University of Mosul
College of Engineering

Guide of Department of Mechatronics Engineering

9 الصناعة والابتكار والبنية التحتية

2025 Edition

Uomosul.edu.iq/engineering/ Iraq-Mosul-Al Majmoaa Street

College of Engineering

Prof. Dr. Adul-Rahim Ibrahim Jasim
Dean of College of Engineering

Dr. Bisam Ehessan Al-Hafiz
Assistant Dean for Administrative Affairs

Asst.Prof. Dr. Ayman Talib Hameed
Assistant Dean for Scientific Affairs

Prof. Dr. Moataz A. Al-Obaydi
Head of Civil Engineering Department

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Head of Electrical Engineering Department

Asst. Prof. Omar Mohammad Hamdoon
Head of Mechanical Engineering Department

Asst. Prof. Dr. Omar Miqdad Abdulghani
Head of Dams and Water Resources Engineering Department

Asst. Prof. Dr. Omar Hazim Ahmed Kharofa
Head of of Architecture Engineering Department

Prof. Dr. Salah Abdulghani Alabady
Head of Computer Engineering Department

Asst. Prof. Dr. Aws Hazim Saber
Head of Mechatronics Engineering Department

Asst. Prof. Dr. Abdullah Ismail Ibrahim
Head of Environmental Engineering Department

Lecturer Dr. Younis Mahal Najm
Head of Sustainable Energy Engineering Department

Introduction

The Department of Mechatronics Engineering at the University of Mosul is one of the comprehensive departments of the College of Engineering. This guide provides an overview of the department, its buildings, laboratories, as well as the scientific activities, events, and community services it offers.

In addition to the bachelor's degree in Mechatronics Engineering awarded by the department, it aims to provide graduate studies in the field of Mechatronics.

This guide is available in both Arabic and English, and this work was prepared under the guidance of Dr. Abdul Rahim Ibrahim Jassim, the Dean of the College of Engineering, and under the supervision of Dr. Aws Hazem Saber, the Head of the Mechatronics Engineering Department.

2024-2025

Department Management

Ass. Prof. Dr. Aws Hazim Saber

- Head of the Mechatronics Engineering Department
- Specialization: Electrical Engineering - Intelligent Systems

Lec. Dr. Firas Ahmed Majid Al-Durzi

- Coordinator of Mechatronics
- Specialization: Electrical Engineering - Control

Department Laboratories

Digital Logic Laboratory

- Laboratory Supervisor: Assist. Prof. Dr. Mohammed Azhar Abdul-Latif

Electronics Laboratory

- Laboratory Supervisor: Lect. Dr. Omar Saadallah Hamed

Measurements and Control Laboratory

- Laboratory Supervisor: Assist. Prof. Dr. Saad Ahmed Al-Qazzaz

Computer Laboratory

- Laboratory Supervisor: Lect. Dr. Ziyad Mohammed

General Mechanics Laboratory

- Laboratory Supervisor: Assist. Prof. Dr. Laith Mohammed Jassim

Robotic Laboratory

- Laboratory Supervisor: Assist. Prof. Dr. Saad Zaghloul Saeed

Automation Laboratory

- Laboratory Supervisor: Lect. Dr. Ali Abdul-Jaleel Abdullah

Processors Laboratory

- Laboratory Supervisor: Lect. Dr. Ali Abdul-Jaleel Abdullah

Workshop

- Laboratory Supervisor: Lect. Ahmed Waadallah Saleh

Electrical Machines Laboratory

- Laboratory Supervisor: Lect. Dr. Maysar Salim Younis

Vision:

To offer a world-leading research and educational mechatronics program with an emphasis on hands-on oriented training.

Mission:

Contribute to the advancement of engineering and technological reality, students' acquisition of theoretical and practical experience, communication skills and outstanding teamwork.

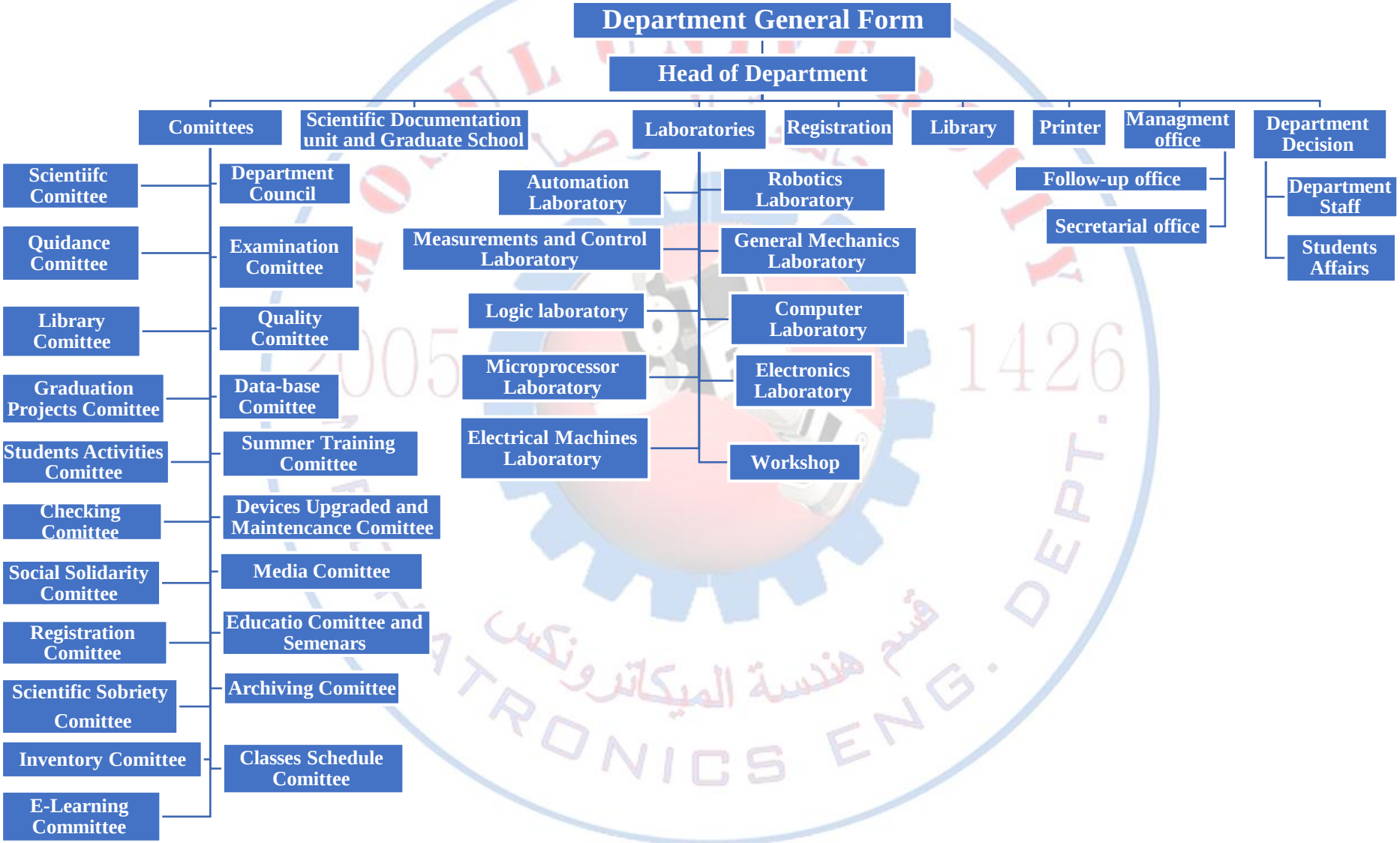
Goals:

1.Successfully adapt to new situations in their professional careers within the global job market, by using the essential tools and fundamental background of the disciplines of Mechatronics Engineering in the areas of Electric and electronics sciences, computer sciences, Thermal and Fluid Sciences, Material Science, Machine Design and Production Engineering, robotics, communication, artificial intelligence, and automation; Or pursue additional degrees through graduate studies.

2. Apply design methodology in relation to mechatronics engineering, by incorporating the use of design standards, realistic constraints, and consideration of the economic, environmental, and social impact of the design.

3. Engage in professional service such as participation in professional societies, and to always consider and support professional ethics.

4. have a constant desire for professional development through life-long learning activities, self-confidence, creativity and leadership.


Department General Form
Head of Department
Comittees
Scientific Documentation unit and Graduate School
Laboratories
Registration
Library
Printer
Managment office
Department Decision
Scientiifc Comittee
Quidance Comittee
Library Comittee
Graduation Projects Comittee
Students Activities Comittee
Checking Comittee
Social Solidarity Comittee
Registration Comittee
Scientific Sobriety Comittee
Inventory Comittee
E-Learning Committee
Department Council
Examination Comittee
Quality Comittee
Data-base Comittee
Summer Training Comittee
Devices Upgraded and Maintencance Comittee
Media Comittee
Educatio Comittee and Semenars
Archiving Comittee
Classes Schedule Comittee
Automation Laboratory
Measurements and Control Laboratory
Logic laboratory
Microprocessor Laboratory
Electrical Machines Laboratory
Robotics Laboratory
General Mechanics Laboratory
Computer Laboratory
Electronics Laboratory
Workshop
Follow-up office
Secretarial office
Department Staff
Students Affairs

Responsibilities

Head of Department: Managing the department in scientific, administrative, cultural, educational, financial, and students' affairs. Supervised on educational techniques and process, prepare a seasonally and annually reports on departments activities and raise it to the dean of the college. Distributing the duties on the department faculty and staff and issued administrative orders to do so.

Department Decision: Distributing and organizing the classes on the faculty members, follow up the student absence and the seminars.

Department Council Committee: Supervision on the department education program. Follow up and achieve the scientific plan and the development of faculty and staff.

Scientific Sobriety Committee: The Scientific Sobriety Committee is considered one of the most important committees in the department. The committee tasks include directing researchers and teaching staff in the department for publishing and how to choose research titles and scientific journals while publishing research, auditing the transactions of journals, their sobriety and their presence within the sober international repositories, and staying away from publishing in disreputable or counterfeit and commercial journals, in addition to Auditing the scientific content of journals and conferences.

Examination Committee: Follow up the mid-term and final exams, organize the observation schedule and observers. Receiving the exam questions and the grades from the faulty and organizing them securely. Prepare statistics to the final grades and provides the pass and fail percentages for examiners, preparing make-up exams.

Checking Committee: It works simultaneously with the examination committee during exams and results. The committee members check the marks received from the faculty.

Graduation Projects Committee: Collecting the suggested projects prepared by the faculty, organize them and present them to students. Preparing committee for discussing the projects after the students have completed their projects.

Continuous Education and Seminars Committee: Following up the continuous education session prepared and presented by department faculty for engineering who are working industrials. Additionally, following up the conferences and seminars prepared by the department.

Summer Training Committee: Prepare official letter specifically for junior students to admit them to be trained at the industrials. monitoring the students during training. Receiving reports prepared by students after they completed their training.

Media Committee: The committee members report all scientific and social activities via that the department make them frequently. They are usually done via photos and posters.

Books Distribution Committee: Distributing books to students at the beginning of each academic year and receive them at the end of the academic year. Organizing a list for borrowed books by faculty and graduate students.

