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



Electromechanical Engineering System Program Academic 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.

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## **Concepts and terminology:**

<u>Academic Program Description</u>: 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 theyhave made the most of the available learning opportunities. It is derived from the program description.

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

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

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

<u>**Curriculum Structure**</u>: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, 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.

<u>Teaching and learning strategies</u>: 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.

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# **Academic Program Description Form**

University Name: University of Technology Faculty/Institute: Electromechanical Eng. Dept. Scientific Department: Electromechanical Eng. Dept. Academic or Professional Program Name: Electromechanical Eng. Dept. Final Certificate Name: Electromechanical Eng./Electromechanical System Engineering Academic System:Engineering Description Preparation Date: 6/2/2024 File CompletionDate:7/2/2024

Signature: Head of DepartmentName: Signature: Scientific Associate Name:

Date:

Date:

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

Signature:

Approval of the Dean

#### 1. Department Vision

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

#### 2. 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.

#### 3. Department Objectives

• 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.

• feeding the society with the specialists, experts and scientific consultants in electromechanical engineering field.

• supporting the research scientific center and engineering industrial projects by the highly capable specialists in their fields.

• strengthening the relation with local and international engineering and scientific establishments.

#### 4. Program Mission

1- Prepare our students for successful careers in the electromechanical systems profession,

2- Conduct high quality and innovative research, and

3- Serve the community and industry providing educational and research resources.

The EMSE mission statement is published on the web site:

# 5. Program Accreditation

The program have not accreditation.

# 6. Other external influences

No sponsor for the program?

7. Program Structure									
Program Structure	Number of	Credit hours	Percentage	Reviews*					
	Courses								
Institution	7	16	0.125	Basic					
Requirements									
College Requirements	13	36	0.232	Basic					
Department	36	97	0.642	Basic					
Requirements									
Summer Training	yes								
Other									

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

8. Program Description									
Year/Level	Course	Course Name	Credit Hours						
	Code								
2024			theoretical	practical					
1 <sup>st</sup> Year, 1 <sup>st</sup> Semester	EME101	Computer Sciences I	2	1					
1 <sup>st</sup> Year, 1 <sup>st</sup> Semester	WOSH101	Workshop I	-	6					
1 <sup>st</sup> Year, 1 <sup>st</sup> Semester	EME105	Mathematics I	4	-					
1 <sup>st</sup> Year, 1 <sup>st</sup> Semester	EMSE110	Fundamentals of Electrical Engineering (D.C)	2	2					
1 <sup>st</sup> Year, 1 <sup>st</sup> Semester	EMSE112	Fundamentals of Auto- CAD tool Drawing	-	3					
1 <sup>st</sup> Year, 1 <sup>st</sup> Semester	EME107	Physics I	4	0					
1 <sup>st</sup> Year, 1 <sup>st</sup> Semester	EME104	Sport	2	0					

1 <sup>st</sup> Year, 2 <sup>nd</sup> Semester	EMSE109	Engineering Mechanics	2	2
1 <sup>st</sup> Year, 2 <sup>nd</sup> Semester	WOSH102	Workshop II	-	6
1 <sup>st</sup> Year, 2 <sup>nd</sup> Semester	EME106	Mathematics II	4	-
1 <sup>st</sup> Year, 2 <sup>nd</sup> Semester	EMSE111	Fundamentals of Electrical Engineering (A.C)	2	2
1 <sup>st</sup> Year, 2 <sup>nd</sup> Semester	EMSE113	Fundamentals of Engineering Drawing (Auto CAD)	-	3
1 <sup>st</sup> Year, 2 <sup>nd</sup> Semester	EME108	Physics II	4	_
1 <sup>st</sup> Year, 2 <sup>nd</sup> Semester	EME103	English Language I	2	-
2 <sup>nd</sup> Year, 1 <sup>st</sup> Semester	EME201	English Language II	2	-
2 <sup>nd</sup> Year, 1 <sup>st</sup> Semester	EME203	Advanced Mathematics I	4	-
2 <sup>nd</sup> Year, 1 <sup>st</sup> Semester	EME205	Computer Sciences II	2	1
2 <sup>nd</sup> Year, 1 <sup>st</sup> Semester	EMSE206	Electrical Machines DC	2	2
2 <sup>nd</sup> Year, 1 <sup>st</sup> Semester	EMSE210	Electrical Circuits	2	2
2 <sup>nd</sup> Year, 1 <sup>st</sup> Semester	EMSE208	Thermodynamics	2	2
2 <sup>nd</sup> Year, 1 <sup>st</sup> Semester	EMSE212	Strength of Material	2	2
2 <sup>nd</sup> Year,2 <sup>nd</sup> Semester	EME202	Human Rights	2	-
2 <sup>nd</sup> Year,2 <sup>nd</sup> Semester	EME204	Advanced Mathematics II	4	_
2 <sup>nd</sup> Year,2 <sup>nd</sup> Semester	EMSE209	Fluid Mechanics	2	2
2 <sup>nd</sup> Year,2 <sup>nd</sup> Semester	EMSE207	Electrical Machines AC	2	2
2 <sup>nd</sup> Year, 2 <sup>nd</sup> Semester	EMSE211	Electronic Circuits	2	2
2 <sup>nd</sup> Year,2 <sup>nd</sup> Semester	EMSE213	Measurements and Instrumentations	2	2
2 <sup>nd</sup> Year, 2 <sup>nd</sup> Semester	EMSE214	Heat Transfer	2	1
3 <sup>rd</sup> Year, 1 <sup>st</sup> Semester	EME301	Industrial Engineering	2	-
3 <sup>rd</sup> Year, 1 <sup>st</sup> Semester	EME302	Engineering Analysis	4	-
3 <sup>rd</sup> Year, 1 <sup>st</sup> Semester	EMSE306	Vibration Theory	2	2
3 <sup>rd</sup> Year, 1 <sup>st</sup> Semester	EMSE308	Hydraulic Systems	2	1
3 <sup>rd</sup> Year, 1 <sup>st</sup> Semester	EMSE304	Analog Communications	2	2
3 <sup>rd</sup> Year, 1 <sup>st</sup> Semester	EMSE312	Power Systems	2	-
3 <sup>rd</sup> Year, 1 <sup>st</sup> Semester	EMSE310	Digital Electronics	2	2
3 <sup>rd</sup> Year, 2 <sup>nd</sup> Semester	EMSE305	Digital Communications	2	2
3 <sup>rd</sup> Year, 2 <sup>nd</sup> Semester	EME303	Numerical Analysis	4	-
3 <sup>rd</sup> Year, 2 <sup>nd</sup> Semester	EMSE307	Control Systems	2	2
3 <sup>rd</sup> Year, 2 <sup>nd</sup> Semester	EMSE313	Protection Systems	2	-
3 <sup>rd</sup> Year, 2 <sup>nd</sup> Semester	EMSE309	Theory of Machines	2	1

3 <sup>rd</sup> Year, 2 <sup>nd</sup> Semester	EMSE314	Special Machines	2	-
3 <sup>rd</sup> Year, 2 <sup>nd</sup> Semester	EMSE311	Electromechanical Design	2	-
4 <sup>th</sup> Year, 1 <sup>st</sup> Semester	EMSE401	Power Electronics	2	2
4 <sup>th</sup> Year, 1 <sup>st</sup> Semester	EMSE403	Signal and Systems	2	-
4 <sup>th</sup> Year, 1 <sup>st</sup> Semester	EMSE405	Microprocessors	2	1
4 <sup>th</sup> Year, 1 <sup>st</sup> Semester	EMSE407	Automation and Control	2	-
4 <sup>th</sup> Year, 1 <sup>st</sup> Semester	EMSE410	Air Conditioning and Refrigeration Systems	2	2
4 <sup>th</sup> Year, 1 <sup>st</sup> Semester	EMSE412	Electromechanical Devices	2	2
4 <sup>th</sup> Year, 1 <sup>st</sup> Semester	EMSE413	Project	-	4
4 <sup>th</sup> Year, 2 <sup>nd</sup> Semester	EMSE402	Electric Drives	2	2
4 <sup>th</sup> Year, 2 <sup>nd</sup> Semester	EMSE404	Signal Processing	2	-
4 <sup>th</sup> Year, 2 <sup>nd</sup> Semester	EMSE406	Microcontrollers	2	1
4 <sup>th</sup> Year, 2 <sup>nd</sup> Semester	EMSE408	Robotic Systems	2	-
4 <sup>th</sup> Year, 2 <sup>nd</sup> Semester	EME409	Ethics in Engineering	2	-
4 <sup>th</sup> Year, 2 <sup>nd</sup> Semester	EMSE411	Computer Aided Design And Manufacturing (CAD/CAM)	2	2
4 <sup>th</sup> Year, 2 <sup>nd</sup> Semester	EMSE414	Project	-	4

#### 9. Expected learning outcomes of the program

#### Graduate Outcomes (GOs) for engineering from ICAEE,

1. An ability to identify, formulate, and solve engineering in energy and renewable energies 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, analyze and interpret 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 energy and renewable energies 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.

#### 10. 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.

#### 11. 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%.

12. Faculty										
Faculty Members										
Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff					
	General	Special			Staff	Lecturer				
Professor (1)	Mechanical Eng.	thermal								
Prof. Assistance (2)	Mechanical Eng.	thermal								
Prof. Assistance (3)	Mechanical Eng.	applied								
Lecturer (3)	Mechanical Eng.	thermal								
Prof. assistance (4)	Electrical Engineering	power								
Professor (1)	Electrical Engineering	power								
Professor (1)	Electrical Engineering	control								
Lecturer (2)	Electrical Engineering	power								
Prof. assistance (1)	Science	Physics								

#### **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).

All Faculty contribute in getting the accreditation from ICAEE, so the faculty became a professional in accreditation process.

#### 13. Acceptance Criterion

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

#### 14. The most important sources of information about the program

Program of system engineering is one of the ABET recognized program and listed in their Web. The initiative of the program came as a result of engineers who can serve as mechanical and electrical workers together. Similar trend was observed globally. The program prepares students for technical and engineering support positions in industry. The program builds on a strong foundation of mathematics and basic sciences, with application of computers design mechanical systems and manufacturing processes using Computer Aided Design (CAD), Compute Aided Machining (CAM), and Computer Aided Engineering (CAE) tools. The program source information based. Many international programs were recently created related to system engineering. 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 many related Iraqi ministries, the information were adopted with their needs.

#### 15. Program Development Plan

The field of system engineering is developing with time globally, so some the program courses were changed every four years. The developing of the program depends on two parameters, first duo to developing of the field globally and second is the requirements of the Iraqi ministries. The contents of the courses reviewed by advisory board every meeting and updated.

	Program Skills Outline									
					Required program Learning outcomes					
Year/Level	Course Code	Course Name	Basic	Knowledge				Skills		Ethics
			or optional	G01	GO2	GO3	G06	G04	G07	G05
1 <sup>st</sup> Year	EME103	English Language I						*		
EN	EME106	Mathematics II		*						
	EME108	Physics II		*						
	EMSE109	Engineering Mechanics		*						
	EMSE111	Fundamentals of Electrical Engineering (A.C)				*				
	EMSE113	Fundamentals of Engineering Drawing (Auto CAD)					*			
2 <sup>nd</sup> Year	EME204	Advanced Mathematics II		*						
	EMSE207	Electrical Machines AC				*				

	EMSE211	Electronic Circuits			*			
	EMSE213	Measurements and Instrumentations	*					
	EMSE214	Heat Transfer	*					
3 <sup>rd</sup> Year	EME302	Engineering Analysis	*					
	EMSE305	Digital Communications			*			
	EMSE307	Control Systems					*	
	EMSE309	Theory of Machines	*					
	EMSE311	Electromechanical Design		*				
	EMSE314	Special Machines	*					
4 <sup>th</sup> Year	EMSE402	Electric Drives	*					
	EMSE404	Signal Processing	*					
	EMSE406	Microcontrollers			*			
	EMSE408	Robotic Systems					*	
	EMSE409	Ethics in Engineering						*
	EMSE411	Computer Aided Design And Manufacturing (CAD/CAM)		*				
	EMSE414	Project				*	*	

# **Course Description Forms**

# Second Year

1. Course Name:

English Language II

2. Course Code:

EME201

3. Semester / Year:

 $2^{\text{st}}$  Year,  $1^{\text{st}}$  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: Ahlam L. Shuraiji

Email:

8. Course Objectives

Course Ob	Course Objectives• Will learn English language grammar.						
	• Will learn reading skills.						
			• Will learn writing skills.				
			• Will be able to write his/her ow:	n CV.			
			• Will be able to write an easy in	any given subjec	et.		
			• Will learn presentation skills				
			• Will be able to give a short pres	entation.			
9. Te	aching	g and Learn	ing Strategies				
Strategy							
	PE	3L					
10. Cou	10. Course Structure						
Week H	lours	Required	Unit or subject name	Learning	Evaluation		
		Learning		method	method		

			1					
		Outcomes						
1 2 3 4 5 6 7 8 9 10 11 12 13 14		GO4	<ul> <li>Simple present</li> <li>Present contint</li> <li>Present prefect</li> <li>Present perfect</li> <li>Simple past</li> <li>Past prefect contint</li> <li>Future</li> <li>Adverbs</li> <li>Punctuations</li> <li>Reading skills</li> <li>Writing skills</li> <li>Oral presentat</li> </ul>	t uous t t continuous ontinuous	PBL	Quiz Mid Exam Final Exam		
11. ( Student 12. [	11. Course Evaluation         Student Activities 15%, Mid exam 15%, Final exam 70%.         12. Learning and Teaching Resources							
Require	d textbool	ks (curricular	books, if any)	New Headway	for beginners $-4$	4th edition		
Main references (sources)								
Recomn (scientifi	nended ic journals	books ar s, reports…)	nd references					
Electron	ic Refere	nces, Website	es					

I I GIII GIII I CI SIICO
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2. Course Code:

EME202

3. Semester / Year:

2<sup>st</sup> Year, 2<sup>nd</sup>Semester

4. Description Preparation Date:

2023

5. Available Attendance Forms:

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

2 Units	5						
<u>7.</u> (	Course Name: W	administrato	r's name (mention all, if r	more than on	e name)		
I	Email:		-				
8. (	Course (	Objectives					
Course Objectives			<ul> <li>Human rights in ancient civilizations.</li> <li>Human rights in divine laws and religions.</li> <li>Human rights sources.</li> <li>Human rights guarantees.</li> <li>The future of human rights.</li> </ul>				
9. 1	Feaching	g and Learning	g Strategies				
Strategy	PI	3L					
10. Co	ourse St	ructure					
Week	Hours	Required	Unit or subject name	Learning	Evaluation		
		Learning Outcomes		method	method		
1,2 3,4 5,6 7,8 9,10		GO5	<ul> <li>Human rights in ancient civilizations.</li> <li>Human rights in divine laws and religions.</li> <li>Human rights sources.</li> <li>Human rights guarantees.</li> <li>The future of human rights</li> </ul>	PBL	Quiz Mid Exam Final Exam		
11. (	Course E	Evaluation					
Student	Activities	s 15%, Mid exan	n 15%, Final exam 70%.				
IZ. L		and Teaching					
Main ref							
Recomm	nended	books and	references				
(scientifi	c journals	s, reports)					
Electron	ic Refere	nces, Websites					

1. Course Name:						
Advance	ed Mat	hematics I				
2. (	Cours	e Code:				
EME203	3					
3. S	semes	ster / Year				
2 <sup>st</sup> Yea	r, I <sup>st</sup>	Semester				
4. I	Descr	iption Pre	oaration Date:			
2023						
<b>5</b> . <i>A</i>	Availa	able Attend	ance Forms:			
6 1	Jumh	or of Crodi	Hours (Total) / Number of Un	its (Total)		
4 Unite	S			115 (10tal)		
7. (	Cours	se adminis	trator's name (mention all, if	more than o	ne name)	
Name:	Ahme	d KamilHasa	n		/	
I	Email	:				
8. 0	Cours	e Objective	S			
Course	Objecti	ives	Series			
Sequence     Eourier Series						
<ul> <li>Fourier series</li> <li>Taylor series.</li> </ul>						
Laplace Transform						
Inverse Laplace Transform.						
O Teaching and Learning Strategies						
Strategy DBI						
Strategy	tegy PBL					
10. Course Structure						
Week	Hour	s Require	I Unit or subject name	Learning	Evaluation	
		Learning		method	method	
		Outcom	s			
1,2,3		G01	Application of Series	PBL	Quiz	
4,5,6			Application of sequence.		Mid Exam	
7,8,9			Application of Laplace     Transform		Final Exam	
			Application of Inverse			
10,11,1			Laplace Transform.			

