

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



2024

Academic Program Description

University Name: Al-Furat Al-Awsat Technical University
College/Institute: Technical Collage of Al-Mussaib
Scientific Department: Department of Machinery and Equipment
Engineering Technology
Academic or Professional Program Name: Bachelor's Degree
Final Degree Name: Bachelor of Science in Building and Construction
Engineering Technology
Study System: Annual
Description Preparation Date:
File Filling Date: 19/2/2024

Signature:

Department Head Name:

Ass. Prof. Dr. Hani Mizhir Magid

Date: 20/4/2024

Signature:

Scientific Assistant Name:

Prof. Dr. Nabil Hamid Abdul Majeed

Date: / / 2024

File Verified By:

Quality Assurance and University Performance Department
Quality Assurance and University Performance Department Director

Name: Dr. Haider Rahman Dawood

Date: 21/4/2024

Signature:



Dean's Approval

1. Program Vision

Keeping pace with the latest scientific developments in the undergraduate and graduate education program, guiding scientific research, developing it, and utilizing applicable research capabilities to serve the machinery and equipment sector.

2. Program Mission

Within the framework of the mission of Al-Musayyib Technical College, the department is committed to preparing engineering technicians and researchers capable of contributing to the development of the machinery and equipment sector.

3. Program Objectives

To prepare technical engineering personnel with qualifications in machinery and equipment engineering.

To develop scientific staff capable of keeping up with scientific advancements in mechanical engineering/machinery and equipment engineering.

To learn how to maintain and repair machinery and equipment.

To learn the design of various types of machinery and equipment.

To learn practical applications through laboratory experiments.

To gain practical experience through field observation to enhance theoretical understanding.

4. Program Accreditation

None

5. Other External Influences

None

6. Program Structure				
Program Structure	Course Count	Credit Hours	Percentage	Notes *
Institutional Requirements	43	195		
College Requirements	43	195		
Department Requirements	43	195		
Summer Training		Two Months		For Second and Third
Notes				Bologna System - Semester and Final

* May include whether the course is mandatory or elective

7. Program description

Educational level	Course or course code	Name of the course or course	Credit hours	
The first	METE1W1	WORK SHOPS	---	180
	METE1M2	ENGINEERNG MATERIALS	60	60
	METE1E3	ENGINEERING MECHANICS	90	30
	METE1M4	MATHEMATICS/1	90	---
	METE1E5	ENGINEERING DRAWING	---	90
	METE1E6	ELECTRICAL TECHNOLOGY	60	60
	METE1C7	COMPUTER APPLICATIONS/1	30	60
	METE1H8	HUMAN RIGHTS AND DEMOCRACY	60	---
	METE1E9	ENGLISH/1	30	---
The second	METE2T1	MECANICAL MASHINE	120	60
	METE2S2	STRENGTH OF MATERIALS	60	60
	METE2T3	THERMODYNAMICS	60	60
	METE2F4	FLUID MECHANICS	60	60
	METE2M5	MECHANICAL DRAWING	90	---
	METE2M6	MATHEMATICS/2	---	90
	METE2C7	COMPUTER APPLICATIONS/2	60	30
	METE2E8	ENGLISH/2	---	30
Third	METE3A1	MACH. & EQUIP.	60	60
	METE3T2	THEORY OF MACH. & VIBRATIONS	60	60
	METE3M3	MACHINE DESIGN	90	30
	METE3I4	INTERNAL COMBUSTION ENGINES	60	60
	METE3M5	MANUFACTURING PROCESSES	90	60
	METE3H6	HYDRAULIC MACHINES	60	30
	METE3M7	MACHINES ELECTRICITY	60	30
	METE3C8	COMPUTER APPLICATIONS/3	60	30
	METE3C9	ENGLISH/3	---	30
Fourth	METE4A1	MACH. & EQUIP.	60	60
	METE4M2	MAINT. & REPAIRE OF MACH. AND EQUIP.	60	60
	METE4A3	EQUIPMENTS DESIGN	60	90
	METE4M4	ENGINEERING MECHANICAL	60	60
	METE4A5	CONTROL AND MEASURMENTS	60	90
	METE4R6	RESEARCH PROGET	---	180
	METE4I7	IRRIGATION PUMPS TECH.	30	60
	METE4M8	MACHINERY ECONOMICS	60	---
	METE4I9	INDUSTRIAL MANAGMENT & PROF. SAFETY	60	---
	METE4C10	COMPUTER APPLICATIONS/4	30	60

8. Expected learning outcomes of the program

Knowledge

1- Introducing the student to the concepts and principles of machinery and equipment engineering. 2- Introducing the student to the types of engines.
3- Introducing the student to the types of loads, forces, and stresses.
4- Teaching the student engineering designs.
5- Teaching the student how to conduct scientific research.

