

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

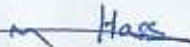


Academic program description form for colleges and institutes

University: Northern Technical

Scientific Department: Medical Instrumentation Techniques

Signature: 

Signature: 

Department head name: Dr. S. H. S. Mohamed Vice Dean of scientific Affairs: Dr. Hassan M. Qassim

Date: 17/6/2026

Date: 17/6/2026

The file has already been checked.

Quality Assurance and University Performance Division

Name of the Director of the Quality Assurance and University Performance Division:

Mohamed Khaled Yousif

Date: 17/6/2026

Signature: 



Dean's endorsement

1.Program vision

A dedicated pursuit of excellence in delivering the best technical medical support services to healthcare and medical institutions in Iraq, based on scientific principles and aligned with medical and health standards

2.Program message:

To supply society, as well as the public and private sectors, with skilled technical personnel specialized in medical device technologies, equipped with outstanding capabilities to support healthcare institutions in Iraq. This includes developing the competencies of the department's faculty and top-performing students, aiming to advance the vertical integration of technical education in the medical field.

3- Program objectives

1. Strengthening the capabilities and potential of healthcare systems by supporting them with medical instrumentation technologies.
2. Responding to the needs of society and both the public and private sectors by providing specialized medical device technicians capable of maintaining and advancing modern medical equipment to enhance the healthcare system's performance.
3. Establishing modern systems for managing healthcare devices and equipment based on the latest technical methods and standards, and performing regular maintenance on all devices.
4. Enhancing technical performance in the field of medical devices through advanced technologies that save time, effort, and costs, ensuring optimal execution of medical technical tasks

4-Program accreditation:

nothing

5-Other external influences:

nothing

6–Program structure:

Program Structure	Number of Courses	Study Unit	Percentage	Notes *
University requirements	10	20		
Institute requirements	8	19		
Department requirements	25	83		
summer training		completed		
Other	/	There isn't any		

7– Program description

Year/level	Course or course code	Name of the course or course	Hours	Note
2025–2026/ first	NTU100	Democracy and Human Rights	٢	
	NTU101	English language 1	2	
	NTU102	Computer 1	1	
	NTU103	Arabic language 1	2	
	NTU105	Physical Activity	1	
	NTU106	French Language	2	
	TIMO100	Mathematics	2	
	TIMO101	Mechanical Workshop	0	
	TIMO102	Engineering Drawing	0	
	ETMI100	DC Current Circuits	4	
	ETMI101	AC Current Circuit	4	
	ETMI102	Analogue Electronic Principles	4	
	ETMI103	Digital Electronic Principles	4	
	ETMI104	Electronic workshop	3	
	ETMI105	Electrical workshop	2	
	ETMI107	Drawing Electrical	3	
	ETMI108	Physics	4	
	ETMI109	Medical Physics	4	
	ETMI110	Chemistry	4	
	ETMI111	Medical Chemistry	4	

2025-2026 / 2nd	NTU 203	English Language	2	
	NTU 204	Professional Ethics	2	
	TIMO200	Baath Party Crimes	2	
	TIMO201	Research Project	2	
	TIMO202	Specialized Workshop	2	
	TIMO203	Application Project	2	
	TIMO204	Professional safety	2	
	ETMI200	Electrical Measurements and Sensors	4	
	ETMI201	Basic Electronic Circuits	5	
	ETMI202	Principles of Microcomputer	4	
	ETMI203	Medical Instrumentations Electronic	4	
	ETMI204	Maintenance of Electronic Medical Instrumentations	3	
	ETMI206	Electromechanical Medical Instrumentations	4	
	ETMI207	Advanced Electronic Circuits	5	
	ETMI209	Physiology	2	
	ETMI210	Maintenance of Electro-mechanical Medical Instrumentations	3	
	ETMI212	Control systems	4	
	ETMI213	Programmable Logic Controller (PLC)	3	
	ETMI214	Renewable Energy Systems	3	

8.Required program outcomes and teaching, learning and evaluation methods

A- Cognitive objectives

A1-Providing the graduate with the necessary knowledge to manage electronic systems of various –1 types and categories and how to deal with them and use them in the best possible way

A2- Providing the graduate with the necessary knowledge to manage computer systems and how to deal with their solid materials and install them

A3- Providing the graduate with basic information in the field of medical devices specialization, starting from choosing the most appropriate devices, through the basics of operation, and reaching assembly and maintenance of both software and electronic material types

A4- Providing the graduate with the necessary knowledge to manage control and command systems and knowledge of industrial automation systems and ways to deal with modern devices and machines

A5- Preparing the graduate to be ready to enter the labor market and enabling him to understand scientific developments in the field of modern medical electronic devices in addition to preparing him to deal with modern machines and advanced and rapidly developing technology

A6- Preparing the graduate to be able to use various electronic examination devices in his field of specialization

A7- Providing the graduate with the required knowledge and skills to deal with any modern medical device and the ability to prepare the necessary checks for these devices and indicate their suitability for work.

B - Program specific skill objectives

B1 - Providing the graduate with the necessary information about electronic components manufactured from semiconductors of different types, how to manufacture them, their basic properties, the function of each electronic component, and methods of installing them in different electronic circuits.

B2 - Knowing the methods of examining electronic components and how to obtain basic electrical signals, as well as their practical applications in various medical devices.

B3 - Preparing the graduate to be able to solve technical problems in the fields of electronics and various medical devices, how to perform periodic maintenance for them, and analyze the causes of their malfunctions and ways to overcome them.

B4 - Providing the graduate with the initial skills necessary to design simple practical electronic circuits using microcontrollers and programmable logic controllers, and how to connect the machine to the computer and control it.

