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

Energy and Renewable Energies Program, Academic Program Course Description

2024

Introduction:

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

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

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

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

Concepts and terminology:

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

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

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

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

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

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (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.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are

followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name: University of Technology
Faculty/Institute: Electromechanical Eng. Dept.
Scientific Department: Energy and Renewable Energies Engineering
Academic or Professional Program Name: Energy and Renewable Energies Engineering
Final Certificate Name: Electromechanical Eng./Energy and Renewable Energies Engineering
Academic System: Engineering
Description Preparation Date: 5/2/2024
File Completion Date: 6/2/2024

Signature:	**Signature:**
Head of Department Name:	**Scientific Associate Name:**
Date:	**Date:**

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

Approval of the Dean

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 (Energy and Renewable Energies) Mission

1- Prepare our students for successful careers in the energy and renewable energies profession,
2- Conduct high quality and innovative research, and
3- Serve the community and industry providing educational and research resources.

5. Program Accreditation

The program has accreditation in 2021−2022 from Iraqi Council Accreditation Engineering Education (ICAEE).

6. Other external influences

There is no sponsor for the program

7. Program Structure

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

* This can include notes whether th–e course is basic or optional.

8. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
2024			theoretical	practical
1st Year, 1st Semester	WOSH101	Workshops I	-	2
1st Year, 1st Semester	EME102	English Language I	2	-
1st Year, 1st Semester	EME104	Sport	2	-
1st Year, 1st Semester	EME105	Mathematics I	4	-
1st Year, 1st Semester	EME107	Physics I	4	-
1st Year, 1st Semester	EMEE110	Engineering Mechanics I	2	1
1st Year, 1st Semester	EMEE112	Fundamentals of AutoCAD tools Drawing	-	1
1st Year, 1st Semester	EME114	Technical Report	2	-
1st Year, 2nd Semester	EME103	Computer Science I	1	1
1st Year, 2nd Semester	WOSH105	Workshops II	-	2
1st Year, 2nd Semester	EME106	Mathematics II	4	-
1st Year, 2nd Semester	EME108	Physics II	4	-
1st Year, 2nd Semester	EMEE109	Fundamentals of Electrical Engineering (AC + DC)	1	1
1st Year, 2nd Semester	EMEE111	Engineering Mechanics II	2	1

1st Year, 2nd Semester	EMEE113	Fundamentals of Engineering Drawing using AutoCAD	–	1
2nd Year, 1st Semester	EME202	Human Rights	2	–
2nd Year, 1st Semester	EME203	Advanced Mathematics I	4	–
2nd Year, 1st Semester	EME205	Computer Science II	1	1
2nd Year, 1st Semester	EMEE207	Electrical Machines (DC)	1	1
2nd Year, 1st Semester	EMEE208	Thermodynamics	1	1
2nd Year, 1st Semester	EMEE210	Electronic Circuits I	1	1
2nd Year, 1st Semester	EMEE213	Measurement & Instrument	1	1
2nd Year, 2nd Semester	EME201	English Language II	2	–
2nd Year, 2nd Semester	EME204	Advanced Mathematics II	4	–
2nd Year, 2nd Semester	EMEE206	Electrical Machines (AC)	1	1
2nd Year, 2nd Semester	EMEE209	Fluid Mechanics	1	1
2nd Year, 2nd Semester	EMEE211	Electrical Circuits II	1	1
2nd Year, 2nd Semester	EMEE212	Strength of Materials	1	1
2nd Year, 2nd Semester	EME214	Probability and Statistics	2	–
3rd Year, 1st Semester	EME301	Numerical Analysis	4	–
3rd Year, 1st Semester	EMEE304	Application of Advance Computer	2	1
3rd Year, 1st Semester	EMEE309	Internal Combustion Engines and Pollution	2	1
3rd Year, 1st Semester	EMEE308	Heat Transfer	2	1
3rd Year, 1st Semester	EMEE310	Digital Electronics	2	1
3rd Year, 1st Semester	EMEE312	Renewable Energy Resources I	2	1
3rd Year, 1st Semester	EMEE 315	Vibration and Noise	1	1
3rd Year, 2nd Semester	EME302	Engineering Analysis	4	–
3rd Year, 2nd Semester	EMEE311	Computer systems	2	1
3rd Year, 2nd Semester	EMEE305	Industrial & Management Engineering	2	–
3rd Year, 2nd Semester	EMEE306	Control Theory	2	1
3rd Year, 2nd Semester	EMEE307	Power Systems	2	1
3rd Year, 2nd Semester	EMEE313	Renewable Energy Resources II	2	1
3rd Year, 2nd Semester	EMEE314	Fluid Machinery	2	1
4th Year, 1st Semester	EME401	Ethics	2	–
4th Year, 1st Semester	EMEE408	Communications	3	–
4th Year, 1st Semester	EMEE411	Steam Power Plants	2	-
4th Year, 1st Semester	EMEE410	Design of Renewable systems I	2	1
4th Year, 1st Semester	EMEE404	Power Electronics	2	1

4th Year, 1st Semester	EMEE403	Power System Analysis	2	1
4th Year, 1st Semester	EMEE402	Project	-	4
4th Year, 2nd Semester	EMEE407	Nuclear Power Plants	2	-
4th Year, 2nd Semester	EMEE412	Gas Power Plants	2	-
4th Year, 2nd Semester	EMEE406	Energy Efficiency	2	-
4th Year, 2nd Semester	EMEE413	Design of Renewable systems I	2	1
4th Year, 2nd Semester	EMEE405	Electrical Motor Drives	2	1
4th Year, 2nd Semester	EMEE414	Underground Grid	2	-
4th Year, 2nd Semester	EMEE409	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 (6)	Mechanical Eng.	thermal	–	–	–	–
Professor (1)	Mechanical Eng.	applied	–	–	–	–

Prof. Assistance (11)	Mechanical Eng.	thermal	–	–	–	–
Prof. Assistance (1)	Mechanical Eng.	applied	–	–		–
Lecturer (2)	Mechanical Eng.	thermal		–	–	–
Prof. assistance (7)	Electrical Engineering	power	–	–	–	–
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).