- Make the student aware of the importance of engineering machinery and equipment techniques in practical life

Skills

1. Program Specific Skill Objectives:
1- Training the student in various welding techniques.
2- Training the student in metal turning and milling.
3- Training the student in metal forming and casting.

- General skills and qualifying the student to maintain engines and machines

3- Learning Outcomes:
1- Empowering the student to acquire practical skills.
2- Empowering the student with theoretical design and its application in graduation projects.

- Knowledge of the foundations and rules of designs.
- Explaining the principles of heat exchanges.
- Explaining the principles of the question and the forces affecting the pressures generated from it.

Values

3. Learning Outcomes

- Analyzing stresses generated in beams from bending and shear.
- Understanding engineering analysis techniques.
- Empowering the student to work on electronic control and its integration with mechanical systems.

- The student can analyze equations.
- He is able to analyze mathematical operations and transform them into practical applications.

9. Teaching and learning strategies

- 1- Explanation and clarification of lectures.
- 2- Scientific seminars in the specialty.
- 3- Summer training.
- 4- Scientific trips and visits to practical sites related to the specialty.

10. Evaluation methods

- 1- Practical tests
- 2- Theoretical tests
- 3- Reports
- 4- Class activities
- 5- Association volunteer work

11. The teaching staff

Faculty members

Scientific rank	Specialization		Requirements/skills Private (if any)		Preparing the teaching staff	
	general	private			Academic	lecturer
Assistant Professor	Mechanical Engineering	Refractories			√	
Assistant Professor	Mechanical Engineering	Fluids and refractories			√	
Assistant Professor	Mechanical Engineering	design			√	
Assistant Professor	Mechanical Engineering	Applied mechanics			√	
Assistant Professor	Mechanical Engineering	Tillage equipment			√	
Assistant Professor	Machine engineering Agricultural	Field capacity design			√	
lecturer	Mechanical Engineering	Applied mechanics			√	
lecturer	Mechanical Engineering	Applied mechanics			√	

lecturer	Master's degree in Manufacturing Engineering	Manufacturing systems engineering			√	
lecturer	Master's degree in Manufacturing Engineering	Industrial engineering			√	
lecturer	Master's degree in Mechanical Engineering	Applied mechanics			√	
lecturer	Master's degree in Mechanical Engineering	Manufacturing and industrial			√	
lecturer	Master's degree in Mechanical Engineering	Applied mechanics			√	
lecturer	Master's degree in industrial management	Production and operations			√	
lecturer	Master's degree in agricultural mechanization	Machines and machines			√	
Assistant Teacher	Master's degree in Mechanical Engineering	Applied mechanics			√	
Assistant Teacher	Master of Mathematics	Data theory			√	

Professional development

Orienting new faculty members

They are defined as members who are newly hired by the university and are within their first year of academic service. A faculty member in his second year is eligible to participate if he is nominated by the deanship.

Professional development for faculty members

The development of teaching staff is facilitated through their participation in teaching methods courses held at the Faculty Development Center, as well as through the organization of departmental seminars where each faculty member is tasked with preparing a seminar on a scientific topic. These seminars are presented in the presence of the department's teaching staff, followed by discussion and recording of necessary feedback, which helps refine the personality of the faculty member and assists in managing discussions, defending positions, and expressing opinions, thereby contributing to the enhancement of the faculty member's academic level and the development of their capabilities. Additionally, many departmental faculty members have participated in internal and external training courses in recent years, which have had a positive impact on increasing knowledge and skill development. Furthermore, most departmental faculty members participate annually in numerous scientific conferences organized by Iraqi universities either as researchers or participants.