9. Teaching and learning methods

1. Theoretical lectures
2. Practical lectures (laboratories)
3. Workshops of all kinds
4. Audio and visual aids
5. Scientific films
6. Scientific field visits
7. Summer training

10. Evaluation Methods

1. Daily quick tests (oral and written)
2. Midterm and final exams
3. Homework
4. Daily or weekly practical reports
5. Immediate evaluation of performance in workshops and laboratories
6. Study sessions
7. Performing a distinctive extracurricular activity
8. Discussing graduation projects

C- Emotional and value-based objectives.

A1- He has academic and technical information, experience and skill in the field of electronics, communications and software.

A2- He can keep pace with the rapid development in the field of modern electronic devices, including communications, control systems, computers, their systems and all their networks.

A3- He can manage, prepare and implement periodic programs for maintenance, sustainability and development.

A4- He has knowledge and awareness of how to install, operate and test practical electronic circuits.

A5- He has the mental ability to install and program transmitters, receivers and cameras of all kinds.

A6- He has full knowledge and awareness of everything new and advanced in the science of and medical electronics devices of all kinds and their uses

11-The teaching staff**Faculty members**

Academic rank	specialization		Special requirements/skills (if any)		preparation of the teaching staff	
	general	Specialized			lecturer	staff
Lecturer	Medical Engineering				staff	
Lecturer	Electrical Engineering				staff	
Lecturer	Electrical Engineering				staff	
Lecturer	Computer Engineering				staff	
Lecturer	Renewable energies					
Assistant Lecturer	Communications Engineering				staff	
Assistant Lecturer	Electrical Engineering				staff	
Assistant Lecturer	Computer Technology Engineering				staff	
Assistant Lecturer	Electrical power				staff	
Assistant Professor	mathematics					
Assistant Lecturer	Physics					
Lecturer	Chemistry					
Lecturer	Physics					

12-Professional development
Orienting new faculty members
Professional development
Professional development for faculty members

13-Acceptance criterion
1-Average 2- Desire 3- Corresponding specialization in vocational secondary schools.

14- The most important sources of information about the program
-External sources (the Internet) - Scientific research and its latest developments -Methodological books

15-Program development plan
1- Learn about recent scientific developments. 2- Participation in international and local conferences. 3- Participation in scientific workshops inside and outside Iraq. 4- Hosting scientific competencies in the field of specialization

CODE	Count the units	Number of hours		:Course name in language		Requirement type
		practical	theoretical	الانكليزية	العربية	
NTU 100	2	-	2	Rights Democracy and Human	الديمقراطية وحقوق الانسان	University requirements (10-15)%
NTU 101	2	-	2	English Language	اللغة الانكليزية	
NTU 102	2	1	1	Computer	الحاسوب	
NTU 103	2	0	2	Arabic Language	اللغة العربية	

NTU 104	2	1	1	Sport	رياضة (اختياري)	
NTU 105	2	0	2	French Language	اللغة الفرنسية (اختياري)	
	8	:: Total university requirements units				
MTI100	2	0	2	Mathematics	الرياضيات	Institute Requirements (16-22)%
MTI101	3	3	0	Mechanical Workshops	ورش ميكانيكية	
MTI102	3	3	0	Engineering Drawing	رسم هندسي	
MTI103	2	0	2	Calculus	تفاضل وتكامل	
	10	Total units of institute requirements				
ETMI100	4	2	2	DC Current Circuits	دوائر التيار المستمر	Department Requirements (63-74)%
ETMI101	4	2	2	AC Current Circuit	دوائر التيار المتناوب	
ETMI102	4	2	2	Analogue Electronic Principles	مبادئ الإلكترونيك التناظري	
ETMI103	4	2	2	Digital Electronic Principles	مبادئ الإلكترونيك الرقمي	
ETMI104	3	3	0	Electronic workshop	ورشة إلكترونية	
ETMI105	2	2	0	Electrical workshop	ورشة كهربائية	
ETMI107	3	3	0	Drawing Electrical	رسم كهربائي	
ETMI108	4	2	2	Physics	فيزياء	
ETMI109	4	2	2	Medical Physics	فيزياء طبية	
ETMI110	4	2	2	Chemistry	كيمياء	
ETMI111	4	2	2	Medical Chemistry	كيمياء طبية	
ETMI112	2	0	2	Mechanics	ميكانيك	
	42	Total units of department requirements				

Level2

CODE	Count the units	Number of hours		Course name in language		Requirement type
		practical	theoretical	الانكليزية	العربية	
NTU 200	2	-	2	English Language	اللغة الانكليزية	University requirements (10-15)%
NTU 201	2	1	1	Computer	الحاسوب	
NTU 202	2	-	2	Arabic Language	اللغة العربية	
NTU 203	2	-	2	Crimes of the Baath regime in Iraq	جرائم حزب البعث	
NTU 204	2	-	2	Professional Ethics	اخلاقيات المهنة	
	10	:Total university requirements units				
MTI200	2	.	2	Research Project	مشروع البحث	