Classes Schedule Committee: The committee members prepare classes schedule for undergraduate and post graduate programs.

Archiving Committee: Archiving masters theses and doctorial dissertations electronically for all area of concentrations under civil engineering major. Additionally, archiving the high diploma and final level projects electronically.

Inventory Committee: An inventory for the furniture and equipment available at the department rooms and laboratories

Social Solidarity Committee: Following up the social cases for the department students and staff who needs financial support.

Registration Committee: Receiving and registering new students at the beginning of each new academic year. Registering students for all academic levels and following up student statuses during academic year such as transferring, hosting, postponing, etc. Preparing students lists for all academic levels according to the classrooms.

Department Management: Reporting incoming official letters, sending out the official letter released from the head of department. Issued the official letters, and organization of issued and received official letters.

Printer: Typing, Printing, and reporting the official letter and reporting the student's daily attendance. Prepare a monthly table for the percent of student absence. Receiving and sending emails from and to the department management.

Library: Receive master thesis and doctorial dissertations electronically and hardcopies for graduated students who graduated recently Organize the work for borrowing books and theses and dissertations. Additionally, organize the Engineering software's CDs.

Teaching staff

SY	Name	Academic Title	Email
1	Dr. Saad Ahmed Al-Qazzaz	Assist. Prof.	kazzazs60@uomosul.edu.iq
2	Dr. Aws Hazim Saber	Assist. Prof.	Aws.Anaz@uomosul.edu.iq
3	Dr. Saad Zaghloul Saeed	Assist. Prof.	Saeeds70@uomosul.edu.iq
4	Dr. Luay Basheer Younis	Assist. Prof.	loayaldabbagh@uomosul.edu.iq
5	Dr. Laith Mohammed Jassim	Assist. Prof.	jasimL68@uomosul.edu.iq
6	Dr. Firas Ahmed Majid	Lecturer	dr.firasaldurze@uomosul.edu.iq
7	Dr. Mohammed Azhar Al-Obaidi	Assist. Prof.	muhamad.azhar@uomosul.edu.iq
8	Dr. Hassan Muthaffar Saeed	Lecturer	saeedh81@uomosul.edu.iq
9	Dr. Ali Abdul-Jalil	Lecturer	ali.alkurukchi@uomosul.edu.iq
10	Dr. Myassar Salem Younis	Lecturer	myasaralattar@uomosul.edu.iq
11	Dr. Ziyad Mohammed Yousif	Lecturer	zmyousif@uomosul.edu.iq
12	Dr. Omar Waleed Najm	Lecturer	omarmaaroof@uomosul.edu.iq
13	Dr. Mohammed Falah Mohammed	Lecturer	mohammed.falah_kanna@uomosul.edu.iq
14	Dr. Saif Abdul-Hameed	Lecturer	sayf@uomosul.edu.iq
15	Dr. Mohammed Yaseen Hazem	Lecturer	mohammed.alnuaimi@uomosul.edu.iq
16	Dr. Omar Saadallah Hamed	Lecturer	omar.abdulwahid@uomosul.edu.iq
17	Dr. Zahraa Tareq Mohammed	Lecturer	Zahraata.eng@uomosul.edu.iq
18	Dr. Marwa Ezzedine Mirza	Lecturer	mialabasy@uomosul.edu.iq
19	Mr. Osama Abdulwahid Thanoon	Assist. Lecturer	Osamah.taha87@uomosul.edu.iq
20	Mr. Hassanein Ali Talib Al-Othman	Assist. Lecturer	Hasanien.ali@uomosul.edu.iq
21	Mr. Islam Abdullah Aziz	Assist. Lecturer	islamabd@uomosul.edu.iq
22	Ms. Noor Muzahim Allawi	Assist. Lecturer	noormozahim@uomosul.edu.iq
23	Mr. Ahmed Waad Allah Saleh	Assist. Lecturer	ahmadalsabawi@uomosul.edu.iq
24	Ms. Rashad Adhed Al-Saigh	Assist. Lecturer	rashad.alsaigh@uomosul.edu.iq
25	Ms. Zahraa Riyadh Mahmoud	Assist. Lecturer	zahraa.reyad@uomosul.edu.iq
26	Mr. Mamoon Ammar Omar	Assist. Lecturer	mamoonatrakchii@uomosul.edu.iq
27	Mr. Ali Eyad Abdul-Jabbar	Assist. Lecturer	alibabeli@uomosul.edu.iq

Department Building

The Mechatronics Engineering Department was established in 2011 on a land area of 1,400 square meters. The department comprises three buildings, each with three floors. The first building contains classrooms and departmental laboratories. The second building contains the administrative offices, faculty offices, and additional laboratories. The third building includes classrooms and laboratories.

Table explain details of the Mechatronics Engineering Department Building.

Type of Facility	Quantity	Area (sqm)	Details
Classrooms	5 of 56 sqm.	350 sqm	Fully furnished and air-conditioned. One room with an area of 63 sqm, and four rooms each with an area of 56 sqm.
Classrooms	5	350 sqm	Fully furnished and air-conditioned. One room with an area of 63 sqm, and four rooms each with an area of 56 sqm.
Faculty Rooms	7	176 sqm	Each room is 24 sqm, except for one room which is 32 sqm. Fully furnished and air-conditioned.
Lecture and Discussion Halls	1	48 sqm	Fully furnished and air-conditioned, equipped with a data projector and smart board.
Postgraduate Rooms	1	42 sqm	Fully furnished and air-conditioned, with varied spaces.
Student Cultural Activities Room	1	48 sqm	Fully furnished and air-conditioned.
Secretary and Printing Room	1	9 sqm	Fully furnished and air-conditioned.
Department Head Office	1	23 sqm	Fully furnished and air-conditioned.
Department Coordinator Office	1	20 sqm	Fully furnished and air-conditioned.
Cafeteria	1	48 sqm	Fully furnished and air-conditioned.
Drawing Room	1	63 sqm	Equipped with drawing tables, fully furnished and air-conditioned.

Department Laboratories

Digital Logic Laboratory

Overview:

The Digital Logic Laboratory was established in 2007 and is considered an environment equipped with tools and devices that assist in studying and analyzing the logical relationships between electronic components and structures. It conducts experiments aimed at understanding and applying digital logic and digital systems in various fields of computer science and engineering. The laboratory is important for learning and developing logical computing skills and analyzing logical problems.

Objectives:

The objective of the Digital Logic Laboratory is to provide an educational and experimental environment that helps in understanding the fundamental concepts and principles of logic. It also aims to enhance critical and logical thinking skills and apply them to various scientific and life domains.

Experimental Lab:

The laboratory's work includes designing experiments and exercises that help to apply logical concepts in solving complex logical problems, analyzing logical data such as mathematical logic analysis and circuit construction using special tables for the logical structures and advanced circuits, building circuits based on logical equations, inside designing and testing digital circuits.

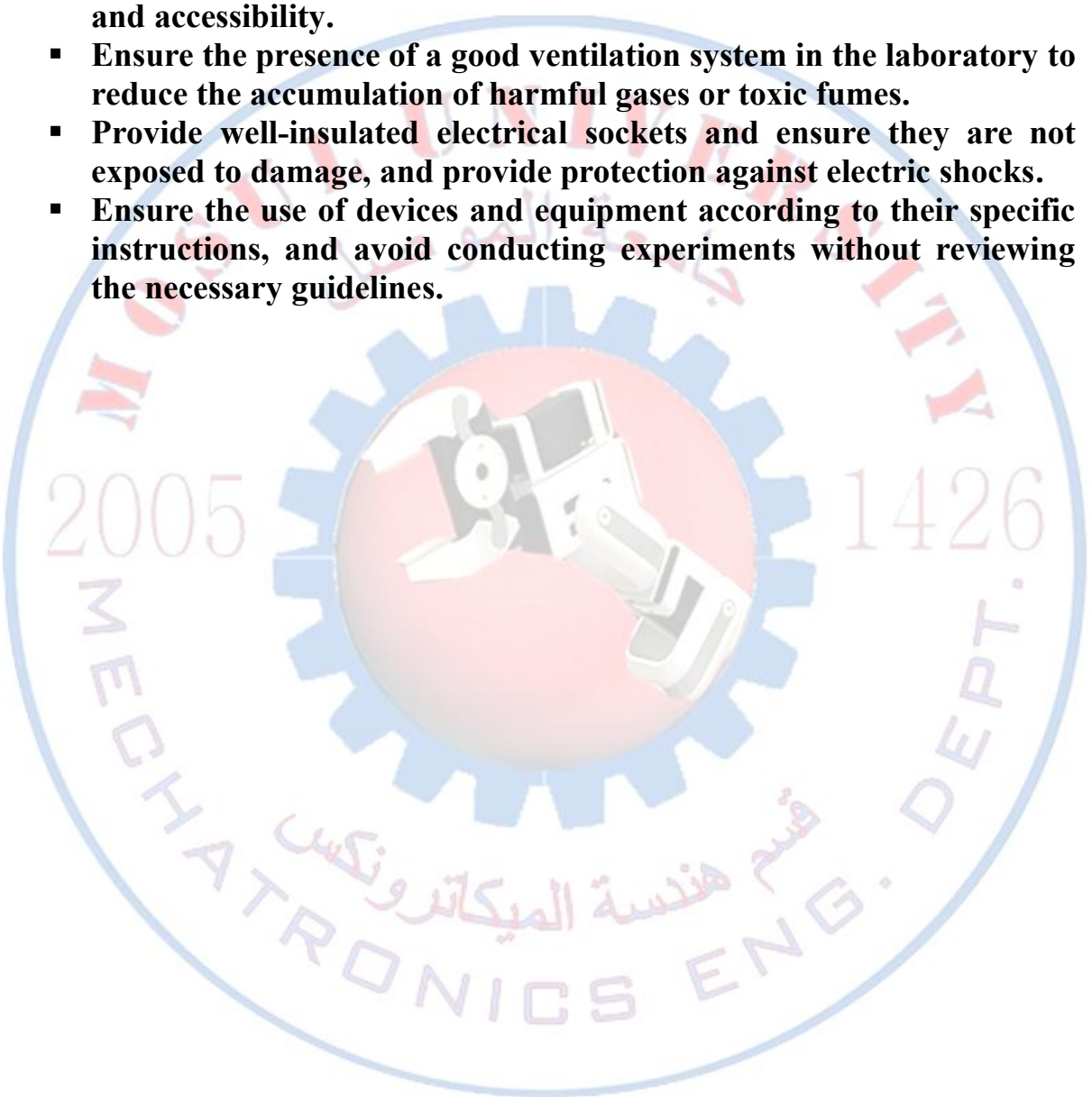
Stakeholders:

The logic lab provides opportunities for interactive learning and hands-on training, allowing students and researchers to practically understand logical concepts through their experiments and research projects. The Digital Logic Lab contributes to the development of methods and tools used in logic study, including the development of new software and advanced devices for analyzing logical data.