1. Identifying the department's needs for faculty members and their specialties based on its vision and goals.
2. Having plans for training programs to develop the skills and capabilities of faculty members.
3. Having databases containing qualifications and experiences of faculty members.
4. Faculty members contributing to areas that serve the department within their specialization.
5. Setting faculty member quotas in the department according to regulations.
6. The department providing research requirements for faculty members.
7. Providing appropriate conditions, administrative requirements, and educational resources within the department.
8. Providing clear and precise instructions including the use of modern teaching and learning methods within the department.
9. Providing facilities for faculty members to participate in conferences, development courses, and training workshops.

12. Acceptance criterion

Inputs:

1. Graduates of the scientific branch of preparatory school.
2. The top five students from graduates of vocational preparatory schools in the machinery, automotive, and mechanical branches.
3. The top 10% and distinguished employees from governmental departments who are graduates of the Technical Education Authority in the following specialties:
 - Mechanical Department: General Mechanics, Production and Metals, and Mechanical Operation and Maintenance.
 - Machinery and Equipment Department, Automotive Branch.
 - Machinery and Equipment Department, Agricultural Branch.
4. The top ten and distinguished employees from governmental departments who are graduates of the Oil Training Institute/Automotive and Heavy Equipment Department.

Admission System: Students are admitted through central admission at the Ministry of Higher Education and Scientific Research in two stages as follows:

1. The first stage accepts graduates of the scientific branch of preparatory school, as well as the top graduates of vocational education in specialties eligible for acceptance.
2. The second stage accepts:
 - The top ten graduates from specified technical institutes mentioned in the inputs.
 - Distinguished individuals in the field of work from specified specialties mentioned in the inputs.
 - The top ten graduates from the Oil Training Institute in specialties specified in the inputs.

13. The Most Important Sources of Information About the Program

The official website of the college

www.tcm.edu.iq

Al-Musayyib Technical College / Babil / Al-Mashroo

14. Program development plan

The Department of Machinery and Equipment Technology Engineering works to develop the student's practical skills and increase his confidence in his scientific capabilities. The curricula are updated by 20% annually by the subject teacher, and periodic updating follows the Deans' Committee.

Program skills chart															
				Learning outcomes required from the program											
Year/level 2023-2220	Course Code	Course Name	Basic Or optional	Knowledge				skills				values			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
The first stage	METE1M2	ENGINEERING MATERIALS	Specialization		*								*		
	METE1E3	ENGINEERING MECHANICS	Specialization		*							*	*	*	
The second stage	METE2T1	THERMODYNAMIC	Specialization		*							*			
	METE2S2	STRENGTH OF MATERIALS	Specialization		*		*	*				*	*	*	
third stage	METE3T2	THEORY OF MACH. & VIBRATIONS	Specialization	*	*	*	*	*	*	*		*	*	*	
	METE3M3	MACHINE DESIGN	Specialization	*	*	*	*	*	*	*		*	*	*	
The fourth stage	METE4A1	MACH. & EQUIP.	Specialization	*	*		*	*	*	*		*	*	*	
	METE4R6	RESEARCH PROJECT	Specialization	*	*	*	*	*	*	*		*	*	*	