MTI201	3	3	.	Specialized Workshop	ورشة تخصصية	Institute Requirements (16-22) %
MTI202	2	2	-	Application Project	مشروع	
MTI203	2	-	2	Professional safety	سلامة مهنية	
	9	Total units of institute requirements:				
ETMI200	4	2	2	Electrical Measurements and Sensors	القياسات الكهربائية والمتحسسات	Department Requirements (63-74)%
ETMI201	5	3	2	Basic Electronic Circuits	دوائر الكترونية اساسية	
ETMI202	4	2	2	Principles of Microcomputer	مبادئ الحاسوب الدقيق	
ETMI203	4	2	2	Medical Instrumentations Electronic	الاجهزة الطبية الالكترونية	
ETMI204	3	3	0	Maintenance of Electronic Medical Instrumentations	صيانة الاجهزة الطبية الالكترونية	
ETMI206	4	2	2	Electromechanical Medical Instrumentations	الاجهزة الطبية الكهروميكانيكية	
ETMI207	5	3	2	Advanced Electronic Circuits	دوائر الكترونية متقدمة	
ETMI209	2	0	2	Physiology	فسلجة	
ETMI210	3	3	0	Maintenance of Electro-mechanical Medical Instrumentations	صيانة الاجهزة الطبية الكهروميكانيكية	
ETMI212	4	2	2	Control systems	نظم السيطرة	
ETMI213	3	2	1	Programmable Logic Controller (PLC)	متحكم منطقي قابل للبرمجة	
ETMI214	3	2	1	Renewable Energy Systems	منظومات الطاقة المتجددة (اختياري)	
ETMI215	3	2	1	Computer Applications	تطبيقات الحاسبة (اختياري)	
Total units of department requirements						

Program skills chart																			
Learning outcomes required from the program																			
Year/level	Course code	Course name	Essential or optional	Knowledge				skills				values				Knowledge			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4
First	ETMI102	Principles of Analog Electronics	Essential	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	ETMI108	Physics	Essential	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	ETMI110	Chemistry	Essential	√	√	√		√	√	√		√	√	√	√	√	√	√	√
	ETMI101	AC Circuits	Essential	√	√			√	√	√	√	√	√	√	√	√	√	√	√
	NTU103	Arabic	optional	√	√	√	√	√	√			√	√			√	√		
the second	ETMI203	Electronic Medical Devices	Essential	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	ETMI206	Electromechanical Medical Devices	Essential	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	ETMI212	Control systems	Essential	√	√	√	√	√	√	√	√	√	√	√		√	√	√	√

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1. Teaching Institution	Ministry of Higher Education and Scientific Research / Northern Technical University
2. University/ Department	Mosul Technical Institute/ Medical Instrumentation Techniques
3. Course title/code	Democracy and Human Rights NTU100
4. Programme (s) to which it contributes	Technical Diploma
5. Modes of Attendance offered	* Weekly lesson schedule (theoretical) * Scientific discussions, seminars, other activities
6. Semester/Year	Annual
7. Number of hours tuition (total)	٣٠
8. Date of production/revision of this specification	8 / 1 / 2025
9. Aims of the Course ١ - Providing students with basic concepts related to democracy and human rights. 2- Knowledge of political systems, methods of elections and public freedoms. 3- Developing the legal and constitutional culture among students.	
10. Course outcomes and teaching, learning and evaluation methods	
A. Cognitive objectives 1- Enabling students to understand the concept of democracy and the rights to be implemented in the field of human rights. 2- Developing the knowledge aspects of the constitution, the legal state and human rights guarantees.	
B - The skills objectives of the course. Enable students to understand the concept of democracy and the rights to be done in the field of human rights and how to defend these rights. And know the guarantees related to them.	
Teaching and learning methods	
((Theoretical lectures / interactive lectures))	
Evaluation methods	
((Oral tests / written tests / weekly reports / daily attendance / participation and interaction in lectures / semester and final exams))	
C- Emotional and value goals Carrying out duties in the workplace with professional motives	
Teaching and learning methods	
((Theoretical lectures / seminars / debate work between students))	
Evaluation methods	
((Oral Tests / Written Tests / Observation / Student Cumulative Record))	
D - Transferable general and qualifying skills (other skills related to employability and personal development). Understand the concept of democracy and the rights to be implemented in the field of human rights.	

11. Course Structure

Week	Hours	Unit/Module or Topic Title	ILOs	Teaching Method	Assessment Method
1	٢	Human rights, definition, objectives Human rights in ancient civilizations / Human rights in heavenly laws	Knowledge and application	Theoretical	Tests & Reports
2	٢	Human Rights in Contemporary and Modern History (International Recognition of Human Rights since the First World War and the League	Knowledge and application	Theoretical	Tests & Reports

		of the United Nations) / Regional Recognition of Human Rights: European Convention on Human Rights 1950, American Convention on Human Rights 1969, African Charter on Human Rights 1981, Arab Charter on Human Rights 1994			
3	٢	NGOs and human rights (ICRC, Amnesty International, Human Rights Watch, National Human Rights Organizations	Knowledge and application	Theoretical	Tests & Reports
4	٢	Human rights in Iraqi constitutions between theory and reality / the relationship between human rights and public freedoms: -١ In the Universal Declaration of Human Rights. -٢ In regional charters and national constitutions.	Knowledge and application	Theoretical	Tests & Reports
5	٢	Economic, social and cultural human rights , Civil and political human rights / Modern human rights : Facts in development , Right to clean environment , Right to solidarity , Right to religion	Knowledge and application	Theoretical	Tests & Reports
6	٢	Guarantees of respect and protection of human rights at the national level, guarantees in the Constitution and laws, guarantees in the principle of the rule of law, guarantees in constitutional oversight, guarantees in freedom of the press and public opinion, the role of non-governmental organizations in respecting and protecting human rights / guarantees, respect and protection of human rights at the international level: ١ Role of the United Nations and its specialized agencies in providing safeguards -٢ The role of regional organizations (Arab League, European Union, African Union, Organization of American States, ASEAN.) ٣ Role of international, regional non-governmental organizations and public opinion in respecting and protecting human rights	Knowledge and application	Theoretical	Tests & Reports
7	٢	The general theory of freedoms: the origin of rights and freedoms, the legislator's position on public rights and freedoms, the use of the term public freedoms	Knowledge and application	Theoretical	Tests & Reports
8	٢	Organizing public freedoms from the previousness of equality: the historical development of the concept of equality The modern development of the idea of equality -Gender equality -Equality between individuals according to their beliefs and race to public authorities	Knowledge and application	Theoretical	Tests & Reports
9	٢	Freedom of learning , freedom of the press , freedom of assembly Freedom of association, freedom of work Right of ownership	Knowledge and application	Theoretical	Tests & Reports
10	٢	Freedom of trade and industry Freedom of security and a sense of security Freedom to go and return Freedom of trade and industry Women's freedom	Knowledge and application	Theoretical	Tests & Reports