11. Course Evaluation         Student Activities 15%, Mid exam 15%, Final exam 70%.	
12. Learning and Teaching Resources Required textbooks (curricular books, if any)	<ul> <li>Advanced Engineering Mathematics. K.A. Stroud,2003</li> <li>Advanced Engineering Mathematics, H.K. DASS. 2009</li> </ul>
Main references (sources)	
Recommendedbooksandreferences(scientific journals, reports)Electronic References, Websites	

Advanced Mathematics II

2. Course Code:

EME204

3. Semester / Year:

 $2^{\text{st}}$  Year,  $2^{\text{nd}}\text{Semester}$ 

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: Ahmed KamilHasan Email:

# 8. Course Objectives

Partial derivative
Line Integral.
Double Integral
Triple integral.
<ul> <li>Second Order Differential Equations</li> </ul>

			• V	ector.			
	•						
9.	9. Teaching and Learning Strategies						
Strategy	Strategy PBL						
10. Co	ourse St	ructure					
Week	Hours	Required	Unit or subject	name	Learning	Evaluation	
		Learning			method	method	
		Outcomes					
1,2,3		G01	Application     derivative	on of partial	PBL	Quiz Mid Exam	
4,5,6			Application of line integration.			Final Exam	
7,8,9			<ul> <li>Application of double integration.</li> <li>Application of triple</li> </ul>				
10,11,1			integratio	n.			
11. (	11. Course Evaluation						
Student	Activities	s 15%, Mid ex	am 15%, Final ex	xam 70%.			
12. Learning and Teaching Resources							
Required textbooks (curricular books, if any)				Advance     Stroud,2	ed Engineering M 003	athematics. K.A.	
				Advance     DASS. 2	ed Engineering M 2009	athematics, H.K.	
Main references (sources)							
Recomn	nended	books ar	nd references				
(scientific journals, reports)							
Electronic References, Websites							

1. Course Name:
Computer Science II
2. Course Code:
EME205
3. Semester / Year:
2 <sup>st</sup> Year, 1 <sup>st</sup> Semester
4. Description Preparation Date:

<ul> <li>5. Available Attendance Forms:</li> <li>6. Number of Credit Hours (Total) / Number of Units (Total)</li> <li>2 Units</li> <li>7. Course administrator's name (mention all, if more than one name)</li> <li>Name: AsifaMahdi Mohammed Email:</li> <li>8. Course Objectives</li> <li>Introduction &amp; Basics in order to be apple to read and write simple programs in c++ language.</li> <li>Selection tools including (if statement, if else statement, if else construct switch statement &amp; conditional operator)</li> </ul>						
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: AsifaMahdi Mohammed         Email:         8. Course Objectives         • Introduction & Basics in order to be apple to read and write simple programs in c++ language.         • Selection tools including (if statement, if else statement, if else construct switch statement & conditional operator)						
Email:         8. Course Objectives         • Introduction & Basics in order to be apple to read and write simple programs in c++ language.         • Selection tools including (if statement, if else statement, if else construct switch statement & conditional operator)						
8. Course Objectives         Course Objectives         • Introduction & Basics in order to be apple to read and write simple programs in c++ language.         • Selection tools including (if statement, if else statement, if else construct switch statement & conditional operator)						
<ul> <li>Course Objectives</li> <li>Introduction &amp; Basics in order to be apple to read and write simple programs in c++ language.</li> <li>Selection tools including (if statement, if else statement, if else construct switch statement &amp; conditional operator)</li> </ul>						
<ul> <li>Course Objectives</li> <li>Introduction &amp; Basics in order to be apple to read and write simple programs in c++ language.</li> <li>Selection tools including (if statement, if .else statement, if .else construct, switch statement &amp; conditional operator)</li> <li>Iteration tools including (while loop statement, dowhile loop stafor loop statement and jumping statements)</li> <li>Functions including (standard functions and user input functions) therefore students can use them to build more than one program.</li> <li>Arrays tools including (one-dimensional array and two dimensional array)</li> <li>Pointers</li> <li>Strings to deal with characters as well as Words and sentences</li> <li>Files: to deal with ways of entering and printing data and results in files and computer monitor</li> </ul>						
Strategy         PBL						
10. Course Structure						
Week       Hours       Required       Unit or subject name       Learning       Evaluation         Learning       Outcomes       Outcomes       Image: Comparison of the subject name       Image: Comparison of the						
1,2GO6Pre-Increment & post - increment operators. Conditional operatorPBLQuiz Mid Exam3,4-Conditional operator Switch. Loops. Standard functions. ReferencesPBLMid Exam Final Exam9,10Classes11,12						
11. Course Evaluation						
Student Activities 15%, Mid exam 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:				
DC Elec	ctrical Ma	chines				
2. Course Code:						
EMSE2	06	/ • •				
3. 9	Semeste	er / Year:				
3 <sup>rd</sup> Yea	ar, $1^{st}$ Se	emester				
4. ]	Descrip	tion Prepara	tion Date:			
2023						
5. 4	Availabl	e Attendance	Forms:			
6 1	Numbor	of Credit Ho	urs (Total) / Number of Uni	ts (Total)		
3 Unite	S S			ls (10tal)		
7. (	Course	administrate	or's name (mention all, if r	nore than c	one name)	
]	Name: A	Abduljabbar O.	Hanfesh		,	
]	Email:					
8. (	Course	Objectives				
Course	• The basics of the electromagnetic, i.e. I-H relation, B-H					
	<ul> <li>relation, and magnetic equivalent circuit.</li> <li>The configuration and principle operation of DC machines.</li> </ul>					
	armature winding, and armature reaction.					
			• Speed control methods	of the DC motors		
9	Teaching	g and Learnir	ng Strategies			
Strategy	PI	BL				
10 Co	ourse St	ructure				
Week	Hours	Required	Unit or subject name	Learning	Evaluation	
		Learning		method	method	
		Outcomes				
1			• DC machine construction	וסס	Ouiz	
2		001	Classification of DC	Γ DL	Mid Exam	
3			machine		Final Exam	
4			<ul> <li>DC generators</li> <li>DC generator operation</li> </ul>			
5			principle			
6			• EMF equation of dc			
7			generator Characteristic of DC			
8			generator			
			DC Motors			

9 10 11 12 13		<ul> <li>Torque equation of DC motor</li> <li>Speed control of DC motor</li> <li>Types of losses in a DC machine</li> </ul>			
11. Course	Evaluation				
Student Activitie	es 15%, Mid exa	m 15%, lab 10%	6, Final exam 60%	6.	
12. Learnin	g and Teachir	ng Resources			
Required textbooks (curricular books, if any)			<ul> <li>U.A.Baksh institute of com</li> <li>P. C. Sen, power electroni</li> <li>S. J. Chapm fundamenta 2012.</li> </ul>	ni, 'Electrical Mach nputer training (pur "Principles of elect ics", John Willy an nan, "Electric mach Is", Mc. Graw Hill	nines', Nobel ne), 2007. tric machines and Id Sons Inc., 1997. inery , 4 <sup>th</sup> Edition,
Main references	(sources)				
Recommended	books and	references			
(scientific journa	ls, reports…)				
Electronic Refer	ences, Websites				

1. Course Name:		
Electrical Machines AC		
2. Course Code:		
EMSE207		
3. Semester / Year:		
3 <sup>rd</sup> Year, 2 <sup>nd</sup> Semester		
4. Description Prepa	ration Date:	
2023		
5. Available Attendan	ce Forms:	
6. Number of Credit H	Iours (Total) / Number of Units (Total)	
3 Units		
7. Course administra	ator's name (mention all, if more than one name)	
Name: ZainabBasheer Abdul	lah	
Email:		
8. Course Objectives		
• To develop an understanding of the fundamental laws of transformer a induction motor.		

9. <sup>–</sup> Strategy	Feachine PI	g and Learn BL	<ul> <li>To learn basic working principle of</li> <li>To develop the ability to apply circ transformer and induction motor.</li> <li>To understand the power flow and 1 motor and to understand mathematica</li> <li>To developed practical skills throug laboratory such as open and short circ</li> </ul>	transformer and i uit analysis of eq osses of transform I methodsof effic h the procedure e uit tests of single	induction motor. uivalent circuit for ner and induction iency. experimental phase transformer.
10. Co	ourse St	ructure		1	
Week	Hours	Required	Unit or subject name	Learning	Evaluation
		Learning		method	method
1		GO3	• Single phase	PRI	Ouiz
2		005	<ul> <li>Transformer-Introduction</li> <li>Transformer operating principle</li> <li>EME Emertion of</li> </ul>		Mid Exam Final Exam
3			<ul> <li>E.M.F. Equation of Transformer</li> <li>Equivalent circuit</li> </ul>		
4			<ul> <li>Open and short circuit tests of single phase</li> </ul>		
5			<ul> <li>Losses and efficiency of transformer</li> <li>Three where</li> </ul>		
7			<ul> <li>Three phase Transformation</li> <li>Three phase Induction motor</li> </ul>		
8			<ul> <li>Introduction-Types - construction</li> <li>Basic working principle</li> </ul>		
9			<ul> <li>of induction motor.</li> <li>Equivalent circuit of induction motor.</li> </ul>		
10			<ul> <li>Losses and power flow diagram.</li> <li>Torgue developed by</li> </ul>		
11 12			• Torque developed by Induction motor.		
11. (	Course	Evaluation			
Student	Activitie	s 15%, Mid ex	xam 15%, lab 10%, Final exam 60	%.	
12. l	earning	and leach	ing Resources	1 11 "	<b>F1</b> 1
Require	d textboo	ks (curricular	books, if any) M.N. Ba Machine Delhi 20 • D P Kot	andyopadhyay," es.Theory and P )07. hari , I J Nagrat	Electical ractice", New h, "Electrical

	<ul> <li>Machines" fourth edition, Tata McGraw Hill Education Private Limited NEW DELHI ,2010.</li> <li>Stephen J. Chapman, "ELECTRIC MACHINERY FUNDAMENTALS" fourth edition, Australia, 2005.</li> </ul>
Main references (sources)	
Recommended books and references (scientific journals, reports)	
Electronic References, Websites	

Engineering Thermodynamic

2. Course Code:

EMSE208

3. Semester / Year:

 $3^{\text{rd}}$  Year,  $1^{\text{st}}$  Semester

4. Description Preparation Date:

2023

5. Available Attendance Forms:

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: Hashim A. Hussein Email:

8. Course Objectives

Course Objectives

The goal of this course in engineering thermodynamic is study how the student improves the efficiency of a process for the transformation between energy and work. To study energy conservation and to study energy the entropy of a system.

9. Teaching and Learning Strategies

Strategy	P	BL				
10. Co	ourse St	ructure				
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		G01	<ul> <li>Introduction some destricts</li> <li>Basic constitution dy thermody</li> <li>Properties substance</li> <li>1<sup>st</sup> law in</li> <li>2<sup>st</sup> law in</li> <li>Entropy</li> <li>Thermody</li> </ul>	on- outline of criptive systems cepts of namics s of pure ss thermodynamics thermodynamics vnamic Relations	PBL	Quiz Mid Exam Final Exam
11. 0 Student 12. 1	Course Activitie Learning	Evaluation <u>s 15%, Mid ex</u> g and Teach	am 15%, lab 10%	, Final exam 609	%	
Require	d textboo	ks (curricular	books, if any)	<ul> <li>Fundame thermod ,2006</li> <li>Modern academic</li> <li>T.H.Thon Heinema</li> <li>-Van W classical edition, 1</li> </ul>	ental of ynamics SI vers engineering c press,2011 Ro nas and R.Hu nn F.d.Books19 /iylenG.andR. thermodynami 1985.	engineering ition ,5 the edition thermodynamics bert balmer int: applied heat 076 Fundamental of ics John willey 3 <sup>rd</sup>
Main ret	ferences	(sources)				
Recomm	nended	books ar	nd references			
(scientif	ic journal	s, reports)				
Electron	ic Refere	ences, Website	es			

Fluid Mechanics

2. Course Code:

EMSE209

3. Semester / Year:

 $3^{\text{rd}}$  Year,  $2^{\text{nd}}$  Semester

4. Description Preparation Date:

2023

5. Available Attendance Forms:

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: Hashim A. Hussein

Email:

8. Course Objectives

 Course Objectives
 The goal of this course in fluid mechanics to analysis of any problem in fluid mechanics necessarily includes statement of the basic laws governing the fluid motion. The basic laws, which are applicable to any fluid.

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		G01	<ul><li>Introduction</li><li>Physical properties of</li></ul>	PBL	Quiz Mid Exam
3,4			fluids <ul> <li>Newtonian<sup>s</sup> law in</li> </ul>		Final Exam
5,6			viscosity and momentum transfer		
7,8			<ul> <li>Static fluids with applications</li> </ul>		
9,10			<ul> <li>Dynamic fluids with applications</li> </ul>		
11,12 13,14			<ul> <li>Fluid Measurements devices</li> <li>Bernoulli's Equation applications</li> </ul>		

11. Course Evaluation	
Student Activities 15%, Mid exam 15%, lab 10%	6, Final exam 60%.
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	<ul> <li>Pugh, E. M., and G. H. Winslow, The Analysis of Physical Measurements. Reading, MA, addison-Wesley, 1966.</li> <li>Kline, S. J., and F. A. McClintock, "Describing Uncertainties in Single-Sample Experiments," Mechanical Engineering, 75, 1, January 1953, pp. 3-9.</li> <li>Doebelin, E. O., Measurement Systems, 4th ed, New York: McGraw-Hill, 1990.</li> <li>Young, H. D., Statistical Treatment of Experimental Data. New York: McGraw- Hill, 1962.</li> <li>Rood, E. P., and D. P. Telionis, "JFE Policy on Reporting Uncertainties in Experimental measurements and Results," Transactions of ASME, Journal of Fluids Engineering, 113, 3, September 1991, pp. 313-314.</li> <li>Coleman, H. W., and W. G. Steele, Experimentation and Uncertainty Analysis for Engineers, New York: Wiley, 1989.</li> <li>Holman, J. P., Experimental Methods for Engineers, 5th ed. New York: McGraw-Hill, 1989.</li> </ul>
Main references (sources)	
Recommended books and references	
(scientific journals, reports)	
Electronic References, Websites	

# 1. Course Name: Electrical Circuits 2. Course Code: EMSE210 3. Semester / Year: 3<sup>rd</sup> Year, 1<sup>st</sup> Semester 4. Description Preparation Date:

2023								
5	Availabl	e Attendanc	ce Forms:					
	<b>T</b> 1			1 011				
6. 3 Unite	Number	of Credit H	ours (Total) / Ni	umber of Uni	ts (Total)			
5 01110	5							
7. (	Course	administra	itor's name (me	ention all, if	more than or	ne name)		
	Name: Adel Ridha Othman							
	Email:							
8. (	Course	Objectives						
Course	Objective	s		In this cours	e, students will l	earn analysis		
	and operation electrical circuits.					uits.		
9. Teaching and Learning Strategies								
Strategy		3L						
10. Co	ourse St	ructure				1		
Week	Hours	Required	Unit or subject r	name	Learning	Evaluation		
		Learning			method	method		
1.0.0		Outcomes	1 Natural and stars as		DDI			
1,2,3		GO1	RC circuit.	sponses of an	PBL	Quiz Mid Exam		
4,3,0			2. Natural and step re RL circuit.	sponses of an		Final Exam		
7,8,9			3. Resonance in serie 4. Resonance in paral	s RLC circuit. lel RLC circuit.				
10,11,			5. Polyphase circuits.					
13,14								
11. (	Course I	Evaluation	<u> </u>					
Student	Activitie	s 15%, Mid ex	xam 15%, lab 10%,	Final exam 60	1%.			
12. I	earning	and Teach	ing Resources					
Require	d textboo	ks (curricular	books, if any)	Charles k. Alexan "Fundamentals of	der and Mathew N. Electric Circuits"F	O. Sadiku, ourth Edition.		
Main ret	erences	(sources)		T unumentails of				
Recomm	nended	books ar	nd references					
(scientif	c journal	s, reports)						