9- 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

The initiative of the program came as a result of power plant requirements for engineers who can serve as mechanical and electrical workers together. Similar trend was observed globally in power plants. The program source information based on energy and renewable energies field. Many international programs were recently created related to energy and renewable energies. Our program intends to cover all requirements in energy sectors, including gas, steam, renewable energies (solar, wind and others), nuclear, water power plants. 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 Electricity Ministry, the information were adopted with Iraqi power plants requirements.

15. Program Development Plan

The field of energy and renewable energies is developing with time globally, so some program courses were changed every four years. Four mechanical courses related to renewable energies were added in third and fourth years when the program changed its name from energy to energy and renewable energies. For electrical courses, two new courses were added in the fourth year last years. The contents of the courses reviewed by advisory board every meeting and updated with requirements of Iraqi power plants.

Program Skills Outline											
				Required program Learning outcomes							
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills		Ethics	
				GO1	GO2	GO3	GO6	GO4	GO7	GO5	
1st Year	EME105	Mathematics I		*							
	EME106	Mathematics II		*							
	EME107	Physics I							*		
	EME108	Physics II							*		
	EMEE109	Fundamental of Electrical Engineering		*							
	EMEE110	Engineering Mechanics I					*				
	EMEE111	Engineering Mechanics II		*							
	EMEE113	Fundamental of Auto CAD					*				
2nd Year	EME203	Advanced Mathematics I		*							
	EME205	Advanced Mathematics II					*				

	EMEE206	Electrical Machines (AC)		*						
	EMEE207	Electrical Machines (DC)		*						
	EMEE209	Fluid Mechanics		*						
	EMEE210	Electronic Circuits				*				
	EMEE211	Electrical Circuits				*				
	EMEE212	Strength of Materials			*					
	EME201	English Language I						*		
3rd Year	EME301	Numerical Analysis		*						
	EME302	Engineering Analysis		*						
	EMEE304	Application of Advance Computer					*			
	EMEE306	Control Systems		*						
	EMEE307	Power Systems		*						
	EMEE308	Heat Transfer		*						
	EMEE309	Combustion and Air Pollution		*						
	EMEE311	Computer System					*			
	EMEE312	Renewable Energy I		*						
	EMEE313	Renewable Energy II		*						

	EMEE314	Fluid Machinery		*	*					
4th Year	EME401	Ethics in Engineering								*
	EMEE402	Project I						*	*	
	EMEE403	Power System Analysis				*				
	EMEE404	Power Electronics		*						
	EMEE405			*						
	EMEE406	Energy Efficiency		*	*					
	EMEE407	Nuclear Power Plant		*						
	EMEE409	Project II						*	*	
	EMEE410	Design of Renewable Energy I			*					
	EMEE412	Gas Power Plant		*						
	EMEE413	Design of Renewable Energy II			*					
	EMEE414	Electrical Drives				*				

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

Course Description Forms

Second Year

1. Course Name:
advanced engineering mathematics II
2. Course Code:
EME204
3. Semester / Year:
2nd Year, 2nd Semester
4. Description Preparation Date:
2023
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total)
4 Units
7. Course administrator's name (mention all, if more than one name)
Name: Mahmoud M. Mahdi Email: Mahmoud M. Mahd@uotechnology.edu.iq
8. Course Objectives

Course Objectives	• Vectors • Laplace Transforms • Inverse Laplace Transforms • Fourier Series • Power Series

9. Teaching and Learning Strategies	
Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2 3,4 5,6 7,8 9,10		GO1	• Vectors • Laplace Transforms • Inverse Laplace Transforms • Fourier Series • Power Series	PBL	Quizzes, Mid Exam, Final Exam

11. Course Evaluation	
Mid exam 15%, student activities 15%, final exam 70%.	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	• Advanced Engineering Mathematics. K.A. Stroud,2003 • Advanced Engineering Mathematics, H.K. DASS. 2009
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

1. Course Name:					
Electronic circuit					
2. Course Code:					
EMEE210					
3. Semester / Year:					
2nd Year, 1st 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: Sahar R. Al- Sakini, Ghassan Abdul-Hussein Bilal Email: Sahar R. @uotechnology.edu.iq					
8. Course Objectives					
Course Objectives	• Fundamentals of (BJT) circuits. • Fundamentals of (FET) circuits. • Biasing of (BJT) amplifier circuits. • Study power amplifiers (class A, class B, class C)				
9. Teaching and Learning Strategies					
Strategy	PBL				
10. Course Structure					
Week	**Hours**	**Required**	**Unit or subject name**	**Learning**	**Evaluation**

		Learning Outcomes		method	method
1,2 3,4,5 6,7,8 9,10,1		GO3	• Introduction to (BJT) and (FET) circuits. • Simplified structure a mode of operation for transistor. • The type of connection of transistor circuits-characteristic curve and load line. • Study of power amplifier (class A, class B, class C)	PBL	Report, Quiz, Mid Exam, Final Exam

11. Course Evaluation	
Mid exam 15%, student activities 15%, 10% lab, final exam 60%.	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Electronic Devices, Thomas L. Floyd, 10th Edition, 2018
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

1. Course Name:
Electrical Circuit II
2. Course Code:
EMEE211
3. Semester / Year:
2nd Year, 2nd 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: Sahar R. Al- Sakini, Ghassan Abdul-Hussein Bilal Email: Sahar R. @uotechnology.edu.iq

8. Course Objectives

Course Objectives	• Study the natural and step response of first and second order (RL, RC, RLC) circuits. • Study balanced three- phase circuits.

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2,3,4 5,6,7,8 9,10,11		GO3	• Analysis the (RL),(RC),(RLC) circuits. • Analysis balanced the 3-phase voltages. • Study WYE-WYE connection.	PBL	Report, Quiz, Mid Exam, Final Exam

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Basic AC circuits, John Clayton Rawlins.2nd Edition, 2000.
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

1. Course Name:
Computer Science II
2. Course Code:
EME205
3. Semester / Year:
2nd , 1st Semester
4. Description Preparation Date:
2023
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total)

2 units

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

Name: Ameer A. Jaddoa
Email: Ameer.A.Jaddoa@uotechnology.edu.iq

8. Course Objectives

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

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

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

11. Course Evaluation

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

12. Learning and Teaching Resources

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

1. Course Name:

advanced engineering mathematics I

2. Course Code:

EME203

3. Semester / Year:

2nd , 1st Semester

4. Description Preparation Date:

2023

5. Available Attendance Forms:

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

4 units

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

Name: Raed Abbas Jessam
Email: Raed Abbas @uotechnology.edu.iq

8. Course Objectives

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

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

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

9,10 11,12			ODE. • Application of vectors.		