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

Course Description Form

1. Course Name:	
ENGINEERNG MATERIALS	
2. Course Code:	
METE1M2	
3. Semester / Year:	
Year	
4. Description Preparation Date:	
Theoretical and practical lectures and field trips	
5. Available Attendance Forms:	
Daily	
6. Number of Credit Hours (Total) / Number of Units (Total)	
4 hours in week / 6	
7. Course administrator's name (mention all, if more than one name)	
<p>Name: Shaymaa Abdul Khader</p> <p>Email: com.ka.shymaa@atu.edu.iq</p>	
8. Course Objectives	
Course Objectives	<ul style="list-style-type: none"> • Introducing the student to the properties and compositions of metallic materials added to the properties of these materials and how to improve the properties by conducting heat treatments and other strengthening methods. • Enable the student to measure the mechanical properties of metals and how to improve these properties by conducting their heat treatments and the effect of these treatments on microstructural structures.
9. Teaching and Learning Strategies	
Strategy	The primary strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1-4	16	REVIEW OF MECHANICAL PROPERTIES: HARDNESS – TENSILE – CREEP – FATIGUE.		Giving lectures	Assignments, oral exams, discussions, direct questions, and short quizzes
Week 5-7	12	REVIEW OF THERMAL EQUILIBRIUM DIAGRAMS – INTERMEDIATE COMPOUNDS – EUTECTOID REACTION – EUTECTIC REACTION.		Giving lectures	Assignments, oral exams, discussions, direct questions, and short quizzes
Week 8-9	8	THERMAL EQUILIBRIUM DIAGRAMS FOR FE .C ALLOYS SYSTEM.		Giving lectures	Assignments, oral exams, discussions, direct questions, and short quizzes
Week 10	4	THE EFFECT OF % CARBON ON THE MECHANICAL PROPERTIES AND CARBON STEEL PHASES.		Giving lectures	Assignments, oral exams, discussions, direct questions, and short quizzes
Week 11	4	CLASSIFICATION OF CARBON STEEL ALLOYS.		Giving lectures	Assignments, oral exams, discussions, direct questions, and short quizzes
Week 12-13	8	ALLOY STEELS – HOW THE EFFECTS OF ADDING ALLOYING ELEMENTS.		Giving lectures	Assignments, oral exams, discussions, direct questions, and short quizzes
Week 14-15	8	CAST IRON – PRODUCTION – TYPES.		Giving lectures	Assignments, oral exams, discussions, direct questions, and short quizzes
Week 16-18	12	HEAT TREATMENTS FOR STEEL (ANNEALING – NORMALIZING –		Giving lectures	Assignments, oral exams, discussions, direct questions,

		HARDENING) , T.T.T. CURVES.			and short quizzes
Week 19-20	8	AUSTENITE TRANSFORMATION – ISOTHERMAL TRANSFORMATION (I.T) – CONTINEOUS COOLING C.T		Giving lectures	Assignments, oral exams, discussions, direct questions, and short quizzes
Week 21-22	8	EFFECT OF ALLOYING ELEMENTS ON T.T.T. CURVES.		Giving lectures	Assignments, oral exams, discussions, direct questions, and short quizzes
Week 23	4	TEMPERING.		Giving lectures	Assignments, oral exams, discussions, direct questions, and short quizzes
Week 24-25	8	AL-EXTRACTION – PROPERITIES –AL ALLOYS – HEAT TREATMENTS – AL – CU THERMAL EQUILIBRIUM DIAGRAM.		Giving lectures	Assignments, oral exams, discussions, direct questions, and short quizzes
Week 26-27	8	CU - EXTRACTION – PROPERITIES – CU ALLOYS – HEAT TREATMENTS – CU – ZN THERMAL EQUILIBRIUM DIAGRAM.		Giving lectures	Assignments, oral exams, discussions, direct questions, and short quizzes
Week 28-29	8	WHITE METALS – COMPOSITION AND USES.		Giving lectures	Assignments, oral exams, discussions, direct questions, and short quizzes
Week 30	4	MG ALLOYS.		Giving lectures	short quizzes

11. Course Evaluation

The Course	Frist Course			Second Course			year works		Annual quest	Final Exam			Total assessment
	Th.	Pr.	Sum	Th.	Pr.	Sum	Ex.	Tet.		Th.	Pr.	Sum	
Theoretical and practical	10	10	20	20	10	20	5	5	50	40	10	50	100

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	<p>1- (Engineering metallurgy, part 1) Higgins, Raymond A.-Engineering Metallurgy - Applied Physical Metallurgy-Elsevier (1993).</p> <p>2- (Engineering metallurgy, part 2) Higgins, Raymond A.-Engineering Metallurgy - Applied Physical Metallurgy-Elsevier (1993).</p>
Recommended books and references (scientific journals, reports...)	<p>1- The Science and Engineering of Materials, Seventh Edition, Donald R. Askeland, University of Missouri—Rolla, Emeritus, Wendelin J. Wright, Becknell Universe, 2016.</p> <p>2- Materials Science and Engineering An Introduction, William D. Callister, Jr. and David G. Rethwisch, 2010.</p>
Electronic References, Websites	http://www.sanfoundry.com/engineering-materials-metallurgy-questions-answers-hardness-tests-metals