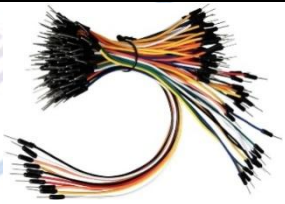
Health Guidelines:

Below are some important safety and health guidelines for the Digital Logic Lab:

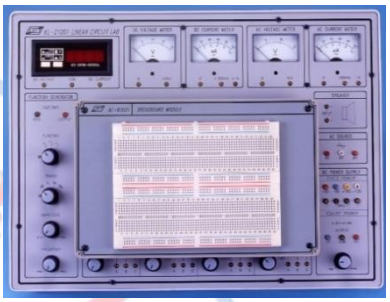
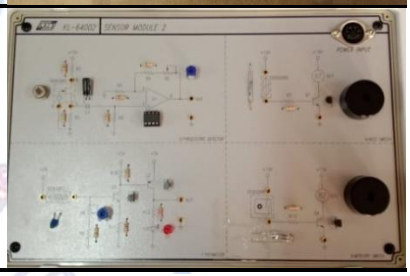
- **Ensure the presence of fire alarm systems and firefighting equipment in the laboratory, provide emergency exits, and ensure their safety and accessibility.**
- **Ensure the presence of a good ventilation system in the laboratory to reduce the accumulation of harmful gases or toxic fumes.**
- **Provide well-insulated electrical sockets and ensure they are not exposed to damage, and provide protection against electric shocks.**
- **Ensure the use of devices and equipment according to their specific instructions, and avoid conducting experiments without reviewing the necessary guidelines.**



Apparatuses Description of Devices and Equipment

No.	Device name	Description	Quantity	Device Image
1	Multimeter	A device used for measuring current, voltage, resistance, frequency, and specialized measurements of some electronic components.	10	
2	Power Supply	Provides various voltage and current outputs with different values and readings.	5	
3	Digital Logic Kit	Includes various logic gates and other digital circuits, facilitating logical connections and conducting logical experiments.	6	
4	Connection Wires	Used to connect input and output points of electrical circuits.	Not specified	

Apparatuses Description of Devices and Equipment

No.	Device name	Description	Quantity	Device Image
5	KL-21001 Linear circuit Lab	A device that contains voltage sources of different values, a function generator, variable electrical resistors, and devices for measuring voltage and current.	1	
6	Oscilloscope	a type of electronic test instrument that graphically displays varying voltages of one or more signals as a function of time.	7	
7	Function Generator	an electronic device used to generate different types of electrical waveforms over a wide range of frequencies.	3	
8	KL-64000 Sensors Modules	A set of modules each of which contains different sensors	15	
9	Arduino UNO R3 development Board	is an open-source microcontroller board based on the Microchip ATmega328P microcontroller	10	
10	Data show	Used to display and present lectures and power point files	1	

Electronics Laboratory

Overview:

The Electronics Laboratory was established in 2006 and serves as a vital hub for learning and research in the field of electronics and electronic systems. It provides an environment equipped with the necessary technologies and tools to conduct experiments in various electronics-related fields, such as designing and developing electronic circuits and testing advanced electronic systems.

The Electronics Laboratory includes a diverse range of equipment and tools, including digital and analog oscilloscopes, test and measurement devices, and electronic control devices. Thanks to this laboratory, students and researchers can benefit from hands-on and interactive experiments to enhance their understanding of electronics concepts and develop their skills in designing and implementing various electronic systems.

Moreover, this laboratory represents one of the innovation and research centers in the field of electronic engineering within the university.

Objectives:

The Electronics Laboratory aims to provide a comprehensive environment that promotes learning, research, and innovation in the field of electronics. It prepares students and researchers to keep pace with technological advancements and contribute to the development of society and industry. Students are empowered to apply theoretical concepts learned in classrooms to real-world scenarios through practical experiments, enhancing their understanding of fundamental principles and techniques in electronics and developing their skills in designing and implementing electronic circuits.

Experimental Lab:

Various experiments are conducted in the field of electronics and circuit analysis. These experiments include the analysis of electrical circuits using multiple principles and theories, such as circuit simplification and finding equivalent circuits. The experiments involve dealing with elements such as resistors, capacitors, and inductors, as well as active components like diodes and transistors. Additionally, experiments include testing and measuring circuits using available test and measurement devices in the laboratory, measuring and testing different electronic circuits, analyzing their performance, and diagnosing potential issues. The laboratory also involves the design and construction of electronic circuits using a variety of electronic components.

Stakeholders:

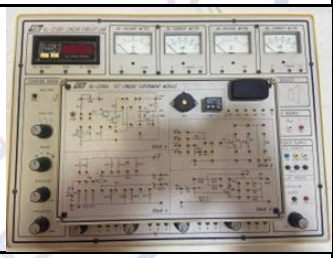
The laboratory serves several stakeholders, including first and second-year students who benefit from practical learning opportunities and the application of theoretical concepts, aiding in the development of practical and analytical skills in the field of electronics. The Electronics Laboratory contributes to training students in modern skills and techniques in electronics, qualifying them for employment and meeting industry needs. The laboratory can also contribute to the development of technology projects, such as renewable energy applications and monitoring systems, enhancing environmental quality and sustainability.

Health Guidelines:

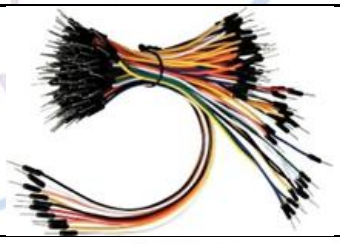
Below are some important safety and health guidelines for the Digital Logic Lab:

- Ensure the presence of fire alarm systems and firefighting equipment in the laboratory, provide emergency exits, and ensure their safety and accessibility.
- Ensure the presence of a good ventilation system in the laboratory to reduce the accumulation of harmful gases or toxic fumes.
- Provide well-insulated electrical sockets and ensure they are not exposed to damage, and provide protection against electric shocks.
- Ensure the use of devices and equipment according to their specific instructions, and avoid conducting experiments without reviewing the necessary guidelines.

Apparatuses Description of Electronics Laboratory

No.	Device Name	Device Description	Quantity	Device Picture
1	Digital Multimeter	Used for measuring current, voltage, resistance, frequency, and specific measurements of electronic components.	5	
2	Analog Multimeter	Used for measuring current, voltage, resistance, frequency, and specific measurements of electronic components.	17	
3	Digital Tester (GDM-8145)	Multifunctional digital tester enabling accurate measurements with a digital display, features like backlight, and data storage.	1	
4	Linear Circuit Experiments Kit (KL-21001)	Includes voltage sources with different values, function generators, variable resistors, and voltage and current measurement devices.	6	
5	Digital Oscilloscope (OWON DS50)	Electronic measurement device used for monitoring and displaying electrical signals with a high-resolution screen and advanced measurement capabilities.	7	

Apparatuses Description of Electronics Laboratory

No.	Device Name	Device Description	Quantity	Device Picture
6	Cathode Ray Oscilloscope (BK Precision)	Electronic device with multiple channels for measuring and displaying voltage as a function of time on the screen.	4	
7	Function Generator (SFG-2110)	Electronic device used to generate various types of electrical waves with multiple frequencies.	2	
8	Power Supply Unit (GPC-3030) DC P.S.	Electronic device used for converting and regulating electrical power digitally, with precision control and the ability to display digital information related to consumed or supplied power.	2	
9	Connecting Wires	Used for connecting input and output points for electrical circuits.	Not specified	
10	Pulse Generator (BK-4030)	Device generating sin & cos pulses at specific frequencies.	2	

Measurements and Control Laboratory

Overview:

The Measurements and Control Laboratory was established in 2008 and is considered an environment equipped with tools and devices that assist in studying and analyzing Measurements tools, sensors and some control systems used in mechatronics systems. It conducts experiments aimed at understanding and applying Measurement instruments and control systems in various fields of engineering. The laboratory is important for learning how to design devices for measuring current, voltage, temperature, humidity, etc., and learn the characteristics of some control systems and ways to use them in mechatronics systems.

Objectives:

Introducing the students to the types of sensors used in mechatronics systems and enabling them to distinguish between the properties of sensors and how to use them in various applications. Also introducing the student to some control systems, how they work, and how to use and apply them in various scientific and life fields.

Laboratory experiments:

The laboratory includes experiments that introduce the student to measurement methods and sensors, such as an experiment on sensing temperature and humidity, an experiment of measuring distance using an ultrasonic sensor, an experiment on measuring the level of liquid in a tank, an experiment on measuring the value of capacitance and inductance, an experiment on designing a voltage and current meter, experiments on different methods for measuring the value of electrical resistance, and an experiment on measuring Short distances accurately using Liner variable differential transformer LVDT.

The laboratory also provides experiments that familiarize the student with control systems, methods of representing them, and knowledge of their characteristics and uses, such as experiments with representing and simulating control systems on the MATLAB program, as well as experiments with the proportional-integral-differential controller (PID controller).

Stakeholders:

The laboratory provides opportunities for interactive learning and practical training, where students and researchers can learn about measurement tools, sensors, and some control systems used in mechatronics systems in a practical way through their own experiences and research projects, as the Measurements and Control Laboratory contributes to developing the methods and tools used in studying measurement methods and control systems.

Health Guidelines:

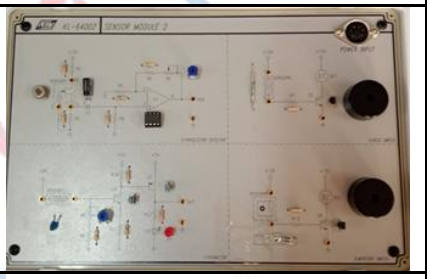
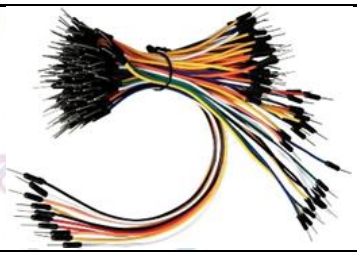
Below are some important safety and health guidelines for the measurement and control lab:

- **Ensure the presence of fire alarm systems and firefighting equipment in the laboratory, provide emergency exits, and ensure their safety and accessibility.**
- **Ensure the presence of a good ventilation system in the laboratory to reduce the accumulation of harmful gases or toxic fumes.**
- **Provide well-insulated electrical sockets and ensure they are not exposed to damage, and provide protection against electric shocks.**
- **Ensure the use of devices and equipment according to their specific instructions, and avoid conducting experiments without reviewing the necessary guidelines.**

Apparatuses Description of Measurements and Control Laboratory

No.	Device Name	Device Description	Quantity	Device Picture
1	Multimeter	A device used for measuring current, voltage, resistance, frequency, and specialized measurements of some electronic components.	10	
2	Power Supply	Provides various voltage and current outputs with different values and readings	5	
3	Laptops	A high-speed machine for solving complex calculations and running design and simulation engineering programs	6	
4	KL-21001 Linear circuit Lab	A device that contains voltage sources of different values, a function generator, variable electrical resistors, and devices for measuring voltage and current.	1	
5	Oscilloscope	a type of electronic test instrument that graphically displays varying voltages of one or more signals as a function of time.	7	

Apparatuses Description of Measurements and Control Laboratory

No.	Device Name	Device Description	Quantity	Device Picture
1	Function Generator	an electronic device used to generate different types of electrical waveforms over a wide range of frequencies	3	
2	KL-64000 Sensors Modules	A set of modules each of which contains different sensors	15	
3	Arduino UNO R3 development Board	is an open-source microcontroller board based on the Microchip ATmega328P microcontroller	10	
4	Connection Wires	Used to connect input and output points of electrical circuits.	Not specified	
5	Data show	Used to display and present lectures and power point files	1	

Computer Laboratory

Overview:

The Computer Laboratory, established in 2006, constitutes a fully equipped educational space spanning 19.5 square meters and accommodating up to 20 students. It is outfitted with 12 laptops and a projector (data show) to support various educational and research activities. The laboratory aims to enhance a deep understanding of computer science concepts, including programming, engineering drawing, and modeling within the field of mechatronics. The Computer Laboratory provides an interactive educational environment that enables students to apply theoretical knowledge in a practical setting, thereby enhancing their analytical and design skills.