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

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

1. Course Name:
Measurements & Devices
2. Course Code:
EMEE213
3. Semester / Year:
2nd Year, 1st 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: Zainab B. Abdulla, Hashmia S. Dakheel Email: Zainab B. @uotechnology.edu.iq
8. Course Objectives

Course Objectives	• Understand different errors in measurements and their rectification. • Understand the basic working of instruments used in measurements. • Analyze different measurements techniques and understand difference between them

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2 3,4 5,6 7,8 9,10 11 12 13 14		GO1	• Introduction to measurements, Measuring units and standards. • Measurement errors and their analysis. • Analog measuring instruments. • Electronic measuring instruments. • Bridges and their applications. • Transducers. • Cathode ray oscilloscope. • Signal analysis, Signal analyzers. • Digital instruments.	PBL	Quiz, Mid Exam, Final Exam

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Albert D. Helfrick & William D. Cooper," Modern electronic instrumentation and measurement techniques", PRENTIC-HALL, INC.1990 • A. K. Sawhney," A course in Electrical and electronic measurements and Instrumentation", Dhanapat Rai & Sons, 1985 • Uday Bakshi, Ajay Bakshi," Electronic measurement and instrumentation", Technical Publication Pune, First Edition, 2008
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

1. Course Name:

AC Electrical Machines

2. Course Code:
EMEE206
3. Semester / Year:
2nd Year, 2nd 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: Zainab B. Abdulla, Hashmia S. Dakheel Email: : Zainab B. @uotechnology.edu.iq
8. Course Objectives

Course Objectives	• The construction and the principle operating of single phase transformer. • The equivalent circuit of the single phase transformer. • Calculation the efficiency of transformer. • Construction of three-phase induction motor. • Principle operating of three-phase induction motor. • Equivalent circuit of three-phase induction motor. • Calculation the efficiency of three-phase induction motor. • Method of control the speed of three-phase induction motor.

9. Teaching and Learning Strategies	
Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7		GO1	• Single phase transformer construction. • Single phase transformer operating principle. • Single phase transformer (Equivalent circuit, voltage regulation, efficiency). • Three-phase transformer construction. • Windings connections of three-phase transformer. • Three-phase induction motor construction and types. • Torque equation of three-phase induction motor.	PBL	Quiz, Mid Exam, Final Exam

8 9			• Equivalent circuit of three-phase induction motor. • Speed control of three-phase induction motor.		

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• P. C. Sen, "Principles of electric machines and power electronics", John Willy and Sons Inc., 1997. • S. J. Chapman, "Electric machinery fundamentals", Mc. Graw Hill, 4th Edition, 2012.
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

1. Course Name:

Thermodynamic

2. Course Code:

EMEE208

3. Semester / Year:

2nd Year, 1st 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: Amged Al Ezzi
Email: Amged Al Ezzi @uotechnology.edu.iq

8. Course Objectives

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

	idea gas processes, cycles, steam, enthalpy, and entropy. •

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

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

11. Course Evaluation

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

12. Learning and Teaching Resources

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

1. Course Name:

Fluid Mechanics

2. Course Code:

EMEE209

3. Semester / Year:

2nd Year, 2nd 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: Ibtisam A. Hassan
Email: Ibtisam A. Hassan @uotechnology.edu.iq

8. Course Objectives

Course Objectives	Students will learn how to apply the value of properties of the fluid and the forces in continuity and energy and momentum equation. Also analysis the boundary layer.

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10		GO1	1. Fluid properties 2. Measurement of pressure 3. Hydrostatics thrusts on submerged surfaces 4. Flow classification 5. Acceleration analysis 6. Applications of Bernoullis Equations 7. Momentum Equation and its applications 8. Laminar and Turbulent flow in pipes 9. Pressure heat losses in pipes and fittings 10. Boundary layer	PBL	Quiz, Mid Exam, Final Exam

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Fluid Mechanics, Victor. Streeter& E. Benjamin Wylie, 6th Ed., McGraw-Hill, 1975
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-

Electronic References, Websites	-

1. Course Name:
Strength of Materials
2. Course Code:
EMEE212
3. Semester / Year:
2nd Year, 2nd 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: Muhannad Zaidan Khalifa Email: Muhannad Zaidan Khalifa @uotechnology.edu.iq
8. Course Objectives

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

9. Teaching and Learning Strategies	
Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3		GO2	• Simple stress and strain • Shearing force and bending moment diagrams • Bending Theory of the beam	PBL	Quiz, Mid Exam, Final Exam

4 5 6 7 8 9 10			• Deflection of beams • Torsion Theory for Circle Shaft. • Free vibration of single degree of freedom system • Forced vibration of single degree of freedom system • Free vibration with damping • Forced vibration two degree of freedom • Forced vibration with damping		

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

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

1. Course Name:
Probability and Statistics
2. Course Code:
EME214
3. Semester / Year:
2nd Year, 2nd 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: Akram Hamzah Abed

Email: Akram Hamzah Abed @uotechnology.edu.iq

8. Course Objectives

Course Objectives	The course teaches students the basic concepts of statistics and the logic of statistical reasoning.

