	Discussion + 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)	Aerodynamics of Student
Main references (sources)	Aerodynamics
Recommended books and references (scientific journals, reports...)	Aerodynamics
Electronic References, Websites	Aerodynamics

1. Course Name:

Composite Material

2. Course Code:

EMU2212

3. Semester / Year:

2nd Year, 2nd Semester

4. Description Preparation Date:

6/2/2024

5. Available Attendance Forms:

In Class

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

30 Hours/ 3 Units

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

Name: Ass. Prof. Dr. Huda Akram Zainal
Email: 50286@uotechnology.edu.iq

8. Course Objectives

Course Objectives	• In this course, you will learn about composite materials and their components by • Understanding composite materials and their properties. • Understanding the components of composite materials and the properties for each component, in addition to their types depending on the properties of each component. • Describe the mechanical behavior of composite materials and their components • Analysis of the stresses placed on the composite material and its components • Understanding how composite materials fail, and being able to start exploring

9. Teaching and Learning Strategies

Strategy	Composite materials are a specialty material used to increasing levels in multiple engineering fiel starting with high-performance aircraft performance, ground vehicles and even relatively low-tech applications in our daily lives. Professionals responsible for products and systems that rely on composite materials will benefit from a deeper understanding of how these materials are made, ho they are used, How to act, and how to fail. It is also important to understand that not all compos

	materials are the same, and that different types.Certain composite materials are suitable for particu applications, and the selection, design, manufacture and use of these materials requires considerations

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 3,4 5,6 6,7 8,9 10,11 12,13 14 15		An ability to to realize the concepts of composite materials and their behaviour during processing as well as recognize the classification of the matrix and fibers . In addition , analyze the composite materials in terms of stress and strain curve and examine the beaviour of these materials at different fiber directions .	➢ Introduction to composite materials ➢ The matrix (Primarily (phase ➢ The Reinforcement or Fiber (Secondary Phase) ➢ Micromechanical Analysis of Composite Strength and Stiffness ➢ Volume fractions,mass fractions and densities ➢ Packing of Fibers of composites Stress-Strain Behavior of the composites ➢ Longitudinal Strength and Stiffness ➢ Transverse Modulus ➢ In-Plane Shear Modulus and Poisson's ratio The Advantages and Disadvantages of the Composite Materials Mid Exam	Traditional education enhanced by examples from public life	Quiz and other activities 15% Final exam 70%

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)	
Recommended books and references (scientific journals, reports...)	Materials Science and Engineering An Introduction
Electronic References, Websites	

1. Course Name:					
Electrical Circuits of aircraft					
2. Course Code:					
EMU2214					
3. Semester / Year: Semester					
2nd Year, 2nd Semester					
4. Description Preparation Date:					
6/2/2024					
5. Available Attendance Forms:					
Daily attendance according to the lecture schedule					
6. **Number of Credit Hours (Total) / Number of Units (Total):**					
2 hr/w					
7. Course administrator's name (mention all, if more than one name)					
Name: Assistant lecturer. Hiba Ali Najim Email: enghiba241@gmail.com					
8. Course Objectives					
Course Objectives	The course introduces the basic concepts of electrical and electronic circuits, the basic electronic elements, introduces the theories of analyzing the operation of these circuits, in different working systems, and trains the student on practical applications in the field of forming these circuits from electronic elements (diodes, transistors...)				
9. Teaching and Learning Strategies					
Strategy	1- By explaining theoretical courses. 2- By applying solutions to the required problems.				
10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	2	GO3	(Simplified Structure and Mode of operation, Type of transistor Connection- characteristic curve- load line-connection analysis of each type of connection, The BJT as an	Explanation of theoretical lectu by subject teachers using teaching and	Daily exams, daily student participation assessment, monthly exams,

			amplifier an as a switch)	presentation methods	and final exams
2	2				
3	2		The basic structure- Characterizing BJT amplifier-CE amplifier- BC amplifier- Multistage amplifier- Differential amplifier.		
4	2		Characteristic of JEFT and biasing circuits, COSFET, D-MONSFET, MOS-FET, C/CS of transistor MOSFET amplifying circuits, Equivalent circuit, amplifier types CS, CD, CG.		
5	2		class A, class B, class AB, class C		
6	4		Feedback loop and the oscillator criterion the oscillator circuits, RC- oscillator circuits, LC- oscillator circuits, crystal oscillators.		
7	2		Natural and step responses of an RL circuit.1, Natural and step responses of an RC circuit.1, Natural and step responses of a Parallel RLC circuit, Natural and step responses of a Series RLC circuit		
8	2		(Balanced 3-phase voltages, Balanced WYE-WYE connection, Balanced WYE- Delta connection, Balanced Delta - Delta connection, Power in balanced 3-phase system).		
9	4		(Series resonance, Parallel resonance, Transfer function, Decibel scale, Bode plots).		
10	4		(Impedance parameters, Admittance parameters, Hybrid parameters, Transmission parameters).		
11	2				
12	2				

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)	1. Electronic Devices and Circuit Theory. 2. Electronic circuits & devices and circuits by Millman & Halkias. 3-Electronic circuits by Schlling
Recommended books and references (scientific journals, reports...)	All solid scientific journals that are related to the broad concept of electronic circuits
Electronic References, Websites	Accessing the Internet through the World Wide Web

1. Course Name:
Heat Transfer
2. Course Code:
EMU2211
3. Semester / Year:
2nd Semester ,2nd Year
4. Description Preparation Date:
6/2/2024
5. Available Attendance Forms:
In Class
6. Number of Credit Hours (Total) / Number of Units (Total)
30 Hours/ 3 Units
7. Course administrator's name (mention all, if more than one name)
Name: Ass. Prof. Dr. Walaa Mousa Hashim Email: 50091@uotechnology.edu.iq
8. Course Objectives

Course Objectives	• Understand the modes of heat transfer and thermo-physical properties • Application of energy conservation equation for thermal problems • Calculate temperature and heat flux in one and two-dimensional conduction • Calculate temperature and heat flux in unsteady conduction • 5. Understand velocity and thermal boundary layers • Use boundary layer theory to determine velocity and temperature profile in • external flows • Evaluate heat transfer in internal flows for both developing and fully • developed regions • Calculate heat transfer rate and effectiveness of different heat exchangers • Understand radiation properties and surfaces for heat transfer • Calculate radiative heat transfer rate among surfaces

9. Teaching and Learning Strategies	
Strategy	Students explore heat transfer and energy efficiency using the context of energy efficient houses. They gain a solid understanding of the three types of heat transfer: radiation, convection and conduction, which are explained in detail and related to the real world. They learn about the many ways solar energy is used as a renewable energy source to reduce the emission of greenhouse gasses and operating costs. Students also explore ways in which a device can capitalize on the methods of heat transfer to produce a beneficial result. They are given the tools to calculate the heat transferred between a system and its surroundings.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	2		Introduction to heat transfer methods		
2	2		Conductive heat transfer/planar wall multilayer		
3	2		Heat transfer by conduction/radial direction		
4	2		Heat transfer by conduction through a heat source		
5	2		Heat transfer by conduction and convection		
6	2		Thermal resistance of fins		
7	2		Mid exam		
8	2		Forced convection heat transfer on a flat		
9	2		plate/boundary layer		
10	2		Thermal boundary layer		
11	2		Heat transfer by forced convection in pipes		
12	2		Heat transfer by natural convection on		
13	2		a horizontal flat plate		
14	2		Heat transfer by natural convection on a vertical		
15	2		flat plate		
			Heat transfer by natural convection in pipes		
			Heat transfer by radiation		
			heat exchangers		

11.Course Evaluation
Midterm Exams: 15 Quizzes: 5 Homework's: 10 Laboratory work: 10 Other: 5 Final Exam: 60

12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	F.P. Incropera and D.D. DeWitt, "Fundamentals of Heat and Mass Transfer", 5thEd., John Wiley, J.P.Holman, 10nthEd
Main references (sources)	J.P.Holman, 10nthEd
Recommended books and references (scientific journals, reports...)	-
Electronic References, Websites	-

Third Year

1. Course Name:
Theory of Vibration
2. Course Code:
EMU3112
3. Semester / Year:
First Semester /3th Year
4. Description Preparation Date:

16/2/2024
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
3/45
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Aseel .J.Mohammed Email: Aseel.J.mohammed@uotechnology.edu.iq
8. Course Objectives

Course Objectives	• Know the types of harmonic and periodic motion. • Know the types of vibrations. Know the degrees of freedom of the system. • Derivation of equations of motion derivation of equations of coercive force. • Introduction to machine noise and diagnostics. Noise reduction by design some principles.
9. Teaching and Learning Strategies	
Strategy	Theoretical lectures (give the lecture to student in person) practical lecture (work in the laboratory to achieve the practical aspect)

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Definition of harmonic motion, periodic motion and correctors	Oscillatory motion	Attendance lectures	Question and answer
2	2	Calculation of natural frequency and calculation of the method of energies	Free vibration	Attendance lectures	Home work
3	2	Calculation of forced vibration imbalance	Simple torsion theory	Attendance lectures	Question and answer
4	2	Calculation of forced vibration imbalance	Vibration coordinated to your taste	Attendance lectures	Question and answer
5	2	Study the motivational and arbitrary arousal	Transient vibration	Attendance lectures	Home work
6	2	Analysis of the	Systems with	Attendance	Question and

		normal situation and preliminary conditions and the study of forced consensual	two degrees or more freedom	lectures	answer Home work
7	2	Of elasticity impact coefficients and hardness impact coefficients	Characteristics of vibration systems	Attendance lectures	Question and answer in the lecture
8	2	Study of the separation of forced vibration equations	Characteristics of vibration systems	Attendance lectures	First monthly exam
9	2	Study the relationships between machine noise and diagnostics	Introduction to nosie	Attendance lectures	Home work
10	2	Nosie reduction effect compared to diagnostic targets	Introduction to nosie	Attendance lectures	Aquestion and answer session in the lecture
11	2	Study of some principles	Advanced stresses	Attendance lectures	The second monthly exam
12	2	Study of some principles	Noise reduction by design some principles	Attendance lectures	Question and answer in the lecture

11.Course Evaluation

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

12.Learning and Teaching Resources

Required textbooks (curricular books, any)	
Main references (sources)	P.E.J.HEARN, (Mechanics of materials), John Willy and Sons Inc., 2002
Recommended books and references (scientific journals, reports...)	S.R.C.Hibbeler (Statics and mechanics of materials), Mc. Graw Hill. 4th edition , 2010
Electronic References, Websites	-