Objectives:

The objective of the Computer Laboratory is to provide an advanced educational environment that contributes to enhancing students' understanding of computer and programming concepts, in addition to developing their skills in areas such as engineering drawing and modeling within the framework of mechatronics. The laboratory aims to enable students to apply theoretical knowledge in practical contexts, which enhances their analytical and design capabilities and equips them with the necessary skills to face future challenges in the fields of computing and technology.

Experimental Lab:

The laboratory includes experiments in various subjects such as:

1. Computer Science:
   - Enabling students to understand computing concepts and the basic operations of computers.
   - Developing students' skills in using word processing, spreadsheets, and presentation software.
   - Enhancing understanding of the fundamentals of operating systems, networking, and cybersecurity.
2. Programming:
   - Enabling students to acquire programming skills using the C++ language.
   - Developing the ability to solve problems and design programming algorithms.

- Enhancing understanding of advanced programming concepts such as data structures, data handling, and arrays.

3. Engineering Drawing (AutoCAD):

- Enabling students to acquire skills in using engineering drawing software like AutoCAD.
- Enhancing understanding of engineering concepts and three-dimensional design.
- Applying engineering concepts in the design of mechatronic systems and components.

4. Modeling:

- Enabling students to acquire modeling skills using software such as MATLAB/Simulink or SolidWorks.
- Developing the ability to analyze and model mechatronic systems using computational tools.
- Enhancing understanding of modeling processes, simulation, and analysis of results to improve the performance of mechatronic systems.

Stakeholders:

The Computer Laboratory in the Department of Mechatronics Engineering provides its students at all educational levels with a rich and advanced learning environment, enabling them to apply theoretical knowledge in practical contexts. Through diverse laboratory experiments, students develop advanced skills in programming, engineering drawing, and modeling, alongside enhancing their understanding of the fundamentals of computer science. This interactive approach contributes to refining their capabilities, equipping them with the necessary skills to face current and future challenges in the field of mechatronics engineering and preparing them efficiently for the job market.

Health Guidelines:

Below are some important safety and health guidelines for the Computer Lab:

- Ensure the presence of fire alarm systems and firefighting equipment in the laboratory, provide emergency exits, and ensure their safety and accessibility.
- Ensure the presence of a good ventilation system in the laboratory to reduce the accumulation of harmful gases or toxic fumes.
- Provide well-insulated electrical sockets and ensure they are not exposed to damage, and provide protection against electric shocks.

Apparatuses Description of Computer Laboratory

No.	Device name	Description	Quantity	Device Image
1	Laptop	Conducting experiments	12	
2	Data show	Used to display and present lectures and power point file	1	

Automation Laboratory

Overview:

This lab was established in 2008 and it is considered one of the important lab in the mechatronics department. Students can learn in this lab the basic of electronic controlling and PLC programming, CNC lathe machine, CNC milling machine, CNC engraving machine and pneumatic training systems.

Objectives:

To train the students on how to use electronical controlling cards and computerized cutting machines.

Experimental Lab:

It consist of the following: -

1- **PLC.**
2- **CNC lathe machine training.**
3- **CNC milling machine training.**
4- **CNC engraving machine training.**
5- **Pneumatic system training.**

Stakeholders:

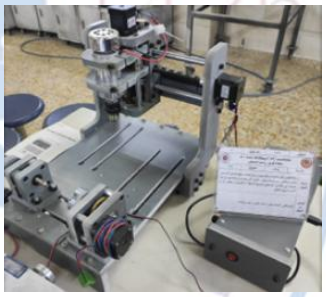
Undergraduate students are basically the main users of the lab, namely, the fourth-class students. Most of the experiment those are given in this lab are belong to the automation subject that is given in the last year of the undergraduate curriculum. The staff of the department, the undergraduate students and the researchers may also do their projects and research in this lab. In addition, the consultation bureau can also be served through this lab.

Health Guidelines:

Below are some important safety and health guidelines for the Automation Lab:

- **Ensure the presence of fire alarm systems and firefighting equipment in the laboratory, provide emergency exits, and ensure their safety and accessibility.**
- **Ensure the presence of a good ventilation system in the laboratory to reduce the accumulation of harmful gases or toxic fumes.**
- **Provide well-insulated electrical sockets and ensure they are not exposed to damage, and provide protection against electric shocks.**
- **Ensure the use of devices and equipment according to their specific instructions, and avoid conducting experiments without reviewing the necessary guidelines.**

Apparatuses Description of Automation Laboratory

No.	Device Name	Device Description	Quantity	Device Picture
1	5-axis CNC Milling machine	It is a programmed milling device that adopt 5-axes during machining of most of the materials such as steels, aluminum, brass and plastics. The working area is approximately 40 cm X 40 cm X 20 cm.	1	
2	CNC engraving machine	It is a programmed device which can be used to engrave most of the materials such as steels, aluminum, brass and plastics. The working area is 25 cm X 25 cm X 10 cm.	5	

Apparatuses Description of Automation Laboratory

No.	Device Name	Device Description	Quantity	Device Picture
3	PLC Logo	PLC from for training on PLC programming in multiple languages with some practical applications.	4	
4	PLC KIT FX1N20 MR	Laboratory board manufactured in mechatronics engineering department, Mosul university. It works based on a Mitsubishi PLC which used for training on programming with applications for controlling certain sensors and indicators, as well as conveyor belt experiments, photoelectric sensor for cars, and controlling the direction of a three-phase .motor, etc	6	
5	Pneumatic training system	It consists of many pneumatic components such as valves, connections, pumps, actuators …etc.	1	

Robotics Laboratory

Overview:

The Robotics Lab was established in 2008 and is dedicated to research and experiments focusing on the interaction between humans and machines, as well as the development of various robotic systems. It includes a range of experiments and devices to help students understand and analyze robotic systems and study related sciences. Additionally, it provides researchers with devices and tools to innovate new control methods and mechanisms for robot systems to contribute to the advancement of scientific research in this field.

Objectives:

The Robotics Lab aims to develop, test, and advance various types of robot systems through research and experimentation, fostering understanding of their components and functionalities.

Experimental Lab:

Robotics Lab encompass testing various control algorithms, assessing sensor effectiveness, experimenting with actuators and motors, studying human-robot interaction dynamics, developing autonomous decision-making algorithms, integrating artificial intelligence techniques, evaluating system robustness, exploring ethical implications, and collaborating across disciplines.

Stakeholder:

The potential beneficiaries of the Robotics Lab include students majoring in Mechatronics Engineering or related fields, researchers specializing in robotics, and companies seeking to integrate humanoid systems into their operations.

Health Guidelines:

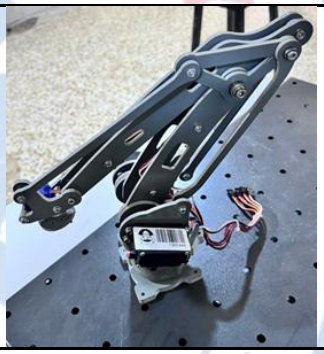
Below are some important health guidelines for the Robotics Lab:

- **Ensure that fire alarms and extinguishing devices in the lab are checked and functioning at all times, provide emergency exits, ensure their safety and accessibility.**
- **Provide well-insulated electrical sockets and ensure they are not damaged, provide protection against electrical shocks.**
- **Ensure the use of devices and equipment according to their specific instructions, avoid conducting experiments without reviewing the necessary guidelines.**
- **Maintain a safe distance from robot systems during operation to avoid accidents in case of malfunctions.**

Apparatuses Description of Robotics Laboratory

No.	Device Name	Device Description	Quantity	Device Picture
1	Lab Volt 5100 Robot	An educational system featuring an industrial robot designed to teach students principles of robotics, motion control, and automation. The system provides a simulated learning environment for industry and manufacturing, where students learn how to program and operate the robot using a simple programming interface.	1	
2	LEGO NXT Robot	The NXT robot offers a fun and interactive learning environment for students to grasp concepts of engineering, programming, and robotics. Students can build a variety of robots using available parts and customize them to perform different tasks, such as movement, sensing, and interacting with the surrounding environment.	3	

Apparatuses Description of Robotics Laboratory

No.	Device Name	Device Description	Quantity	Device Picture
3	Lynxmotion Robot	Comprising a set of movable joints, the Lynxmotion robot allows the arm to move similarly to a human arm. It can be remotely controlled using various control systems, enabling users to execute a variety of tasks such as exploration, assembly, and loading.	1	
4	Robot Arm	robotic arm consisting of a set of servo motors to control various joints, simulating human arm movement and performing different tasks.	2	

General Mechanics Laboratory

Overview:

The General Mechanics Lab was established in 2017 and is equipped with tools and devices that facilitate the study of practical applications of mechanical phenomena. It is used for conducting experiments aimed at understanding and applying mechanical fields and their practical and engineering applications. The lab is essential for learning and developing students' skills in solving mechanical problems.

Objectives:

The objective of the General Mechanics Lab is to enhance students' understanding of the theoretical aspect of mechanical engineering materials taught in the Mechatronics Engineering department. This includes topics such as Statics, Dynamics, Manufacturing Processes, Engineering Materials, Mechanics of Materials, Machine Mechanics, and Machine Component Design. The lab conducts practical experiments to enable and assist Mechatronics engineers in designing and building the basic mechanical system, which is the first building block in creating an integrated Mechatronics system.

Laboratory experiments:

The lab includes the design of experiments and exercises that help apply practical concepts in solving mechanical problems. Some examples include the Hook's Law experiment, torsion testing, coefficient of friction for inclined surfaces, and reaction testing.