1. Course	Name:				
Electronic Circui	its				
2. Course	Code:				
EMSE211					
3. Semeste	er / Yea	ır:			
3 <sup>rd</sup> Year, 2 <sup>nd</sup> Se	emester				
4. Descrip	tion Pro	eparation Date:			
2023					
5. Availab	le Atten	dance Forms:			
6. Number	of Crec	lit Hours (Total)	) / Number of Units	(Total)	
3 Units					
				(1	<b>`</b>
7. Course		istrator's name	e (mention all, if m	ore than or	ne name)
Frail:	Adel Ridr	ia Othman			
Lillall.					
8. Course	Objectiv	/es			
Course Objective	S	In this c	course, students will le	arn analysis ar	nd operation
		electric	al and electronic circui	ts.	
9. Teachin	g and L	earning Strategi	les		
Strategy	PI	BL			
10. Course St	tructure				
10. Course St	tructure	Required	Unit or subiect	Learning	Evaluation
10. Course Si Week	tructure Hours	Required	Unit or subject	Learning	Evaluation
10. Course Si Week	tructure Hours	Required Learning	Unit or subject name	Learning method	Evaluation method
10. Course Si Week	tructure Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
10. Course Si Week 1,2,3,4,5	tructure Hours	Required Learning Outcomes GO3	Unit or subject name 1. Bipolar junction transistor (BJT)	Learning method PBL	Evaluation method Quiz Mid Evam
10. Course Si Week 1,2,3,4,5	Hours	Required Learning Outcomes GO3	Unit or subject         name         1. Bipolar junction         transistor (BJT)         simplified structure         and mode of	Learning method PBL	Evaluation method Quiz Mid Exam
10. Course Si Week 1,2,3,4,5	Hours	Required Learning Outcomes GO3	Unit or subject name1. Bipolar junction transistor (BJT) simplified structure and mode of operation. 2. Biasing	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam
10. Course S <sup>4</sup> Week 1,2,3,4,5	tructure Hours	Required Learning Outcomes GO3	Unit or subject         name         1. Bipolar junction         transistor (BJT)         simplified structure         and mode of         operation. 2. Biasing         in BJT amplifier         circuits. 3. BIT	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam
10. Course Si Week 1,2,3,4,5	Hours	Required Learning Outcomes GO3	Unit or subject name1. Bipolar junction transistor (BJT) simplified structure and mode of operation. 2. Biasing in BJT amplifier circuits. 3. BJT amplifier, CE, CC,	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam
10. Course Si Week 1,2,3,4,5	Hours	Required Learning Outcomes GO3	Unit or subject name 1. Bipolar junction transistor (BJT) simplified structure and mode of operation. 2. Biasing in BJT amplifier circuits. 3. BJT amplifier, CE, CC, CB, multistage	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam
10. Course Si Week 1,2,3,4,5 6,7,8,9,10,11	Hours	Required Learning Outcomes GO3	Unit or subject name1. Bipolar junction transistor (BJT) simplified structure and mode of operation. 2. Biasing in BJT amplifier circuits. 3. BJT amplifier, CE, CC, CB, multistage amplifier and differential amplifier	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam
10. Course Si Week 1,2,3,4,5 6,7,8,9,10,11	Hours	Required Learning Outcomes GO3	Unit or subject name 1. Bipolar junction transistor (BJT) simplified structure and mode of operation. 2. Biasing in BJT amplifier circuits. 3. BJT amplifier, CE, CC, CB, multistage amplifier and differential amplifier. 4. Field Effect	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam
10. Course Si Week 1,2,3,4,5 6,7,8,9,10,11	Hours	Required Learning Outcomes GO3	Unit or subject name 1. Bipolar junction transistor (BJT) simplified structure and mode of operation. 2. Biasing in BJT amplifier circuits. 3. BJT amplifier, CE, CC, CB, multistage amplifier and differential amplifier. 4. Field Effect Transistor (FET). 5. Characteristic and	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam

JFET.							
11. Course Evaluation							
Student Activities 15%, Mid exam 15%, lab 10%, Fin	al exam 60%.						
12. Learning and Teaching Resources							
Required textbooks (curricular books, if any)	1- Thomas L. Floyed "Ele Seventh Edition, 2005, Pe	ectronic Devices", earson Prentice Hall					
Main references (sources)							
Recommended books and references (scientific							
journals, reports…)							
Electronic References, Websites							

Strength of Materials

2. Course Code:

EMSE212

3. Semester / Year:

3<sup>rd</sup> Year, 1<sup>st</sup> Semester

4. Description Preparation Date:

2023

5. Available Attendance Forms:

# 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: Faten N. Al Zubaidi

Email:

# 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 degre	e of freedom.	
9. Teachin	g and	Learning Stra	ategies		
Strategy	I	PBL			
10. Course St	tructure	9			
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		GO2	<ul> <li>Simple stress and strain</li> <li>Shearing force and bending moment diagrams</li> <li>Bending Theory of the beam</li> <li>Deflection of beams</li> <li>Torsion Theory for Circle Shaft.</li> <li>Free vibration of single degree of freedom system</li> <li>Forced vibration of single degree of freedom system</li> <li>Free vibration with damping</li> <li>Forced vibration two degree of freedom</li> <li>Forced vibration with damping</li> <li>Free vibration of multi degrees of freedom systems</li> </ul>	PBL	Quiz Mid Exam Final Exam
11. Course	Evalua	ition			
Student Activitie	s 15%,	Mid exam 15%	, lab 10%, Final exam 60%	).	
12. Learning	g and	eaching Re		hanics of Ma	atorials I E I
Required textboo	oks (curi	ricular books, i	e Any) HEA 2007 • Stree	ARN, THIR ARN, THIR 7. ngth of mater	D EDITION, ials, G. G. Jon,

	<ul><li>2009.</li><li>Mechanical vibration by S.S. Rao.</li></ul>
Main references (sources)	
Recommended books and references (scientific	
journals, reports)	
Electronic References, Websites	

Measurements and Instrumentations

2. Course Code:

EMSE213

3. Semester / Year:

 $3^{\text{rd}}$  Year,  $2^{\text{nd}}$ Semester

4. Description Preparation Date:

2023

5. Available Attendance Forms:

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: Najat S. Jasim

Email:

### 8. Course Objectives

The performance characteristics of an instruments.
 Measurement of errors and limiting error
 Statistical analysis
 Working principle for kinds of analog measuring instruments (PMMC, Moving Iron, electro-dynamometer)
 Principles design theory of various dc and ac analogue voltmeters, ammeters wattmeter.
 Analysis of DC and AC bridges

# 9. Teaching and Learning Strategies

Strategy	]	PBL			
10. Course S	tructu	re			
Week	Hours	Required	Unit or subject name	Learning	Evaluation

		Learning				method	method
		Outcomes					
1,2		G01	•	Introduc Measure	ction to ements	PBL	Quiz
2			٠	Measure	ement Error		Mid Exam
3			•	General Analogi	Theory of the Measuring		Final Exam
4			•	Instrum Workin	ents		
5.6			·	PMMC	g rincipie		
5,5			•	Workin Principl	g eMoving Iron		
7,8			•	Workin	g		
				eter	eelectrodynamom		
9,10			•	Principl ofDC at	es Design Theory		
11 10				Voltmet	ters, Ammeters		
11,12			•	Watt me DC and	eters. AC Bridges		
13.14			٠	Cathode	Ray		
10,11				Oscillos	scope		
11. Course	Evaluat	tion					
Student Activitie	es 15%, N	Aid exam 15%	6, lab 10	0%, Fin	al exam 60%.		
12. Learning	g and T	eaching Re	source	es			
Required textboo	oks (curri	icular books,	if any)		1- P. Prithwiraj, e	et al. "Electric	al and
					Electronics Meas Instrumentation"	2013.	
					2- L. D. Jones an	d A. F. Chin, "	Electronic
					instruments and $r = 3 - N D$ In and F	neasurements,	" 1991. w. "National
					Diploma in Elect	rical Engineeri	ng
					Technology Elec	trical / Electron	nic
Main references	(sources	6)			mstrumentation	2008.	
Recommended	books a	, and reference	es (scie	entific			
journals, reports.	)		(- ).				

Heat Transfer

2. Course Code:

EMSE214

3. Semester / Year:

3<sup>rd</sup> Year, 2<sup>nd</sup>Semester

	tion Du		) at a .			
4. Descrip	tion Pre	eparation L	Jate:			
2023						
5. Availab	le Atten	dance Form	18:			
6 Number	of Croc	lit Hours (T	Cotal) / Number of Unite	(Total)		
3 Units	of Crec	IIT HOULS (1	otal) / Number of Units	s(10tal)		
5 01113						
7. Course	admini	strator's n	ame (mention all, if m	ore than or	ne name)	
Name: A	Abduljabł	oar M. Ahmeo	d			
Email:						
8. Course	Objectiv	res				
Course Objective	s	Definin	g the heat transfer modes cond	cepts to the seco	ond year students.	
		<ul> <li>Defining coincide</li> </ul>	ed with a laboratory experime	nt.	on neat transfer	
		• Definin	g the theoretical basics of the	e forced and fre	e convective heat	
		<ul> <li>Definin</li> </ul>	g the theoretical basics of the	experiment. radiation heat tr	ansfer.	
		• Definin	g the theoretical basics of the	heat exchangers	s coincided with a	
		laborato	bry experiment.	mixed modes of	f heat transfer	
		• Demin	g the theoretical basies of the	mixed modes of	i neat transfer.	
			- ( '			
9. Teachin	g and L	earning Stra	ategies			
Strategy	PI	3L				
10. Course St	tructure					
10. Course St	tructure	Required	Unit or subject name	Learning	Evaluation	
10. Course Si Week	tructure Hours	Required	Unit or subject name	Learning	Evaluation	
10. Course Si Week	tructure Hours	Required Learning	Unit or subject name	Learning method	Evaluation method	
10. Course Si Week	tructure Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method	
10. Course Si Week 1,2	tructure Hours	Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Conduction heat transfer.</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam	
10. Course St Week 1,2 3.4	tructure Hours	Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Conduction heat transfer.</li> <li>Heat transfer through fine</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam	
10. Course St Week 1,2 3,4	tructure Hours	Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Conduction heat transfer.</li> <li>Heat transfer through fins.</li> <li>Two dimensional</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam	
10. Course Si Week 1,2 3,4 5,6	tructure Hours	Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Conduction heat transfer.</li> <li>Heat transfer through fins.</li> <li>Two dimensional steady state heat</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam	
10. Course S Week 1,2 3,4 5,6	tructure Hours	Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Conduction heat transfer.</li> <li>Heat transfer through fins.</li> <li>Two dimensional steady state heat conduction.</li> <li>One and Two</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam	
10. Course S Week 1,2 3,4 5,6 7,8	tructure	Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Conduction heat transfer.</li> <li>Heat transfer through fins.</li> <li>Two dimensional steady state heat conduction.</li> <li>One and Two dimensional unsteady</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam	
10. Course S Week 1,2 3,4 5,6 7,8	tructure	Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Conduction heat transfer.</li> <li>Heat transfer through fins.</li> <li>Two dimensional steady state heat conduction.</li> <li>One and Two dimensional unsteady state heat conduction.</li> <li>Convective heat</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam	
10. Course S Week 1,2 3,4 5,6 7,8 9,10	tructure	Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Conduction heat transfer.</li> <li>Heat transfer through fins.</li> <li>Two dimensional steady state heat conduction.</li> <li>One and Two dimensional unsteady state heat conduction.</li> <li>Convective heat transfer.</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam	
10. Course S Week 1,2 3,4 5,6 7,8 9,10 11 12	tructure	Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Conduction heat transfer.</li> <li>Heat transfer through fins.</li> <li>Two dimensional steady state heat conduction.</li> <li>One and Two dimensional unsteady state heat conduction.</li> <li>Convective heat transfer.</li> <li>Forced convection.</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam	
10. Course S Week 1,2 3,4 5,6 7,8 9,10 11 12 13	tructure	Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Conduction heat transfer.</li> <li>Heat transfer through fins.</li> <li>Two dimensional steady state heat conduction.</li> <li>One and Two dimensional unsteady state heat conduction.</li> <li>One and Two dimensional unsteady state heat conduction.</li> <li>Convective heat transfer.</li> <li>Forced convection.</li> <li>Natural convection.</li> <li>Thermal radiation</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam	
14			• Heat exch	angers.		
---	-------------	--------------	----------------	----------------	----------------------	--------------
11. Course Evaluation						
Student Activitie	es 15%, M	lid exam 15%	, lab 10%, Fir	nal exam 60%.		
12. Learning	eaching Res					
Required textbooks (curricular books, if any)				Heat Transfer,	ten edition, J, P. H	olman, 2002.
Main references (sources)						
Recommended	books a	nd reference				
journals, reports.	)					

# Third Year

I. Course	e Name:				
Industrial Engir	neering				
2. Course	e Code:				
EME301	. /				
3. Semes	ter / Yea	ir:			
3 <sup>14</sup> Year, 1 <sup>st</sup> S	Semester	-			
4. Descri	ption Pro	eparation I	Date:		
2023					
5. Availa	ble Atten	dance Form	18:		
<u>6. Numbe</u>	er of Cred	lit Hours (T	Cotal) / Number of Units (	(Total)	
2 Units					
7 Cours	e admini	istrator's n	ame (mention all if mo	re than on	e name)
Name:	IsraaSaad	Ahmed			ie namej
Email:	1514454444	1 1111100			
8. Course	e Objectiv	ves			
Course Objectiv	/es	То	develop student's practi	aal abrilla a	
		10	uevelop student s practi	cal skills a	ind knowledge
-		rec	quired to solve the problems i	n industrial E	nd knowledge Engineering.
9. Teachi	ng and L	earning Str	quired to solve the problems i ategies	n industrial E	nd knowledge Engineering.
9. Teachi Strategy	ng and L	earning Stra	quired to solve the problems i ategies	n industrial E	nd knowledge Engineering.
9. Teachi Strategy	ng and L	earning Stra BL	ategies	n industrial E	and knowledge
9. Teachi Strategy	ng and L	earning Stra	ategies	n industrial E	nd knowledge
9. Teachi Strategy 10. Course S	ng and L PI Structure	earning Stra	ategies	n industrial E	and knowledge
9. Teachi Strategy 10. Course S Week	ng and L P Structure Hours	earning Stra BL Required	uevelop student s practi quired to solve the problems i ategies Unit or subject name	Learning	Evaluation
9. Teachi Strategy 10. Course S Week	ng and L P Structure Hours	earning Stra BL Required Learning	Unit or subject name	Learning method	Evaluation method
9. Teachi Strategy 10. Course S Week	ng and L Pl Structure Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
9. Teachi Strategy 10. Course S Week 1,2	ng and L Pl Structure Hours	earning Stra BL Required Learning Outcomes GO1	Unit or subject name	Learning method PBL	Evaluation method
9. Teachi Strategy 10. Course S Week 1,2	ng and L Pl Structure Hours	earning Stra BL Required Learning Outcomes GO1	Unit or subject name <ul> <li>Introduction to industrial engineering.</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam
9. Teachi Strategy 10. Course S Week 1,2 3,4	ng and L PI Structure Hours	earning Stra BL Required Learning Outcomes GO1	Unit or subject name <ul> <li>Introduction to industrial engineering.</li> <li>The production and the number of the production of the prod</li></ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam
9. Teachi Strategy 10. Course S Week 1,2 3,4	ng and L P Structure Hours	earning Stra BL Required Learning Outcomes GO1	Unit or subject name <ul> <li>Introduction to industrial engineering.</li> <li>The production and the productivity.</li> <li>Linear programming</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam
9. Teachi Strategy 10. Course S Week 1,2 3,4 5,6	ng and L Pl Structure Hours	earning Stra BL Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Introduction to industrial engineering.</li> <li>The production and the productivity.</li> <li>Linear programming (LP) models.</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam
9. Teachi Strategy 10. Course S Week 1,2 3,4 5,6 7,8	ng and L Pl Structure Hours	earning Stra BL Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Introduction to industrial engineering.</li> <li>The production and the productivity.</li> <li>Linear programming (LP) models.</li> <li>Assignment model</li> <li>Transportation</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam
9. Teachi Strategy 10. Course S Week 1,2 3,4 5,6 7,8 9	ng and L PI Structure Hours	earning Stra BL Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Introduction to industrial engineering.</li> <li>The production and the productivity.</li> <li>Linear programming (LP) models.</li> <li>Assignment model</li> <li>Transportation model.</li> </ul>	Learning method	Evaluation method Quiz Mid Exam Final Exam
9. Teachi Strategy 10. Course S Week 1,2 3,4 5,6 7,8 9 10	ng and L PI Structure Hours	earning Stra BL Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Introduction to industrial engineering.</li> <li>The production and the productivity.</li> <li>Linear programming (LP) models.</li> <li>Assignment model</li> <li>Transportation model.</li> <li>Network Models.</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam

12			balanc	cing.		
13						
11. Course	Evaluati	on				
Student Activitie	s 15%, N	lid exam 15%	, Final exam7	0%.		
12. Learning	g and Te	eaching Res	ources			
Required textbooks (curricular books, if any)				<ol> <li>Industrial Eng</li> <li>Kumar, Tenti</li> <li>INDUSTRIA</li> <li>ENGINEERING</li> <li>Introduction</li> <li>Cohen, 2017.</li> </ol>	gineering and Ma h Edition, 2019. L and SYSTEMS G, Edited by Aded to Industrial Engin	nagement, by Dr. 6 lejiBadiru, 2014. neering, Yuval
Main references	(sources	)				
Recommended	books a	ind reference				
journals, reports.	)					
Electronic Refere	ences, W	ebsites				