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2 3,4 5 6,7 8,9 10,11		GO1	1. Introduction to probability 2. Random experiment, Sample Spaces, Events, Probability 3. Random variables and probability distributions 4. Mathematical expectation and variance 5. Engineering Statistic 6. Skewness & Kurtosis Measures	PBL	Quiz, Mid Exam, Final Exam

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Kim, Bong Sun, Sang Gyu Park, Young Kwan You, and Soo Il Jung. "Probability & statistics for engineers & scientists." (2011). 2- Montgomery, Douglas C., and George C. Runger. Applied statistics and probability for engineers. John wiley & sons, 2010.
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

1. Course Name:

DC Electrical Machines

2. Course Code:

EMEE207

3. Semester / Year:

2nd Year, 1st 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: Ahlam L. Shuraiji

Email: Ahlam L. Shuraiji @uotechnology.edu.iq

8. Course Objectives

Course Objectives	• The basics of the electromagnetic, i.e. I-H relation, B-H relation, and magnetic equivalent circuit. • The configuration and principle operation of DC machines, armature winding, and armature reaction. • Speed control methods of the DC motors. • The construction and the principle operating of single phase transformer. • The equivalent circuit of the single phase transformer.

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10			• Magnetic circuit • Faraday's law • DC machine construction • Classification of DC machine • DC generators • DC generator operation principle • EMF equation of dc generator • Characteristic of DC generator • DC Motors • Torque equation of DC motor • Speed control of DC motor	PBL	Quiz, Mid Exam Final Exam

11. Course Evaluation

Mid exam 15%, student activities 15%, 10% lab, final exam 60%.	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	• P. C. Sen, "Principles of electric machines and power electronics", John Willy and Sons Inc., 1997. • S. J. Chapman, "Electric machinery fundamentals", Mc. Graw Hill, 4th Edition, 2012.
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

Third Year

1. Course Name:	
Industrial Engineering	
2. Course Code:	
EMEE305	
3. Semester / Year:	
3rd Year, 2nd Semester	
4. Description Preparation Date:	
2023	
5. Available Attendance Forms:	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Hadia Kadhim Judran Email: Hadia Kadhim Judran @uotechnology.edu.iq	
8. Course Objectives	
Course Objectives	• How can an Engineer determine the most effective ways for an organization to use the basic factors of production. • How engineering helps organizations grow and expand efficiently during periods of prosperity, and streamline costs and consolidate and reallocate resources during austere times. • Developing performance modeling, measurement, and evaluation for systems. • Developing and maintaining quality standards for industry and business. • Improving overall productivity of integrated systems of people,

	materials, and processes. • Recognizing and incorporate factors affecting performance of a composite system. • Planning, organizing, scheduling, and controlling production and service projects. •

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2 3,4 5 6 7 8 9 10 11 12		GO1	• Introduction to Industrial Eng. (IE). • The production and the productivity • Linear programming (LP) Models • Assignment Model • Transportation Model • Network Models • Sequencing Models • Assembly Line Balancing • Quality Control	PBL	Quiz, Mid exam Final Exam

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Industrial Engineering, Khan. M. I, second Ed., New Age International, publishers, New Delhi, 2008. • Quantitative Methods for Decision Makers, Hejase, J. and Ale, J. Hejase., first Ed., Dar Sader Publishers, Beirut-Lebanon, 2012.
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

1. Course Name:
Digital Electronics
2. Course Code:
EMEE310
3. Semester / Year:
3rd Year, 1st 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: Mohammed Qasim Mohammed Sulttan Email: Mohammed Qasim @uotechnology.edu.iq
8. Course Objectives

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

9. Teaching and Learning Strategies	
Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2 3,4		GO1	• Logic Technology • Logic Gates • Boolean Algebra.	-	-

5,6 7,8 9,10			• De Morgan's Theorem. • Combinational Logic-		

11. Course Evaluation

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

12. Learning and Teaching Resources

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

1. Course Name:

Application of Advanced Computer

2. Course Code:

EMEE304

3. Semester / Year:

3rd Year, 1st 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: Nassr Fadhil Hussein

Email: Nassr Fadhil @uotechnology.edu.iq

8. Course Objectives

Course Objectives	• Introduction to the Microprocessor and Computer • Microcontroller (Arduino) • Family of Arduino • Traffic Light by using Arduino • LED Brightness on a 16x2 LCD • LED Effects • Complete Guide for Ultrasonic Sensor HC-SR04 servo

	motor with Arduino • Arduino with PIR Motion Sensor •

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1,2,3 4,5,6,7 8,9,10,11		GO6	• The possibility of understanding the microprocessors 8086 and their types and characteristics of each type. • Introduction & Basics in order to be apple to read and write simple programs in assemble language. • Possibility to employ the language of C ++ in the microcontrollers programming(Arduino)	PBL	Quiz Report Mid Exam Final Exam

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Oxford University Press, Microprocessors and Microcontrollers. Kumar, N. Senthil, M. Saravanan, and S. Jeevananthan. ., Inc., 2011. • Evans, Brian. Beginning Arduino Programming. Apress, 2011. • McCormick ,INTRODUCTION TO MATLAB FOR ENGINEERING STUDENTS, David Houcque, 2005
Main references (sources)	-
Recommended books and references	-

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

1. Course Name:
Computer System
2. Course Code:
EMEE311
3. Semester / Year:
3rd Year, 2nd Semester
4. Description Preparation Date:
2023
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total)
3 Units
7. Course administrator's name (mention all, if more than one name)
Name: Nassr Fadhil Hussein Email: Nassr Fadhil. @uotechnology.edu.iq
8. Course Objectives

Course Objectives	• MATLAB (Introduction and Basic features) • Basic plotting • Matrix generation • Array operations and Linear equations • Introduction to programming in MATLAB • Control flow and operators

9. Teaching and Learning Strategies	
Strategy	PBL

10. Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1,2,3 4,5,6 7,8,9 10,11			• MATLAB • Plotting • Matrix • Array		

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

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	• Oxford University Press, Microprocessors and Microcontrollers. Kumar, N. Senthil, M. Saravanan, and S. Jeevananthan. ., Inc., 2011. • Evans, Brian. Beginning Arduino Programming. Apress, 2011. • McCormick ,INTRODUCTION TO MATLAB FOR ENGINEERING STUDENTS, David Houcque, 2005
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

1. Course Name:
Control Theories
2. Course Code:
EMEE306
3. Semester / Year:
3rd Year, 2nd Semester
4. Description Preparation Date:
2023
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total)
3 Units
7. Course administrator's name (mention all, if more than one name)
Name: Aseel Jasim Mohammed Email: Aseel Jasim @uotechnology.edu.iq
8. Course Objectives

Course Objectives	• This Course Specification provides the main features of the Theory of Control for the students of 3rd year in Electromechanical Engineering. Learning outcomes which gained by this program will help a typical student to achieve

	and demonstrate the learning opportunities that are provided during the course study and to comply with the program specification as electromechanical systems Engineering. • Enabling student to get the knowledge and understanding of the theoretical principles of control for different electromechanical systems. • Preceding the understanding the Ideological philosophy of open loop and closed loop systems and their applications. • Proceeding knowledge and understanding of the applications, and using Matlab.