1. Course Name:
Numerical Analysis
2. Course Code:
EMU3201
3. Semester / Year:
3rd Year, 1st Semester
4. Description Preparation Date:
2023
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
4 Units
7. Course administrator's name (mention all, if more than one name)
Name: Ameer A. Jaddoa Email: Ameer.A.Jaddoa@uotechnology.edu.iq
8. Course Objectives

Course Objectives	• Aims of the course are to graduates qualified engineers who they have theoretical experience in advanced numerical in electromechanical field. • This unit of study aims to provide theoretical knowledge and principles of advanced numerical and the ability to analysis and solve the numerical problems. • Illustration and discussion the main the application of numerical methods for the solution of equation(s) - linear, non-linear (algebraic) that occur in most numerical of electromechanical field. • The student may also go beyond the subject and perform grid sensitivity, parametric study and stability analysis.
9. Teaching and Learning Strategies	
Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2,3 4,5,6		GO1	Solution of non –linear equations by numerical methods: • Simple Iteration Method	PBL	Quiz Mid Exam Final Exam

7,8 9,10 11,12			• Bisection method • Newton –Raphson iterative Curve fitting &Interpolation a) Curve fitting : • Least square method b) Interpolation : • Newton Interpolation Polynomial • Lagrange Interpolation Polynomial Numerical Solution of linear equations systems: • Direct method • Indirect method Numerical integration • Trapezoidal rule • Simpson's rule Solution of differential equations by numerical methods: • Modified Euler's method • Runge-Kutta method		

11. Course Evaluation	
Mid exam 15%, student activities 15%, final exam 70%.	
12. Learning and Teaching Resources	
Required textbooks (curricular books, any)	• Chapra, Steven C., and Raymond P. Canale., "Numerical methods for engineers," Vol. 2, New York: *McGraw-Hill*, 2012.
Main references (sources)	-
Recommended books and references (scientific journals, reports...)	-
Electronic References, Websites	-

13. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Stroud, Kenneth Arthur, and Dexter J. Booth., "Advanced engineering mathematics," *Palgrave Macmillan*, 2011.
Main references (sources)	-
Recommended books and references (scientific journals, reports...)	-
Electronic References, Websites	-

1. Course Name:
Theory of Radar
2. **Course Code**:
EMU3113
3. Semester / Year:
3rd Year, 1st Semester
4. Description Preparation Date:
2/11/2024
5. Available Attendance Forms:
In person
6. Number of Credit Hours (Total) / Number of Units (Total)
3Hours/Week 3H(2H theory +1 H tutorial)
7. Course administrator's name (mention all, if more than one name)
Name: Ahmed Hameed Reja 50073@uotechnology.edu.iq

8. Course Objectives

Course Objectives	Radio detection and ranging (radar) is one of the most common sensor systems used for automatic monitoring of people, machines, and nature. And when they are placed on a platform, such as an airplane or a satellite, they are dominant. It is used to detect stationary and moving targets in addition to the formation of pictures of the Earth and its characteristics, which is called remote sensing. The aim of this course is to provide an overview of the theory of typical radar and its operational principles, starting with concepts. The basics include wave propagation, types of resolution, and specifications. It is required to be available in signal-receiving systems and then to know how to derive the radar equation according to the nature of its work.

9. Teaching and Learning Strategies

Strategy	Theoretical lectures (giving the lecture to students in person) and including daily exams, homework, reports, and assignments.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Acquire-basic know ledge	Introduction to the nature	Giving the	The extent of the

		The concept of radar Understanding the basic principles To make radar Classification of shapes Rada waves Get to know the main parts of a system .Radar	of radar maxi, mum unambiguo us range, radar wave forms, the simple form of radar, in addition .to radar applications	lecture Discussio and exercises	stude nt's interaction with the lec ture and the extent of his understanding through it Questions and answers
2	3	The student will learn about : Frequency beams of the radar system The student's understanding of the typesof systems Radar and problems according to the package Frequency The student will acquire concepts Basics of radar .theory	Classify radar according to the type of operating signal Radar classification according to the frequency level Recognize the maximum detection range and the .factors involved	Giving the lecture Discussion and exercises	The extent of the student's interaction with the lecture and the extent of his understanding through it Questions and answers
3	3	The student will understand the most important factors that are associated with process detection, including the and accuracy of extent detection Also, the student will be able to visualise the technologies used in .scanning operations The student will learn about the types of signals .used by radar systems	Classification of radar according to the type of signal Classification of radar according to the frequency band Maximum detection range .and the factors involved`	Giving the Lecture Discussion and exercises	The extent of the student's interaction with the lecture and the extent of his understanding through it Questions and answers
4	3	The student will understand the most critical factors associated with a detection process, including the extent and accuracy of .detection The student will be able to recognise the technologies used in radar scanning .operations The student will learn about the types of signals used in .radar systems	Continuing with the topic of maximum detection range and factors .associated with it Prediction of Range Performance, Minimum ,Detectable Signal .Receiver Noise, and SNR	Giving the lecture Discussion and exercises	The extent of the student's interaction with the lecture and the extent of his understanding through it Questions and answers
5	2	First month Exam	First month Exam	First month Exam	First month Exam
6	3	Advantages and disadvantages of each type	The student will gain knowledge of the	Giving the le+cture	The extent of the student's

		of scanning method. Advantages and disadvantages of transmitter methods.	advantages and disadvantages of scanning .methods The student will understand the types of transmitters and the .advantages of each kind	Discussion and exercises	interaction with the lecture and the extent of his understanding through it Questions and answers
7	3	Radar Horizon Weather factors and their impact on the detection Physical phenomena that that impact the detection process	The student will understand some physical phenomena and their .impact on radar operation	Giving the lecture Discussion and exercises	The extent of the student's interaction with the lecture and the extent of his understanding through it Questions and answers
8	3	Radar range equation: simple model, detection prediction, .noise at the receiver	The student will learn Basic ideas of the process of Derivation of the radar equation, Its characteristics, and .relevant factors	Giving the lecture Discussion and exercises	The extent of the student's interactio with the lecture and the extent of his understanding throu it Questions and answers
9	3	Signal-to-noise ratio, Integration of radar pulses, Cross section of the target, its types, and the .characteristics of each kind	The student will have a more accurate under standing of the radar equation. In addition, detection depends on the .targets	Giving the lecture Discussion and exercise	The extent of the student's interaction with the lecture and the extent of his understanding through it Questions and answers
1(	2	Second month Exam	Second month Exam	Second month Exam	Second month Exam
1	3	Transmission power, frequency, pulse repetition frequency, and losses while .propagation	The impact of the student's ability will be understood in transmitted signal and the eff of value frequency pulse as a .result of natural propagatio	Giving the lecture Discussion and exercises	The extent of the student's interaction with the lecture and the extent of his understanding through it Questions and answers
1	3	Types of modulation signals i the radar and understanding t Doppler frequency effect	The student will know the advantages, modulation type and characteristics of the .Doppler phenomenon	Giving the lecture Discussion and exercises	The extent of the student's interaction with the lecture and the extent of his understanding through it Questions and answers
1	3	Radar systems that work with continuous signals and their	The student will understand how the radar systems work	Giving the le+cture	The extent of the student's

		.characteristics	.with continuous waves	Discussion and exercises	interaction with the lecture and the extent of his understanding through it Questions and answers
14	3	The separation between transmitter and receiver, the requirements frequency, and applications of CW Radar	The student will realize separation between transmitter and receiver, the requirements frequency, and applications of CW .Radar	Giving the le+cture Discussion and exercises	The extent of the student's interaction with the lecture and the extent of his understanding through it Questions and answers
15	3	Final Semester Exam	Final Semester Exam	Final Semester Exam	Final Semester Exam

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Not available
Main references (sources)	Introduction to Radar Systems – Merrill I. Skolnik, SECOND EDITION, McGraw-Hill, 19
Recommended books and references (scientific journals, reports...)	Not available
Electronic References, Websites	Introduction to Radar Systems – Merrill I. SKolnik, THIRD EDITION, Tata McGraw-Hill, 2001.

1. Course Name:

Microprocessor and Microcontroller

2. Course Code:

EMU3111

3. Semester / Year:

3rd Year, 1st Semester

4. Description Preparation Date:

6-Feb-2024

5. Available Attendance Forms:

In Class Lectures

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

64 Hours through one semester /4 Units

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

Name: Yase Ali
Email: 50111@uotechnology.edu.iq

8. Course Objectives

Course Objectives	• Revising the common numbering system then generalizing to hybrid numbering systems. • Explaining microprocessors architectures. • Explaining internal registers of the 8086 microprocessor. • Explaining assembly language instructions l of the 8086 microprocessor. • Practice designing and programming small system based on 8086 CPU.

9. Teaching and Learning Strategies

Strategy	1- Provide the student theoretical lectures. 2- Providing the student with laboratory experiments. 3- Providing the student with various problems and introducing him to the mechanism solving them.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	**GO6**	Reviewing basic and hybrid numbering systems.	Giving lectures	Students' interaction within the lecture
2	4		8086 Microprocessor architecture reviewed	Giving lectures	Students' interaction within the lecture
3	4		Why assembly language is important	Giving lectures	Students' interaction within the lecture
4	4		Explain the registers of the 8086	Giving lectures	Students' interaction within the lecture
5	4		Review of the addressing modes	Giving lectures	Students' interaction within the lecture
6	4		Review the arithmetic instructions	Giving lectures	Students' interaction within the lecture
7	4		Review of logical instruction	Open discussions between the student and the lecturer	Giving the student an incentive reward (grades) and urging him to excel
8	2	Mid-Term Exam			
9	4		Multiplexing and de-multiplexing techniques.	Giving lectures	Students' interaction within the lecture
10	4		Review of conditional and jump instructions	Open discussions between the student and the lecturer	Giving the student an incentive reward (grades) and urging him to excel
11	4		Review of the loop instructions	Open discussions between the student and	Giving the student an incentive reward (grades) and urging him to excel

				the lecturer	
12	4		Practical example (1) to design and program 8086	Giving lectures	Students' interaction within the lecture
13	4		Practical example (2) to design and program 8086	Giving lectures	Students' interaction within the lecture
14	4		Practical example (3) to design and program 8086	Giving lectures	Students' interaction within the lecture
15	3	End of the term Exam			In class, paper based exam

11.Course Evaluation

The final score is out of 100, collected according to the different tasks assigned to the student such as daily preparation, oral presentations, daily quizzes, monthly exams, reports.... etc.