11	٢	Scientific and technical progress and public freedoms The future of public freedoms	Knowledge and application	Theoretical	Tests & Reports
12	٢	The crime of genocide	Knowledge and application	Theoretical	Tests & Reports
13	٢	Democracy, its characteristics and types	Knowledge and application	Theoretical	Tests & Reports
14	٢	Elections, their definition and types	Knowledge and application	Theoretical	Tests & Reports
15	٢	Contemporary political systems	Knowledge and application	Theoretical	Tests & Reports

1. Infrastructure

Required reading:	Available in free education and institute library
Main references (sources)	Available in free education and institute library
B - Electronic references, Internet sites...	Internet

2. Course development plan

- 1- Developing curricula appropriate to human rights developments.
- 2- Dividing the article into two parts, the first related to human rights and the second to democracy.

1. Teaching Institution	Ministry of Higher Education and Scientific Research / Northern Technical University
2. University/ Department	Mosul Technical Institute/ Medical Instrumentation Techniques
3. Course title/code	Computier1 NTU102
4. Programme (s) to which it contributes	Technical Diploma
5. Modes of Attendance offered	* Weekly lesson schedule (theoretical and practical) * Scientific discussions, seminars, other activities
6. Semester/Year	Annual
7. Number of hours tuition (total)	30
8. Date of production/revision of this specification	8 / 1 / 2024
9. Aims of the Course	
1- Teaching the student the skills of working on the computer and the use of ready-made applications and the principles of the Internet in the field of specialization.	
2- Perform his duties at the workplace for professional motives.	
10. Course outcomes and teaching, learning and evaluation methods	
A. Cognitive objectives	
A1-Teaching the student the skills of working on the computer and the use of ready-made applications and the principles of the Internet in the field of specialization.	
B - The skills objectives of the course.	
B1 - Teaching the student the skills of working on the computer and the use of ready-made applications and the principles of the Internet in the field of specialization.	
Teaching and learning methods	
((Theoretical lectures / practical lectures / field visits / solving examples / seminars / summer training))	
Evaluation methods	
((Oral exams / written tests / weekly reports / daily attendance / semester and final exams))	
C- Emotional and value goals	
C1- Perform his duties at the workplace for professional motives.	
Teaching and learning methods	
((Theoretical lectures / practical lectures / field visits / solving examples / seminars / summer training))	

Evaluation methods

((Oral Tests / Written Tests / Observation / Student Cumulative Record))

D - Transferable general and qualifying skills (other skills related to employability and personal development).

D1- Improve their discussion skills.

D2- Raising their research perceptions and transferring the student from the stage of teaching to learning.

11. Course Structure

Week	Hours	Unit/Module or Topic Title	ILOs	Teaching Method	Assessment Method
2&1	2	Introduction to the computer / computer system / information technology / types of computers / input units / central processing unit / output units / main memory and its types / data storage in memory / factors affecting computer performance Definition of software and its types / systems software: operating systems / programming languages and software systems / applied software.	Knowledge and practical application	Practical + Theoretical	Tests & Discussion
3	2	Introduction to Windows / its features / operating the device / shutting down the device / using the mouse / windows screen components: taskbar: icons: and their types (standard and general.)	Knowledge and practical application	Practical + Theoretical	Tests & Discussion
4	2	Control Panel / Desktop Control / Screen Saver / Window Colors and Lines / Screen Settings / Adjust Screen Colors / Modify Time and Date / Volume / Change Between Mouse Buttons / Double-Click Speed Control / Change Mouse Pointer / Control Mouse Speed / Install and Uninstall Programs	Knowledge and practical application	Practical + Theoretical	Tests & Discussion
5	2	Minimize and enlarge the window / final closure / temporary closure / move the window / control the capacity of the window / ways to run applications and programs	Knowledge and practical application	Practical + Theoretical	Tests & Discussion
6	2	Order start menu items / delete start menu items / add submenu to start menus / add new button to start menu	Knowledge and practical application	Practical + Theoretical	Tests & Discussion
7	2	Basic System Information / Stop Unwanted Applications Windows explorer window finder / My computer icon / my computer window parts	Knowledge and practical application	Practical + Theoretical	Tests & Discussion
8&9	2	Recycle Bin (delete, retrieve and empty the basket) / My Document icon	Knowledge and practical application	Practical + Theoretical	Tests & Discussion
10&11	2	Definition of files and folders / Identification of files and folders / Properties of files Definition of folders / Create files and folders / Change the name of files and folders / Move file or folder / Copy file or folder / Search for file or folder / Create a shortcut icon for an application or file	Knowledge and practical application	Practical + Theoretical	Tests & Discussion

12&13	2	Calculator / Notepad / WordPad / Use the memo to edit and create the file Paint / Screen components / Create drawings / Select front and background colors / Choose brush font size / Select and select the drawing tool / Save drawing / Make drawing desktop background / Quit Paint Entertainment programs Media player	Knowledge and practical application	Practical + Theoretical	Tests & Discussion
14&15	2	Viruses / Reason for naming / Definition / Ways of spreading the virus / Symptoms of infection with the virus / Protection methods / Types of viruses Computer crimes / theft / hackers	Knowledge and practical application	Practical + Theoretical	Tests & Discussion