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2 3,4 5,6 7,8 9,10		GO1	• mathematics background : mathematics symbols ,mathematics method • Differential equation review: equation types ,rank ,and degree ,differential methods • Conception of transfer function :general illustration, examples • Open and closed loop transfer function :General illustration ,Examples • Transfer function for some physics systems :Hydraulic system example, Mechanical linkage example	PBL	Quiz Mid Exam Final Exam

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Automatic Control Engineering. Francis H. Raven, • Automatic Control system ,9th Edition-solutions manual,2009

Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic Referenc Websites	-

1. Course Name:
Internal Combustion Engines and Pollution
2. Course Code:
EMEE309
3. Semester / Year:
3rd Year, 1st 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: Adel Hannon Ayaal Email: Adel Hannon @uotechnology.edu.iq
8. Course Objectives

Course Objectives	• To develop student's practical skills and knowledge required to critically evaluate alternative combustion process for different types of system sources, and provide applied solutions to the combustion problems. • To explain concept of various forms combustion process &air pollution problem • To outline division aspects and utilization new process of combustion and improve of different type of fuel and energy sources for different uses such as domestics and industrial applications. • To analysis and understand the process of combustion and improve the system of reducing emission. •

9. Teaching and Learning Strategies	
Strategy	PBL
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2 3,4 5,6 7,8 9,10		GO1	• Fuel and its chemical composition • Thermo-chemistry of fuel-air mixture • Combustion in spark ignition engine • Combustion in diesel engines • Combustion in furnaces and other open systems • Air pollution and emission.	PBL	Quiz Mid Exam Final Exam

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Hand book of air pollution from internal combustion engines pollutant formation and control by ERAN SHER, 1998. • Internal combustion engines, applied thermo science, 2nd edition by colin R. Ferguson, 2001. • Fundamentals and Tech of com combustion by F. EL-Mahallawy2002. • Engineering fundamentals of the internal combustion By Willard W. Pulkrabek.
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

1. Course Name:

Fluid Machinery

2. Course Code:

EMEE314

3. Semester / Year:

3rd Year, 2nd Semester

4. Description Preparation Date:

2023

5. Available Attendance Forms:

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

3 Units

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

Name: Hussein M. Salih
Email: Hussein M. Salih @uotechnology.edu.iq

8. Course Objectives

Course Objectives	Students will learn how to analyze the flow within the fluid machinery in order to calculate force and power developed or consumed in additional to their efficiency. Topics include analysis and working principle for each machine. There is also a brief introduction to hydro-electrical power plants design.

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2,3 4,5 6,7 8 9 10 11		GO1	• Dynamic action of fluid • Hydro-electrical power plants • Pelton turbine or impulse turbine • Reaction turbine (Francis and Kaplan) • Pumps • Unit and specific quantities • Compressors	PBL	Quiz Mid Exam Final Exam

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Hydraulic machines including fluidics, Dr. Jag – sh. Lal, 1979 Fluid mechanics and hydraulic machines, R. K. Rajput, 2007
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

1. Course Name:
Numerical Analysis
2. Course Code:
EME301
3. Semester / Year:
3rd Year, 1st 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: Hayder Qasim Email: Hayder Qasim @uotechnology.edu.iq
8. Course Objectives

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

9. Teaching and Learning Strategies	
Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2,3 4,5,6		GO1	Solution of non –linear equations by numerical methods: • Simple Iteration Method • Bisection method • Newton –Raphson iterative Curve fitting &Interpolation a) Curve fitting:	PBL	Quiz Mid Exam Final Exam

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

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

1. Course Name:
Engineering Analysis
2. Course Code:
EME302
3. Semester / Year:
3rd Year, 2nd Semester
4. Description Preparation Date:
2023
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total)
4 Units
7. Course administrator's name (mention all, if more than one name)

Name: Hayder Qasim

Email: Hayder Qasim @uotechnology.edu.iq

8. Course Objectives

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

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

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

11. Course Evaluation

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

12. Learning and Teaching Resources

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

1. Course Name:

Heat Transfer

2. Course Code:

EMEE308

3. Semester / Year:

3rd Year, 1st 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: Ibtisam A. Hassan

Email: Ibtisam A. Hassan @uotechnology.edu.iq

8. Course Objectives

Course Objecti	The goal of this course is to build up the students' interest in fundamental heat transfer problems and develop the skills of applying knowledge in solving the problems.

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2 3 4,5 6 7,8 9 10 11 12		GO1	• Conduction heat transfer (1D) • Heat transfer through fins • Two dimensional steady state heat conduction • One and Two dimensional unsteady state heat conduction • Convective heat transfer • Forced convection • Natural convection • Thermal radiation • Heat exchangers	PBL	Quiz Mid exam Final Exam

11. Course Evaluation

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

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Heat Transfer, Tenth Edition, J. P. Holman, 2002
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-
	-

1. Course Name:
Power System
2. Course Code:
EMEE307
3. Semester / Year:
3rd Year, 2nd Semester
4. Description Preparation Date:
2023
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total)
3 Units
7. Course administrator's name (mention all, if more than one name)
Name: Samar Jaafar Ismael Email: Samar Jaafar Ismael @uotechnology.edu.iq
8. Course Objectives

Course Objecti	• Illustration and discussion the principles of power systems generation stations and some factors affecting when load changes. • Preceding to the student analysis the electrical component of power sy stems. • Illustration and discussion the main theoretical principles of the electri cal design of overhead transmission line in power systems. • Understanding some of the apparent accompaniment occur in transmit ting the power (corona). • Giving knowledge about the distribution type systems and us underground cables and its types