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Non
Main references (sources)	The Intel microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro processor, Pentium II, Pentium III, Pentium 4, and Core2 with 64-bit extensions: Architecture, programming, and interfacing / By: Barry B. Brey—8th edition, 2009
Recommended books and references (scientific journals, reports...)	Non
Electronic References, Websites	Non

1. Course Name:

Analog Communications

2. Course Code:

EMU3213

3. Semester / Year:

3rd Year, 1st Semester

4. Description Preparation Date:

02-2024

5. Available Attendance Forms:

Attendance lectures

6. Number of Credit Hours (Total) / Number of Units (Total)
2 hours weekly (30 hours in course)/ 2 Units
7. Course administrator's name (mention all, if more than one name)
Name: Asst. Prof. Dr. Mohammed Qasim Mohammed Email: 50033@uotechnology.edu.iq
8. Course Objectives

Course Objectives	• **Teaching students the basic concepts of analogue communications** • **Study the analysis of signals, their types, useful signals, and the useful operations for signals** • **Study Fourier analyses and their types** • **Study the modulation and demodulation techniques and their types in detail**

9. Teaching and Learning Strategies	
Strategy	Theoretical lectures (give the lecture to students in person) Practical lectures (work in the laboratory to achieve the practical aspect)

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	An introduction to understanding the basics of analogue communications	Fundamentals of analogue communications	Attendance lecture	Question and Answer
2	2	Learn the concept of signal analysis	signal analysis	Attendance lecture	Question and Answer
3	2	Learn the types of signals, useful signals	signal analysis	Attendance lecture	Homework
4	2	Learn some operations on signals	signal analysis	Attendance lecture	Question and Answer
5	2	Study of Fourier analyzes and their types	Fourier analyzes and their types	Attendance lecture	Quiz
6	2	Applying Fourier analyzes to sinusoidal signals	Fourier analyzes and their types	Attendance lecture	Question and Answer
7	2	Applying Fourier analyzes to complex functions	Fourier analyzes and their types	Attendance lecture	Question and Answer
8	2	Learn Fourier transforms for discontinuous signals Mid-course exam	Fourier transforms	Attendance lecture	Homework
9	2	An introduction to embedding and de-embedding	Mid-course exam	Attendance lecture	Written questions Question and Answer
10	2	techniques and their types	embedding and de-embedding techniques	Attendance lecture	

11	2	Learn the concept of amplitude modulation	amplitude modulation & Demodulation	Attendance lecture	Question and Answer Quiz
12	2	Learn the concept of amplitude Demodulation	amplitude modulation & Demodulation	Attendance lecture	
13	2	Learn the types of amplitude-modulated signals	amplitude modulation & Demodulation	Attendance lecture	Question and Answer Homework
14	2	Learn the concept of angular modulation and its types (frequency modulation)	angular modulation	Attendance lecture	
15	2	Learn the concept of angular modulation and its types (phase modulation)	angular modulation	Attendance lecture	Question and Answer

11.Course Evaluation

5% attendance grade; 5% homework; 5% Quizzes; 15% midterm exam; 60% final exam

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	No
Main references (sources)	B. P. Lathi, "Modern Digital And Analog Communications Systems", 3rd Edition, (The Oxford Series in Electrical and Computer Engineering).
Recommended books and references (scientific journals, reports...)	• Bruce Carlson, Paul Crilly, Janet Rutledge "Communication Systems", 4th Edition, - McGraw Hill • Simon Haykin, Barry Van Veen, "Signals and Systems", 2nd Edition-Wiley.
Electronic References, Websites	No

1. Course Name:

Aircraft Systems I

2. Course Code:

EMU3116

3. Semester / Year:

3rd Year, 1st Semester

4. Description Preparation Date:

1-9-2023

5. Available Attendance Forms:

Direct Attendance

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

2 hrs., 2 units

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

Name: Asst. Dr. Ahmed Adnan Shandookh
Email: Ahmed.A.Shandookh@uotechnology.edu.iq

8. Course Objectives

Course Objectives	1. To familiarize the student with the most important aircraft electrical systems. 2. Familiarity with the electrical parts of drones. 3. Know the different types of drones

9. Teaching and Learning Strategies

Strategy	1 .General strategy 2. Diversified strategy

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	4	Criterion (1,4 and 7)	Introduction to the basic electrical systems in drones	Direct teaching method through lectures and explanatory films	Written and oral exams
3-5	6	Criterion (1,4 and 7)	Sensors, devices, and basic electrical equipment	Direct teaching method through lectures and explanatory films	Written and oral exams
6-8	6	Criterion (1,4 and 7)	Actuating equipment and Driving devices (electro-pneumatic and hydraulic)	Direct teaching method through lectures and explanatory films	Written and oral exams
9-11	6	Criterion (1,4 and 7)	Electrical Systems of Fixed Wing RC Aircrafts	Direct teaching method through lectures and	Written and oral exams

				explanatory films	
12-15	8	Criterion (1,4 and 7)	Electrical Systems of Drons	Direct teaching method through lectures and explanatory films	Written and oral exams

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 an	**Aircraft Electrical and Electronic Systems** Principles, Operation and Maintenance Mike Tooley and David Wyatt
Main references (sources)	**Aircraft:** Electricity and Electronics Thomas K. Eismin
Recommended books and references (scientific journals, reports...)	**Aircraft Electrical Systems** EHJ Pallett
Electronic References, Websites	

1. Course Name:	
Aircraft performance	
2. Course Code:	
EMU3115	
3. Semester / Year:	
3rd Year, 1st Semester	
4. Description Preparation Date:	
7-02-2024	
5. Available Attendance Forms:	
In-person only	
6. Number of Credit Hours (Total) / Number of Units (Total)	
(2 hours) Theory Weekly / 2 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. AKeel Ali Wanas Email: 20184@uotechnology.edu.iq	
8. Course Objectives	
Course	• **Aerodynamic performance analysis**

Objectives	• **Applying concepts to aircraft design** • **Solving practical problems** • **Enhancing analytical and evaluation skills**
9. Teaching and Learning Strategies	
Strategy	• **Understanding the basic theory** • **Hands-on training** • **Providing constructive feedback** • **Focusing on safety and balance** • **Enhancing analytical and decision-making skills** • **Using modern techniques** • **Enhancing collaboration and communication** • **Boosting self-confidence**

10. Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
2 3 4 6- 8- 11- 13- 15-	2 2 2 2 4 4 6 4	Introduction: The importance of studying aircraft performance. The Earth's Atmosphere: Components of the atmosphere. The effect of weather conditions on aircraft performance. Performance Analysis I - Steady Flight Level: Analysis	Introduction Earth's atmosphere performance analysis I – Steady level flight Performance analysis II – Steady climb, descent and glide Performance analysis III – Range and endurance Performance analysis IV– Accelerated level flight and climb Performance analysis V – Maneuvers Performance analysis VI – Take-off and landing	• Reading and studying the educational materials. • Practical application and solving exercises. • Participating in group discussions. • Watching educational videos. • Conducting practical training. • Reviewing and taking tests.	• Participating in discussions. • Quizzes. • Final tests.

		and evaluation of aircraft performance in horizontal flight. Performance Analysis II - Climbing, Descending, and Steady Gliding: Analysis of aircraft performance during climbing, descending, and horizontal gliding. Performance Analysis III – Range and Endurance: Analysis of aircraft performance under long-distance flight conditions. Performance Analysis IV – Level Flight and Accelerated Climbing: Analysis of			

		aircraft performance in horizontal flight and accelerated climbing. Performance Analysis V – Maneuvers: Analysis of aircraft performance during aerial maneuvers. Performance Analysis VI – Takeoff and Landing: Analysis of aircraft performance during takeoff and landing operations.			

11.Course Evaluation	
5 marks for attendance and quizzes + 25 marks for the mid-term exam + 70 marks for the final exam	
12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	Introduction to Aircraft Flight Mechanics :Performance, Static Stability, Dynamic Stability, and Classical Feedback Control, by Thomas R. Yechout, 2003.
Recommended books and references (scientific	

journals, reports...)	
Electronic References, Websites	

1. Course Name:					
Electromagnetic Field					
2. Course Code:					
EMU3211					
3. Semester / Year:					
3rd Year, 2nd Semester					
4. Description Preparation Date:					
02-2024					
5. Available Attendance Forms:					
Attendance lectures					
6. Number of Credit Hours (Total) / Number of Units (Total)					
2 hours weekly (30 hours in course)/ 2 Units					
7. Course administrator's name (mention all, if more than one name)					
Name: Dr. Murooj Nadhom Mohammed Ali Email: murooj.n.mohammed@uotechnology.edu.iq					
8. Course Objectives					
Course Objectives	• **Teaching students the principles behind electromagnetic fields** • **Focusing on electromagnetic waves and their properties.** • **Addressing the Divergence and Gauss's theorem, Curl and Stokes theorems.** • **Understanding and analyzing vector concepts and operations** • **Evaluating resistances of conductors in a few simple geometric forms.** • **Analyse and apply Maxwell's equations for time-varying fields, both in integral and differential form.** • **Solving the wave equation for the electric and magnetic fields.**				
9. Teaching and Learning Strategies					
Strategy	Theoretical lectures (give the lecture to students in person)				
10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	2	An introduction to understanding the basics of Electromagnetic Field	Fundamentals of Electromagnetic waves	Attendance lecture	Question and Answer