1. Course Name
----------------

Engineering Analysis

2. Course Code:

EME302

3. Semester / Year:

3<sup>rd</sup> Year, 1<sup>st</sup> 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: Naseer H. Farhood Email:

#### 8. Course Objectives

0. 000130	CDJC		03			
Course Objective	<ul> <li>Fourier series includes: Definition- Periodic functions- Fourier series (Euler's formula) for function having period 2πFourier series (Euler's formula) for function having arbitrary period T, Fourier series (Euler's formula) for Odd and even functions- Half range expansions.</li> <li>Fourier integral includes: Complex Fourier series- Fourier integral theorem-Some special functions and their transforms: (Even functions- Odd functions-Top-hat function)- Properties of Fourier transform: (Linearity- Time shafting-Frequency shafting)- Convolution: (the convolution theorem).</li> <li>Complex analysis includes: Functions of complex variable- Complex mapping: (Mapping of straight line in the z-transform onto the w-plane under the transformationw = f(z), Types of transformation Differentiation of complex functions- Complex integration: (Line integrals in the z-plane).</li> <li>Power series solutions of ordinary differential equation includes: Classification of ODE according to having the ordinary and singular (regular and irregular) points- Power series solutions: (General method of power series, Solution of differential equations by the method of Frobenius) - Bessel's equation- Legendre's equations.</li> <li>Partial differential equations includes: Separation of variables method- Initial and boundary conditions- Solution of Mave equation- Solution of heat equation- Solution of Laplace equation- Beta and</li> </ul>					rier series (Euler's der's formula) for mula) for Odd and integral theorem- as- Odd functions- ty- Time shafting- riable- Complex onto the w-plane transformation nction, Cauchy- ntegration: (Line uation includes: ary and singular (General method of the method of on of variables f wave equation- nation- Beta and
9. Teachin	g and	d L	earning Stra	ategies		
Strategy	-	PI	BL	-		
10. Course S	tructu	ire				
Week	Hou	rs	Required	Unit or subject name	Learning	Evaluation
			Learning		method	method
			Outcomes			
1,2,3 4,5,6 7,8,9 10,11,12,13		GO1• Fourier series. Fourier integral. • Complex analysis. • Power series solutions of ordinary differential equation.PBLQuiz Mid Example Final Example • Power series • Power series 				Quiz Mid Exam Final Exam
11. Course	Evalu	Jati	ion			
Student Activitie	s 15%	$\mathbf{N}$	fid exam 15%	Final exam70%		

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	1. Fundamentals of Engineering Numerical Analysis, ParvizMoin.– 2 <sup>nd</sup> edition, First published 2010, Printed in the United States of America.
	2. Numerical Methods for Engineers and Scientists, Second edition, Joe D. Hoffman, New York, Basel 2001.
	3. Numerical Methods for Engineers, Fifth edition, Chapra S. C. and Canale's R. P., New Delhi, McGraw-Hill education, 2006
Main references (sources)	
Recommended books and references (scientific	
journals, reports)	
Electronic References, Websites	

13.	Course Name:						
Numerical Ana	lysis						
14.	Course Code:						
EME303							
15.	Semester / Year:						
3 <sup>rd</sup> Year, 2 <sup>nd</sup> S	Semester						
16.	Description Preparation Date:						
2023							
17.	Available Attendance Forms:						
18.	Number of Credit Hours (Total) / Number of Units (Total)						
4 Units							
19.	Course administrator's name (mention all, if more than one						
name)							
Name:	Naseer H. Farhood						
Email:							
20.	Course Objectives						
Course Objectiv	• Aims of the course are to graduates qualified engineers who they have theoretical						
	<ul> <li>experience in advanced numerical in electromechanical field.</li> <li>This unit of study aims to provide theoretical knowledge and principles of</li> </ul>						

		<ul> <li>advanced</li> <li>Illustration of solution of electro</li> <li>The stude parametric</li> </ul>	numerical and the ab on and discussion the of equation(s) - linear, mechanical field. ent may also go beyor ic study and stability a	ility to analysis an main the application non-linear (algebraic and the subject and p analysis.	d solve the num on of numerical raic) that occur i perform grid sen	erical problems. methods for the in most numerical asitivity,
21.	leach	ing and Lea	arning Strategie	S		
Strategy	P]	BL				
22. Course	Structu	ire				
Week	Hours	Required	Unit or subject	name	Learning	Evaluation
		Learning			method	method
		Outcomes				
1,2,3 4,5,6 7,8 9,10		GO1	Solution of non –lin numerical methods: Simple Iten Bisection n Newton –F Curve fitting &Inten a) Curve Least squa b) Interp Newton In Polynomia Lagrange I Polynomia Numerical Solution equations systems: Direct met Indirect met Numerical integratio Simpson's Solution of differen numerical methods: Modified H Runge-Kut	ear equations by ration Method nethod Raphson iterative polation fitting : re method polation : terpolation 1 nterpolation 1 of linear hod ethod on al rule rule tial equations by Euler's method tta method	PBL	Quiz Mid Exam Final Exam
11,12,13						
23. Cours	se Evalu	uation		1004		
Student Activ	ing one	, Mid exam 1	15%, Final exam 7	/0%.		
Required text	books (c	urricular book	s, if any)	Chapra, Steven C "Numerical meth York: <i>McGraw-</i> I	C., and Raymond ods for enginee <i>Hill</i> , 2012.	l P. Canale., rs," Vol. 2, New
Main reference	es (sour	ces)				
Recommende	d books	and refere	ences (scientific			

journals, reports)	
Electronic References, Websites	

Analog Communications

26. Course Code:

### EMSE304

27. Semester / Year:

3<sup>rd</sup> Year, 1<sup>st</sup> Semester

28. Description Preparation Date:

2023

29. Available Attendance Forms:

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

## 3 Units

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

Name: Murooj N. Mohammed Ali Email:

### 32. Course Objectives

-	
Course Objectives	<ul> <li>Illustrating and discussing the fundamental principles of communication systems.</li> <li>Proceeding to the student analysis the signals in both time and frequency domains.</li> <li>Emphasis is placed on the Fourier series in linear systems analysis.</li> <li>Providing the students the essential knowledge related to Analog Communication Systems and Analog Modulation Techniques.</li> <li>Giving knowledge about Amplitude modulation (AM).</li> <li>Giving knowledge about Frequency modulation (FM) and phase modulation (PM).</li> </ul>
33. Teac	hing and Learning Strategies

Strategy	P	PBL			
34. Course St	ructure				
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2			<ul> <li>Signals and Linear Systems</li> <li>Classification of Signals</li> </ul>		
3 4 5			<ul> <li>Some Important Signals and Their Properties</li> <li>Fourier Series</li> <li>The Effects of Symmetry on the</li> </ul>		
7			<ul> <li>Symmetry on the Fourier Coefficients</li> <li>Elements of communication System</li> <li>Amplitude Modulation Systems (AM)</li> <li>Modulation Index, Spectrum of AM Signal</li> <li>Sidebands and the</li> </ul>		
9					
10 11 12			<ul> <li>Frequency Domain</li> <li>Frequency-Domain Representation of AM</li> <li>Power calculations in</li> </ul>		
13			<ul> <li>AM Systems</li> <li>Angle Modulation (FM and PM)</li> <li>Transmission</li> </ul>		
14			Bandwidth of FM waves		
35. Course Student Activitie 36. Learning	Evaluati s 15%, M g and Te	on <u>lid exam 15%</u> eaching Res	, lab 10%, Final exam 60%. sources		
<ul> <li>36. Learning and Teaching Resources</li> <li>Required textbooks (curricular books, if any)</li> <li>Laith B.P. and Ding Z., Modern Digital and Analog Communication Systems. Oxford University Press, edition, 2010.</li> <li>Proakis, J.G. and Salehi M., Fundamentals Communications Systems, Pearson Education Inc., 2</li> </ul>				<i>L.</i> , Modern ommunication versity Press, 4 <sup>th</sup> hi M., unications acation Inc., 2 <sup>nd</sup>	

	edition, 2014.
Main references (sources)	
Recommended books and references (scientific	
journals, reports…)	
Electronic References, Websites	

i dourse munic.	1-	Course Name:
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**Digital Communication** 

2- Course Code:

EMSE305

3- Semester / Year:

3<sup>rd</sup> Year, 2<sup>nd</sup>Semester

4- Description Preparation Date:

2023

5- Available Attendance Forms:

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: Murooj N. Mohammed Ali Email:

8- Cours	e Object	ives			
Course Objectives• Illustrating and discussing the fundamental principles of communication systems.• Introducing the models for communication systems.• Understanding and analyzing multiplexing techniques.• Teaching students the basic concepts of Probability, Information theory and Entropy.• Giving knowledge about modulation techniques in telecommunication systems.• Emphasis is placed on Pulse Code Modulation (PCM) techniques.• Showing how sampling theorem, quantization process, and channel capacity play a vital role in coding schemes.9- Teaching and Learning Strategies					s of les. Information 1 I) techniques. ss, and channel
Strategy	ŀ	PBL			
10 Courso	Structure	<u></u>			
Week	Hours	Required Learning	Unit or subject name	Learning method	Evaluation method
1,2 3,4 5.6		GO3	<ul> <li>Performance of Digital Communication System</li> <li>Communication Systems Models</li> <li>Transmission</li> </ul>	PBL	Quiz Mid Exam Final Exam
7,8 9			<ul> <li>Methods in Communication systems</li> <li>Multiplexing techniques</li> <li>Introduction to a Probability, Information &amp; Entropy theorems in</li> </ul>		
10,11			digital communications • Modulation Techniques in Telecommunication		
12			<ul> <li>Systems</li> <li>Pulse Code Modulation (PCM)</li> <li>PCM manufacture</li> </ul>		
13 14			<ul> <li>PCM waveform types</li> <li>Sampling Theorem and concept of quantization</li> </ul>		

15	Channel Capacity Digital Modulation Techniques (ASK, FSK and PSK)
11- Course Evaluation	
Student Activities 15%, Mid exam 15%, lab 1	0%, Final exam 60%.
12- Learning and Teaching Resource	es
Required textbooks (curricular books, if any)	<ul> <li>Laith B.P. and Ding Z., Modern Digital and Analog Communication Systems. Oxford University Press, 4<sup>th</sup> edition, 2010.</li> <li>Proakis, J.G. and Salehi M., Fundamentals Communications Systems, Pearson Education Inc., 2<sup>nd</sup> edition, 2014.</li> </ul>
Main references (sources)	
Recommended books and references	
(scientific journals, reports)	
Electronic References, Websites	

Vibration Theory

2- Course Code:

EMEE306

3- Semester / Year:

 $3^{\text{rd}}$  Year,  $1^{\text{st}}$  Semester

4- Description Preparation Date:

2023

5- Available Attendance Forms:

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: Anees Al-Tamimi

Email:

8- Course Objectives

•

Course Objectives

Introduction to vibratory motion and definitions

	-	1			
	•	Introduction	n to oscillatory motion	<b>f</b> f	
	•	Free vibratio	on of an undamped single degree	e or freedom	system
	•	Free vibratio	on of viscously damped single deg	gree of freedo	om system
	•	Forced vibra	ation of viscously damped and	undamped s	single degree of
		freedom sys	stem		
	•	Transient vi	bration of Electromechanical syst	ems	
	•	Simple ener	gy method (Raleigh principle)		
	•	Lagrange's e	equation		
	•	Eigen values	s and Eigenvectors		
	•	Free vibratio	on of an undamped two degree	of freedom sy	/stem
	•	Free vibration	on of viscously damped two degre	ee of freedom	n system
	•	Forced vibr	ation of viscously damped and	undamped	two degree of
		freedom sys	stem		
	•	Torsional vi	bration		
	•	Free vibrati	ons of an undamped and viscous	sly damped r	nulti degrees of
		freedom sys	stems		
	•	Forced vibra	ation of an undamped and visco	ously damped	a multi degrees
		of freedom	systems		
9- Teachin	g and L	earning Stra	ategies		
Strategy	PI	BL			
0,					
10- Course St	tructure				
10- Course St Week	tructure Hours	Required	Unit or subject name	Learning	Evaluation
10- Course St Week	tructure Hours	Required Learning	Unit or subject name	Learning method	Evaluation method
10- Course St Week	tructure Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
10- Course St Week	tructure Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
10- Course St Week	tructure Hours	Required Learning Outcomes GO1	Introduction to     wibratory motion and	Learning method PBL	Evaluation method Quiz
10- Course St Week	Hours	Required Learning Outcomes GO1	Introduction to vibratory motion and definitions	Learning method PBL	Evaluation method Quiz Mid Exam
10- Course St Week	tructure Hours	Required Learning Outcomes GO1	Unit or subject name     Introduction to vibratory motion and definitions     Introduction to	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam
10- Course St Week 1 2	Hours	Required Learning Outcomes GO1	<ul> <li>Introduction to vibratory motion and definitions</li> <li>Introduction to oscillatory motion</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam
10- Course St Week 1	tructure Hours	Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Introduction to vibratory motion and definitions</li> <li>Introduction to oscillatory motion</li> <li>Error vibration of an</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam
10- Course St Week 1 2 3	Hours	Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Introduction to vibratory motion and definitions</li> <li>Introduction to oscillatory motion</li> <li>Free vibration of an undamned single</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam
10- Course St Week 1 2 3	Hours	Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Introduction to vibratory motion and definitions</li> <li>Introduction to oscillatory motion</li> <li>Free vibration of an undamped single degree of freedom</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam
10- Course St Week 1 2 3	Hours	Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Introduction to vibratory motion and definitions</li> <li>Introduction to oscillatory motion</li> <li>Free vibration of an undamped single degree of freedom system</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam
10- Course St Week 1 2 3 4	Hours	Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Introduction to vibratory motion and definitions</li> <li>Introduction to oscillatory motion</li> <li>Free vibration of an undamped single degree of freedom system</li> <li>Eree vibration of a</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam
10- Course St Week 1 2 3 4	Hours	Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Introduction to vibratory motion and definitions</li> <li>Introduction to oscillatory motion</li> <li>Free vibration of an undamped single degree of freedom system</li> <li>Free vibration of wiscously demped</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam
10- Course St Week 1 2 3 4	Hours	Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Introduction to vibratory motion and definitions</li> <li>Introduction to oscillatory motion</li> <li>Free vibration of an undamped single degree of freedom system</li> <li>Free vibration of viscously damped single dogree of freedom</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam
10- Course St Week 1 2 3 4	Hours	Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Introduction to vibratory motion and definitions</li> <li>Introduction to oscillatory motion</li> <li>Free vibration of an undamped single degree of freedom system</li> <li>Free vibration of viscously damped single degree of freedom custors</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam
10- Course St Week 1 2 3 4	Hours	Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Introduction to vibratory motion and definitions</li> <li>Introduction to oscillatory motion</li> <li>Free vibration of an undamped single degree of freedom system</li> <li>Free vibration of viscously damped single degree of freedom system</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam
10- Course St Week 1 2 3 4	Hours	Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Introduction to vibratory motion and definitions</li> <li>Introduction to oscillatory motion</li> <li>Free vibration of an undamped single degree of freedom system</li> <li>Free vibration of viscously damped single degree of freedom system</li> <li>Forced vibration of</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam
10- Course St Week 1 2 3 4 5	Hours	Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Introduction to vibratory motion and definitions</li> <li>Introduction to oscillatory motion</li> <li>Free vibration of an undamped single degree of freedom system</li> <li>Free vibration of viscously damped single degree of freedom system</li> <li>Forced vibration of viscously damped and</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam
10- Course Si Week 1 2 3 4 5	Hours	Required Learning Outcomes GO1	<ul> <li>Unit or subject name</li> <li>Introduction to vibratory motion and definitions</li> <li>Introduction to oscillatory motion</li> <li>Free vibration of an undamped single degree of freedom system</li> <li>Free vibration of viscously damped single degree of freedom system</li> <li>Forced vibration of viscously damped and undamped single</li> </ul>	Learning method PBL	Evaluation method Quiz Mid Exam Final Exam

	system
6	Iransient vibration of
	Electromechanical
	systems
	Simple energy method
7	(Raleigh principle)
8	Lagrange's equation
	<ul> <li>Eigen values and</li> </ul>
	Eigenvectors
9	Free vibration of an
,	undamped two
	degree of freedom
	system
10	<ul> <li>Free vibration of</li> </ul>
10	viscously damped two
	degree of freedom
	system
	<ul> <li>Forced vibration of</li> </ul>
11	viscously damped and
	undamped two
	degree of freedom
	system
	Torsional vibration
12	Free vibrations of an
12	undamped and
15	viscously damped
	multi degrees of
	freedom systems
	Eorced vibration of an
	undamped and
14	
	multi degrees of
	freedom systems
11- Course Evaluation	n
Student Activities 15% Mi	d exam 15%, lab 10%, Final exam 60%.
12- Learning and Te	aching Resources
Required textbooks (curricu	Benaroya, Haym, Mark Nagurka, and
	SeonMi Han. Mechanical Vibration:
	Theory and Application. Rutgers
	University Press, 2022.
	Benarova, Havm. Mark Nagurka and
	SeonMi Han Mechanical Vibration
	Theory and Application Rutgers
	meory and Application. Ratgers