9. Teaching and Learning Strategies	
Strategy	PBL

10. Course Structure

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

1,2,3 4,5,6 7,8 9,10 11,12		GO1	• Illustration and discussion the principles of power sy stems generation stations and some factors affecting when load changes. • Preceding to the student a nalysis the electrical com ponent of power systems. • Illustration and discussion the main theoretical princi ples of the electrical desig n of overhead transmissio n line in power systems. • Understanding some of th e apparent accompanimen t occur in transmitting the power (corona). • Giving knowledge about distribution type systems using underground cables its types		

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Principles of Power system by V.K Mehta • 2-Electrical power by M. L. Anand
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

1. Course Name:

Renewable Energy Resources I

2. Course Code:

EMEE 312

3. Semester / Year:

3rd Year, 1st 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: Sundus Sameer Jumaah

Email: Sundus Sameer Jumaah @uotechnology.edu.iq

8. Course Objectives

Course Objectives	The course aims to introduce the basic concept, principle, potentials, efficiencies and limitations of various renewable energy sources and devices including solar thermal energy, Solar Radiation Instruments and Measurement. Solar Energy Conservation into Electrical Energy Application and Solar Energy Conservation into Thermal Energy Application. Student will develop the ability to identify, formulate and solve problems of renewable energy conversion.

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2,3 4,5 6,7 8 9 10		Go1	• Environmental characteristics of solar energy • Radiation characteristics • Kind of solar collectors • Solar Energy Applications	PBL	Quiz, Mid Exam Final Exam

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• B. H. Khan, Non – conventional energy resources, *McGraw Hill Publisher*, New Delhi, 2006 • Solar Energy Engineering, Soteris Kalogirou, *Academic Press Publication*, 1st Ed., 2009.
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

1. Course Name:

Renewable Energy Resources II

2. Course Code:

EMEE313

3. Semester / Year:

3rd Year, 2nd Semester

4. Description Preparation Date:

2023

5. Available Attendance Forms:

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

3 Units

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

Name: Sundus Sameer Jumaah

Email: Sundus Sameer Jumaah @uotechnology.edu.iq

8. Course Objectives

Course Objectives	The course aims to introduce the basic concept, principle, potentials, efficiencies and limitations of water energy, fuel cell, and biomass energy. Student will develop the ability to identify, formulate and solve problems of renewable energy conversion.

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2 3,4 5,6 7,8 9,10,1		GO1	• Analysis of geothermal power plants • Conversion of Biomass to heat and electricity • Analysis of energy and power estimation in a tide • Performance of fuel cell		

11. Course Evaluation	
Mid exam 15%, student activities 15%, lad 10%, final exam 60%.	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	• B. H. Khan, Non – conventional energy resources, *McGraw Hill Publisher*, New Delhi, 2006 • Solar Energy Engineering, Soteris Kalogirou, *Academic Press Publication*, 1st Ed., 2009.
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

Fourth Year

1. Course Name:	
Ethics in Engineering	
2. Course Code:	
EMEE401	
3. Semester / Year:	
4th Year, 1st semester	
4. Description Preparation Date:	
2023	
5. Available Attendance Forms:	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Jalal M. Jalil Email: 50003@uotechnology.edu.iq	
8. Course Objectives	
Course Objectives	• Moral Sensitivity • Moral Reasoning • Ethical Theories

	• Increased knowledge of the Ethical Codes

9. Teaching and Learning Strategies

Strategy	Problem Based Learning

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12 13 14		GO5	• Moral Reasoning, • Being a Professional • Codes of Ethics, • Ethical Problem Solving Techniques • Ethical concerns Related to Engineering Organizations • Conflicts of interest • Safety, Risk and accidents • Informed Consent • Legal liability • Whistleblowing • Research Ethics • Global Issues • Emerging Technology and Ethics • Environmental Ethics	PBL	Report, Mid Exam, Seminar, Final Exam

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Engineering Ethics, Fourth Edition, Charles B. Fledderma University of New Mexico.
Main references (sources)	-

Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

1. Course Name:
Energy Efficiency
2. Course Code:
EMEE406
3. Semester / Year:
4th Year, 2nd 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: Jalal M. Jalil Email: 50003@uotechnology.edu.iq
8. Course Objectives

Course Objectives	• Efficiency of Energy Conversion • Fundamentals of Heat Transfer • Energy Audit • Energy Efficiency Tool Box • Energy Efficiency Management

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2 3,4 5,6		GO1, GO2	• Efficiency of Energy Conversion • Fundamentals of Heat Transfer • Energy Audit • Energy Efficiency Tool Box	PBL	Report, Quiz, Mid Exam Final Exam

7,8 9,10			• Energy Efficiency Management		

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

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any	• Energy Efficiency, Benefits for Environment and Society, Ming Yang and Xin Yu, Springer-Verlag London 2015. • Energy Management Handbook, Wayne C. Turner, 2001, The Fairmont Press.
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

1. Course Name:
Communication
2. Course Code:
EMEE408
3. Semester / Year:
4th Year, 1st 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: Ahmed Kamil Hasan AL-Ali Email: Ahmed Kamil Hasan @uotechnology.edu.iq
8. Course Objectives

Course Objectives	• Basic definition and terms of communication system • Signal Classification • Self Information, Source entropy, Mutual Information • Source Efficiency and redundancy

	• Source Coding of Discrete sources • Channel Coding • Decoding of Linear Block Codes, and Cyclic Codes

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2 3,4 5 6 7 8 9,10 11,12		GO1	· Basic definition and terms of communication systems. · Signal classification and signal spectrum · Information theory. · Source coding of discrete communication sources. . Channel coding and decoding	PBL	Quiz Mid Exam Final Exam

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Principles of Digital Communication, Cambridge University Press; 1st edition (March 24, 2008)
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

1. Course Name:

Steam Power Plant

2. Course Code:

EMEE411

3. Semester / Year:

4th Year, 1st Semester

4. Description Preparation Date:

2023

5. Available Attendance Forms:

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

2 Units

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

Name: Khalid Faisal Sultan

Email: Khalid Faisal Sultan @uotechnology.edu.iq

8. Course Objectives

Course Objectives	In this course, students will learn how to analyze the steam within the power plants in order to calculate heat and work done in each part of the cycle of power plant in additional to their efficiency for each component of cycle as well as efficiency of the plant. Topics include analysis and working principle for each part of the steam power plants design.