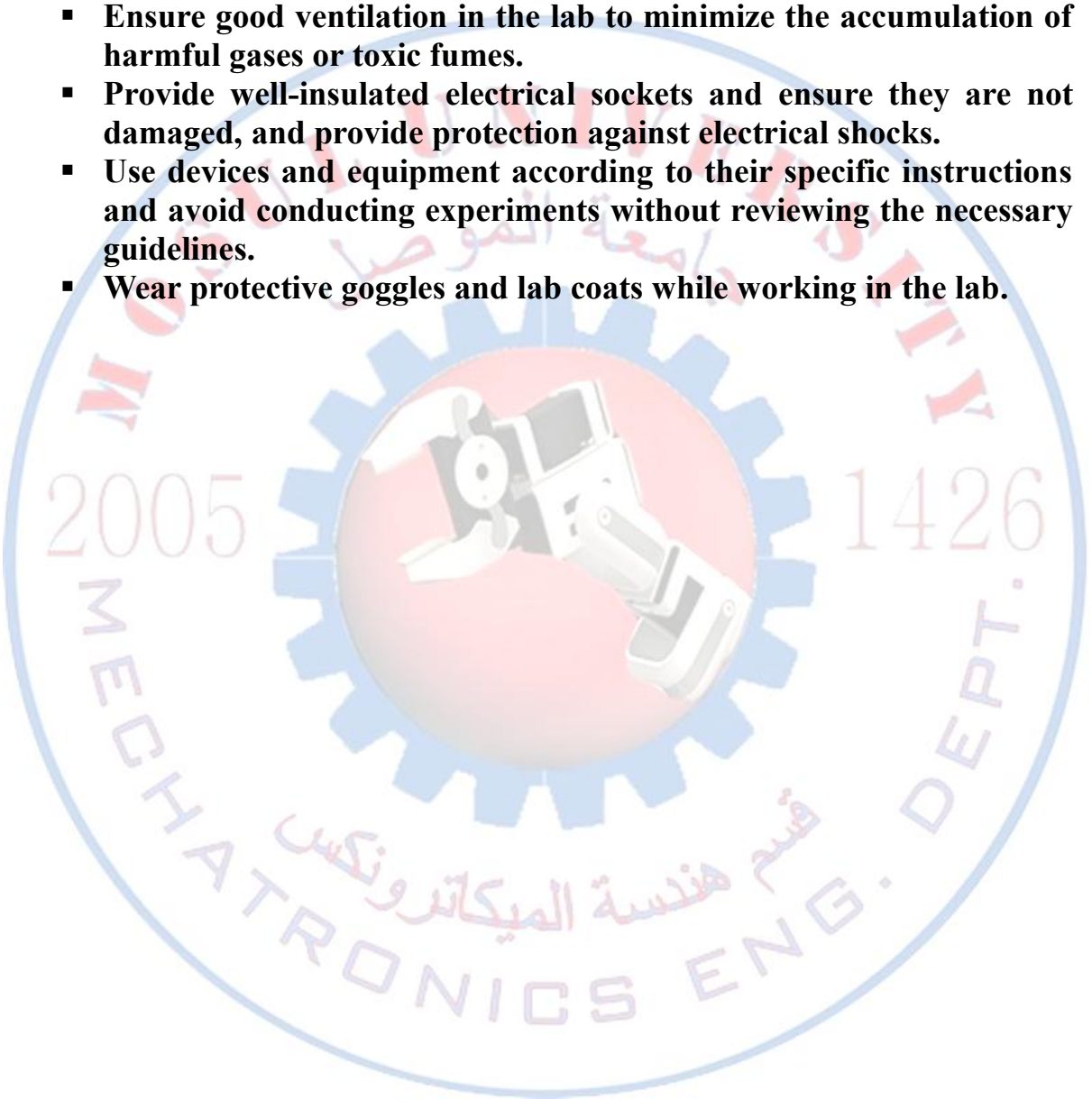
Stakeholders:

The lab provides opportunities for interactive learning and hands-on training. Students and researchers can gain practical knowledge and understanding through their own experiments and research projects.

Health Guidelines:

Below are some important health guidelines for the Mechanical Engineering Lab:

- **Ensure the presence of fire alarms and firefighting equipment in the lab, provide emergency exits, and ensure their safety and easy accessibility.**
- **Ensure good ventilation in the lab to minimize the accumulation of harmful gases or toxic fumes.**
- **Provide well-insulated electrical sockets and ensure they are not damaged, and provide protection against electrical shocks.**
- **Use devices and equipment according to their specific instructions and avoid conducting experiments without reviewing the necessary guidelines.**
- **Wear protective goggles and lab coats while working in the lab.**



Apparatuses Description of General Mechanics Laboratory

No.	Device Name	Device Description	Quantity	Device Picture
1	Extension and compression of spring	The device is a vertical wall-mounted holder that is used to test tension and compression springs. It consists of two separate mechanisms placed side by side. One mechanism is designed for testing tension springs, while the other is for testing compression springs	1	
2	Reaction of beams Apparatus	A metal base is fixed vertically at its ends with two horizontal columns. Suspended from these columns are two spring balances, and a horizontal column is suspended from the springs. The experiment involves attaching weights at different points along this column and observing the effect of these weights on the springs	1	
3	Friction on an inclined plane	The unit consists of a sturdy aluminum base plate with non-slip feet and a vertical column in the center. Attached to this base is a steel surface that can be locked in any inclined position within a limited range of ±45 degrees using adjustable protractors. A frictional material is placed on this inclined surface and secured with a rope, which is then passed over a pulley and connected to a weight to control the level of slippage or increase it	1	

Apparatuses Description of General Mechanics Laboratory

No.	Device Name	Device Description	Quantity	Device Picture
4	Toggle Joint Apparatus	A load is applied to a pair of links through a suspended weight carrier at the point of contact between the links. One of the links has one end fixed to the base, while the other link has one end capable of movement on low-friction ball-bearing wheels of a loading chair. The links are constrained by a horizontal spring balance, which directly measures the horizontal interaction between them.	1	
5	Triangle of Forces	A base plate is attached to a seat, with a raised circular table containing a central pin and a 360-degree rotating platform. The table has three adjustable clamps with rollers along its edge. There are three sets of wires with hooks, connected to a central ring and terminating at weight holders. The central ring is fixed above the central pin.	1	
6	Alternating Bending Fatigue Machine	A motor is connected to a sample, with one end of the sample left free to facilitate bending. The free end of the sample can move up and down through a frequency mechanism, allowing the device to apply significant bending, generating high stresses in non-metallic samples with low Young's modulus values	1	
7	Acceleration Apparatus	The carriage carrying five removable blocks slides on two rails connected to the base. An electrically sensitive paper strip is passed through a spark generator connected to the carriage, producing five pulses per second. This allows for precise measurement of the acceleration of the carriage.	1	

Apparatuses Description General Mechanics Laboratory

No.	Device Name	Device Description	Quantity	Device Picture
8	Rope Belt Friction Apparatus	The device consists of a wall-mounted stationary pulley with a loaded belt. It is used together with pulleys with four V-grooved angles: 120, 90, and 60 degrees	1	
9	Rotating Fatigue Machine	A motor with a speed of 2800 revolutions per minute rotates a sample through a gear and pulley system, with speeds ranging from 5600 to 1400 revolutions per minute. The load is applied to the sample through a screw mechanism that includes a load measuring cell. The device is equipped with a digital display that shows the applied force and the number of sample rotations, and the display can be zeroed before each experiment. When the sample fails, a small switch turns off the motor while the number of rotations remains recorded on the screen	1	

Electrical Machines Laboratory

Overview:

The Electrical Machines Laboratory was established in 2011 as a dedicated space for conducting experiments and tests on electrical machines and associated control devices. The purpose of this laboratory is to examine and test the performance of electrical machines of various types, such as motors, transformers, and others, to ensure their efficient and safe operation. A variety of electrical and mechanical tests are conducted in this laboratory, along with performance measurements. The laboratory relies on specialized measurement and testing equipment to ensure result accuracy and enhance understanding of the operation of electrical machines.

Objectives:

The objectives of the Electrical Machines Laboratory is to conduct experiments and tests on various types of electrical machines and their control devices. This is done to ensure their efficient and safe operation by examining and evaluating their performance. Through a range of electrical and mechanical tests, the laboratory aims to enhance understanding of the operation of electrical machines and to ensure the accuracy of results through specialized measurement and testing equipment. Ultimately, the laboratory's objective is to contribute to advancements in electrical machine technology and promote their effective utilization in various applications.

Experimental Lab:

The laboratory conducts experiments on electrical machines and motors to understand how they operate, interact with them, control them, regulate their speed, as well as connect electrical transformers, derive their equivalent circuits, determine component values, understand transformation ratios, and explore practical applications in circuits, facilities, and industries.

Stakeholders:

The beneficiaries of the Electrical Machines Laboratory may include

- **Researchers and Engineers: Experts and engineers can utilize the laboratory to develop new techniques in the field of electrical machines and enhance their performance.**
- **Students and Learners: University and institute students can learn from laboratory experiments and grasp scientific concepts related to electrical machines.**

Overall, any entity relying on or utilizing electrical machines can benefit from the services and results of the Electrical Machines Laboratory.

Health Guidelines:

Here are some basic health and safety guidelines in the Electrical Machines Laboratory:

- **Equipment Safety Check: Before using electrical equipment, it's essential to ensure its safety along with the safety of cables, sockets, switches, and rotary switches.**
- **Safe Operating Procedures: Operations should be carried out according to safety guidelines, and operating without supervision should be avoided.**
- **Training and Education: Adequate training should be provided to employees on how to use equipment safely and follow correct procedures.**
- **Regular Maintenance: Regular maintenance of electrical equipment should be conducted, and any issues should be addressed before they lead to accidents.**

Electrical laboratories adhere to industry standards and safety regulations to ensure a safe and healthy working environment for all employees and visitors

Apparatuses Description of Electrical Machines Laboratory

No.	Device Name	Device Description	Quantity	Device Picture
1	Multimeter	A device used for measuring current, voltage, resistance, frequency, and specialized measurements of some electronic components.	6	
2	dc motor	A device that converts electrical energy to mechanical and rotates loads works on direct current.	4	
3	synchronous motor	A device that converts electrical energy to mechanical and rotates loads works on Alternating current.	1	
4	Connection Wires	Used to connect input and output points of logical circuits.	Not specified	
5	power analyzer	to analyze power component	1	

Microprocessor Laboratory

Overview:

The laboratory was established in 2008. The Microprocessor Lab is an educational and research environment dedicated to studying, understanding, and developing electronic processors. The aim of this laboratory is to provide a deep understanding of processors and related technologies, including microengineering and processor programming. Among the fundamental concepts taught and applied in the Processor Lab is assembly language.

Objectives:

The Microprocessor Lab aims to provide students with the fundamental principles of microprocessor subjects, including learning their programming and implementation on lab devices through a set of laboratory experiments. Students become acquainted with the basic concepts of microprocessors, preparing engineers with the knowledge and competence to interact with them.

Laboratory experiments:

The lab includes experiments designed to enable students to understand and apply the concepts of assembly language, and learn how to use the DEBUG program to analyze and debug programs. Additionally, it covers the basics of arithmetic and logical operations performed within the microprocessor.