2	2	How to measure the Electromagnetic waves	Measuring Electromagnetic Wave	Attendance lecture	Question and Answer
3	2	Understanding and analyzing vectors	Vector Analysis	Attendance lecture	Homework
4	2	Learn the basic concepts the rectangular coordinate system	Vector Analysis	Attendance lecture	Question and Answer
5	2	Understanding vector field and learning the DOT product	Vector Analysis	Attendance lecture	Quiz
6	2	Learn the CROSS product	Vector Analysis	Attendance lecture	Question and Answer
7	2	Giving knowledge about the steady magnetic field	The steady magnetic field	Attendance lecture	Homework
8	2	Learn Biot-Savart Law and Amper's Circuital Law	The steady magnetic field	Attendance lecture	Question and Answer
9	2	Learn Curl and Stokes' Theorem	The steady magnetic field	Attendance lecture	Question and Answer
10	2	Analyzing Forces on A Differential Current Element	Magnetic Forces, Materials, and Inductance	Attendance lecture	Quiz
11	2	Analyzing Force and Torque on a Closed Circuit	Magnetic Forces, Materials, and Inductance	Attendance lecture	Question and Answer
12	2	Mid-course exam	Mid-course exam	Attendance lecture	Written questions
13	2	Calculate Magnetization and Permeability	The Nature of Magnetic Materials	Attendance lecture	Question and Answer Homework
14	2	Potential Energy and Forces on Magnetic Materials	Magnetic Forces, Materials, and Inductance	Attendance lecture	Question and Answer
15	2	Inductance and Mutual Inductance	Magnetic Forces, Materials, and Inductance	Attendance lecture	

11.Course Evaluation

5% attendance grade; 5% homework; 5% Quizzes; 15% midterm exam; 60% final exam

12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	No
Main references (sources)	William H. Hayt, Jr., "Engineering electromagnetics", 8th Edition, The McGraw-Hill Companies, Inc.,2012.
Recommended books and references (scientific journals, reports...)	• Ellingson, Steven W. "*Electromagnetics*", Vol. 2. Blacksburg, VA: Virginia Tech Publishing, (2020). • Papachristou, C. J. "Introduction to Electromagnetic Theory and the Physics of Conducting Solids", Springer Nature, (2020)
Electronic References, Websites	No

1.Course Name:	
Aerodynamics II	
2.Course Code:	
EMU3216	
3.Semester / Year:	
3rd Year, 2nd Semester	
4.Description Preparation Date:	
1-9-2023	
5. Available Attendance Forms:	
Direct Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total):	
2 hrs., 2 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Asst. Dr. Ahmed Adnan Shandookh Email: Ahmed.A.Shandookh@uotechnology.edu.iq	
8. Course objectives	
Course objectives	1. To familiarize the student with the most important aircraft aerodynamics principles. 2. Familiarity with the parts of aircraft related to aerodynamics. 3. Know the different types of aircraft affecting its aerodynamics

9. teaching and learning strategies	
strategies	1 .General strategy 2. Diversified strategy

10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	4	Criterion (1,4 and 7)	Introduction to the Basic Aircraft Principles and Fundamentals	Direct teaching method through lectures and explanatory films	Written and oral exams
3-5	6	Criterion (1,4 and 7)	Airfoil Shapes and Types affected upon aerodynamics	Direct teaching method through lectures and explanatory films	Written and oral exams
6-8	6	Criterion (1,4 and 7)	Effect of Aircraft Shape on its Aerodynamics	Direct teaching method through lectures and explanatory films	Written and oral exams
9-15	14	Criterion (1,4 and 7)	Effect of Wing Shape and Design on Aircraft Aerodynamics	Direct teaching method through lectures and explanatory films	Written and oral exams

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)	**Aerodynamics for Engineering Students** E.L. Houghton P.W. Carpenter Steven H. Collicott Daniel T. Valentine

Main references (sources)	**APPLIED AERODYNAMICS** Jorge Colman Lerner Ulfilas Boldes
Recommended books and references (scientific journals, reports...)	A Modern Course in Aeroelastici Earl H. Dowell
Electronic References, Websites	No

1. Course Name:	
Aircraft systems II	
2. Course Code:	
EMU3215	
3. Semester / Year:	
3rd Year, 2st Semester	
4. Description Preparation Date:	
6/2/2025	
5. Available Attendance Forms:	
In Class	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30 Hours/ 3 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Ass. Prof. Dr. Walaa Mousa Hashim Email: 50091@uotechnology.edu.iq	
8. Course Objectives	
Course Objectives	• Aircraft systems engineering is the field of study relating to the maintenance, safety, and airworthiness of aircraft. • Aircraft system engineers support the development of on board flight systems, including flight controls. landing gear, electrical power, hydraulics, and avionics systems.
9. Teaching and Learning Strategies	
Strategy	This course develops a detailed understanding of the range of systems typical on complex modern aircraft, including sensors and actuators, flight control, navigation, flight management, engine management, power, communication, display, data bus and other avionics technologies. It takes a systems engineering perspective and addresses the complex interplay, and the design and integration issues between the many subsystems of an aircraft. The course will cover important aspects of reliability, robustness, redundancy, validation and verification in the systems engineering process. The syllabus will

	contain substantial case studies to reaffirm these lessons with examples from incidents and accidents in aeronautical history. Students will gain experience from group activities involving systems engineering practice.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 13	2 2 2 2 2		Introduction to Aircraft Systems Principle of Hydraulic & Pneumatic Systems -Fluid Power Concept -Principle of Hydraulic& Pneumatic Drive -Basic Components of Hydraulic Systems -Advantage and Disadvantage of Hydraulic Pneumatic Systems -Symbols of Hydraulic& Pneumatic circuits Power Unit -Theory of pumping -Classification of Hydraulic Pumps -Types of Pumps ■Gear Pump ■Lobe Pump ■Gerotor Pump ■Vane Pump ■Screw Pump Pneumatic Systems - Air Compressors - Compressed Air Tank - Air Service Units (FRL(Control Unit -Directional control valve -Pressure control valve -Flow control valve -Proportional control valve Actuator -Hydraulic Cylinder (types		

14 15	2 2		and principle circuit(-Hydraulic Motor -Moment, Velocity, Power and efficiency Accumulators -Theory of Accumulators -Types of Accumulators ■Weight Accumulator ■Spring Accumulator ■Piston Accumulator ■Bladder Accumulator ■Membrance Accumulator Auxiliary Hydraulic& Pneumatic Systems -Pipes -Filter -Measurement Gauges -Heat Exchanger Fundamental Hydraulic & Pneumatic Systems -Open, Critical and Closed Circuits -Speed Controlling Circuit -Pressure Controlling Circuits Hydraulic & Pneumatic Control Systems -Conventional Control System -Servo Control System Application of Hydraulic & Pneumatic systems in aircrafts		

11.Course Evaluation

Midterm Exams: 15
Quizzes: 5
Homework's: 10
Laboratory work: 10
Other: 5
Final Exam: 60

12.Learning and Teaching Resources	
Required textbooks (curricul books, if any)	Nelik, Lev., "Centrifugal and rotary pumps", Raghu Chaitanya.M.V, " Model Based Aircraft Control System Design and Simulation", George E. Totten and Victor J. De Negri"HANDBOOK OF HYDRAULIC FLUID TECHNOLOGY" S E C O N D E D I T I O N
Main references (sources)	
Recommended books and references (scientific journals, reports...)	-
Electronic References, Websites	-

1. Course Name:	
Aircraft Structures	
2. Course Code:	
EMU3214	
3. Semester / Year:	
3rd Year,2nd semester	
4. Description Preparation Date:	
7/2/2024	
5. Available Attendance Forms:	
Class	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30 hr Theoretical 2 unit	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Dr. Farag Mahel Mohammed Email: 50127@uotechnology.edu.iq	
8. Course Objectives	
Course Objectives	• Knowledge of basic concepts of aircraft structures. • Knowing the parts of aircraft structures and their importance. • Calculate the loads to which parts of the aircraft structure are exposed.
9. Teaching and Learning Strategies	
Strategy	Enable students to identify the components of the aircraft structure and

	the aerodynamic and shock loads to which the structure is exposed.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Learn the basics of aircraft classification and the forces acting on them	Introduction to the development of aircraft	Theoretical	Discussion
2	2		Classification of aircraft	Theoretical	Discussion
3	2	Learn the parts of aircraft structures and their general arrangement	Arrangement of wing and tail unit locations	Theoretical	Discussion
4	2		Arrangement of wheels and loads acting on them	Theoretical	Quiz
5	2	Learn the parts of the wing, install the parts, and calculate the loads on the wing	Introduction to the wing types, wing design factors, and high-lift devices	Theoretical	Discussion
6	2			Theoretical	Discussion
7	2		Wing construction and wing construction classifications	Theoretical	Discussion
8	2		Calculating shear stresses on wing cells	Theoretical	Discussion
9	2			Theoretical	Quiz
10	2		Mid Exam. (1)		
11	2	Learn how to design a tail unit	Types of tail unit, parts of the tail unit and their importance	Theoretical	Discussion
12	2		Calculate the wing area	Theoretical	Discussion
13	2	Learn how to assemble and build an airplane fuselage	Fuselage construction and design requirements	Theoretical	Discussion
14	2		Calculating the loads acting on the aircraft fuselage	Theoretical	Discussion
15	2		Mid Exam. (2)		

11.Course Evaluation

daily preparation 5, written Mid exams 25, Lab. 10 and Final Exam. 60	
12.Learning and Teaching Resources	
Required textbooks (curricular books, if any	
Main references (sources)	1. David Peery, Aircraft Structures, McGraw-Hill Book Company. 2. Egbert Torenbeek, Synthesis of Subsonic Airplane Design, Delft University Press. 3. Reg Austin, Unmanned Aircraft Systems, A John Wiley and Sons, Ltd., Publication. 4. Megson, Aircraft structures for engineering students, Edward Arnold.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Theory of Aircraft Engines
2. Course Code:
EMU2115
3. Semester / Year
One/2023-2024
4. Description Preparation Date:
8/3/2024
5. Available Attendance Forms:
attendance list
6. Number of Credit Hours (Total) / Number of Units (Total)
Theoretical 2 / Practical 2
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Dr. Hashim A. Hussein + Lecturer Zainab Basher Email:50005@uotechnology.edu.iq Zainab.B.Abdullah@uotechnology.edu.iq
8. Course Objectives

Course Objectives	1. Develop and understanding of the fundamental laws and elements of A/C engines. 2. Learn the energy properties of electric elements and the

	techniques to measure A/C A/C Parameters of engines 3. Develop the ability to apply Thermodynamic analysis to A/C engines types