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2 3,4 5,6 7,8 9,10,1			• Simple steam plant, ideal Rankine cycle, heat cycle of turbine plant, imperfection on the simple plant, the effect of initial parameters on the cycle efficiency. • Introduction in advanced steam plants, regenerative and reheat plant, heat cycles of modern steam plants. • Nozzle of steam turbine, types of steam turbines, simple impulse turbine. • Velocity diagram of simple turbine compounded – Impulse turbine, reaction turbine – the reaction stages, velocity diagram and radial effect. • Boiler classification, fire tube boiler, water tube boilers, thermal calculation of steam boiler.	PBL	Quiz Mid Exam Final exam

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Power Plant Engineering by F.T. Morse. • Power Plant Engineering Technology by M. M. EL – Wakil. • Analysis of Engineering Cycle by Heywood. • Basic Engineering Thermodynamics by R. Joule.
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

1. Course Name:
Gas Power Plant
2. Course Code:
EMEE412
3. Semester / Year:
4th Year, 2nd 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: Khalid Faisal Sultan Email: Khalid Faisal Sultan @uotechnology.edu.iq
8. Course Objectives

Course Objectives	In this course, students will learn how to analyze the gas within the power plants in order to calculate heat and work done in each part of the cycle of power plant in additional to their efficiency for each component of cycle as well as efficiency of the plant. Topics include analysis and working principle for each part of gas power plant. There is also a brief introduction to gas power plants design.

9. Teaching and Learning Strategies	
Strategy	PBL

10. Course Structure

Week	Hours	Required	Unit or subject name	Learning	Evaluation

		Learning Outcomes		method	method
1,2,3,4 6,7,8,9		GO1	• Velocity diagram of simple turbine compounded –Impulse turbine, reaction turbine – the reaction stages, velocity diagram and radial effect. • Simple gas turbine plant, advance gas turbine plant, regenerative cycle – reheat cycle, cycle with inter cooling, reheating and regenerative.		

11. Course Evaluation	
Mid exam 15%, student activities 15%, final exam 70%.	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	• Power Plant Engineering by F.T. Morse. • Power Plant Engineering Technology by M. M. EL – Wakil. • Analysis of Engineering Cycle by Heywood. • Basic Engineering Thermodynamics by R. Joule.
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

1. Course Name:
Power system analysis
2. Course Code:
EMEE432
3. Semester / Year:
4th Year, 1st Semester
4. Description Preparation Date:
2023
5. Available Attendance Forms:

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

2 Units

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

Name: SaharAl-Sakini

Email: SaharAl-Sakini @uotechnology.edu.iq

8. Course Objectives

Course Objectives	● Illustration and discussion the principles of power system analysis. ● Proceeding to the Student power system analysis. ● Illustration and discussion the Main Theoretical Principles of power system analysis. ● Understanding of using different kind of power system analysis.

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11 12 13 14		GO3	• The one line diagram • Impedance and reactance diagram • Per unit system • Data for load flow studies • Bus classifications, Bus admittance matrix • Gauss - siedle method, Newton – Raphson method • Control of voltage profile • Three phase short circuit • Unloaded synchronous generator • Power system three phase short circuit • Bus Impedance matrix • Circuit breaker selection • Symmetrical component a-operator • Symmetrical component of unbalance three phase system • Sequence impedance of synchronous machine • Sequence impedance of transmission lines • Sequence impedance of transformer • Unbalance faults, single line-to- ground fault • Line –to – line and double line	PBL	Report Quiz Mid Exam Final Exam

15			– to – ground fault		

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Power system analysis 1st Edition by John Grainger, William Steven, 2000. • Elements Power system analysis, William Steven, 2003
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

1. Course Name:

Underground grids

2. Course Code:

EMEE414

3. Semester / Year:

4th Year, 2nd 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: Sahar R. Al-Sakini

Email: Sahar R. Al-Sakini @uotechnology.edu.iq

8. Course Objectives

Course Objectives	• Illustration and discussion the principles of underground cable • Proceeding to the Student underground cable • Illustration and discussion the Main Theoretical Principles of underground cable • Understanding of using different kind of underground cable

9. Teaching and Learning Strategies

Strategy	PBL

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 1 2 2 3 3 4 4 5 6 7 7 8 8 9 10 11 12 13 14 15		Go3	1. Underground Cables 2. Construction of Cables 3. Insulating Materials for Cables 4. Classification of Cables 5. Cables for 3-Phase Service 6. Laying of Underground Cables 7. Insulation Resistance of a Single-Core Cable 8. Capacitance of a Single-Core Cable 9. Dielectric Stress in a Single-Core Cable 10. Most Economical Conductor Size in a Cable 11. Grading of Cables 12. Capacitance Grading 13. Intersheath Grading 14. Capacitance of 3-Core Cables 15. Measurements of Ce and Cc 16. Current-Carrying Capacity of Underground Cables 17. Thermal Resistance 18. Thermal Resistance of Dielectric of a Single-Core Cable 19. Permissible Current Loading		

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Power system analysis and design by BR. Gupta, 2008. • Principal in power system by V.K.Mehta, Rohjt Mehata, 2019.
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

1- Course Name:

Nuclear power plant

2- Course Code:

EMEE407

3- Semester / Year:

4th Year, 2nd 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: Mahmoud Mustafa Mahdi
Email: Mahmoud Mustafa Mahdi @uotechnology.edu.iq

8- Course Objectives

Course Objectives	• Design Nuclear Reactor Requirements and Engineering Considerations. • Analyze Heat Transfer System and Thermal-hydraulics for nuclear reactor. • Calculation of Fuel-Coolant and Heat Transfer for nuclear power plant. • Nuclear Energy generation Process and Design Evaluation.