12.Infrastructure

Required reading:	Available in the free department and library of the institute
Main references (sources)	Available in the free department and library of the institute
Recommended books and references (scientific journals, reports,...)	Internet

13.Course development plan

- 1- Developing curricula adapted to the labor market
- 2- Holding seminars and scientific conferences aimed at updating the curricula
- 3- Follow-up scientific developments in the field of specialization

1. Teaching Institution	Ministry of Higher Education and Scientific Research / Northern Technical University
2. University/ Department	Mosul Technical Institute Medical Instrumentation Techniques
3. Course title/code	Arabic Language NTU103
4. Programme (s) to which it contributes	Technical diploma
5. Modes of Attendance offered	* Weekly lesson schedule (theoretical) * Discussions and reports
6. Semester/Year	Annual
7. Number of hours tuition (total)	30
8. Date of production/revision of this specification	8 / 1 / 2024
9. Aims of the Course 1- Enabling the student to read correctly. 2- Enabling the student to write correctly and use punctuation marks. 3- The student should acquire the ability to use the Arabic language correctly. 4- Introducing the student to the correct Arabic language words, structures and sound methods in an interesting way. 5- Accustom the student to sound and clear expressions of his ideas. 6- Helping the student to understand complex structures and mysterious methods.	
10. Course outcomes and teaching, learning and evaluation methods	

A.Cognitive objectives A- The student should recognize common mistakes in writing Arabic in order to avoid them B - The student should recognize the punctuation marks and use them correctly C - The student should distinguish between the solar lam and the lunar lam, which helps to pronounce it correctly D - The student differentiates between Dhad and Zaa, and this is what helps him to avoid falling into a spelling error E - To distinguish between the verb, the noun and the letter, as this is what his Arabic speech is based on. F- He must be able to write the hamza in its correct position correctly.
B - The skills objectives of the course. B1 – Providing the student with a linguistic wealth that makes him more able to correctly express what he wants. B2- Correcting the student's tongue and preventing it from error
Teaching and learning methods
((Theoretical lectures / listening lectures / conversation lectures / interactive lectures / research in libraries and the Internet on specific topics)).
Evaluation methods
((Oral tests / written tests / weekly reports / daily attendance / participation and interaction in lectures / semester and final exams))
C- Emotional and value goals C1- Thinking, activation and organization development C2- Working to make the student's imagination fertile imagination by highlighting the aesthetics of the language and thus enabling him to express the essence of the soul in a proper way.
Teaching and learning methods
((Theoretical lectures / seminars / conducting debates between students / making reports))
Evaluation methods
((Oral Tests / Written Tests / Observation / Student Cumulative Record))
D - Transferable general and qualifying skills (other skills related to employability and personal development). D1- The ability to develop and develop his expressive skills such as poetry and story. D2- The ability to communicate with the outside world properly.

11. Course Structure

Week	Hours	Unit/Module or Topic Title	ILOs	Teaching Method	Assessment Method
1	٢	Introduction to linguistic errors – Taa Al-Marbouta and Al-Taa Al-Maktaba	1. Identify the types of linguistic errors. 2. Differentiate between open Taa and Taa tethered	Discussion method, lecture method	Oral test

2	٢	Rules for writing the elongated and compartment thousand – solar and lunar letters	1. Differentiate between the writing of the extended thousand and the compartment and the positions of the writing of the two thousand 2. Differentiate between solar letters and lunar letters	Discussion method, lecture method	Oral test
3	٢	Al-Daad and Al-Zaa	Differentiate between Dhad and Z	Discussion method, lecture method	Oral test
4	٢	Hamza writing	Enable the student to write the hamza correctly	Discussion method, lecture method	Oral test
5	٢	Punctuation	Recognize punctuation and write it in the correct location	Discussion method, lecture method	Oral test
6	٢	Noun and verb and differentiate between them	1. Recognize the noun and verb and indicate the sign of each 2. Differentiate between noun and verb 3. Indication of the types of verb 4. Differentiate between types of verbs	Discussion method, lecture method	Oral test
7	٢	Effects	Identify the types of effects and differentiate between them	Discussion method, lecture method	Oral test
8	٢	Number	Enable the student to write numbers correctly	Discussion method, lecture method	Oral test
9	٢	Applications of common linguistic errors	Recognize and avoid common language errors	Discussion method, lecture method	Oral test
10	٢	Applications of common linguistic errors	Recognize and avoid common language errors	Discussion method, lecture method	Oral test
11	٢	Noon and Tanween meanings of prepositions	1. Differentiate between Nun and Tanween 2. Recognize the meanings of prepositions	Discussion method, lecture method	Oral test
12	٢	Formal aspects of administrative discourse	Identify the formal aspects of administrative discourse	Discussion method, lecture method	Oral test

13	٢	The language of administrative discourse	Recognize the language of administrative discourse	Discussion method, lecture method	Oral test
14	٢	The language of administrative discourse	Recognize the language of administrative discourse	Discussion method, lecture method	Oral test
15	٢	Samples of administrative correspondence	Identify samples of administrative correspondence	Discussion method, lecture method	Oral test