9. Teaching and Learning Strategies

Strategy	• Boosting students' interest through interactive lesson delivery improves learning. • Improving teacher and students relationship improves learning. • Encouraging students to participate freely in lesson delivery improves students learning. • Provision of efficient laboratories and workshops makes students to improve in their learning.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	2	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. The majority of the lectures and homework of this course deal with the derivations and application of linear mathematics and engineering theory for circuit analysis	• Form of energy transformation and Aircraft Engines Definitions , Classifications • Calculations of real cycles • Basic constructions configurations of aero piston • Performance characteristic • Turbojet engines and ramjet engines • Engine noise • Nozzle performance • Turbo shaft engines • Turboprop engines • Turbofan engines • Performance	Traditional education enhanced by examples from public life	Midterm exam 15% Quiz and other activities15% Lab. 10% Final exam 60%

			Calculations • Aero piston engines • Thermodynamic analysis of A/C engines Introduction Electrical Machines, Electrical Machines Classifications • Graphical Determination of the h-Parameters ,Voltage Gain Working principle of Electric Machines as an Amplifier • DC machine • Back EMF in DC Motor • Power Flow and Losses in DC Gain, • Magnetization curve Servo Motor		

11.Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, dailyoral, monthly, or written exams, reports .... etc	
12.Learning and Teaching Resources	
Required textbooks (curricular books, if any	1. Aircraft Propulsion and Gas Turbine Engines, Ahmed F. Al sayed , 20011, Egypt 2. Thomas L. Floyd , "ELECTRONIC DEVICES" , Tenth Edition,2018
Main references (sources)	Electric Circuits, 9th edition, J. Nilsson

	and S. Riedel, Prentice Hall, 2011
Recommended books and references (scientific journals, reports...)	Any book in the field
Electronic References, Websites	Educational video

1. Course Name:
Theory of Control
2. Course Code:
EMU3212
3. Semester / Year:
2nd Semester /3th Year
4. Description Preparation Date:
4th Feb 2024
5. Available Attendance Forms:
Face to Face
6. Number of Credit Hours (Total) / Number of Units (Total)
32 hours through one semester /2 Units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Aseel .J.Mohammed Email: Aseel.J.mohammed@uotechnology.edu.iq
8. Course Objectives

Course Objectives	• Introduce the student to control systems (continuous control organizations and digital control systems) • Introduce the student to the types of control systems (open circuit and closed circuit). • Design and calculation of the stability of the system from a distance calculated the transition function. • Graduating engineers with competence, skill and knowledge in the design of the mass chart
9. Teaching and Learning Strategies	
Strategy	1- Provide the student with theoretical lectures. 2- Provide the student with different problems and introduce him to the mechanism for solving them.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	2	**GO1**	Mathematics background	Giving lectures	Students' interaction with the lecture
2	2		Differential equation review	Giving lectures	Students' interaction with the lecture
3	2		Conception of Transfer function	Giving lectures	Students' interaction with the lecture
4	2		Open and close loop transfer function	Giving lectures	Students' interaction with the lecture
5	2		Transfer function for some physic systems	Giving lectures	Students' interaction with the lecture
6	2		Grounded chair representation	Giving lectures	Students' interaction with the lecture
7	2		Instructions of block diagram reduction	Open discussions between the student and the lecturer	Giving the student an incentive reward (grades) and urging him to excel
8	2	1st Examination			
9	2		Signal flow graph scheme and Mison formula	Giving lectures	Students' interaction with the lecture
10	2		Time response analysis	Open discussions between the student and the lecturer	Giving the student an incentive reward (grades) and urging him to excel
11	2		Specification of	Open	Giving the

			transient and steady state response	discussions between the student and the lecturer	student an incentive reward (grades) and urging him to excel
12	2		Steady State Error	Giving lectures	Students' interaction with the lecture
13	2		Routh Criterion method for stability	Giving lectures	Students' interaction with the lecture
14	2		Bod plot analysis for stability	Giving lectures	Students' interaction with the lecture
15	2		Life cycle analysis	Giving lectures	Students' interaction with the lecture
16	2	2nd Examination			

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, any)	Non
Main references (sources)	Automatic Control Engineeing Francis H.Raven
Recommended books and references (scientific journals, reports...)	Non
Electronic References, Websites	Non

1. Course Name:
Engineering Analysis
2. Course Code:
EMU3101
3. Semester / Year:

3rd Year, 2nd Semester
4. Description Preparation Date:
2023
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total)
4 Units
7. Course administrator's name (mention all, if more than one name)
Name: Ameer A. Jaddoa Email: Ameer.A.Jaddoa@uotechnology.edu.iq
8. Course Objectives

Course Objectives	• Aims of the course are to graduates qualified engineers who they have theoretical experience in advanced engineering in electromechanical field. • This unit of study aims to provide theoretical knowledge and principles of advanced numerical and the ability to analysis and solve the engineering problems. • Illustration and discussion the main the application of engineering methods for the solution of ordinary differential equation(power series), differentiation of complex function that occur in most engineering of electromechanical field. • The student may also go beyond the subject and perform grid sensitivity, parametric study and stability analysis.

9. Teaching and Learning Strategies	
Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2 3,4 5,6 7,8 9,10 11,12		GO1	• Complex analysis • Complex mapping: • Differentiation of complex function: • Harmonic functions • Power series solution of ordinary differential equation • Power series solutions:	PBL	Quiz Mid Exam Final Exam

11. Course Evaluation
Mid exam 15%, student activities 15%, final exam 70%.

Fourth Year

1. Course Name:
Computer Aided Manufacturing (CAD)
2. Course Code:
EMU4114
3. Semester / Year:
4th Year,1st semester
4. Description Preparation Date:
7/2/2024
5. Available Attendance Forms:
Class
6. Number of Credit Hours (Total) / Number of Units (Total)
30 hr Theoretical + 30 hr Practical 3 unit
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Dr. Farag Mahel Mohammed Email: 50127@uotechnology.edu.iq
8. Course Objectives

Course Objectives	• **Knowledge of basic concepts in computer aided design systems.** • **Use computer aided design programs.**

9. Teaching and Learning Strategies	
Strategy	Enable students to recognize the basic hardware and software components in a computer-aided design system, and use numerical solution methods in design.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Learn the basic of	Computer in industry	Theoretical	Discussion

		Computer Aided design and its applications	Design Process Data base creation		
2	2		Computer Aided Design (CAD), Benefits of CAD-Applications of CAD.	Theoretical	Discussion
3	2	Learn the CAD workstation	Terminals of graphics - Input / output devices Central processing unit CPU and buffer storage	Theoretical	Discussion
4	2		Interactive computer graphics (ICG).	Theoretical	Quiz
5	2	Learn how the Computer Graphic	Geometric transformations	Theoretical	Discussion
6	2		2-D and 3-D Geometric transformations	Theoretical	Discussion
7	2			Theoretical	Discussion
8	2		Database structure Projection and display.	Theoretical	Discussion
9	2		Mid Exam. (1)		
10	2	Learn the Geometric Modeling	Wireframe modeling Surface modeling	Theoretical	Discussion
11	2		Solid modeling.	Theoretical	Quiz
12	2	Learn to analysis using Finite Element method	Introduction- Applications of FEM in Engineering Types of elements	Theoretical	Discussion
13	2		Procedure of FEM in structural analysis	Theoretical	Discussion
14	2		Spring element Bar element.	Theoretical	Discussion
15	2			Theoretical	Discussion

11. Course Evaluation

daily preparation 5, written Mid exams 25, Lab. 10 and Final Exam. 60

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	.1 Computer Aided Design and Manufacturing, C.B. Besant, 1986 . .2 Computer Aided Design and Computer Aided Manufacture, Groover, 1984 . .3 Computer Aided Manufacturing, Chien, Richard and Wang, 2006 . .4 CAD/CAM Principles and applications, Pnrao, 2010 . .5 Finite Element Analysis, Theory and application with ANSYS, Saeed, 1999 . 6. Computer Aided Manufacturing, Vishal, 2013.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

1. Course Name:	
Autopilot and Mission Planning	
2. Course Code:	
EMU4112	
3. Semester / Year:	
4th Year, 1st Semester	
4. Description Preparation Date:	
2024-2-7	
5. Available Attendance Forms:	
In-person only	
6. Number of Credit Hours (Total) / Number of Units (Total)	
(4 hours) Theory + Lab Weekly / 3 credits	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. AKeel Ali Wanas Email: 20184@uotechnology.edu.iq	
8. Course Objectives	
Course Objectives	• The Fundamentals: Learning the principles of autopilot and how autopilot systems work in aircraft. • Control Systems: Studying different types of automated control systems and the technology used in them. • Programming and Configuration of Autopilot: Learning how to program and configure the autopilot to execute specific tasks. • Mission Planning: Understanding how to plan and execute flight missions using autopilot, including setting routes and altitudes. • Data Analysis: Learning how to analyze data generated from autopilot tasks to improve performance and efficiency. • Integration with Other Systems: Understanding how to integrate the autopilot with other aircraft systems, such as navigation and communication systems.
9. Teaching and Learning Strategies	
Strategy	• Setting educational goals: Establishing clear and measurable objectives for what students should learn by the end of the course, based on the previously mentioned points**.** • Designing the curriculum: Developing syllabi that cover all aspects of autopilot and mission planning, including theory and practical application**.** • Using technology: Integrating modern tools and software into the

	educational process to provide a practical and experimental understanding of how autopilot works. • Active learning: Encouraging students to participate in experiments, simulations, and autopilot design projects to enhance practical learning. • Continuous assessment: Conducting periodic assessments to measure progress and student understanding of the material, including tests, reports, and presentations. • Providing feedback: Offering constructive and immediate feedback to students to continuously improve their understanding and skills. • Collaboration and teamwork: Encouraging students to work together on team projects to enhance communication and collaboration skills. • Continuous content update: Keeping the educational content updated with the latest developments and innovations in the field of autopilot and mission planning.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Understanding the Fundamentals: Students' ability to explain the basic principles of autopilot and its importance in aviation. Signal Command Processing: Skill in understanding and applying how to process command signals in autopilot systems. Servo Motors Knowledge: Ability to identify and explain the role of servo motors in the autopilot system. Autopilot Engagement Interlocks: Understanding the necessary conditions for engaging and disengaging the autopilot. Familiarity with Autopilot Modes: Knowledge of different autopilot modes and how to apply them. Understanding of Autopilot Channels: Ability to explain the functions of various autopilot channels (rudder, roll, pitch.(Auto Throttle: Knowledge	Autopilot - Fundamentals Command signal Processing Servo Motors Autopilot Engage Interlocks Autopilot Modes Autopilot Channels Autopilot Channels - Rudder Autopilot Channels- Roll Autopilot Channels- Pitch Auto throttle -1 Auto throttle -2 Automatic Landing Autopilot - return to home base system Autopilot - Through the terrain Review and Test	• Reading and studying the educational materials. • Practical application and solving exercises. • Participating in group discussions. • Watching educational videos. • Conducting practical training. • Reviewing and taking tests.	• Participating in discussions. • Quizzes. • Final tests.

		on how to operate and adjust the auto throttle to control the aircraft's speed. Automatic Landing: Ability to understand the principles and applications of automatic landing. Return to Home Base System: Understanding how the return to home base system works in autopilot. Autopilot Through the Terrain: Ability to analyze and apply flying strategies through terrain using autopilot. Review and Knowledge Assessment: Demonstrating the ability to review key concepts and successfully pass knowledge assessment tests.			