9- Teaching and Learning Strategies

Strategy	PBL

10- Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2 3,4		GO1	• Nuclear Energy Generation Processes. • Reactor Design Requirements and Engineering Considerations. • Characteristics of Heat	PBL	Quiz Mid Exam Final Exam

5,6 7,8 9,10 11,12			Transfer System in nuclear reactor. • Types of Fuel-Coolant. • Analysis of Hydraulic Systems.		

11- Course Evaluation

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

12- Learning and Teaching Resources

Required textbooks (curricular books, if any)	Power Plant Engineering, Nuclear Reactor Process Systems, Thermal-hydraulic Design, Nuclear Safety Reactor, and Nuclear Power Plant Systems
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

1- Course Name:

Power Electronics

2- Course Code:

EMEE404

3- Semester / Year:

4th Year, 1st 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: Ali H. Numan
Email: Ali H. Numan @uotechnology.edu.iq

8- Course Objectives

Course Objectives	• Design and analysis of AC to DC converters (Rectifiers). • Design and analysis of DC to AC converters (Inverters).

	• Design and analysis of DC to DC converters (DC Choppers). • Design and analysis of AC to AC converters. • Recognize speed control of DC and AC drives.

9- Teaching and Learning Strategies

Strategy	PBL

10- Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 2 3 4 5 6 7 8 9 10 11		GO1	• Introduction to power electronics. • Single and three phase uncontrolled as well as controlled rectifiers. • Single and three phase inverters. • Step-up and step-down DC choppers. • AC voltage controller and cycloconverter. • Concepts of electrical drives. • Speed control of DC drives. • Speed control of AC drives.	PBL	Quiz Mid Exam Final Exam

11- Course Evaluation

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

12- Learning and Teaching Resources

Required textbooks (curricular books, if any)	• N.Mohan, et al , Power Electronics, Converters, Applications, and Design, 3rd Edition , John Wiley and Sons,2003. • P.C.Sen, Principles of Electric Machines and Power Electronics, 3rd Edition, John Wiley and Sons, 2014.
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

1- Course Name:

Electrical Motor Drives

2- Course Code:

EMEE405

3- Semester / Year:

4th Year, 2nd 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: Ali H. Numan
Email: Ali H. Numan @uotechnology.edu.iq

8- Course Objectives

Course Objectives	• Understand the basics of electric drives and fundamentals of drive dynamics. • Learn and analyze DC drive. • Learn and analyze different steady state speed control methods for Induction motors, and understand the closed loop block diagrams for different methods. • Get introduced to modern synchronous motors and drives.

9- Teaching and Learning Strategies

Strategy	PBL

10- Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2 3,4 5,6 7,8 9,10 11,12		GO1	• Concept of electric drive. • Single phase converter drives • Three phase converter drives. • Chopper drives. • Induction motor drives. • Synchronous motor drives	PBL	Quiz Mid Exam Final Exam

11- Course Evaluation

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

12- Learning and Teaching Resources

Required textbooks (curricular books, if any)	• N. Mohan, et al , Power Electronics, Converters, Applications, and Design, 3rd Edition , John Wiley and Sons,2003.

	• P. C. Sen, Principles of Electric Machines and Power Electronics, 3rd Edition, John Wiley and Sons, 2014. • B. K. Bose, Modern Power Electronics and AC Drives, Prentice Hall Inc, 2002. • C. W. Lander, Power Electronics, 2nd Edition, McGraw Hill, 1987. • M.H. Rashid, Power Electronics Handbook Devices Circuits and Applications, 3rd Edition, Elsevier Inc., 2011.
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

1- Course Name:	
Renewable Systems Design I	
2- Course Code:	
EMEE410	
3- Semester / Year:	
4th Year, 1st 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: Ayad Kadhim Khlief Email: Ayad Kadhim K@uotechnology.edu.iq	
8- Course Objectives	
Course Objectives	• To develop student practical skills and knowledge required to critically evaluate solar and provide applied solutions to the energy demand. • To explain the theory of solar and their applications. • To outline division aspects and utilization of these renewable energy resources for different uses such as domestics and industrial applications. • To analysis the environmental and cost economics of using renewable energy sources compared to fossil fuels.
9- Teaching and Learning Strategies	
Strategy	PBL
10- Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2 3,4 5,6 7,8 9,10 11,12			• Solar collectors • Concentration Solar power (CSp) • Solar Power Tower (SPT) • Parabolic trough concentrator • Photovoltaic solar power		

11- Course Evaluation
Mid exam 15%, student activities 15%, lab 10%, final exam 60%.

12- Learning and Teaching Resources	
Required textbooks (curricular books, if any)	• John A. Duffie., "Solar Engineering of Thermal Processes", University of Wisconsin Madison, 1980. • Gilbert M. Masters., "Renewable and Efficient Electric Power Systems", Stanford University, 2004.
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-

1- Course Name:
Design of Renewable Energy Systems II
2- Course Code:
EMEE413
3- Semester / Year:
4th Year, 2nd 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: Abdulmunem R. Abdulmunem

Email: Abdulmunem R. Abdulmunem @uotechnology.edu.iq

8- Course Objectives

Course Objectives	• Introduction to wind energy • Wind Characteristics • Classification of Wind Turbines • Wind Turbine Components • Grid-Independent Applications • Basics of wind energy conversion systems • Wind turbine power and torque • Axial momentum theory • Rotor design • Rotor Performance • Analysis of wind regimes • Statistical models for wind data analysis • Environmental benefits of wind energy • Life cycle analysis

9- Teaching and Learning Strategies

Strategy	PBL

10- Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1,2 3,4 5,6 7,8 9,10 11,12		GO2	• Energy Audit • Energy Conversion from wind to turbine • Rotor and blade design of wind turbine • Turbine design based on the energy demand • Problem-solving techniques		

11- Course Evaluation

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

12- Learning and Teaching Resources

Required textbooks (curricular books, if any)	Wind Energy Fundamentals, Resource Analysis and Economics, Sathyajith Mathew, Faculty of Engineering, KCAET, Tavanur, Malapuram, Kerala, India 2006.
Main references (sources)	-
Recommended books and references (scientific journals, reports…)	-
Electronic References, Websites	-