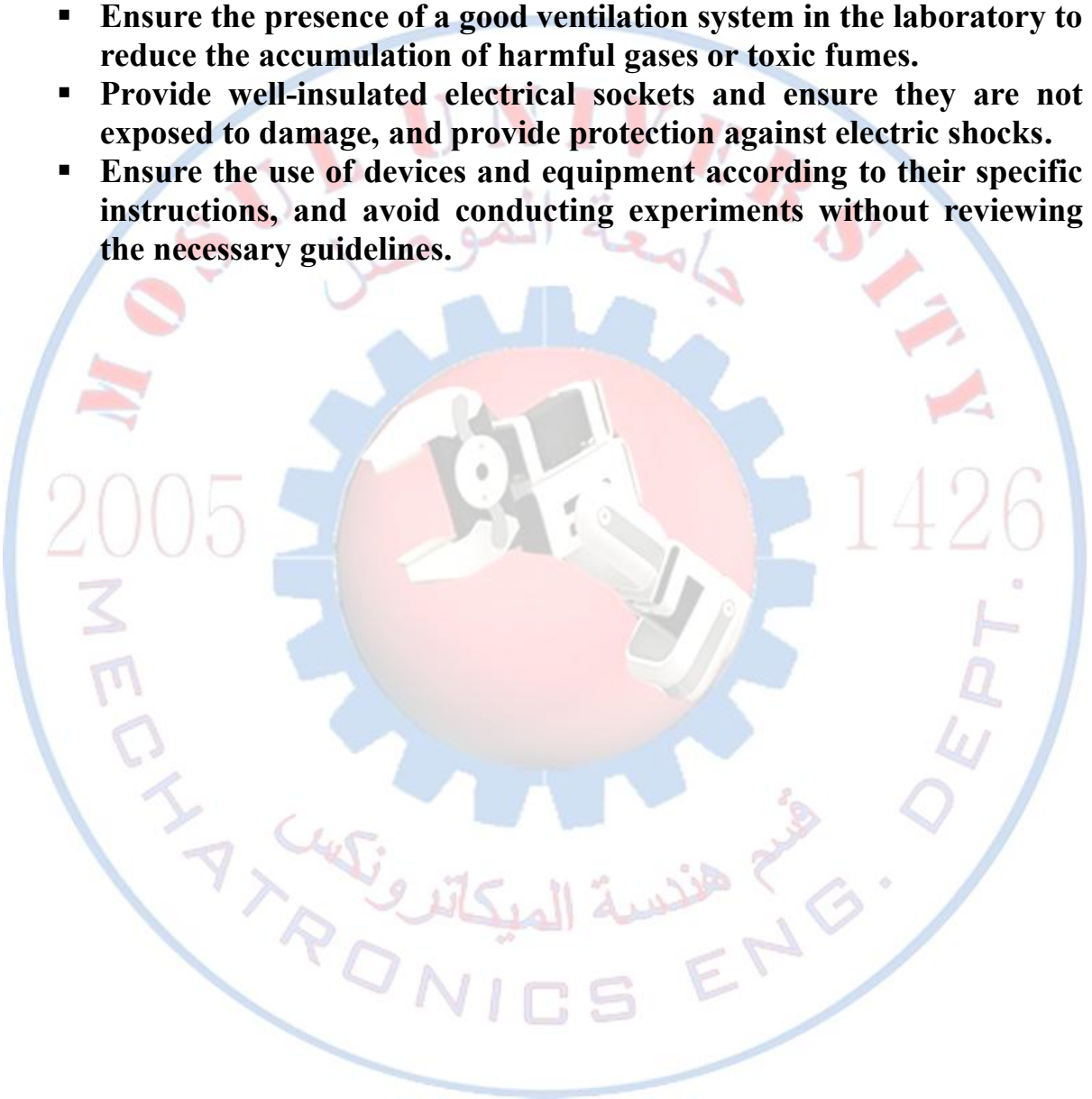
Stakeholders:

The lab provides opportunities for interactive learning and hands-on training, allowing students and researchers to benefit from developing their practical skills in the field of microprocessors and programming. It also enables them to understand the theories related to microprocessors and apply them practically.

Health Guidelines:

Below are some important safety and health guidelines for Microprocessor lab:

- **Ensure the presence of fire alarm systems and firefighting equipment in the laboratory, provide emergency exits, and ensure their safety and accessibility.**
- **Ensure the presence of a good ventilation system in the laboratory to reduce the accumulation of harmful gases or toxic fumes.**
- **Provide well-insulated electrical sockets and ensure they are not exposed to damage, and provide protection against electric shocks.**
- **Ensure the use of devices and equipment according to their specific instructions, and avoid conducting experiments without reviewing the necessary guidelines.**



Apparatuses Description of Microprocessor Laboratory

No.	Device Name	Device Description	Quantity	Device Picture
1	Computer	It is used to execute various experiments and projects related to microprocessors and assembly language.	9	
2	MTS-86C Kit	It helps students understand the structure and programming of the 8086 computers.	6	
3	Oscilloscope	It is used to display and analyze the waveform of electronic signals.	4	
4	Top 2007 IC-programmer	It is used in programming a wide range of EPROMs, microcontrollers, EEPROMs, and GAL ICs.	2	

Apparatuses Description of Microprocessor Laboratory

No.	Device Name	Device Description		Device Picture
5	DC power supply	Providing voltage and current with various values and readings.	3	
6	Data show	Used to display and present lectures and power point files.	1	

Workshop

Overview:

The workshop had been established since 2006 and it contains the basic mechanical instruments such as spanners, screw drivers, files … etc and other devices such as lathe machine which help to combine the lectures received in class and the practical training.

Objectives:

To give students the basic techniques those used are in plain workshop.

Experimental Lab:

Many experiments can be given in about two hours of workshop works that can be given usually to many groups of students. Those experiments are concluded as follow: -

1. **Turning operation**
2. **Milling operation**
3. **Drilling**
4. **Wood works**
5. **Arc welding**
6. **grinding operation**
7. **Filing**
8. **Measurements.**

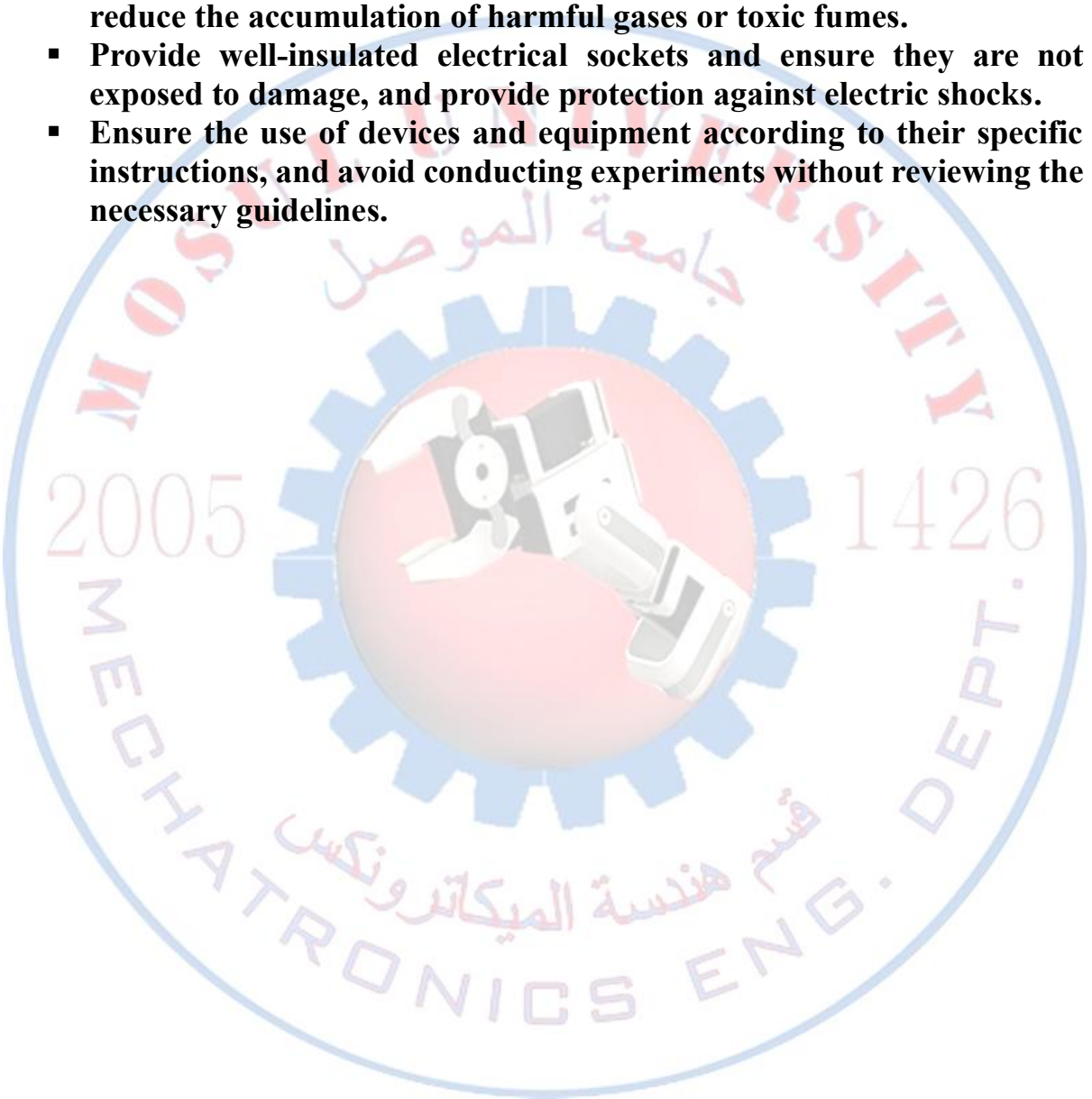
Stakeholders:

Undergraduate students, namely the first grade students, are the main target of the workshop by allowing training for the basic techniques such as lathe operation, drilling …etc. Final grade students can also use the workshop for doing their undergraduate projects specially the mechanical parts. Faculty and graduate students can also do their research rigs and equipment in the workshop.

Health Guidelines:

Below are some important safety and health guidelines for the Workshop:

- **Ensure the presence of fire alarm systems and firefighting equipment in the laboratory, provide emergency exits, and ensure their safety and accessibility.**
- **Ensure the presence of a good ventilation system in the laboratory to reduce the accumulation of harmful gases or toxic fumes.**
- **Provide well-insulated electrical sockets and ensure they are not exposed to damage, and provide protection against electric shocks.**
- **Ensure the use of devices and equipment according to their specific instructions, and avoid conducting experiments without reviewing the necessary guidelines.**



Apparatuses Description of Workshop

No.	Device Name	Device Description	Quantity	Device Picture
1	Multimeter	A device used for measuring current, voltage, resistance, frequency, and specialized measurements of some electronic components.	2	
2	Power supply	It supports variable voltages and amperes	1	
3	Lathe machine	It is used for longitudinal and face turning, teeth machining, drilling, boring …ect for different materials such as steels, brass, aluminum, plastics …etc.	1	
4	Arc welding	It used for welding steels.	1	
5	Bench drill machining	It is used for drilling different material such steels, plastics, wood, aluminum, brass …etc.	1	

Apparatuses Description of Workshop

No.	Device Name	Device Description	Quantity	Device Picture
6	Portable power saw	It is used basically for cutting woods, aluminum, acrylic and plastics.	1	
7	Oscilloscope	A device used to study electrical transmission patterns as well as power and frequency	1	

University of Mosul / College of Engineering / Department of Mechatronics Engineering
2025-2024 Course Catalog /First and Second Stages / Polonia System