11.Course Evaluation

%5 for attendance and pop quizzes + 10 %for laboratory work + %25 for mid-semester exam + 60% for the final exam

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Automatic Flight Control System, by Said D. Jenie and Agus Budiyono
Recommended books and references (scientific journals, reports...)	Flight Stability and Automatic Control, by Dr. Robert C. Nelson
Electronic References, Websites	

1. Course Name:

Signal Processing

2. Course Code:

EMU4115

3. Semester / Year:

4th Year, 1st Semester

4. Description Preparation Date:

2/11/2024

5. Available Attendance Forms:

Attendance

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

2Hours \ week 2 H Theory \ 2 Units

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

Name: Asst. Prof. Dr. Ahmed Abdulqader Hussein
Email: 50045@uotechnology.edu.iq

8. Course Objectives

Course Objectives	The primary objective of this course is to provide a thorough understanding and working knowledge of design, implementation and analysis of signal systems.

9. Teaching and Learning Strategies

Strategy	The teaching strategy of the course is divided into three sections: classroom learning , home works and quizzes and finally students reports .

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Theory , Tutorial	Introduction to DSP, Real time DSP System, Applications of DSP, Sampling Theorem and ADC	Lecture	Quiz, Homework
2	3	Theory , Tutorial	Discrete-time signals and systems Modeling Properties of Discrete-Time systems, Linearity , Causality, Time Variant\Invariant, Stability	Lecture	Quiz, Homework
		Theory ,	DSP Operations: Convolution Linear	Lecture	Quiz,

3	3	Tutorial	and Circular Convolution, Correlation, Autocorrelation and Cross-correlation		Homework
4	3	Theory , Tutorial	Z Transform: Definition and Properties Convergence Theorems Inverse Z Transform: Computation based on residue theorem and Partial Fraction Method	Lecture	Quiz, Homework
5	3	Theory , Tutorial	Difference equations and time-domain response, Solving difference equations Impulse response and step response	Lecture	Quiz, Homework
6	3	Theory , Tutorial	Transfer Functions: first, second, and Higher order TF Frequency response	Lecture	Quiz, Homework
7	3	Theory , Tutorial	Introduction to Fourier Transform: Discrete Time Fourier Transform DTFT, Discrete Fourier Transform DFT: Definitions and calculations	Lecture	Quiz, Homework
8	3	Theory , Tutorial	Twiddle factor Matrix Discrete Fourier Transform DFT by using Matrix Formulation, DFT Properties, Time-shift theorem, Correlation, Complex conjugation, Real and imaginary sequences	Lecture	Quiz, Homework
9	3	Theory , Tutorial	Fast Fourier Transform FFT Algorithms, Decimation in Time FFT, Decimation in Frequency FFT Algorithm, Inverse Fast Fourier Transform IFFT Algorithms	Lecture	Quiz, Homework
10	3	Theory , Tutorial	Introduction to Digital Filters Types of Digital Filters	Lecture	Quiz, Homework
11	3	Theory, Tutorial	Digital Filters Realization FIR Filters Realization: Direct form , Cascade structure, linear phase structures	Lecture	Quiz, Homework
12	3	Theory , Tutorial	Digital Filters Realization IIR Filters Realization Direct form, Direct canonic form, Cascade structure parallel structures	Lecture	Quiz, Homework
13	3	Theory , Tutorial	FIR Filters Design: Window Technique Types of windows	Lecture	Quiz, Homework
14	3	Theory , Tutorial	IIR Filters Design: Analog to Digital Filter Transformation, Bilinear Transformation Method	Lecture	Quiz, Homework
15	3	Theory , Tutorial	Midterm Exam	Lecture	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)	1- Oppenheim, Alan V., Ronald W. Schafer, and John R. Buck. Discrete-time signal processing, 2nd edition, Pearson Education. 2- Monson H.Hayes "digital signal processing "schaums outline series 2007
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

1. Course Name:
RADAR Systems
2. Course Code:
EMU4216
3. Semester / Year:
4th Year, 1st Semester , 2024
4. Description Preparation Date:
2/11/2024
5. Available Attendance Forms:
In person

6. Number of Credit Hours (Total) / Number of Units (Total)	
2 Hours / Week	
7. Course administrator's name (mention all, if more than one name)	
Name: Ahmed Hameed Reja 50073@uotechnology.edu.iq	
8. Course Objectives	
Course Objectives	The primary objective of this course is to introduce radar concepts, technologies, challenges, and applications that address the increasingly complex operational environment. Lectures will be based on recent research activities, presentations, and publications to gain an understanding of recent radar capabilities and continual improvements to the .technology, including modern threat systems
9. Teaching and Learning Strategies	
Strateg	It will be evaluated based on research projects. In addition, the class will utilise the "interactive learning" concept, such as discussions in class, question and answer during lectures, and interaction between students with .homework assignment presentations

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	The moving target indicator radar type will be reviewed. It will include learning about the most important features, which include the method of operation, its types, blind speed, and the method of .mitigating it	Moving target indicat radar	Giving the le+cture Discussion and exercises	The extent of the student's interaction with the lecture and the extent of his understanding through it Questions a answers
2	3	The student will learn :about • Double	• Double delay-line canceller • Staggered Pulse Repetition	Giving the le+cture Discussion and exercises	The extent of the student's

		delay-line canceller • Staggered Pulse Repetition Frequencies. • Pulse Doppler Radar • MTI and Doppler RADAR comparison • Range and Doppler Ambiguities, Resolving Range Ambiguity, Resolving Doppler Ambiguity	Frequencies • Pulse Doppler Radar, .Working • MTI and Doppler RADAR comparison • Range and Doppler Ambiguities, Resolving Range Ambiguity, Resolving Doppler Ambiguity		interaction with the lecture and the extent of his understanding through it Questions and answers
3	3	The student will understand the importance of pulse compression in radar systems. Beside, the match filter is an essential part of the detection side; therefore, it will enable the	• Pulse Compression in RADAR • Motivation for Pul Compression • The Matched Filte • Pulse Compressio Process • Frequency Modulation In Pul Compression • Matched Filter Analysis of LFM Pulse Compressio	Giving the le+cture Discussion and exercises	The extent of the student's interaction with the lecture and the extent of his understanding through it Questions a answers

		students to recognise the purpose of using the pusle compression. And how the pulse compression can be applied to a frequency modulation .signal			
4	3	The students will gain knowledge on how to make the derivation based on a certain type of radar according .to its operation	The RADAR Equation with Pulse Compression.	Giving the le+cture Discussion and exercises	The extent of the student's interactio n with the lecture and the extent of his understan ding through it Questions a answers
5	2	First month Exa	First month Exam	First month Exam	First month Exam
6	3	• Active Processing in LFM Pulse Compression • Correlat ion Processing • Stretch Processing • Syntheti c Aperture Radars • Resoluti on along the XLOS Axis	• The student will gain knowledge on how the different types of pulse compression work and understand the main differences .between them	Giving the le+cture Discussion and exercises	The extent of the student's interactio n with the lecture and the extent of his understan ding through it Questions

					and answers
7	3	• Radar Equation of the Sar System	Understanding the basic derivation of the SAR radar range equation and the related .parameters	Giving the le+cture Discussion and exercises	The extent of the student's interactio n with the lecture and the extent of his understan ding through it Questions and answers
8	3	Tracking Radars	The student will learn about how this type of tracking radar system works, in addition to the factors that affect its .calculations	Giving the le+cture Discussion and exercises	The extent of the student's interactio n with the lecture and the extent of his understan ding through it Questions and answers
9	3	Tracking Radars calculations	In more detail,the student will be able to understand the business rule of tracking objectives as well as the errors that arise according to each type and based on .calculations	Giving the le+cture Discussion and exercises	The extent of the student's interactio n with the lecture and the extent of

					his understanding through it Questions and answers
10	2	Second month Exam	Second month Exam	Second month Exam	Second month Exam
11	3	Over-the-Horizon Radar	The student learns about over-the-horizon radars and how they work, along with mathematical calculations based .on their operations	Giving the le+cture Discussion and exercises	The extent of the student's interaction with the lecture and the extent of his understanding through it Questions and answers
12	3	Skywave OTHR System (E nvironmental effects of the sky)	In this lesson, the environmental effects of the sky will be covered on the signals throughout radar .operation	Giving the le+cture Discussion and exercises	The extent of the student's interaction with the lecture and the extent of his understanding through it Questions and answers
13	3	Secondary	The student will	Giving the	The

		Surveillance Radar	understand the basic operation of the secondary surveillance radar Radar, its .applications	le+cture Discussion and exercises	extent of the student's interactio n with the lecture and the extent of his understan ding through it Questions and answers
1	3	Secondary Surveillance Radar Equation	Starting from the basic principle of derivation, the students will be able to recognise how to start making the derivation into the radar equation of the Secondary Surveillance Radar Equation. This comes with some mathematical .examples	Giving the le+cture Discussion and exercises	The extent of the student's interactio n with the lecture and the extent of his understan ding through it Questions and answers
1	3	Final Semester Exam	Final Semester Exam	Final Semester Exam	Final Semester Exam

11.Course Evaluation
The course grade is based upon attendance and participation, homework assignments and presentations, midterms, and the final exam. Take home the final exam to .include "Technical Report" and it will be weighted more heavily in the final exam

12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Not available
Main referen	Radar Systems And Components, 2022

(sources)	Radar and Communication Spectrum Sharing, 2018 introduction to Radar Systems 3rd Edition, 2002..
Recommended books and references (scientific journals, reports...)	Not available
Electronic References, Websites	https://radar-engineer.com/pages/resources.html An interactive introduction to Radar - http://media.thales-nederland.nl/thisisradar/ThisIsRadar.html Radar Tutorial notes with diagrams - http://www.radartutorial.eu/index.en.html IET, Radar Sonar and Navigation. - http://www.ietdl.org/IET-RSN IEEE, Aerospace and Electronic Systems Magazine - http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=62

1. Course Name:
Automation Systems
2. Course Code:
EMU4111
3. Semester / Year:
4th Year,1st Semester
4. Description Preparation Date:
06-02-2024
5. Available Attendance Forms:
Attendance lectures

6. Number of Credit Hours (Total) / Number of Units (Total)
2 hours weekly (30 hours in course)/ 2 Units
7. Course administrator's name (mention all, if more than one name)
Name: Asst. Prof. Dr. Wisam Essmat Abdul-Lateef Email: 50110@uotechnology.edu.iq
8. Course Objectives

Course Objectives	• Introducing students to automation systems, their basic components, design, principles of operation, and benefiting from them in various fields. • Introducing students to advanced control systems and artificial intelligence systems, their components, design, operating principles, and how to use them. • Introducing students to the types of controls related to the operation of machines, automation systems, and special programming languages and how to use them and benefit from them. • Introducing students to the engineering designs of automation systems and understanding the mechanical and electrical parts that make up them.