	<ul> <li>University Press, 2022.</li> <li>Tse, Francis Sing, Ivan E. Morse, and Rolland Theodore Hinkle. Mechanical vibrations. Boston: Allyn and Bacon, 1963.</li> </ul>
Main references (sources)	
Recommended books and references (scientific	
journals, reports)	
Electronic References, Websites	

13- Co	ourse Name:
Control Systems	
14- Co	ourse Code:
EMSE307	
15- Se	mester / Year:
3 <sup>rd</sup> Year, 2 <sup>nd</sup> Se	emester
16- De	escription Preparation Date:
2023	
17- Av	vailable Attendance Forms:
18- Nu	umber of Credit Hours (Total) / Number of Units (Total)
3 Units	
19- Co	ourse administrator's name (mention all, if more than one
name)	
Name: A	nees Al-Tamimi
Email:	
20- Co	ourse Objectives
Course Objectives	1. Introduction to control system, Basic definition and idea for the control
	system.
	2. Types of control system
	3. Block Diagram
	4. Single flow graph
	5. Modelling of control system
	<ul> <li>o. Time response analysis</li> <li>7. Stability Analysis</li> </ul>
	/. Stadinity Analysis

21- Te	eaching	and Learni	ng Stra	ategies			
Strategy	PI	3L					
22- Course St	ructure						
Week	Hours	Required Learning Outcomes	Unit o	r subje	ct name	Lear ning met hod	Evaluation method
1,2,3 4,5,6 7 8 9 10 11		G07		1- <b>2-</b> 3- 4- 5- 6- 7-	Introduction to control system, Basic definition and idea for the control system. Types of control system Block Diagram Single flow graph Modelling of control system Time response analysis Stability Analysis	PBL	Quiz Mid Exam Final Exam
23- Course	Evaluati	on					
Student Activitie	s 15%, M	lid exam 15%	, lab 10	%, Fina	l exam 60%.		
24- Learning Required textboo	g and Te	eaching Res	source: f any)	•	Automatic Control Raven. Automatic Control solutions manual,200 Control Systems En Nise.	Engineer System 09 ngineerir	ring, Francis H. , 9th Edition- ng, Norman S.
Main references	(sources)	)					
Recommended	books	and refe	rences				
(scientific journal	s, reports	s)					
Electronic Refere	ences, We	ebsites					

### Hydraulic System

2- Course Code:

#### EMSE308

3- Semester / Year:

 $3^{\text{rd}}$  Year,  $1^{\text{st}}$  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: Abduljabbar M. Ahmed Email:

0	Courso	Objectives
<b>o-</b>	Course	Objectives

Course Objective	S	- Defining th students	e principle of hydraulic systems	s concepts to	the third year
		2- Defining the	e construction of hydraulic system	s coincided w	with a laboratory
		<ul> <li>B- Defining the coincided was</li> </ul>	he hydraulic pumps: Theory of with a laboratory experiment	pumping- T	ypes of pumps
	2	<ul> <li>Defining the control value</li> </ul>	the controlling valves like Direct re- Flow control valve.	tion control	valve- Pressure
		<ul><li>5- Defining the</li><li>5- Defining the</li></ul>	e actuators (hydraulic cylinder) wi e auxiliary hydraulic systems like	th a laborator accumulators	ry experiment.
		<ul><li>7- Torsional vi</li><li>8- Free vibrati</li></ul>	bration ons of an undamped and viscous	sly damped r	nulti degrees of
		freedom sys	stems	,	
	9	<ul> <li>Forced vibration of freedom</li> </ul>	ation of an undamped and visco systems	ously damped	I multi degrees
10- Te	eaching	and Learni	ng Strategies		
Strategy	P	BL			
11- Course St	tructure				
Week	Hours	Required	Unit or subject name	Learning	Evaluation
		Learning		method	method
		Outcomes			

1,2 3,4	G01	<ul> <li>Principle systems.</li> <li>Advantag disadvant bydraulic</li> </ul>	s of hydraulic ges and tage of	PBL	Quiz Mid Exam Final Exam
5,6		Hydraulic     Hydraulic     of pumpin     pumps) G     Blades pu     pumps     Pi	pumps (Theory ng- Types of ear pumps- mps- Screw		
7,8		Controllin Direction Pressure of Flow cont	g valves: control valve- ontrol valve- rol valve		
9,10		• Actuators cylinder).	(hydraulic		
11,12		• Auxiliary systems (A	hydraulic Accumulators).		
12- Course Evalu	ation			1	
Student Activities 15%	, Mid exam 159	%, lab 10%, Fir	al exam 60%.		
13- Learning and	Teaching Re	esources			
Required textbooks (cu	rricular books,	if any)	Fluid Power: T A. Sullivan, Th Prentice Hal Jersey, 1989.	heory and Ap hird Edition, A l, Englewood	plication, James A Reston Book Cliffs, New
Main references (sourc	es)				
Recommended books	and reference	ces (scientific			
journals, reports)					
Electronic References,	Websites				

Theory of Machine

2- Course Code:

EMSE309

3- Semester / Year:

3<sup>rd</sup> Year, 2<sup>nd</sup>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: EneemObiedHassoun         Email:         8- Course Objectives         Course Objectives         To develop student's practical skills and knowledge required to solve the problems with differentiation, Integration, differential equations and some applications each of them.         9- Teaching and Learning Strategies         Strategy       PBL         10- Course Structure         Week       Hours         Required       Unit or subject name       Learning         0utcomes       Stratege         12       GO1       • Distance, Stance, Stance       PBL         9,10       Gear       Acceleration       Balance       Belt         9,10       Gear       Fily Wheel       Gear       Fily Wheel         12       Came       Image: Course Structure       Image: Course Structure         Student Activities 15%, Mid exam 15%, lab 10%, Final exam 60%.       Image: Course Structure       Image: Course Structure         11- Course Evaluation       Image: Course Structure       Image: Course Structure       Image: Course Structure         Student Activities 15%, Mid exam 15%, lab 10%, Final exam 60%.       Imag						
2 Units       7. Course of certer from (remotion all, if more than one name)         Name: EneemObiedHassoun       Name: EneemObiedHassoun         B- Course Objectives       To develop student's practical skills and knowledge required to solve the problems with differentiation, Integration, differential equations and some applications each of them.         9- Teaching and Learning Strategies       PBL         10- Course Structure       Value in the strategies         Week       Hours       Required Learning Outcomes         1,2       3,4         3,6       601       Distance, speed, Acceleration         6,6       Acceleration       Balance.         9,10       Evaluation       Belt         11- Course Evaluation       Gara       Fly Wheel         12- Learning and Teaching Resources       Came       Student Activities 15%, Mid exam 15%, lab 10%, Final exam 60%.         12- Learning and Teaching Resources <ul> <li>Required textbooks (curricular books, if any)</li> <li>Theory of machines, R.S. Khurmi&amp;J.K.Gupta 2010.</li> <li>Theory of Machines and Mechanisms, John J. Uicker, Gordon R. Pennock, Joseph E. Shigley.</li> <li>Main references (sources)</li> <li>Recommended books and references (scientific journals, reports)</li> <li>Electronic References, Websites</li> <li>Electronic References, Websites</li> </ul>	6- Number	of Cred	lit Hours (T	otal) / Number of Units (T	'otal)	
7- Course administrator's name (mention all, if more than one name) Name: EneemObiedHassoun Email:         8- Course Objectives         Course Objectives         To develop student's practical skills and knowledge required to solve the problems with differentiation, Integration, differential equations and some applications each of them.         9- Teaching and Learning Strategies       9BL         10- Course Structure         Week       Hours       Required Learning       Unit or subject name (Sources)       Learning method       Evaluation method         1,2       GO1       Distance, Speed, Acceleration Belance. Belt       PBL       Quiz Mid Exam Final Exam         9,10       Gear       Belt       Gear       Fly Wheel       Fly Wheel       Fly Wheel         12       Came       Came       * Theory of machines, R.S. KhurmikJ.K.Gupta 2010.       * Theory of machines, R.S. KhurmikJ.K.Gupta 2010.       * Theory of machines, R.S. KhurmikJ.K.Gupta 2010.       * Theory of machines and Mechanisms, John J. Uicker, Gordon R. Pennock, Joseph E. Snigley.         Main references (sources)         Recommended books and references (scientific journals, reports)       Electronic References, Websites	2 Units	01 0100			otary	
7- Course administrator's name (mention all, if more than one name)         Name: EncemObiedHassoun         Email:         8- Course Objectives         To develop student's practical skills and knowledge required to solve the problems with differentiation, Integration, differential equations and some applications each of them.         9- Teaching and Learning Strategies       9-         Strategy       PBL         10- Course Structure       Unit or subject name       Learning method       Evaluation method         Meek       Hours       Required       Unit or subject name       Learning method       Quiz         1,2       GO1       •       Distance, •       PBL       Quiz       Mid Exam         3,4       ·       Speed, ·       Acceleration •       Balance. •       PBL       Quiz         9,10       ·       Gear       ·       Fly Wheel •       Came       Image: Pipe Pipe Pipe Pipe Pipe Pipe Pipe Pipe						
Name: EneemObiedHassoun Email:         8- Course Objectives         To develop student's practical skills and knowledge required to solve the problems with differentiation, Integration, differential equations and some applications each of them.         9- Teaching and Learning Strategies       9- Teaching and Learning Strategies         Strategy         PBL         10- Course Structure         Week       Hours       Required Learning       Unit or subject name Quicomes       Learning method       Revaluation method         1,2       3,4       GO1       • Distance, • Acceleration • Balance. • Belt       PBL       Mid Exam Final Exam         9,10       I       Gear       • Fly Wheel       Image: Structure       Image: Structure         Strudent Activities 15%, Mid exam 15%, lab 10%, Final exam 60%.         12- Learning and Teaching Resources         Required textbooks (curricular books, if any)       • Theory of machines, R.S. Khumi&Zi, K.Gupta 2010. • Theory of Machines and Mechanisms, John J. Uicker, Gordon R. Pennock, Joseph E. Shigley.         Main references (sources)       Recommended books and references (scientific journals, reports)       Image: Scientific         Betch cols, References, Websites       Image: Scientific       Image: Scientific       Image: Scientific	7- Course	admini	istrator's n	ame (mention all, if more	e than one	e name)
Email:         8- Course Objectives         To develop student's practical skills and knowledge required to solve the problems with differentiation. Integration, differential equations and some applications each of them.         9- Teaching and Learning Strategies       PBL         Integration differential equations and some applications each of them.         9- Teaching and Learning Strategies       Vertex of them.         Strategy       PBL         10- Course Structure       Vertex of them.       Learning method       Evaluation method         Meek       Hours       Required Learning Outcomes       Distance, a colspan="2">PBL       Vertex of the them of them	Name: I	EneemOb	iedHassoun			
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Productions and some applications and some ap	Course Objectiv	res To d	evelop studen ems with dif	nt's practical skills and knowl ferentiation Integration differ	edge require ential equat	ions and some
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       A       GO1       • Distance, • Speed, • Acceleration • Balance. • Belt • Gear       PBL       Quiz Mid Exam         9,10       I       • Distance, • Belt • Gear       PBL       Quiz Mid Exam         11-       Course Evaluation       • Belt • Came       Intervention       Final Exam         11-       Course IS%, Mid exam 15%, lab 10%, Final exam 60%.       Intervention       Intervention       Intervention         12-       Learning and Teaching Resources       Intervention       Intervention       Intervention       Intervention         Required textbooks (curricular books, if any)       • Theory of Machines, R.S. Khurmi&J.K.Gupta 2010.       • Theory of Machines and Mechanisms, John J. Uicker, Gordon R. Pennock, Joseph E. Shigley.         Main references (sources)       Intervention       Intervention       Intervention       Intervention         Recommended books and references (scientific journals, reports)       Intervention       Intervention       Intervention         Electronic References, Websites       Intervention       Intervention<		appli	cations each of	of them.	ential equat	ions and some
Strategy       PBL         10- Course Structure       Hours       Required Learning       Unit or subject name Learning       Learning method       Evaluation method         1,2       GO1       • Distance, • Speed, • Acceleration • Balance. • Belt 9,10       PBL       Quiz Mid Exam Final Exam         1,2       GO1       • Distance, • Speed, • Acceleration • Balance. • Belt • Gear       PBL       Quiz Mid Exam Final Exam         11-       Course Evaluation       Student Activities 15%, Mid exam 15%, Iab 10%, Final exam 60%.       I         12-       Learning and Teaching Resources       • Theory of machines, R.S Khurmi&J.K.Gupta 2010. • Theory of Machines and Mechanisms, John J. Uicker, Gordon R. Pennock, Joseph E. Shigley.         Main references (sources)       Recommended books and references (scientific journals, reports)       Itereforences, Websites	9- Teachin	g and L	earning Stra	ategies		
10- Course Structure         Week       Hours       Required Learning       Unit or subject name (Learning)       Learning method       Evaluation method         1,2       G01       • Distance, • Speed, • Acceleration • Balance. • Belt • Gear       PBL       Quiz Mid Exam Final Exam         7,8       Belt • Gear       • Belt • Gear       • Belt • Came       • Pinal Exam         11-       Course Evaluation       • Evaluation • Balance. • Belt • Came       • Pinal Exam         12-       Learning and Teaching Resources       • Theory of machines, R.S. Khurmi&J.K.Gupta 2010. • Theory of Machines and Mechanisms, John J. Uicker, Gordon R. Pennock, Joseph E. Shigley.         Main references (sources)       • Scuentific       • Shigley.         Recommended books and references (scientific journals, reports)       • Scientific       • Shigley.	Strategy	P	BL			
10- Course Structure         Week       Hours       Required Learning Outcomes       Unit or subject name Learning Outcomes       Learning method       Evaluation method         1,2       GO1       • Distance, • Speed, • Acceleration       PBL       Quiz Mid Exam Final Exam         5,6       • Belt       • Gear       • Fly Wheel       • Came       Pinal Exam         9,10       • Fly Wheel       • Came       • Fly Wheel       • Came       • Theory of machines, R.S Khurmi&J.K.Gupta 2010.         11- Course Evaluation       Theory of machines, R.S Khurmi&J.K.Gupta 2010.       • Theory of machines, R.S Khurmi&J.K.Gupta 2010.       • Theory of Machines and Mechanisms, John J. Uicker, Gordon R. Pennock, Joseph E. Shigley.         Main references (sources)       Image: Super standard Standa						
10- Course Structure       Required Learning Outcomes       Unit or subject name Learning Outcomes       Learning method       Evaluation method         1,2       0utcomes       0utcomes       PBL       Quiz Mid Exam         3,4       -       Speed, -       Speed, -       PBL       Quiz Mid Exam         5,6       -       Balance. -       Belt -       Gear       Final Exam         9,10       -       Fly Wheel -       Came       Vertical Participant       Vertical Participant         11-       Course Evaluation       -       Came       Vertical Participant       Vertical Participant         12-       Learning and Teaching Resources       -       Theory of machines, R.S Khurmi&J.K.Gupta 2010.       Theory of Machines and Mechanisms, John J. Uicker, Gordon R. Pennock, Joseph E. Shigley.         Main references (sources)       -       -       -       -         Recommended books and references (scientific journals, reports)       -       -       -       -         Electronic References, Websites       -       -       -       -       -       -						
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1,2       GO1       • Distance, Speed, • Acceleration       PBL       Quiz Mid Exam Final Exam         7,8       9,10       • Belt • Gear       • Belt • Came       • Belt       • Fly Wheel         12       • Came       • Came       • Came       • Came       • Came         11- Course Evaluation         Student Activities 15%, Mid exam 15%, lab 10%, Final exam 60%.         12- Learning and Teaching Resources       • Theory of machines, R.S Khurmi&J.K.Gupta 2010.         Required textbooks (curricular books, if any)         • Theory of Machines and Mechanisms, John J. Uicker, Gordon R. Pennock, Joseph E. Shigley.         Main references (sources)       •         Recommended books and references (scientific journals, reports)       •         Electronic References, Websites       •			Outcomes			
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11       • Fly Wheel         12       • Came         11- Course Evaluation       11- Course Evaluation         Student Activities 15%, Mid exam 15%, lab 10%, Final exam 60%.       12- Learning and Teaching Resources         Required textbooks (curricular books, if any)       • Theory of machines, R.S Khurmi&J.K.Gupta 2010.         Nain references (sources)       • Theory of Machines and Mechanisms, John J. Uicker, Gordon R. Pennock, Joseph E. Shigley.         Main references (sources)       Recommended books and references (scientific journals, reports)         Electronic References, Websites       Image: State	8, /			• IN II		
12       • Came         11- Course Evaluation         Student Activities 15%, Mid exam 15%, lab 10%, Final exam 60%.         12- Learning and Teaching Resources       12- Learning and Teaching Resources         Required textbooks (curricular books, if any)         • Theory of machines, R.S Khurmi&J.K.Gupta 2010.         • Theory of Machines and Mechanisms, John J. Uicker, Gordon R. Pennock, Joseph E. Shigley.         Main references (sources)         Recommended books and references (scientific journals, reports)         Electronic References, Websites	7,8 9,10			Gear		
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Another books (current books, in any)       Khurmi&J.K.Gupta 2010.         Khurmi&J.K.Gupta 2010.       Theory of Machines and Mechanisms, John J. Uicker, Gordon R. Pennock, Joseph E. Shigley.         Main references (sources)       Recommended books and references (scientific journals, reports)         Electronic References, Websites       Image: State of the s	7,8 9,10 11 12 11- Course Student Activitie 12- Learning	Evaluati s 15%, M	on Iid exam 15% eaching Rea	<ul> <li>Gear</li> <li>Fly Wheel</li> <li>Came</li> <li>(a), 1ab 10%, Final exam 60%.</li> </ul>		
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Mechanisms, John J. Uicker, Gordon R. Pennock, Joseph E. Shigley. Main references (sources) Recommended books and references (scientific journals, reports) Electronic References, Websites	7,8 9,10 11 12 <u>11-</u> Course Student Activitie 12- Learning Required textboo	Evaluati s 15%, M g and Te oks (currie	on Iid exam 15% eaching Res cular books, i	Gear     Gear     Fly Wheel     Came  , lab 10%, Final exam 60%.  sources f any)     Theory of Khurmi&	of machines, F &J.K.Gupta 20	R.S 010.
Main references (sources) Recommended books and references (scientific journals, reports) Electronic References, Websites	7,8 9,10 11 12 11- Course Student Activitie 12- Learning Required textboo	Evaluati s 15%, M g and Te oks (currie	on Iid exam 15% eaching Res cular books, i	<ul> <li>Gear</li> <li>Fly Wheel</li> <li>Came</li> <li>Came</li> <li>any)</li> <li>Theory of Khurmia</li> <li>Theory of Khurmia</li> </ul>	of machines, I &J.K.Gupta 20 of Machines a	R.S 010. nd
Recommended books and references (scientific journals, reports) Electronic References, Websites	7,8 9,10 11 12 11- Course Student Activitie 12- Learning Required textboo	Evaluati s 15%, M g and Te oks (currie	on Iid exam 15% eaching Res cular books, i	<ul> <li>Gear</li> <li>Fly Wheel</li> <li>Came</li> </ul> 5, lab 10%, Final exam 60%. 50 Sources 6 f any) <ul> <li>Theory of Mechani R. Penno</li> </ul>	of machines, H &J.K.Gupta 20 of Machines a sms, John J. 1 ock, Joseph E	R.S 010. nd Uicker, Gordon . Shigley.
journals, reports) Electronic References, Websites	7,8 9,10 11 12 11- Course Student Activitie 12- Learning Required textboo	Evaluati s 15%, M g and Te oks (curric	on Iid exam 15% eaching Res cular books, i	<ul> <li>Gear</li> <li>Fly Wheel</li> <li>Came</li> <li>A came</li> <li>A came</li></ul>	of machines, H &J.K.Gupta 20 of Machines a sms, John J. 1 ock, Joseph E	R.S 010. nd Uicker, Gordon . Shigley.
Electronic References, Websites	7,8 9,10 11 12 11- Course Student Activitie 12- Learning Required textboo Main references Recommended	Evaluati s 15%, M g and Te oks (curric (sources) books a	ion Iid exam 15% eaching Res cular books, i cular books, i	<ul> <li>Gear</li> <li>Fly Wheel</li> <li>Came</li> <li>A came</li> <li>A came</li></ul>	of machines, H &J.K.Gupta 20 of Machines a sms, John J. V ock, Joseph E	R.S 010. nd Uicker, Gordon . Shigley.
	7,8 9,10 11 12 <u>11- Course</u> Student Activitie 12- Learning Required textboo Main references Recommended journals, reports.	Evaluati s 15%, M g and Te oks (curric (sources) books a )	ion Iid exam 15% eaching Res cular books, i cular books, i	Gear     Gear     Fly Wheel     Came  , lab 10%, Final exam 60%.  Sources f any)     Theory of     Khurmi&     Theory of     Mechani     R. Penno  es (scientific	of machines, H &J.K.Gupta 2 of Machines a sms, John J. V ock, Joseph E	R.S 010. nd Uicker, Gordon . Shigley.