12. Infrastructure

Required reading:	Textbooks: General Arabic Language Binding for Technical Universities by (Dr. Safaa Kazem Makki and Dr. Lama Muhammad Younis
Main references (sources)	1- Clear dictation: Abdul Majeed Al-Nuaimi, Daham Al-Kayyal, Dar Al-Mutanabbi Library, Baghdad, 6th edition, 1987 AD. 2- Lessons in language, grammar and spelling for state employees: Ismail Hammoud Atwan and others, Ministry of Education Press No. (3), Baghdad, 2nd edition, 1984. 3- Arabic language for the third intermediate grade: Fatima Nazem Al-Attabi, et al., 1st edition, 2018. 4 - General Arabic language for sections other than specialization: Abdul Qadir Hassan Amin and others, Ministry of Higher Education and Scientific Research, 2nd Edition, 2000. 5- Inspired by Arabic literature: Haval Muhammad Amin, Al-Saadoun Press, Baghdad.
Electronic references, Internet sites...	World Wide Web

13. Course development plan

Correcting the linguistic errors that occurred in the manual to be taught and trying to add a definition to some of the terms contained in the fascicle, especially since the Arabic language fascicle was prepared for non-specialists in the Arabic language, and this leads to making the prescribed vocabulary more accurate and clear.

1. Teaching Institution	Ministry of Higher Education and Scientific Research / Northern Technical University
2. University/ Department	Mosul Technical Institute/ Medical Instrumentation Techniques
3. Course title/code	Sport NTU104
4. Programme (s) to which it contributes	Technical Diploma
5. Modes of Attendance offered	* Weekly lesson schedule (theoretical and practical) * Sports discussions and activities
6. Semester/Year	Annual

7. Number of hours tuition (total)	30
8. Date of production/revision of this specification	8 / 1 / 2024
9. Aims of the Course 1- The student should be able to identify the most important types of sports and what are the laws and skills of some sports 2- Identify the motor mechanism of the human body and what are the common injuries that occur in the human body. 3. Perform his duties at the workplace for professional motives.	
10. Course outcomes and teaching, learning and evaluation methods	
A.Cognitive objectives	
A1- The student should be able to identify the most important types of sports and what are the laws and skills of some sports	
B - The skills objectives of the course.	
B¹- Identify the motor mechanism of the human body and what are the common injuries that occur in the human body.	
Teaching and learning methods	
((Theoretical lectures / practical lectures / field visits / solving examples / seminars))	
Evaluation methods	
((Oral exams / written tests / weekly reports / daily attendance / semester and final exams))	
C- Emotional and value goals	
C1- Perform his duties at the workplace for professional motives.	
Teaching and learning methods	
((Theoretical lectures / practical lectures / field visits / solving examples / seminars))	
Evaluation methods	
((Oral Tests / Written Tests / Observation / Student Cumulative Record))	
D - Transferable general and qualifying skills (other skills related to employability and personal development).	
D1- Improve their discussion skills.	
D2- Raising their research perceptions and transferring the student from the stage of teaching to learning.	

11. Course Structure

Week	Hours	Unit/Module or Topic Title	ILOs	Teaching Method	Assessment Method
1	2	Sport definition, importance and types	Knowledge and practical application	theoretical and practical	Tests & Reports
2	2	The mechanism of movement of the human body	Knowledge and practical application	theoretical and practical	Tests & Reports
3	2	Common sports injuries	Knowledge and practical application	theoretical and practical	Tests & Reports
4	2	Basic skills of the game of basketball	Knowledge and practical application	theoretical and practical	Tests & Reports
5	2	International Basketball Law	Knowledge and practical application	theoretical and practical	Tests & Reports
6	2	Basic skills of table tennis and its international law	Knowledge and practical application	theoretical and practical	Tests & Reports
7	2	Basic skills of volleyball and its international law	Knowledge and practical application	theoretical and practical	Tests & Reports

8	2	Swimming sport	Knowledge and practical application	theoretical and practical	Tests & Reports
9	2	Basic skills of tennis and its international law	Knowledge and practical application	theoretical and practical	Tests & Reports
10	2	Basic skills of handball	Knowledge and practical application	theoretical and practical	Tests & Reports
11	2	International Handball Law	Knowledge and practical application	theoretical and practical	Tests & Reports
12	2	Arena and field games (types, international law of the game)	Knowledge and practical application	theoretical and practical	Tests & Reports
13	2	Basic Football Skills	Knowledge and practical application	theoretical and practical	Tests & Reports
14	2	Management of sports competitions and competitions	Knowledge and practical application	theoretical and practical	Tests & Reports
15	2	Sports Laws and Legislations	Knowledge and practical application	theoretical and practical	Tests & Reports

12.Infrastructure

Required reading:	Available in the free department and library of the institute
Main references (sources)	Available in the free department and library of the institute
Electronic references, Internet sites.	Internet

13.Course development plan

- 1- Developing curricula adapted to the labor market
- 2- Holding seminars and scientific conferences aimed at updating the curricula
- 3- Follow-up scientific developments in the field of specialization

1. Educational institution	Ministry of Higher Education and Scientific Research / Northern Technical University
2. Academic department/center	Mosul Technical Institute Medical Instrumentation Techniques
3. Course name/code	DC circuits
4. Available forms of attendance	theoretical + Practical
5. Semester/year	courses
6. Number of study hours (total)	4 hours / week x decision =60 hours (theoretical And my work)
7. Date this description was prepared	7/1/2024
1. Course objectives	

- Apply Ohm's law and find the voltage, current and power in an electrical circuit.
- How to calculate the equivalent resistance in series, parallel and mixed connections
- Converting the connection from star to triangular and vice versa and finding the equivalent resistance.
- Kirchhoff's law and how to analyze the circuit using Kirchhoff's law
- How to solve using the mesh method which depends on Kirchhoff's voltage law.
- Analyse complex electrical circuits using some theories such as Thevenin and Norton's theorem and the cumulative theory.
- How to convert the voltage and current source from one to the other to facilitate solving the circuit and finding the current or voltage in any resistance in the electrical circuit.
- The theory of maximum possible power transfer and how to derive it and find it in the electrical circuit.