Republic of Iraq - Ministry of Higher Education and Scientific Research
University of Mosul
Bachelor's degree in Mechatronics Engineering (First cycle)
Four years (Eight semesters) - 240 ECTS credits - 1 ECTS = 25hr
Program Curriculum (2023 - 2024)

جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة الموصل
بكالوريوس في هندسة الميكاترونكس (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة اوربية - كل وحدة اوربية = ٢٥ ساعة
المنهاج الدراسي للعام ٢٠٢٣-٢٠٢٤

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w) CL	Lect	Lab	Pr	Tut	Semn	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
UGI	One	1	MTE 101	English Language	اللغة الانكليزية	English	2						3	33	17	50	2.00	S	
		2	MTE 102	Mathematics I	الرياضيات I	English	4						3	63	87	150	6.00	B	
		3	MTE 103	Material Science	علم المواد	English	2				2		3	63	87	150	6.00	B	
		4	MTE 104	Engineering Drawing & AutoCAD	الرسم الهندسي والرسم بواسطة I	English			4				3	63	62	125	5.00	B	
		5	MTE 105	Computer	الحاسوب	English	1		2				3	48	27	75	3.00	B	
		6	MTE 106	Electrical Circuits Analysis I	تحليل الدوائر الكهربائية I	English	2		2		1		3	78	72	150	6.00	C	
		7	MTE 107	Democracy and Human Rights	الديمقراطية و حقوق الانسان	Arabic	2						3	33	17	50	2.00	S	
						Total	13	0	8	0	3	0	21	381	369	750	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w) CL	Lect	Lab	Pr	Tut	Semn	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
	Two	1	MTE 108	Arabic language	اللغة العربية	Arabic	2						3	33	17	50	2.00	S	
		2	MTE 109	Mathematics II	الرياضيات II	English	4						3	63	62	125	5.00	B	
		3	MTE 110	Engineering Mechanics-Statics I	الميكانيكك الهندسي - السكون	English	3	1			1		3	78	47	125	5.00	B	
		4	MTE 111	Computer Programming	برمجة الحاسوب	English	2		2				3	63	62	125	5.00	B	
		5	MTE 112	Manufacturing Processes	عمليات التصنيع	English	2		2				3	63	37	100	4.00	C	
		6	MTE 113	Electrical Circuits Analysis II	تحليل الدوائر الكهربائية II	English	2		2		1		3	78	47	125	5.00	C	MTE 106
		7	MTE 114	Physics	الفيزياء	English	2				1		3	48	52	100	4.00	B	
						Total	17	1	6	0	3	0	21	426	324	750	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w) CL	Lect	Lab	Pr	Tut	Semn	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
UGII	Three	1	MTE 201	Baath regime crimes in Iraq	جرائم نظام البعث في العراق	Arabic	2						3	33	17	50	2.00	S	
		2	MTE 202	Engineering Mechanics-Dynamics	الميكانيكك الهندسي - الحركي	English	4				1		3	78	47	125	5.00	C	
		3	MTE 203	Applied Mathematics I	الرياضيات التطبيقية I	English	4						3	63	62	125	5.00	B	MTE 109
		4	MTE 204	Electronic Principles and Devices	مبادئ الالكترونك والنبائط	English	4		2				3	93	82	175	7.00	C	MTE 113
		5	MTE 205	Electrical Machines	المكائن الكهربائية	English	2		1		1		3	63	62	125	5.00	C	MTE 113
		6	MTE 206	Thermodynamics	الديناميكا الحرارية	English	3				1		3	63	37	100	4.00	C	
		7	MTE 207	Expermintal Methods for Engineers	الطرق المختبرية للمهندسين	English	2						3	33	17	50	2.00	C	
						Total	21	0	3	0	3	0	21	426	324	750	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w) CL	Lect	Lab	Pr	Tut	Semn	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
	Four	1	MTE 208	Applied Mathematics II	الرياضيات التطبيقية II	English	4	1					3	78	72	150	6.00	B	MTE 109
		2	MTE 209	Fluid Mechanics	ميكانيكا الموائع	English	4	1			1		3	93	57	150	6.00	C	
		3	MTE 210	Mechanics of Materials	ميكانيكا المواد	English	2				2		3	63	87	150	6.00	B	
		4	MTE 211	Digital Circuits Design	تصميم الدوائر المنطقية	English	2		2				3	63	37	100	4.00	C	
		5	MTE 212	Engineering Economics with statis	الاقتصاد الهندسي والاحصاء	English	3				1		3	63	62	125	5.00	B	
		6	MTE 213	Signals and Systems	الاشارات والنظم	English	2				1		3	48	27	75	3.00	C	MTE 203
						Total	17	2	2	0	5	0	18	408	342	750	30.00		

University of Mosul – College of Engineering – Mechatronics Engineering Department
Curriculum / Academic Year 2024–2025

(First Level/Fall semester)								
	Type	Subject	Theoretical hours	Practical hours	Units	Pre-request	Code	Notes
University requirements	Compulsory	English language	3	-	3	-	UOMC101	
	Compulsory	Computer	2	2	3	-	UOMC102	
College requirements	Compulsory	Calculus I	3	-	3	-	ENGC121	
	Compulsory	Engineering Drawing	-	3	1	-	ENGC123	
Department requirements	Compulsory	Electric circuit analysis	2	2	3	-	ECAN100	
	Compulsory	Engineering mechanics I (static)	3	-	3	-	EMSA101	
	Compulsory	Physics	2	-	2	-	PHY102	
Total hours			15	18	18			

(First Level/Spring semester)								
	Type	Subject	Theoretical hours	Practical hours	Units	Pre-request	Code	Notes
University requirements	Compulsory	Arabic language	2		2		UOMC100	
	Compulsory	Rights and freedom	2		2		UOMC103	
	Elective	Manufacturing processes	2		2		-	Student choose one
	Elective	Environmental pollution	2		2		-	
	Elective	Information technology	2		2		-	
	Elective	Electrical installation	2		2		-	
	Elective	Modelling of building materials	2		2		-	
College requirements	Compulsory	Calculus II	3		3	Calculus I	ENGC122	
	Compulsory	Auto cad		3	1	Engineering drawing	ENGC124	
Department requirements	Compulsory	Strength of materials	2		2	Engineering mechanics	STMT150	
	Compulsory	Algorithm and computer programing	1	2	2	Computer	ALCP151	
	Compulsory	Engineering materials and manufacturing	3	2	4		ENMM152	
Total hours			15	7	18			

(Second Level/Fall semester)								
	Type	Subject	Theoretical hours	Practical hours	Units	Pre-request	Code	Notes
University requirements	Compulsory	Professional ethics	2		2		UOMC104	
College requirements	Compulsory	Statistics	2		2		ENGC227	
	Compulsory	Engineering math I	3		3	Calculus I,II	ENGC228	Compulsory for department student
Department requirements	Compulsory	Engineering mechanics II(dynamic)	2		2	Engineering mechanic I	EMDY201	
	Compulsory	Electrical machine	2	2	3	Electrical circuit analysis	ELMA202	
	Compulsory	Thermodynamic and heat transfer	2		2		THHT203	
	Compulsory	Electronic principle	2	2	3	Electrical circuit analysis	ELCP204	
Total hours			15	4	17			

(Second Level /Spring semester)								
	Type	Subject	Theoretical hours	Practical hours	Units	Pre-request	Code	Notes
University requirements	Compulsory	English language pre intermediate	1		1			last level take 3 units
College requirements	Compulsory	Engineering economics	2		2		ENGC226	
	Compulsory	Engineering math II	3		3		ENGE230	Compulsory for dep.
Department requirements	Compulsory	Fluid mechanics	2		2	Thermodynamic and heat transfer	FLME251	
	Compulsory	Digital logic	2	2	3	Electronic principle	DILO252	
	Compulsory	Electromechanical systems	2	2	3	Electrical machine	ELES253	
	Compulsory	Signal and system	2		2	Calculus II	SISY254	
	Elective	Introduction to mechanical design	3		3	Strength of materials	INMD261	Student choose one
		Composite materials	3		3	Engineering materials and manufacturing process	COMA262	
		Advanced heat transfer	3		3	Thermodynamic and heat transfer	AHTR263	
		Renewable energy	3		3	Thermodynamic and heat transfer	RENR264	
Total hours			17	4	19			

(Third Level/Fall semester)								
	Type	Subject	Theoretical hours	Practical hours	Units	Pre-request	Code	Notes
University requirements	Compulsory	English language intermediate	2		2			
College requirements	Compulsory	Numerical analysis	2		2	Calculus I,II	ENGE320	Compulsory for depart.
Department requirements	Compulsory	Mechanism and vibration	2		2	Engineering mechanics II dynamics	MEVI300	
	Compulsory	Mechanics engineering lab.		2	1	Engineering mechanics II dynamics	MLAB301	
	Compulsory	Modelling and simulation	1	2	2	Signal and system	MODS302	
	Compulsory	Measurement and instrumentation	2	2	3	Electronic principle	MEIN303	
	Compulsory	Microprocessors and assembly language	2	2	3	Digital logic	MICA304	
	Elective	Signal processing	3		3	Signal and system	SPRO361	Student choose one
	Elective	Image processing	3		3		IMPR362	
		Total hours	14	8	18			

(Third Level /Spring semester)								
Notes	Type	Subject	Theoretical hours	Practical hours	Units	Pre-request	Code	Notes
Department requirements	Compulsory	Design of machine element	3		3	Engineering mechanics II dynamic	DMEL350	
	Compulsory	Power electronics and drives	2	2	3	Electronic principle	PELD351	
	Compulsory	Control systems	2	2	3	Modelling and simulation	CONS352	
	Compulsory	Microcontroller system design	2	2	3	Microprocessors and assembly language	MCSD353	
	Compulsory	Theory of machine	2		2	Engineering mechanics II dynamic	THMH354	
	Compulsory	Hydraulic and pneumatic systems	2		2	Fluid mechanics	HPNS355	
	Elective	Solid modelling	3		3		SMOD363	Student choose one
		Industrial LAN	3		3		ILAN364	
		Communication engineering	3		3		COEN365	
Total hours			16	6	19			

Note :Summer Training is one of the requirements that the student has to apply during July or August.