#### Digital Electronics

14- Course Code:

EMSE310

15- Semester / Year:

 $3^{\mbox{\scriptsize rd}}$  Year,  $1^{\mbox{\scriptsize st}}$  Semester

16- Description Preparation Date:

2023

17- Available Attendance Forms:

18- Number of Credit Hours (Total) / Number of Units (Total)

3 Units

# 19- Course administrator's name (mention all, if more than one name)

Name: Mohammed QasimSulttan Email:

20- C	Course Objectives						
Course Objective	s	1- An introduction to learning the Fundamentals Digital Electronics.					
		2-	Learn the N	lumbers Systems and their conversions.			
		3- Learn the signed binary number representation.					
		4- Study and analysis logic gates and their classifications.					
		5- Learn the mathematics of digital systems (Boolean algebra and their expressions).					
		6-	Learn the lo	gic simplification of digital circui	ts.		
		7-	Learn to des	sign the logic gates by using unive	ersal logic gate	es.	
		8- Study and learn the standard forms of Boolean expressions.					
		9- Learning simplifying Boolean expressions by using Karnaugh map.					
10- Te	10- Teaching and Learning Strategies						
Strategy		PBL					
11- Course St	11- Course Structure						
Week	Hou	lours Required Unit or subject name Learning Evalua			Evaluation		
			Learning		method	method	
			Outcomes				
4.0					DDI		
1,2			GOT	• Fundamentals of	PRL	Quiz	

3,4 5,6 7 8 9 10 11 12	Digit Num "Dec Hexa Num Code Num Signe Repro Logio Boole Logio Other Stand Boole TheK	al Electronics bers Systems imal, Binary, decimal, Octal bers, and Binary s" bers Conversions ed Numbers esentation c Gates ean Algebra and c Representation ersal Logic Gates lard Forms of ean Expression Carnaugh Map	Mid Exam Final Exam
12- Course Evaluat	ion		
Student Activities 15%, N	Iid exam 15%, lab 10%, Fi	nal exam 60%.	
13- Learning and T	eaching Resources		
Required textbooks (curri	cular books, if any)	<ol> <li>Floyd, T. L. (2011). Digital fu Pearson Education India.</li> <li>"Digital Design with an int Verilog HDL", M Morris Man Ciletti. 5th Edition.</li> <li>Saha, A., &amp; Manna, N. principles and logic design. J Learning.</li> </ol>	ndamentals, 10/e. troduction to the to & Michael D. (2009). Digital Jones & Bartlett
Main references (sources	)		
Recommended books a	and references (scientific		
journals, reports)			
Electronic References, W	ebsites		

14-	Course Name:
Electromecha	nical Design
15-	Course Code:
EMSE311	
16-	Semester / Year:
$3^{rd}$ Year, $1^{st}$	Semester
17-	Description Preparation Date:
2023	

13-       Available Attendance Forms.         19-       Number of Credit Hours (Total) / Number of Units (Total)         2 Units       20-         20-       Course administrator's name (mention all, if more than one name)         Name: Bassam Ali Ahmed Email:       21-         Course Objectives       1-         Electromechanical Design Definition, Knowledge of Mechanical Design, Classification of Mechanical Design, Design Process Steps, Mechanical Properties of Materials, Stress-Strain Diagram, Designation Systems, and Using Tebles and Figures
19-       Number of Credit Hours (Total) / Number of Units (Total)         2 Units       20-       Course administrator's name (mention all, if more than one name)         Name: Bassam Ali Ahmed Email:       21-       Course Objectives         Course Objectives       1-       Electromechanical Design Definition, Knowledge of Mechanical Design, Classification of Mechanical Design, Design Process Steps, Mechanical Properties of Materials, Stress-Strain Diagram, Designation Systems, and Using Tables and Eigenergy
2 Units         20-       Course administrator's name (mention all, if more than one name)         Name: Bassam Ali Ahmed Email:         21-       Course Objectives         Course Objectives         1-       Electromechanical Design Definition, Knowledge of Mechanical Design, Classification of Mechanical Design, Design Process Steps, Mechanical Properties of Materials, Stress-Strain Diagram, Designation Systems, and Unior Tables and Figure 7
20-       Course administrator's name (mention all, if more than one name)         Name: Bassam Ali Ahmed Email:         21-       Course Objectives         Course Objectives         1-       Electromechanical Design Definition, Knowledge of Mechanical Design, Classification of Mechanical Design, Design Process Steps, Mechanical Properties of Materials, Stress-Strain Diagram, Designation Systems, and Using Tables and Figures
20-       Course administrator's name (mention all, if more than one name)         Name: Bassam Ali Ahmed Email:         21-       Course Objectives         Course Objectives         1- Electromechanical Design Definition, Knowledge of Mechanical Design, Classification of Mechanical Design, Design Process Steps, Mechanical Properties of Materials, Stress-Strain Diagram, Designation Systems, and Using Tables and Figures
name)         Name: Bassam Ali Ahmed         Email:         21-       Course Objectives         Course Objectives         1-       Electromechanical Design Definition, Knowledge of Mechanical Design, Classification of Mechanical Design, Design Process Steps, Mechanical Properties of Materials, Stress-Strain Diagram, Designation Systems, and Using Tables and Figures
Name: Bassam Ali Ahmed         Email:         21-       Course Objectives         Course Objectives       1-       Electromechanical Design Definition, Knowledge of Mechanical Design, Classification of Mechanical Design, Design Process Steps, Mechanical Properties of Materials, Stress-Strain Diagram, Designation Systems, and Using Teblas and Eigungs
Email:         21- Course Objectives         Course Objectives         1- Electromechanical Design Definition, Knowledge of Mechanical Design, Classification of Mechanical Design, Design Process Steps, Mechanical Properties of Materials, Stress-Strain Diagram, Designation Systems, and Using Tables and Figures
21-       Course Objectives         Course Objectives       1-       Electromechanical Design Definition, Knowledge of Mechanical Design, Classification of Mechanical Design, Design Process Steps, Mechanical Properties of Materials, Stress-Strain Diagram, Designation Systems, and Using Tables and Figures
21-       Course Objectives         Course Objectives       1-       Electromechanical Design Definition, Knowledge of Mechanical Design, Classification of Mechanical Design, Design Process Steps, Mechanical Properties of Materials, Stress-Strain Diagram, Designation Systems, and Using Tebles and Figures
Course Objectives       1- Electromechanical Design Definition, Knowledge of Mechanical Design, Classification of Mechanical Design, Design Process Steps, Mechanical Properties of Materials, Stress-Strain Diagram, Designation Systems, and Using Tehlas and Figures
Classification of Mechanical Design, Design Process Steps, Mechanical Properties of Materials, Stress-Strain Diagram, Designation Systems, and
Properties of Materials, Stress-Strain Diagram, Designation Systems, and
Using Tables and Figures
Using Tables and Figures.
2- Spur Gear Definition, Spur Gear Applications, Advantages and
Disadvantages of Spur Gears, Spur Gear Geometry, Forces Acting on
Gears
3- Helical Gear Definition, Helical Gear Applications, Advantages and
Disadvantages of Helical Gears, Helical Gear Geometry, Forces Acting on
Helical Gears, Helical Gear Terminologies, and Procedures for Design
Helical Gears. 4- Bevel Gear Definition Bevel Gear Applications Advantages and
Disadvantages of Bevel Gears, Types of Bevel Gears, Bevel Gear
Geometry, Forces Acting on Bevel Gears, Bevel Gear Terminologies, and
Procedures for Design Bevel Gears.
5- worm Gear Definition, worm Gear Applications, Advantages and Disadvantages of Worm Gears Worm Types Worm Gears Types Worm
Gear Geometry, Forces Acting on Worm Gears, Worm Gear
Terminologies, and Procedures for Design Worm Gears.
6- Belt Drive Definition, Belt Drive Applications, Advantages and Disadvantages of V Belt Drive V Belt Drive Types Belt Drive
Geometry, Belts types, Belt Drive Mechanism, and Procedures for
Designing V- Belt Drive.
7- Chain Drive Definition, Chain Drive Applications, Advantages and
Disadvantages of Chain Drive, Types of Chain Drive, Roller Chain Construction Forces Acting on the Chain Sprockets, and Procedures for
Designing Chain Drive.
8- Gears, Belt & Chain Forces, Power, Torque, and Velocity Transmission,
Axle Design, Shaft Subject to Torsion only, Shaft Subject to Torsion and
9- Rolling Contact Bearings Types Calculations of Ball Bearings Design
Life, Compute Design Load, Selection Type of Deep Groove Ball
Bearing, Calculations of Taper Roller Bearing, Life Prediction Under
Varying Loads, and Fixing Internal and External Racing of Bearing with Shaft and Housing
Shart and Housing.
10- Teaching and Learning Strategies
Strategy PBL

11- Course St	ructure					
Week	Hours	Required Learning Outcomes	Unit or subj	ect name	Learning method	Evaluation method
1,2,3 4,5,6		G02	<ul> <li>Introd Electr Desig of Ma</li> <li>Spur Helica Bevel</li> </ul>	luction of the romechanical n and Selection aterials Gear Design, al Gear Design, Gear Design,	PBL	Quiz Mid Exam Final Exam
7,8,9			<ul> <li>Worm</li> <li>Belt I Chain Force Shaft</li> <li>Rollir Bearin Desig Brake Desig</li> </ul>	n Gear Design Drive Design, a Drive Design, s Exerted on the & Shaft Design ng Contact ngs, Flywheel n, Clutch and e Design, Spring n		
12- Course	Evaluati	on	I			
Student Activitie	<u>s 15%, M</u> and Te	fid exam 15%	, Final exam	70%.		
Required textboo	ks (currio	cular books, if	f any)	<ul> <li>Robert Vavrek, "Machin Design"</li> <li>Robert Marshel Machine Wiley si</li> <li>Robert Element Pearson</li> <li>R.S. K "Machine</li> </ul>	L. Mott, and Jyl ne Elements , Pearson 20 C. Juvinall, c, "Funda e Compon ixth edition. L. Mot in Mechan 2014. hurmi, and ne Design", 2	Edward M. hwen Wang, in Mechanical 18. and Kurt M. amentals of ent Design", t, "Machine nical Design", J.K. Gupta, 2005
Main references	(sources)	)				
Recommended	books a ۱	nd reference	es (scientific			
Electronic Refere	ences, We	ebsites				

Power System

2- Course Code:

EMSE312

3- Semester / Year:

3<sup>rd</sup> Year, 1<sup>st</sup> 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: Samar Jaafar Ismael Email:

0	Course	Oh	iactiv	00
O-	Course	OD	ιεςιν	62

Course Objective	s	1- Illustration and discussion the principles of power systems				
		2-	Proceeding	to the student analysis the ele	ctrical comp	onent of
			power syst	ems.	1	
		3- Illustration and discussion the main theoretical principles of the				
		electrical design of overhead transmission line in power systems.				
		of the overhead transmission line				
		5- Proceeding to the student analysis about the distribution System in $DC$ and $AC$				
6 Teachin	a and	414	parning Str	otonios		
	y and		saming Sur	alegies		
Strategy		PE	BL			
7- Course St	ructu	ire				
Week	Hou	rs	Required	Unit or subject name	Learning	Evaluation
			Learning		method	method
			Outcomes			
					•	

$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	G01	<ul> <li>Gen</li> <li>Sour</li> <li>Gen</li> <li>Ecor</li> <li>Load</li> <li>Base</li> <li>Perf</li> <li>Over</li> <li>Tran</li> <li>Gen</li> <li>Med</li> <li>Insu</li> <li>Calc</li> <li>Calc</li> <li>Cons</li> <li>Insu</li> <li>Elect</li> <li>Type</li> <li>Insu</li> <li>Pote</li> <li>Mat</li> </ul>	eration of ces of energy erating nomical I curves and ormance of rhead smission line eralized hanical design lators (pin ulation of ulation of struction of lating trical e of lators, Main ential hematical	PBL	Quiz Mid Exam Final Exam
		• Met	hod of		
8- Course Eva	lluation				
Student Activities	15%, Mid exam 15%	6, Final exam7	0%.		
9- Learning ar	nd Teaching Reso	ources			
Required textbooks (curricular books, if any)			<ul> <li>Princip</li> <li>Mehta</li> <li>Electri</li> </ul>	oles of Pow cal power b	er system by V.K by M.L. Anand.
Main references (sources)				·	-
Recommended bo	ooks and referenc	es (scientific			
journals, reports	)				
Electronic Referen	ces, Websites				