10. Course outcomes, teaching, learning and assessment methods

A- Cognitive objectives

A1- Identify Ohm's law and its application and the units of the international system.

A2- Identify the different types of connections and find the equivalent resistance, current and voltage.

A3- The ability to apply and analyze the electrical circuit and find the voltage and current using theories.

B - Course specific skill objectives.

B1 - 1 The student should have the ability to think and solve problems and electrical circuits.

B2 - The student should have the ability to analyze and think scientifically by applying laws.

B3 - The student should have the ability to conduct scientific investigations related to aspects of electrical circuits .

Teaching and learning methods

- 1) Theoretical lectures
- 2) Scientific discussion in classrooms
- 3) Small group method
- 4) Conducting practical experiments in laboratories
- 5) Study sessions and presentation of the latest scientific developments globally by students
- 6) Scientific films and other means of clarification
- 7) Methodological training
- 8) Summer training

Evaluation methods

- Oral and written tests
- Midterm and final exams
- Practical reports
- Homework
- Daily assessment

• C- Emotional and value-based objectives

C1- Enhancing the love of knowledge and interest in the technical details of DC circuits.

C2- Encouraging accuracy and attention while working with DC components and devices.

C3- Developing patience and perseverance while solving problems and analyzing circuits.

C4- Enhancing cooperation and teamwork in DC laboratories and projects..

D- General and transferable skills (other skills related to employability and personal development).

D1-Understanding the basic principles of DC and how to analyze it and design circuits.

D2-Using the necessary tools and devices to measure and analyze DC.

D3-Designing DC circuits to meet specific specifications and analyzing their performance.

D4-Developing problem-solving and critical thinking skills by dealing with circuit challenges.

11.structure The decision / Level the first

The week	Hours	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
the first	2				
the second	2	Knowing the units of the international system and the special components in the electrical circuit. Finding the voltage, current and power in a simple electrical circuit.	Electrical Quantities and Units Multiple and Submultiple of the Internal System Units (SI): Electrical Circuit Components Ohm's law Electrical Power Resistor Power Absorption	Theoretical lectures and scientific discussion Showing scientific films, the latest developments and means of clarification	Exams Daily Short Duties Home, Exams Quarterly And final
the third	2	Applying the special law to find the resistance based on the length, area and specific resistance of the material, and finding the resistance value before or after being exposed to a temperature change based on the thermal coefficient of the material.	Resistance and Resistivity Resistor temperature coefficient	Theoretical lectures and scientific discussion Showing scientific films, the latest developments and means of clarification	Exams Daily Short Duties Home, Exams Quarterly And final
Fourth	2	Applying the special laws for both series and parallel circuit connection, finding the voltage for each resistor in series connection using a voltage divider, and finding the current for each resistor in parallel connection using a current divider.	- Series Circuit - Voltage divider's law - Parallel circuit - Current divider's law	Theoretical lectures and scientific discussion Showing scientific films, the latest developments and means of clarification	Exams Daily Short Duties Home, Exams Quarterly And final

Fifth	2	Finding the equivalent resistance and both voltage and current for each resistor in a series-parallel connection in an electrical circuit	- Series-Parallel combination - examples		
Sixth And the seventh	4	Converting delta to star and vice versa, finding the equivalent resistance and both voltage and current for each resistance in the electrical circuit	Wye-delta transformations Examples Solve various examples of types of connection	=	=
The eighth	2	Apply Kirchhoff's law and find both the voltage and current for each resistance in the electrical circuit	Kirchhoff's law method (Branch current method) Examples		
Ninth	4	Analysis of the electrical circuit that is difficult to solve using Ohm's law and apply and solve the electrical circuit using the Mesh method and find both the voltage and current for each resistance in the electrical circuit.	Mesh method (Maxwell current loop method) Examples	=	=
tenth	2	Apply and solve the electric circuit using the superposition theory and find both the voltage and current for each resistance in the electric circuit.	superposition theorem: Examples	=	=
eleventh	2	Apply and solve the electrical circuit using	Thevenin's theorem		

		Thevenin's theorem and find the load current in the electrical circuit.	Examples		
twelfth	2	Apply and solve the electrical circuit using Norton's theorem and find the load resistance current in the electrical circuit	Norton's Theorem Examples		
thirteenth	2	Apply and solve the electrical circuit using source conversion..	Source transformation Example		
fourteenth	2	Apply and solve the electrical circuit and find the maximum power transfer.	Maximum power transfer theorem Example	Theoretical lectures and scientific discussion Showing scientific films, the latest developments and means of clarification	Exams Daily Short Duties Home, Exams Quarterly And final
fifteenth	2	Solve examples	Solve examples of all theories		

.	1- Books The reporter Required
1- Charles K. Alexander, Mathew NO Sadiku "Fundamental of electric circuit",3rd.	2- the reviewer Home (Sources)
	A Books References that Recommended With it (Magazines Scientific , reports ,....)
Technical Institute website / Mosul	for - the reviewer Electronic, Sites The Internet

١٣. Curriculum Development Plan

- 1- Curriculum Development
- 2- Laboratories Development
- 3- Continuing Education Courses
- 4- Showing Scientific Films
- 5- Holding Scientific Visits
- 6- Organizing Study Groups

1. Educational institution	the university Technology Northern
2. Academic department/center	Mosul Technical Institute/ Medical Instrumentation Techniques
3. Course name/code	Digital circuits
4. Available forms of attendance	theoretical + Practical
5. Semester/year	courses
6. Number of study hours (total)	4 hours / week x decision =60 hours (theoretical And my work)
7. Date this description was prepared	7/1/2024

8. Course Objectives

- To introduce the basic principles of digital circuits and how they work.
- Develop the ability to design and analyze logical circuits.
- Theories and applications of digital logic, logic gates, counters, comparators, and numerical systems
- Identify the applications of digital circuits in electronic devices and communication systems.
- Use the tools and techniques necessary to design and test digital circuits.