9. Teaching and Learning Strategies	
Strategy	Theoretical lectures (delivering the lecture to students)

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1st	2	An introduction to understanding automation systems, their basic components and uses.	Introduction to automation systems basic components and uses.	Attendance lecture	Question and Answer
2nd	2			Attendance lecture	Homework
3rd	2	What are advanced control systems? and their types.	An introduction to understanding advanced control and its uses.	Attendance lecture	Quiz
4th	2	What are artificial intelligence systems?		Attendance lecture	Question and Answer

5th	2	Study of the automation pyramid (the automated pyramid) and the social and economic efficiency of using automation systems and smart systems.	An introduction to understanding intelligence systems and their uses.	Attendance lecture	Question and Answer
6th	2			Attendance lecture	Homework
7th	2	Study the logic control units (PLC), its operations and its laws.	An introduction to understanding automation systems, their design, and their operating principles.	Attendance lecture	Question and Answer
8th	2			Attendance lecture	Editorial questions
9th	2	Study the distributed control system (DCS), its operations and its laws.		Attendance lecture	Homework
10th	2	Study the Supervisory control and data acquisition (Scada), its operations and its laws.	Modern control technology in systems.	Attendance lecture	Question and Answer
11	2	Midterm exam.	Modern control technology in systems.	Attendance lecture	Question and Answer
12	2	Study of the proportional-integral-differential controller (PID Controller) and learn of the Ziegler-Nichols method for adjusting the parameters of the	Modern control technology in systems	Attendance lecture	Quiz
13	2			Attendance lecture	Question and Answer
14	2		Midterm exam	Attendance lecture	Homework

15th	2	PID controller. An introduction to understanding artificial intelligence systems, their design, and their operating principles. An introduction to understanding machine learning, its design, and its operating principles Study of artificial neural networks, their design and operating principles. Study of fuzzy logic controller, its design and working principle. Study of the genetic algorithm controller, its design and operating principles.? An introduction and study the Robotic Systems and their design and applications.	Modern control technology in systems Intelligent control systems technology . Intelligent control systems technology . Intelligent control systems technology . Intelligent control systems technology . Intelligent control systems technology .	Attendance lecture	Quiz

			Robotic Systems technology.		

11.Course Evaluation
5% attendance grade; 5% homework; 5% Quizzes; 15% midterm exam; 70% final exam

12.Learning and Teaching Resources	
Required textbooks (curricular books, any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

1. Course Name:
Design of aircraft
2. Course Code:
EMU4113
3. Semester / Year: 2023\2024
4th Year,1st Semester
4. Description Preparation Date:
13-02-2024
5. Available Attendance Forms:
class
6. Number of Credit Hours (Total) / Number of Units (Total)
2
7. Course administrator's name (mention all, if more than one name)
Name: Prof Dr Muhammad.A.R Yass Email: 50251@uotehnology.edu.iq
8. Course Objectives

Course Objectiv	• **Goals** • **requirement...** • **Design**
9. Teaching and Learning Strategies	
Strateg	Class+ notes

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1 2 3 4 5 6 7	2 2 2 2 2	class class class Class Class Class	Longitudinal Longitudinal Longitudinal Directional Directional Lateral lateral	Class+notes	Discussion+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 boo if any)		Airplane Design			
Main referen (sources)		Airplane design			
Recommended books and references (scientific journals, reports...)		Airplane design			
Electronic References, Websites		Airplane design			

1. Course Name:
Airplane Stability
2. Course Code:

EMU4213

3. Semester / Year:

4th Year, 2nd Semester2023\2024

4. Description Preparation Date:

13-02-2024

5. Available Attendance Forms:

class

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

2

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

Name: Prof Dr Muhammad.A.R Yass
Email: 50251@uotehnology.edu.iq

8. Course Objectives

Course Objectives	Longitudinal stability..... ..directional stability... ..lateral stability...

9. Teaching and Learning Strategies

Strategy	Class+ notes

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	class	Longitudinal	Class+notes	Discussion+exam
2	2	class	Longitudinal		
3	2	class	Longitudinal		
4	2	Class	Directional		
5	2	Class	Directional		
6		Class	Lateral		
7			lateral		

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)	Airplane stability and control
Main references (sources)	Airplane stability and control
Recommended books and references (scientific journals, reports...)	Airplane stability and control
Electronic References, Websites	Airplane stability and control

1. Course Name:	
Digital Communications	
2. Course Code:	
EMU4116	
3. Semester / Year:	
4th Year,2nd Semester	
4. Description Preparation Date:	
02-2024	
5. Available Attendance Forms:	
Attendance lectures	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 hours weekly (30 hours in course)/ 2 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Asst. Prof. Dr. Mohammed Qasim Mohammed Email: 50033@uotechnology.edu.iq	
8. Course Objectives	
Course Objectives	• Teaching students the basic concepts of digital communications and its advantages • Study the performance of the digital communications system and the factors affecting it • Studying the types of communications systems models, methods of transmission, and data selection techniques • Study the concept of information theory and probabilities and their importance in digital communications systems • Studying the techniques of embedding and de-embedding and their types in digital communications systems • Study the concept of pulse modulation and convert

	the analogue signal to digital through sampling, quantization and encryption processes.

9. Teaching and Learning Strategies

Strategy	Theoretical lectures (give the lecture to students in person) Practical lectures (work in the laboratory to achieve the practical aspect)

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	An introduction to understanding the basics of digital communications	Fundamentals of digital communications	Attendance lecture	Question and Answer
2	2	Learn the concept of the performance of digital communications systems and the factors affecting them	the performance of digital communications systems	Attendance lecture	Question and Answer
3	2	Learn the types of communication models and ways to transfer information	types of communication models and types to transmit information	Attendance lecture	Homework
4	2	Learn the concept of data selector, its types, advantages and disadvantages Study	Multiplexing Techniques	Attendance lecture	Question and Answer
5	2	of information theory and its importance in digital communications	information theory	Attendance lecture	Quiz
6	2	Studying the concept of probability and its importance in digital communications	probability and its importance in digital communications	Attendance lecture	Question and Answer
7	2	Studying the types of modulation and the importance of pulse modulation to convert the signal from analogue to digital	types of modulation	Attendance lecture	Question and Answer
8	2	Learn the concept of sampling and quantification Mid-course exam	sampling and quantification	Attendance lecture	Homework
9	2	Learn the concept of line coding and how	Mid-course exam	Attendance	Written

10	2	to draw various signals Study of the types of modulation (BAFK & BFSK)	line coding	lecture Attendance lecture	questions Question and Answer
11	2	Study of the types of modulation (BPSK& DBPSK)	modulation (BAFK & BFSK)	Attendance lecture	Question and Answer
12	2	Study of QPSK modulation and its types	modulation (BPSK& DBPSK)	Attendance lecture	Quiz
13	2	Learn the concept of type modulation (M-ray ASK)	QPSK modulation	Attendance lecture	Question and Answer
14	2	Learn the concept of type modulation (M-ray FSK & PSK)	modulation (M-ray ASK)	Attendance lecture	Homework
15	2		modulation (M-ray FSK & PSK)	Attendance lecture	Question and Answer

11.Course Evaluation

5% attendance grade; 5% homework; 5% Quizzes; 15% midterm exam; 60% final exam

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	No
Main references (sources)	B. P. Lathi, "Modern Digital And Analog Communications Systems", 3rd Edition, (The Oxford Series in Electrical and Computer Engineering).
Recommended books and references (scientific journals, reports...)	• John-Proakis "Digital Communications", 4th Edition, - McGraw Hill • John-Proakis & Masoud Salehi "Digital Communications", 5th Edition, - McGraw Hill
Electronic Referenc Websites	No

1. Course Name:

Aircraft Navigation Systems

2. Course Code:

EMU4212

3. Semester / Year:

4th Year, 2nd Semester / 2023-2024

4. Description Preparation Date:

2024-02-07

5. Available Attendance Forms:

In-person only

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

4 hours theoretical + laboratory weekly / 3 units

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

8. Course Objectives

Course Objectives	• Understanding the basics of air navigation • Familiarity with traditional and modern navigation systems • Practical applications of theory • Understanding of communication and surveillance systems • Problem-solving and decision-making

9. Teaching and Learning Strategies

Strategy	• Interactive lectures • Self-study • Multimedia use • Laboratories and workshops • Semester projects • Field visits • Continuous assessment • Encouragement of collaborative learning • Feedback and review

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	• Understanding basic concepts of the Inertial Navigation System (INS.(• Recognizing the main components of the Inertial Navigation System (INS.(• Understanding the operating principles of the Inertial Navigation System (INS.(• Understanding how the Global Positioning System (GPS) works. • Understanding the operating principles of the Global Positioning System. • The ability to analyze and read coordinates using INS. • The ability to analyze and read coordinates using the GPS system. • Understanding how to integrate INS data with GPS data for accurate positioning.	• Inertial Navigation system (INS(• INS-Fundamentals • INS- Components • INS- Principles • Global Positioning Systems (GPS(• GPS – Principles • Analysis and reading latitude and longitude By INS. • Analysis and reading latitude and longitude by GPS. • INS/GPS Integration • Open-loop implementation of INS/GPS integration • Closed-loop implementation of INS/GPS integration • Loosely coupled INS/GPS integration • Tightly coupled integration of INS/GPS • Tightly Coupled INS/GPS Integration	• Reading and studying the educational materials. • Practical application and solving exercises. • Participating in group discussions. • Watching educational videos. • Conducting practical training. • Reviewing and taking tests.	• Participating in discussions . • Quizzes. • Final tests.