(Fourth Level/Fall semester)								
	Type	Subject	Theoretical hours	Practical hours	Units	Pre-request	Code	Notes
College requirements	Elective	Public safety	2		2		ENGE429	Compulsory for depa.
Department requirements	Compulsory	Robotics	2	2	3	Theory of machine	ROTI400	
	Compulsory	Design of machine elements II	3		3	Design of machine element I	DMEL401	
	Compulsory	Modern control systems	2	2	3	Control system	MOCS402	
	Compulsory	Graduation project I	2		2	All compulsory department requirements for the third level	ENGP403	
	Elective	Special topics in mechatronics	3		3		STME461	Student choose one
	Elective	CNC machine	3		3		CNCM462	
	Elective	Building management system	3		3		BMSY463	Student choose one
	Elective	PC interface and data acquisition	2	2	3	Microcontroller and system design	PCID464	
	Total hours		16/17	4/6	19			

(Fourth Level /Spring semester)								
	Type	Subject	Theoretical hours	Practical hours	Units	Pre-request	Code	Notes
University requirements	Compulsory	English language upper intermediate	2		2			
College requirements	Elective	Engineering management	2		2		ENDC425	
Department requirements	Compulsory	Mechatronics systems design	2	2	3	Control system	MSTD450	
	Compulsory	Industrial automation	2	2	3	robotics	INAU451	
	Compulsory	Graduation project II	2		2	Graduation project I	ENGP452	
	Compulsory	Artificial intelligent	2		2		ARIN453	
	Elective	Mobile robot	3		3	robotics	MROB465	Student choose one
	Elective	Intelligent control	3		3	Control system	ICON464	
Total hours			15	4	17			

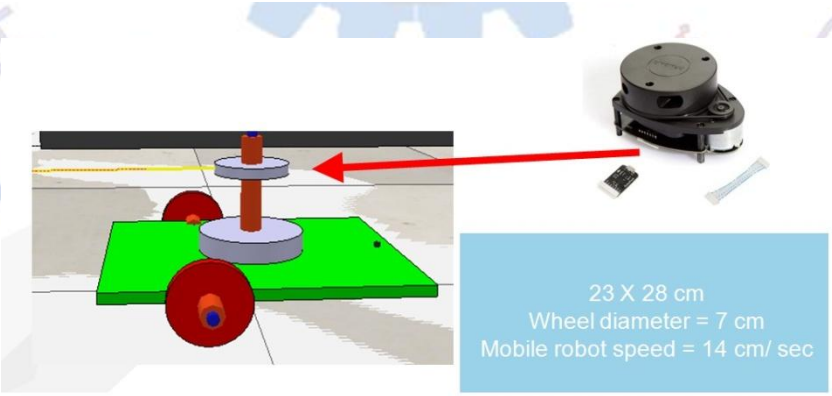
Research Directions/Aspects Considered in Department of Mechatronics Engineering

The department provides a wide range of facilities for training and research in Mechatronics Engineering. The research sides in the Mechatronics Engineering department mainly focus on: The Automation of Industrial Systems, Adjustable Control, Neural Networks applications, Artificial Intelligence, Intelligent Control, Remote Controlling Techniques, The simulation of physical systems, Mechanical systems control, and Robots. Currently, there are three main research paths as follows:

1-Robot Technology:

The robot is considered a mechanical machine that can be programmed to perform numerous tasks. The areas of robot technology usage expanded to include the inspection and production in the human risk environment. The robots could be damaged and face errors that affect its performance, in addition to obstacles that may appear it its path. Staff currently working on the study of fault diagnosis for the robot arm and obstacles avoidance in this field are:

- **Assistant Prof Dr. Muhammed Azhar**
- **Lecturer Dr. Zead Mohammed Yosif**



The current researches in this field are:

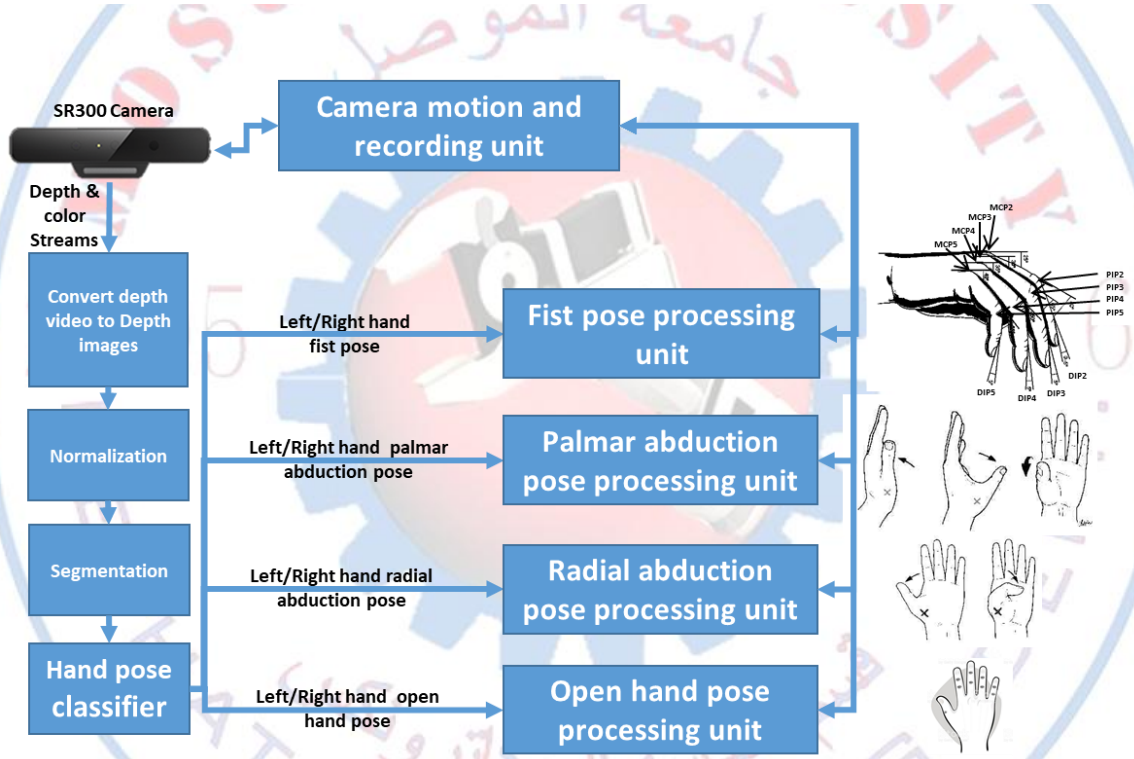
- **Faults Diagnosis in Robot Systems: A Review**
- **Reactive mobile robot navigation**

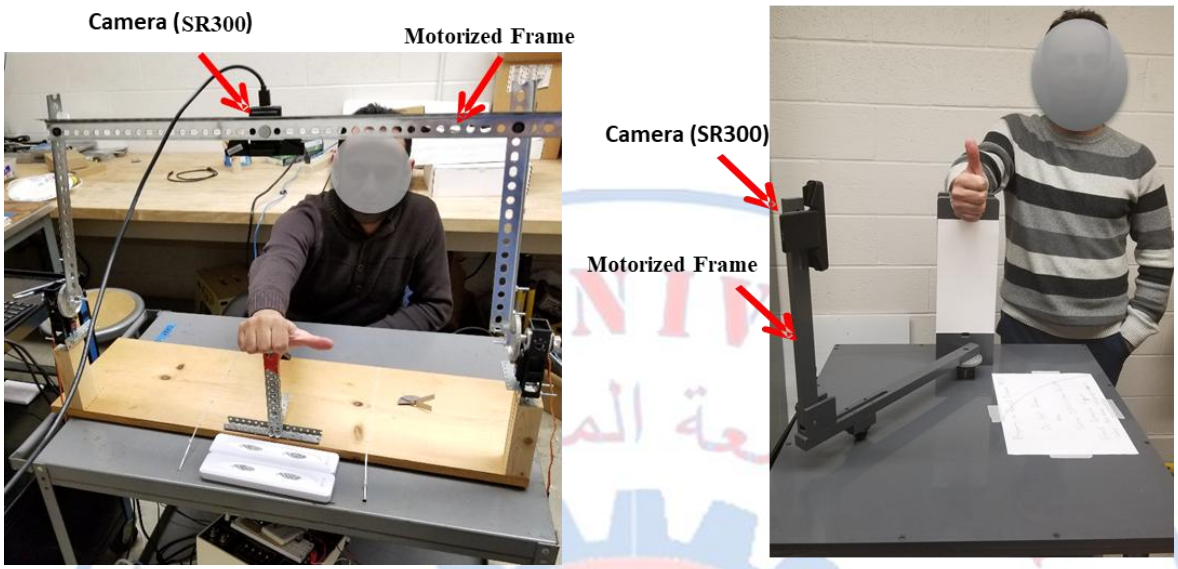
2-Medical devices for rehabilitation and Artificial organs:

Humans are affected daily by different accidents that lead to various levels of disability in organs functions.

Staff researching this field are:

- **Assistant Prof. Dr. Aws Hazim Saber**
- **Lecturer Dr. Mohammed Yaseen Hazim**





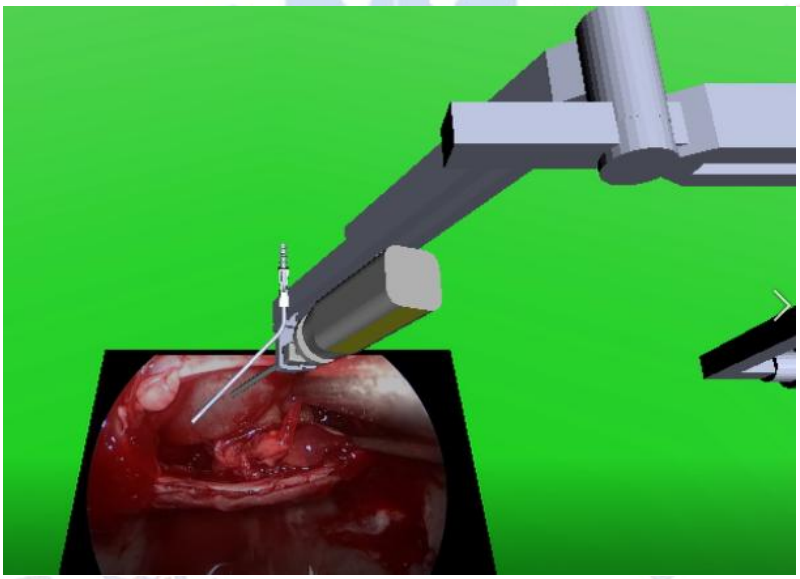
Main researches in this path:

- **Aws Anaz, Marjorie Skubic, Jay Bridgeman, and David M. Brogan, "Classification of Therapeutic Hand Poses Using Convolutional Neural Networks," IEEE International Conference of the Engineering in Medicine and Biology Society (EMBC),**
- **Khalil, Rafid Ahmed, Aws Anaz. "FPGA Implementation of Adaptive Noise Canceller." AL Rafdain Engineering Journal 17, no. 4 (2009): 63-72.**
- **Aws Anaz, Marjorie Skubic, Jay Bridgeman, and David M. Brogan, "Automated And Non-contact Human Finger Range Of Motion Measurement System," under preparation.**

3-Surgical Robots:

with the fast-growing technology in medical devices, many surgical techniques have been made. During the last three decades, surgical robots industry has developed and been used in real-life surgical operations. Researches and studies to develop surgical systems with the use of robots have been accomplished. In our department, we follow this important path.

- **Assistant Prof. Dr. Saad Ahmed Salih**
- **Lecturer Dr. Omar Waleed Najm (https://orcid.org/0000-0002-8910-2075 , Scopus Author ID: 55561100900)**



University of Mosul
College of Engineering

This guide has been prepared under the guidance of the Dean of the College of Engineering

Professor Dr. Abdul Rahim Ibrahim Jassim

Under the supervision of the Head of the Mechatronics Engineering Department
Assistant Professor
Dr. Aws Hazim Saber

To serve as a reference for introducing the Department of Mechatronics Engineering, its members, and the study programs for undergraduate and graduate studies

coordination
Department of Media and Government Communication at the College of Engineering

2025 Edition