1- Course Name:
Protection Systems
2- Course Code:
EMSE313
3- Semester / Year:
3 <sup>rd</sup> Year, 2 <sup>nd</sup> Semester

4- Description Preparation Date:						
2023						
5- Availabl	le Att	ene	dance Form	IS:		
6- Number	of C	red	lit Hours (T	otal) / Number of Units (T	otal)	
2 Units						
7- Course	adm	ini	strator's n	ame (mention all if more	than one	e name)
Name: F	Iusseir	<u>п Т</u>	. R			5 Harriey
Email:						
8- Course	Objec	ctiv	es			
Course Objective	s -P	rote	ection princip	les and components.		
	-P	ow	er system net	work.		
	-1 D	ype	es of electrica	I faults.		
	-1 -R	eai	irements of a	a protection system.		
	-F	use	element mat	erial.		
	-0	per	rating princip	le.		
	-C	ircu	uit breakers.			
	-0	per	rating princip	le.		
	-A	.KC Iotk	phenomenoi	n. extinction		
	-N	leu	sification of (	C.B.		
	-P	rote	ective relays.			
	-F	unc	lamental requ	irements of protective relaying	•	
	-F	unc	tional relay t	ypes.		
	-V	olt	age transform	ners.		
-Current transformers.						
9- Teaching	y anu			alegies		
Strategy		PE	3L			
10- Course St	ructu	re				
Week	Hour	lours Required Unit or subject name Learning Evaluation			Evaluation	
			Learning		method	method
			Outcomes			
1			CO1	-Rated carrying current	PRI	Ουίτ
2			UUI	-Fusing current.		Mid Evam
3				-Fusing factor.		Final Evan
4				-Prospective current and cu		
_				off current.		
5				time)		

					r	
			-Arcing-time			
7			-Total operat	ing time.		
8			-Breaking ca	pacity of fuse.		
			-Circuit brea	kers.		
9			-Operating p	rinciple.		
10			-Circuit brea	ker ratings.		
			-Breaking ca	pacity.		
11			-Marking cap	pacity.		
12			-Short time r	ating.		
			-Normal curi	ent rating.		
13			-Difference	between a fus		
			and circuit bi	reaker ratings,		
14			-Fundamenta	l requirements		
			of protective	relaying.		
			-Selectivity,	speed,		
			sensitivity, re	eliability,		
15			simplicity, ed	conomy.		
			-Relay uning	g.		
	Voluati	on			L	<u> </u>
Student Activities 15%, Mid exam 15%, Final exam			, Final exam (	70%.		
12- Learning and Teaching Resources						
Required textbook	s (curric	ular books. if	anv)	Power Sy	/stem Protec	tion by L.G
			Hewitson Mark Brown			
			<ul> <li>Switchge</li> </ul>	ar & protecti	on (J.B. Gupta).	
Main references (sources)						
Recommended books and references (scientific			s (scientific			
journals, reports	.)					
Electronic References, Websites						

1- Course Name
Special Electrical Machines
2- Course Code
EMSE314
3. Semester / Vear
J- Semester / Teat.
3 <sup>rd</sup> Year 1 <sup>st</sup> Semester
4- Description Prenaration Date
2023
2023
5. Available Attendance Forms.

6- Number	of Cred	lit Hours (T	otal) / Number	of Units (T	'otal)			
2 Units	2 Units							
7- Course	admini	strator's n	ame (mention	all, if more	e than one	e name)		
Name: A	Abduljabl	oar O. Hanfes	h					
Email:								
8- Course	Objectiv	'es						
Course Objectiv	ves • Cor	struction, pri	nciple of operatio	n, control and	l performanc	e of stepping		
	• Cor	rs. Istruction, pri	nciple of operation	n, control and	l performance	e of switched		
	reluc	tance motors.		, , 1	1	C		
	• Cor perm	istruction, pri anent magnet	heiple of operation brushless D.C. m	n, control and otors.	1 performance	ce of		
	• Cor	struction, pri	nciple of operation	n and perform	nance of Lin	ear Motor.		
	Co   Mach	nstruction, pi	inciple of operat	tion and per-	formance of	other special		
9- Teachin	g and L	earning Stra	ategies					
Strategy	P	BL						
10- Course St	tructure							
Week	Hours	Required	Unit or subject	name	Learning	Evaluation		
		Learning			method	method		
		Outcomes						
1,2		G01	<ul> <li>Stepper N</li> <li>Switched</li> </ul>	lotors. Reluctance	PBL	Quiz		
5,1			Motors.			Mid Exam Final Exam		
5,6 7.8			<ul><li>Brushless</li><li>Permanen</li></ul>	DC Motors. It Magnet		i mui Exum		
7,0			Synchron	ous Motors.				
9,10			<ul><li>Elliear Mo</li><li>Repulsion</li></ul>	n Motor.				
11,12			• AC series	Motors.				
11- Course	Evaluati	on						
Student Activitie	s 15%, N	lid exam 15%	, Final exam70%					
12- Learning	g and Te	eaching Re	sources					
Required textboo	oks (currio	cular books, i	any) • K.Ven	kataratnam,	'Special E	lectrical		
			Machine	es', Univers	ities Press	(India)		
			• T. Ker	ijo, 'Steppir	ng Motors a	nd Their		
1. Kenjo, Stepping Wotors and Then								

	Microprocessor Controls', Clarendon Press London, 1984 • E.G. Janardanan, 'Special electrical machines', PHI learning Private Limited, Delhi, 2014.
Main references (sources)	
Recommended books and references	
(scientific journals, reports)	
Electronic References, Websites	

# Fourth Year

1- Course Name:

Power Electronics

2- Course Code:

EMSE401

3- Semester / Year	<b>[</b> ]
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 $4^{\text{th}}$ Year,  $1^{\text{st}}$  Semester

4- Description Preparation Date:

2023

5- Available Attendance Forms:

6- Number of Credit Hours (Total) / Number of Units (Total) 3Units

### 7- Course administrator's name (mention all, if more than one name) Name: Jamal A.-K. Mohammed

Email:

8- Course Objectives

Course Objectives	a.	have an in-depth understanding of the theory of electrical energy conversion using power electronic systems that perform AC/DC, DC/DC, DC/AC, or AC/AC conversion
	b. c.	Understand operating principles and modulation strategies for 1- phase and 3-phase diode rectifiers, thyristor-based converters, switch-mode DC/DC power electronic converters and DC/AC inverters. Understand modeling and control of power electronic converters.

### 9- Teaching and Learning Strategies

-	0		0	0			
Strategy		PBL					

### 10- Course Structure

Week	Hours	Required	Unit or subject name	Learning	Evaluation		
		Learning		method	method		
		Outcomes					
1,2,3		G01	<ul> <li>Principles of Power Electronics</li> <li>DC to AC Conventors</li> </ul>	PBL	Quiz Mid Exam		
4,5,6			<ul> <li>DC-to-AC Converters (Rectifiers)</li> <li>DC-to-AC Converters</li> </ul>		Final Exam		
7,8			<ul><li>(Inverters)</li><li>DC-to-DC Converters</li><li>(Coppers)</li></ul>				
9,10			<ul> <li>AC-to-AC Converters</li> </ul>				
11,12			(Cycloconverters)				
11- Course Evaluation							
Student Activitie	s 15%, N	Iid exam $15\%$	, lab 10%, Final exam60%.				

12- Learning and Teaching Resources	
Required textbooks (curricular books, if any)	<ul> <li>Muhammad H. Rashid, Narendra Kumar, Ashish R. Kulkarni, Power Electronics Devices, Circuits, and Applications, Fourth Editionm Pearson Education Limited 2014.</li> <li>V. Kumar, Ranjan K. Beheram, D. Joshi, R, Bansal, Power Electronics, Drives, and Advanced Applications, Taylor &amp; Francis Group, LLC, 2020.</li> </ul>
Main references (sources)	
Recommended books and references (scientific	
journals, reports)	
Electronic References, Websites	

1- Course Nar	ne:
Electric Drives	
2- Course Cod	le:
EMSE402	
3- Semester /	'Year:
4 <sup>th</sup> Year, 2 <sup>nd</sup> Seme	ester
4- Description	n Preparation Date:
2023	
5- Available A	Attendance Forms:
6- Number of	Credit Hours (Total) / Number of Units (Total)
2 Units	
7- Course ad	ministrator's name (mention all, if more than one name)
Name: Jama	al AK. Mohammed
Email:	
8- Course Obj	ectives
Course Objectives	<ul> <li>a. Understanding of control principles used in modern electrical motor drives.</li> <li>b. Understanding of rotating electrical machines and their application, common load used as for electrical maternal.</li> </ul>
	c. be introduced to various types of electric drives (AC and DC drives)

<ul> <li>d. be able to select a particular type of electric drive for a given application</li> <li>e. be able to control position, speed and torque of the drive system using Power Electronics and Control Circuits.</li> </ul>							
Strategy	F	PBL					
10- Course St	ructure	9					
Week	Hours	Required	Unit or subject nam	e	Learning	Evaluation	
		Learning			method	method	
		Outcomes					
1-15		GO1	AC Drives & DC Drives		PBL	Quiz Mid Exam Final Exam	
11- Course	Evalua	tion					
Student Activitie	s 15%, I	Mid exam 15%	, lab 10%, Final exam	60%.			
12- Learning	g and T	Feaching Rea	sources				
Required textboo	ks (curr	icular books, i	• any)	Muhamr Kumar, Electron Applicat Pearson V. Kum Joshi, R Drives, Taylor &	nad H. Ras Ashish R. K iors Devices, ions, Four Education Lir ar, Ranjan K , Bansal, Pov and Advance Francis Grou	<ul> <li>shid, Narendra</li> <li>Kulkarni, Power</li> <li>Circuits, and</li> <li>th Editionm</li> <li>nited 2014.</li> <li>K. Beheram, D.</li> <li>wer Electronics,</li> <li>d Applications,</li> <li>ap, LLC, 2020.</li> </ul>	
Main references	(source	s)					
Recommended	Recommended books and references (scientific						
journals, reports.	)						
Electronic Refere	ences, V	Vebsites					

Signals and Systems

2- Course Code:

EMSE403

3- Semester / Year:

 $4^{\text{th}}$  Year,  $1^{\text{st}}$  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: Manal K. Oudah

Email:

8- Course Ob	ojectives
Course Objectives	1- The objectives of this course are:
-	2- To introduce students to the basic concepts of signals and explore various types of signals.
	3- To explore the concept of a system, systems classification and define linear time invariant (LTI) systems.
	4- To develop students' understanding of time-domain and frequency domain representation of signals.
	5- To analysis of continuous and discrete systems and to provide students with necessary tools and techniques to analyze electrical networks and systems.
6- Teaching a	and Learning Strategies

Strategy	PBL							

### 7– Course Structure

Week	Hours	Required	Unit or subject name	Learning	Evaluation
		Learning		method	method
		Outcomes			
1,2,3 4,5,6		G01	<ul> <li>Introduction to signals, classification of signals, elementary signals, and operations on signals.</li> <li>Classification of systems, interconnection of</li> </ul>	PBL	Quiz Mid Exam Final Exam
			systems, interconnection of systems, examples of		

7,8 9,10 11,12				•	systems. Time Dom Analysis of Systems, Representa systems, In response of Continuou Fourier Tr (CTFT) ar application Definition Fourier tra properties CTFT, par energy the LTI system using CTF	nain of L7 ation npul of a s is Ti ansf ad n, C' , inv unsfc of the plica created orer ns at T	FI n of LTI ise system. me form TFT verse orm, he itions of al's n nalysis		
8- Course E	8– Course Evaluation								
9- Learning	and Tea	<u>10 exai</u> china	m 15%. Resou	, Final urces	exam 70%	•			
Required textbooks (curricular books, if any)			<ul> <li>B. P. Lathi, Signal Processing and Linear Systems, 1st Indian Edition, Oxford University Press, 2006.</li> <li>A. V. Oppenheim and A. S. Willsky, Signals and Systems, Prentice Hall, 2nd ed., 1997.</li> <li>Hwei P. Hsu, Theory and Problems of Signals and Systems, McGraw-Hill, (1995).</li> </ul>						
Main references	(sources)						· /		
Recommended	books	and	refere	ences					
(scientific journal	s, reports	)							
Electronic Refere	ences, We	ebsites							

Signal Processing 2- Course Code:

EMSE404

3- Semester / Year:

# 4<sup>th</sup> Year, 2<sup>nd</sup>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: Manal K. Oudah

Email:

8- Course Objectives							
Course Objective	s 1 2 3 4 5 6	<ol> <li>Introduce the basic concepts and techniques for processing signals and digital signal processing fundamentals</li> <li>Understand the processes of analog-to-digital and digital-to-analog conversion.</li> <li>Apply correlation process to analyzing signal and find the similarity exists between two signals.</li> <li>Represent of discrete-time signals in the frequency domain, using z- transform, discrete Fourier transforms (DFT)</li> <li>Understand the implementation of the DFT in terms of the FFT, as well as some of its applications in signal processing (computation of convolution sums, spectral analysis)</li> <li>provide knowledge of digital filter a.</li> </ol>					
7- Teaching and Learning Strategies							
Strategy	P.	BL					
8- Course St	8- Course Structure						
Week	Hours	Required	Unit or subject name	Learning	Evaluation		

WEEK	nours	Required	onit of subject name	Leanning	Lvaluation
		Learning		method	method
		Outcomes			
1,2 3,4		GO1	<ul> <li>Principles of Power Basic element of Signal Processing</li> <li>Digital Against Analog Signal Processing</li> </ul>	PBL	Quiz Mid Exam Final Exam
5,6			• Sampling, aliasing and the relationship between discrete and continuous signals		

7 8,9 10,11 12 13 14	• • • • •	Convolution and pectral analysis Correlation of Continuous Time Signal Discrete Fourier Gransform (DFT) Fast Fourier Gransform -Transform Digital Filters design echniques		
9- Course Eval	uation			
Student Activities 1	5%, Mid exam 15%, Final e	am 70%.		
10- Learning a	nd Teaching Resources			
Required textbooks	(curricular books, if any)	<ol> <li>L. Stankovi c, Digital Signal Processing Basic Theory and Applications, Independent Publishing Platform, Amazon.com Company,2020.</li> <li>Sophocles J. Orfanidis, Introductory to Signal Processing, Prentice Hall, Inc, 2010</li> <li>A. V. Oppenheim and R.W. Schaffer,Discrete Time Signal Processing, PHI, 2009.</li> </ol>		
Main references (so	urces)			
Recommended boo	oks and references (scie	tific		
journals, reports)				
Electronic Reference	es, Websites			

### Microprocessors

# 2- Course Code:

EMSE405

3- Semester / Year:

4<sup>th</sup> Year, 1<sup>st</sup> Semester

4- Description Preparation Date:

2023

5- Available Attendance Forms:

6- Number	of Cred	lit Hours (T	otal) / Number of Units (T	otal)	
3 Units		nt 110015 (1	our) / munifier of Onits (1	otar)	
7- Course administrator's name (mention all, if more than one name)					
Email:	alali K. I	viannood			
8- Course	Objectiv	ves			
Course Objective	s 1	- program ar	nd debug in assembly language		
	2.	- understand	the basic computer architecture		
		<ul> <li>understand</li> <li>perform initial</li> </ul>	the memory organization and me	mory interfac	cing
	5	<ul> <li>performing</li> <li>understand</li> </ul>	the hardware and software interr	upts and their	applications.
6-Teachin	g and L	earning Stra	ategies		
Strategy	P	BL			
	truoturo				
/- Course Si	Hours	Poquirod	Unit or subject name	Loorning	Evaluation
Week	HOUIS	Learning	Onit of Subject name	method	Evaluation
		Outcomes		method	method
12		GO1	Introduction to	PRL	Ουίz
1,4		dor	Microprocessor and	I DL	Mid Exam
			An Overview of 8086 Microprocessor		Final Exam
3,4			• Architecture of 8086		
F C			<ul> <li>Microprocessor</li> <li>Register Organization</li> </ul>		
ס,כ 7			of 8086		
8			<ul><li>Memory Segmentation</li><li>Brief idea of machine</li></ul>		
			and assembly		
			<ul> <li>8086 Instruction Set</li> </ul>		
9			and Assembly		
10			Programming		
11			<ul> <li>Addressing Modes</li> <li>Data transfer</li> </ul>		
			• Data transfer Instructions: MOV,		
12			JMP		
12			Annihieuc and Logic     Instructions		
12			PUSH/POP Instruction with Stack		
			instruction with Stack		
8-Course Evaluation					
--	---	--	--	--	--
Student Activities 15%, Mid exam 15%, lab 10%, Fin	nal exam60%.				
9-Learning and Teaching Resources					
Required textbooks (curricular books, if any)	Microcomputer Systems: The 8086 / 8088 Family - Architecture, Programming and Design, Second Edition, By Yu-Cheng Liu, Glenn A. Gibson, Prentice Hall of India, 2011.				
Main references (sources)					
Recommended books and references (scientific					
journals, reports)					
Electronic References, Websites					

Microcontrollers

2- Course Code:

EMSE406

3- Semester / Year:

4<sup>th</sup> Year, 2<sup>nd</sup>Semester

4- Description Preparation Date:

2023

5- Available Attendance Forms:

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: Rafah K. Mahmood

Email:

### 8- Course Objectives

Course Objectives	1- understand the basic computer architecture
	2- understand the memory organization and memory interfacing
	3- perform input/output device programming in assembly
	4- understand the hardware and software interrupts and their
	applications.
	a.