		• The ability to implement and troubleshoot an open loop for INS/GPS integration. • The ability to implement and troubleshoot a closed loop for INS/GPS integration. • Understanding how to loosely integrate data between INS and GPS. • Understanding how to tightly integrate data between INS and GPS. • Understanding how to tightly couple data integration between INS and GPS. • Practice reviewing learned concepts and conducting tests to assess understanding and application.	• Review and Test		

11. Course Evaluation

%5 for attendance and pop quizzes + 10 %for laboratory work + %25 for mid-semester exam + 60% for the final exam

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	• GLOBAL POSITIONING SYSTEMS ,INERTIAL NAVIGATION ,AND NTEGRATION
Recommended books and references (scientific journals, reports...)	• Aircraft Systems Instruments, Communications, Navigation, and Control
Electronic References, Websites	

1. Course Name:
Real Engineering and Ethics
2. Course Code:
EMU4211
3. Semester / Year:
4th Year, 2nd Semester
4. Description Preparation Date:
11-02-2024
5. Available Attendance Forms:
Present (in person)

6. Number of Credit Hours (Total) / Number of Units (Total)
2 Hours / 2 Units
7. Course administrator's name (mention all, if more than one name)
Name:Asst. Prof. Dr. Aseel.J.Mohammed Email: Aseel.J.Mohammed@uotechnology.edu.iq
8. Course Objectives

Course Objectives	• To create an awareness on Engineering Ethics and Human Values. • To instill Moral and Social Values and Loyalty • To appreciate the rights of others. • To create awareness on assessment of safety and risk
9. Teaching and Learning Strategies	
Strategy	• Lectures: The theoretical and practical lectures will be presented throughout the semester. • Assignments: after the lectures, the assignment will be explained and given to students. It is expected to be done on weekly bases. • Quizzes: the contents of each lecture will be discussed during class for open question and answer to make sure every student will participate and active.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12 13 14	2 2 2 2 2 2 2 2 2 2 2 2 2 2	• Learn about morals, values, and work ethics. • Learn to respect others and develop civic virtue. • Develop commitment. • Learn how to live peacefully.	Ethical theories introduction Moral theory Utilitarianism Ethical problems introduction Types of issues in ethical problems Problems solving Case studies Line drawing method Understanding ethical problems introduction Cost benefit analysis Duty ethics and right eth Risk and Accidents definitions Engineers and safety Safety and risk Examples	• Lectures • Projects • Discussion	• Homework • Project assignments • Mid-term exa • Final exam

			and case studies		

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, any)	Mike W. Martin and Roland Schinzinger "Ethics in Engineering" Tata McGraw-Hill–2003.
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Computer Aided Manufacturing (CAM)
2. Course Code:
EMU4214
3. Semester / Year:
4th Year, 2nd Semester
4. Description Preparation Date:
7/2/2024
5. Available Attendance Forms:
Class
6. Number of Credit Hours (Total) / Number of Units (Total)
30 hr Theoretical + 30 hr Practical 3 unit
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Dr. Farag Mahel Mohammed Email: 50127@uotechnology.edu.iq
8. Course Objectives

Course Objectives	• Introduces the fundamental concepts in CAM systems. • Transferring part geometry from CAD to CAM for the development of a CNC-ready program. • Use CAM software**.**

9. Teaching and Learning Strategies	
Strategy	The students be identify of the basic hardware and software components in a typical CAM system, generate CNC codes from a given geometry and write the G and M codes to cut different geometric shapes.

10. Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	2	Learn the basic of	Introduction to	Theoretical	Discussion

		Computer Aided Manufacturing and its applications	Computer Aided Manufacturing (CAM)		
2	2		Product cycle and computer integrated manufacturing Benefits of CAD/CAM.	Theoretical	Discussion
3	2	Learn the NC and CNC components and their coordinates	Beginning of CAM Basic components of numerical control system (NC)	Theoretical	Discussion
4	2		Coordinate system in NC process.	Theoretical	Quiz
5	2		NC process classification – NC applications	Theoretical	Discussion
6	2		Structure of NC CNC tool changer.	Theoretical	Discussion
7	2		Mid Exam. (1)		
8	2	Learn to write the CNC program using G and M code for different cutting shapes	Introduction to CNC Programming	Theoretical	Discussion
9	2		Part programming fundamentals	Theoretical	Discussion
10	2		Manual part programming G-codes M-codes	Theoretical	Discussion
11	2		Tool length compensation Cutter radius compensation.	Theoretical	Quiz
12	2		Canned cycle	Theoretical	Discussion
13	2		Turning center programming	Theoretical	Discussion
14	2		Thread cutting	Theoretical	Discussion
15	2		Mid Exam. (2)		

11.Course Evaluation

daily preparation 5, written Mid exams 25, Lab. 10 and Final Exam. 60

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	.1 Computer Aided Design and Manufacturing, C.B.

	Besant, 1986 . .2 Computer Aided Design and Computer Aided Manufacture, Groover, 1984 . .3 Computer Aided Manufacturing, Chien, Richard and Wang, 2006 . .4 CAD/CAM Principles and applications, Pnrao, 2010 . .5 Finite Element Analysis, Theory and application with ANSYS, Saeed, 1999 . 6. Computer Aided Manufacturing, Vishal, 2013.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

1. Course Name:
Image Processing and Aircraft Monitoring Systems
2. Course Code:
EMU4215
3. Semester / Year:
4th Year, 2nd Semester
4. Description Preparation Date:
7/2/2024
5. Available Attendance Forms:
Attendance
6. Number of Credit Hours (Total) / Number of Units (Total):
2Hours \ week 2 H Theory \ 2 Units
7. Course administrator's name (mention all, if more than one name)
Name: Asst. Prof. Dr. Ahmed Abdulqader Hussein Email: 50045@uotechnology.edu.iq
8. Course Objectives

Course Objectives	• **To learn the fundamental concepts of Digital Image Processin** • **To study basic image processing operations.** • **To understand image analysis algorithms.**
9. Teaching and Learning Strategies	
Strategy	The teaching strategy of the course is divided into three sections: classroom learning , home works and quizzes and finally students reports .

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Theory , Tutorial	**Introduction And Digital Image Fundamentals:** ▪ The origins of Digital Image Processing ▪ Examples of Fields that Use Digital Image Processing ▪ Fundamentals Steps in Image Processing ▪ Elements of Digital Image Processing Systems	Lecture	Quiz, Homework
2	3	Theory , Tutorial	▪ Image Sampling and Quantization, ▪ Some basic relationships like Neighbors Connectivity, Distance Measures between pixels ▪ Translation, Scaling, Rotation and Perspective Projection of image	Lecture	Quiz, Homework
3	3	Theory , Tutorial	**Intensity Transformation** **Image Enhancement Methods** ▪ Basic Gray Level Transformations ▪ Linear Functions ▪ Logarithmic Functions ▪ Power Law Functions	Lecture	Quiz, Homework
4	3	Theory , Tutorial	**Image Enhancement Methods** Piecewise Linear Transformation Functions ▪ Contrast Stretching , thresholding ▪ Gray – Level Slicing ▪ Bit – Plane Slicing	Lecture	Quiz, Homework
5	3	Theory , Tutorial	**Histogram Equalization** ▪ Histogram definition ▪ Histogram Processing ▪ Image Enhancement using Histogram Equalization	Lecture	Quiz, Homework
6	3	Theory , Tutorial	**Image Enhancement in the Spatial Domain** Basics of Spatial Filters Smoothening and Sharpening Spatial Filters ▪ Types of Smoothing Filters (Low Pass Filters) Types of Sharpening Filters (High Pass Filters	Lecture	Quiz, Homework
7	3	Theory , Tutorial	**Image Enhancement in the Frequency Domain** Introduction to Fourier Transform and the frequency Domains ▪ Computing Fourier Transform of the Image ▪ Phase, Magnitude Power Spectra of an Image	Lecture	Quiz, Homework
		Theory ,	**Image Enhancement in the Frequency Domain**	Lecture	Quiz,

8	3	Tutorial	▪ Smoothing Frequency Domain Filters ▪ Sharpening Frequency Domain Filters ▪ Homomorphic Filtering		Homework
9	3	Theory , Tutorial	**Image Restoration:** ▪ A model of The Image Degradation / Restoration Process ▪ Noise Models ▪ Restoration in the presence of Noise Only Spatial Filtering	Lecture	Quiz, Homework
10	3	Theory , Tutorial	**Image Restoration (cont.):** ▪ Periodic Noise Reduction by Frequency Domain Filtering ▪ Linear Position-Invariant Degradations ▪ Estimation of Degradation Function	Lecture	Quiz, Homework
11	3	Theory, Tutorial	**Image Restoration (cont.):** ▪ Geometric Mean Filter ▪ Geometric Transformations	Lecture	Quiz, Homework
12	3	Theory , Tutorial	**Image Compression:** ▪ Coding ▪ Interpixel and Psychovisual Redundancy ▪ Image Compression models ▪ Compression standards	Lecture	Quiz, Homework
13	3	Theory , Tutorial	**Image Compression:** ▪ Image Compression Methods ▪ Huffman Coding	Lecture	Quiz, Homework
14	3	Theory , Tutorial	**Monitor images** ▪ Characteristics of the video image- ▪ television camera-imaging camera. ▪ Laser light and laser-laser imaging ▪ laser imagers-imaging plates-Dry cameras	Lecture	Quiz, Homework
15	3	Theory , Tutorial	Midterm Exam	Lecture	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 any)	
Main references (sources)	1- Gonzalez, Rafael C. *Digital image processing*. Pearson education india, 2009.. 2- Solomon, Chris, and Toby Breckon. *Fundamentals of Digital Image Processing: A practical approach with examples in Matlab*. John Wiley & Sons, 2011.
Recommended books and	

references (scientific journals, reports…)	
Electronic References, Websites	