5-Teaching and Learning Strategies

Strategy	P	BL				
6- Course St	ructure					
Week	Hours	Required Learning Outcomes	Unit or subj	ect name	Learning method	Evaluation method
1		GO3	Introc Micro Overv Micro      Archi	luction to processor and an riew of 8086 processor tecture of 8086	PBL	Quiz Mid Exam Final Exam
3			Micro Regis of 808 Memo Brief	processor ter Organization 36 ory Segmentation idea of machine		
5 6,7			and as langu • 8086 and A Langu	ssembly ages Instruction Set ssembly age		
8,9 10			Progr • Addre • Data t Instru	amming essing Modes transfer ctions: MOV,		
11			Arithi     Instru	netic and Logic ctions		
12			FOSF     Instru     Solve     Povia	ction with Stack d examples		
13 14			exami	nation		
7-Course Ev	aluatio	า				
Student Activitie	<u>s 15%, N</u> and Tea	lid exam 15%	, lab 10%, Fir	nal exam60%.		
Required textbooks (curricular books, if any)			Microcomputer S Family - Archited Design, Second H Glenn A. Gibson 2011.	Systems: The cture, Progran Edition, By Y , Prentice Ha	8086 / 8088 nming and u-Cheng Liu, ll of India,	
Main references	Main references (sources)					
Recommended journals, reports.	books a )	nd reference	es (scientific			
Electronic Refere	, ences, W	ebsites				

Automation and Control

2- Course Code:

EMSE407

3- Semester / Year:

 $4^{\text{th}}$  Year,  $1^{\text{st}}$  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: WisamEssmat Abdul-Lateef Email:

8- Course Ol	bjectives
Course Objectives	Automation Systems Introduction.
	Basic Components of Automation Systems.
	Control technology of Automation Systems.
	Advantages and Disadvantages of Automation Systems.
	Advanced Automation Systems Functions.
	Automation Pyramids Systems.
	Distributed Control System (DCS)
	Programmable logic controllers (PLC)
	Supervisory control and data acquisition (SCADA)
	Applications of Automation Systems.
	Industrial Automation: How it Works, Types, and Benefits.
	Industrial technological complexes with the Automation Systems.
	Layouts of technological complexes with Automation Systems.
	Management of technological complexes.
	Stages of designing technological complexes.
	Features of Automated systems in Industrial technological complexes.
	Socio-economic efficiency of use the Automation Systems.
	Control systems Introduction.
	Fundamentals Control of systems.
	Advanced techniques of Control Systems.
	Observer ability and Controllability in control system
	• PID Controller.
	Ziegler–Nichols method Tuning PID Controller.
	Intelligent Control Systems.
	Artificial Intelligence.
	Machine Learning.
	Artificial Neural Network.
	Neural Network topology and Classifications.

<ul> <li>Fuzzy Logic Controller.</li> <li>Structure of Fuzzy Logic Controller.</li> <li>Genetic Algorithm.</li> <li>Particle swarm optimization (PSO).</li> </ul>						
9- Teachin	g and L	earning Stra	ategies			
Strategy PBL						
10- Course St	ructure					
Week	Hours	Required	Unit or subj	ect name	Learning	Evaluation
		Learning			method	method
		Outcomes				
1,2,3		G01	Autor Basic applic	nation Systems: , Theories and ations.	PBL	Quiz Mid Exam
4,5,6			Classifications, Advantages and     Final Exa			
7,8			Disad Autor • Theor	vantages of nation Systems. ies of Advanced		
9,10			Contr	ol systems.		
11,			• Theor Intelli	ies of Artificial gence.		
12			• Theor Learn	ies of Machine ing.		
11- Course	Evaluati	on				
Student Activitie	s 15%, N	lid exam 15%	, Final exam	70%.		
12- Learning	g and Te	eaching Res	sources			
Required textbooks (curricular books, if any)       1- Bruno Siciliano, Lorenzo Sciavicco, Luig         Villani and Giuseppe Oriol, Robotics Modelling         Planning and Control, 2009.         2- Nestor Eduardo Nava Rodríguez, Edition P         Advanced Mechanics in Robotic Systems, 2010.         3- Thomas R. Kurfess, Robotics and Automation         Handbook, 2005.					Sciavicco, Luigi botics Modelling, íguez, Edition 1, Systems, 2010. and Automation	
Main references (sources)						
Recommended books and references (scientific						
journals, reports.	)					
Electronic Refere	ences, We	ebsites				

Robotic Systems

2- Course Code:

EMSE408

3- Semester / Year:

4<sup>th</sup> Year, 2<sup>nd</sup>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: WisamEssmat Abdul-Lateef Email:

8-	Course	Obje	ectives
----	--------	------	---------

Course Objective	s i	1- Introduction	ns and Definitions of Robotic Syst	tems.		
		2- Advantage ar	nd disadvantage of Robotic Systems.			
3- Robot Systems Classification.						
4- Robotic Systems Applications.						
		5- Robotic Syste	ems Structure.			
	(	5- Anatomy of I	Robot.			
		7- Robot Link.				
		8- Robot Joint.				
		9- Robot Actual	tors.			
		10- Robot Sensor	rs. n Analysis			
		12- Robot Forwa	rd Kinematic			
		12 Robot I of wa	Kinematic			
		14- Dynamic of I	Robot.			
		15- Trajectory Co	ontrol of Robotic Systems.			
		16- Robot Trajec	tory Introduction and Classifications			
		17- Requirement	s of a trajectory.			
		18- Path Control.				
		19- Trajectory G	eneration Planning.			
		20- Method of Ci	ubic Polynomial Trajectories.			
		21- Robotic Syste	ems Control.			
		22- KODOLIC Syste				
23- Te	eaching	g and Learni	ng Strategies			
Strategy	F	BL				
24- Course St	24- Course Structure					
Week	Hours	Iours Required Unit or subject name Learning Evaluation				
		Learning method method				
	Inetiou Inetiou				methou	
		Outcomes				
1,2,3		G07	Robotic Systems:	PBL	Quiz	

4,5,6 7,8 9,10 11,12		<ul> <li>Basic applic</li> <li>Classi Advar Disad Robot</li> <li>Analy Motic</li> <li>Trajec planni</li> <li>Theor System</li> </ul>	, Theories and cations. ifications, ntages and vantages of tic Systems. vsis of Robot on. ctory and path ing of Robot. ries of Robotic ms Control.		Mid Exam Final Exam
25- Course E	valuation	Einal avom (	700/		
Student Activities	15%, Mid exam 15%,	, Final exam	/0%.		
26- Learning	and Teaching Res	sources			
Required textbooks (curricular books, if any)		<ol> <li>Bruno Sicilian Villani and Giusej Planning and Cont</li> <li>Nestor Eduar Advanced Mechan</li> <li>Thomas R. Kur Handbook, 2005.</li> <li>Edited by Claro Systems Devices, Monitoring, 2008.</li> </ol>	no, Lorenzo ppe Oriol, Rol rol, 2009. do Nava Ro ics in Robotic rfess, Robotics ence W. de Si Design, Contro	Sciavicco, Luigi botics Modelling, dríguez, Editorl, Systems, 2010. and Automation ilva, Mechatronic ol, Operation and	
Main references (s	sources)				
Recommended be	ooks and references	s (scientific			
journals, reports	)	·			
Electronic Referen	ces, Websites				

Ethics in Engineering

2- Course Code:

EMSE409

3- Semester / Year:

 $4^{\text{th}}$  Year,  $2^{\text{nd}}\text{Semester}$ 

4- Description Preparation Date:

2023

5- Available Attendance Forms:

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

2 Units

7- Course	7- Course administrator's name (mention all, if more than one name)					
Email:		. 11055011				
8- Course	Objectiv	ves				
8- Course Objectives The goal of this course in engineering ethics is to sensitize student to important ethical issues before you have to confront them. Student will study important cases from the past so that student will know what situations other engineers have faced and will know what to do when similar situations arise in your professional career. Finally, student will learn techniques for analyzing and resolving ethical problems when they arise.						
9- Teachin	g and L	earning Stra	ategies			
Strategy	P	BL				
10- Course St	ructure					
Week	Hours	Required Learning	Unit or subj	ect name	Learning method	Evaluation method
4.0		Outcomes	lutur d		DDI	
1,2 3,4 5 6 7,8 9,10 11 12 13 14		GO5Introduction, Professionalism and codes of ethics, Understanding ethical problems, Ethical problem solving techniques, Risk, safety and accidents and the rights and responsibilities of engineersPBL Quiz Mid Exam Final Exam				
11 000000	Evolue*					
11- Course Student Activitie		UII [id exam 15%	Final exam 3	70%		
12- Learning	g and Te	eaching Res	sources			
Required textbooks (curricular books, if any) Bengineering ethics, Fourth edition, Charles B.Fleddermann, University of						

	New Mexico.
Main references (sources)	
Recommended books and references (scientific	
journals, reports)	
Electronic References, Websites	

Air Conditioning and Refrigeration Systems

2- Course Code:

EMSE410

3- Semester / Year:

 $4^{\text{th}}$  Year,  $1^{\text{st}}$  Semester

4- Description Preparation Date:

2023

5- Available Attendance Forms:

### 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: Adnan GhareebTuaamah Al-Hasnawi Email:

### 8- Course Objectives

Course Objectives	1-	Introduction to air-conditioning and Refrigeration - Thermodynamics
		properties of moist air
	2-	Psychometric Processes- Cooling, Heating, humidification and dehumidification processes
	3-	Air conditioning process /summer- Air conditioning process /winter-Thermal comfort and design conditions
	4-	Cooling load calculation /wall and roofs- Cooling load calculation/windows- Cooling load /Ventilation, infiltration, lighting and occupancies- Heating load calculation- Application on cooling and heating load
	5-	Ducting Design : procedure and methods- Equal pressure drop method-Types of fan , piping and fitting a.
6- Teaching a	and Le	arning Strategies

Strategy	PI	BL				
7- Course S	tructure					
Week	Hours	Required Learning Outcomes	Unit or subj	ect name	Learning method	Evaluation method
1,2,3 4,5,6 7,8 9,10 11,12		GO1	<ul> <li>Review funda condir refrigue</li> <li>Psych Proce</li> <li>Air co proce</li> <li>Therm</li> <li>Desigue condire</li> </ul>	w of mentals: air- tioning and eration ometric sses nditioning ss nal loads n of Air- tioning ducts	PBL	Quiz Mid Exam Final Exam
8- Course E Student Activitie 9- Learning	valuation <u>s 15%, M</u> and Tea	n Iid exam 15% Iching Reso	, lab 10%, Fir	al exam 60%.		
Required textboo	oks (currio	cular books, it	f any)	<ul> <li>Stoecker Conditior</li> <li>Ramgopa Conditior Indian Kharagpu</li> <li>Khalid A Conditior Engineeri 1998</li> </ul>	W. F. "Refrig ing" 2nd Ed., M l M. "Refrig ing", Departm Institute co r, India 2012 A. Al-Joodey, " ing and ng College,	geration and Air- AcGraw-hill,1982 eration and Air- nent Engineering of Technology Principle of Air- Refrigeration", Basra University,
Main references	(sources)	)				
Recommended	books a	nd reference	es (scientific			
journals, reports.	)					
Electronic Refere	ences, W	ebsites				

### Computer-Aided Design and Manufacturing

2- Course Code:

EMSE411

3- Semester / Year:

4<sup>th</sup> Year, 2<sup>nd</sup> Semester

4- Description Preparation Date:

2023

5- Available Attendance Forms:

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: Bassam Ali Ahmed

Email:

0 Course Object	tivoo
o- course objec	50.000
Course Objectives	1- Definitions, Benefits of CAD/CAM, General Design Process, Product
	Cycle by CAD/CAM, steps for Production of Mechanical Element, steps
	for Production of Mechanical Mechanism, steps for Creating the
	Geometric Model, Requirements of The Geometric Modeling, Function of
	the Geometric Model, Wireframe Modeling, Surface Modeling, Solid
	Modeling, Boundary Representation, Constructive Solid Geometry, and
	the Boolean Operations.
	2- Types of Transformations, Basic Modeling Transformations, Translation,
	Scaling, Reflection or Mirror, Rotating, 2-D Rotating About an Arbitrary
	Point, Reflection About an Arbitrary Axis, Three-Dimensional
	Cohen-Sutherland clipping algorithm of 2-D
	3- Types of Finite Element Spring as a Finite Element and Bar as a Finite
	Element
	4- Manufacturing Production Cycle, Processing operation, Assembly
	operation, Material handling and storage, Control, Method of workpiece
	Transport, Continuous transfer mechanism, Intermitted transfer
	mechanism, Type of Transfer Mechanism, Geneva mechanism (Indexing
	table), Materials Transport Equipment, and Building Blocks of
	5- Basic Component of an (NC) System Classification of Numerical
	Control. Motion Control of (NC) System, Mathematics for programming
	coordinate system, and Positioning Systems
	6- Automatic Tool Changer, Coordinate Systems, an Introduction to Part
	Programming, Preparatory functions, G-code, and Miscellaneous function
7- Teaching and	Learning Strategies

Strategy	PI	PBL				
8- Course Si	liuciure	Dec. ind	11.11.11.1.1.1.1			
VVEEK	Hours	Required	Unit or Subj	ect name	Learning	Evaluation
		Learning			metnoa	method
		Outcomes				
1,2,3		GO2	Introc     Geom	luction & etric Modelling	PBL	Quiz Mid Errore
156			• Geom	etrical		MIG Exam
4,5,0			Trans • Finite	formations Flement		
7,8			Metho	od		
9,10			Manu     Fund	facturing		
11,12			Nume	erical Control		
13,14			CNC     Drogr	Machines Parts		
			riogi	amming		
9- Course Evaluation						
Student Activitie	s 15%, M	lid exam 15%	, Final exam '	70%.		
10- Learning	g and Te	eaching Re	sources			
Required textbooks (curricular books, if any)			1- Rao, CAD/CAM Principles and Applications, McGraw-Hill, New Delhi,			
			2010. 2- Chang Richard and Wang Computer			
		Aided Manufacturing, Pearson Hill, 2006.				
		3- S. Vishal, Computer Aided				
		4- Goyal, Fundamental of Computer-				
			Aided Design, Katson, Delhi, 2013.			
Main references (sources)						
Recommended books and references (scientific						
journals, reports)						
Electronic Refere	ences, We	ebsites				

Electromechanical Systems and Devices

2- Course Code:

EMSE412

3- Semester / Year:

$4^{\text{th}}$	Year,	$1^{st}$	Semester
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4- Description Preparation Date:

2023

5- Available Attendance Forms:

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 J. Mohammed

Email:

8- Course Objectives

-	
Course Objectives	1- To know the fundamental of Mechanical Components.
-	2- To know the fundamental of Electrical Components
	3- To convert between mechanical and electrical Components
	4- To find the final transfer function of hydraulic systems
	5- To study the signal conditioning device
	6- To explain the electromechanical sensors and actuators
	7- To control the system using microcontrollers
8- Teaching a	nd Learning Strategies
Strategy	PBL

### 9- 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	<ul> <li>Convert between Mechanical and Electrical Components</li> <li>Analysis the hydraulic systems</li> <li>Study the signal conditioning chip</li> <li>Electrotechnical sensors</li> <li>Electromechanical Actuators</li> <li>Microcontroller Boards</li> </ul>	PBL	Quiz Mid Exam Final Exam
10- Course Evaluation					
Student Activities 15%, Mid exam 15%, lab 10%, Final exam 60%.					

11- Learning and Teaching Resources			
Required textbooks (curricular books, if any)	Raven, Francis H Automatic control engineering McGraw Hill, Inc 1995. Ogata, Katsuhiko "Modern control engineering Book Reviews 1999.		
Main references (sources)			
Recommended books and references (scientific			
journals, reports)			
Electronic References, Websites			