9. Course outcomes, teaching, learning and assessment methods

B - Course specific cognitive objectives.

A1-Understanding the basic principles of digital circuits and numerical systems.

A2-Identifying logic gates* and how to use them in building circuits.

A3-Analyzing and designing logic circuits using specific tools and techniques for digital circuits in various electronic devices and communication systems.

B - Course specific skill objectives.

B1- Perform various operations on numerical systems.

B2- Design and implement various logical circuits.

B3- Simplify and analyze logical circuits.

B4- Implement practical applications of logical circuits.

Teaching and learning methods

- Theoretical lectures
- Scientific discussion in classrooms
- Small group method
- Conducting practical experiments in laboratories
- Study seminars and presentation of the latest scientific developments globally by students
- Scientific films and other means of clarification
- Methodological training
- Summer training

Methods Evaluation

- Evaluation Methods
- Oral and written tests
- Semester and final exams
- Practical reports

- Homework
- Daily assessment

C- Emotional and value-based objectives

C1- Developing students' sense of scientific curiosity towards digital circuits and their technologies.

C2- Encouraging teamwork and cooperation between students in projects and practical applications.

C3- Stimulating innovation and creativity in the design and analysis of digital circuits.

D- General and transferable skills (other skills related to employability and personal development).

D1 Design and analyze logic circuits* accurately.

D2 Use the software tools* necessary to design and test circuits.

D3- Understand the practical applications* of digital circuits in modern devices and systems.

D4- Develop logical thinking and problem solving* by dealing with the challenges of circuit design

11.structure The decision / Level the first

The week	Hours	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
the first	2	-	Course introduction, learning objectives, course content	Theoretical lectures and scientific discussion Showing scientific films, the latest developments and means of clarification	Exams Daily Short Duties Home, Exams Quarterly And final
the second	2	Knowing the binary number system and its relationship with other systems and converting from the decimal system to this system and vice versa and converting from this system to the rest of the systems and the basis of the system and the	Number systems 1- The decimal system 2- The binary system 3- The octal system 4- The hexadecimal system	=	=

		symbols used for each system			
the third	2	Knowing the basis of the system and the symbols used for it and converting from the decimal system to this system and vice versa. Conversion from this system to the rest of the systems.	Conversions between number systems Conversion from the decimal system to other systems and vice versa Conversion from the binary system to hexadecimal and vice versa Converting fractional numbers	Theoretical lectures and scientific discussion Showing scientific films, the latest developments and means of clarification	Exams Daily Short Duties Home, Exams Quarterly And final
Fourth	2	Knowledge of addition, subtraction, multiplication and division and complements in the binary system (1's complement and 2's complement) and subtraction using complements 4- Addition, subtraction and multiplication in the hexadecimal system	Arithmetic Operations in Binary Addition, Subtraction, Multiplication and Division Complements in Binary Subtraction Using Complements	Theoretical lectures and scientific discussion Showing scientific films, the latest developments and means of clarification	Exams Daily Short Duties Home, Exams Quarterly And final
Fifth	2	Knowledge of basic gate studies and their reality tables reality table	Basic logic gates AND gate electrical circuit and its reality table OR gate electrical circuit and its reality table NOT gate electrical circuit and its	=	=
Sixth	2	Knowing the NAND gate, the electrical circuit and its reality table, the NOR gate, the electrical circuit and its reality table, the XOR gate, the electrical circuit and	Combination gates NAND gate NOR gate XOR gate and XNOR gate	=	=

		its reality table, the XNOR gate, the electrical circuit and its reality table.			
Seventh	2	Knowing the effect of reversing gate inputs and the effect of reversing gate outputs And the effect of reversing gate inputs and outputs	Converting gates using inverters The effect of reversing gate inputs The effect of reversing gate outputs The effect of reversing gate inputs and outputs	=	=
The eighth	2	Knowing the effect of reversing gate inputs and the effect of reversing gate outputs And the effect of reversing the entrances and exits of the gate	Knowing how to assemble gates using AND-OR gate logic And assembling logic gates using NAND gate logic All logic gates Assembling gates using AND-OR gate logic Assembling logic gates using NAND gate logic	=	=
Ninth	2	Understanding De Morcan's First Law Understanding De Morcan's Second	Law De Morcan's Laws De Morcan's First Law De Morcan's Second Law	=	=
tenth	2	Simplify logic circuits using the laws and rules of Boolean algebra.	Boolean algebra relations OR relations AND relations	=	=
eleventh	2	Simplify logic circuits using Boolean algebra rules and laws.	Boolean algebra laws My law of substitution Legal Collection Legal Distribution	Theoretical lectures and scientific discussion Showing scientific films, the	Exams Daily Short Duties Home, Exams Quarterly And final

				latest developments and means of clarification	
twelfth	2	Simplify logic circuits using Boolean algebra rules and laws.	Simplify logic equations using Boolean algebra rules and laws Reducing the number of gates used in the design	=	=
thirteenth	2		Universal Gates (NAND & NOR) Design of Logic Circuits Using Universal Gates	=	=
fourteenth	2		Writing logical equations from truth table Derive logical equation from truth table using SOP method. Derive logical equation from truth table using POS method.	=	=
fifteenth	2		Solve questions and review		

7 Structure Infrastructure

	1- Books The reporter Required
	2- the reviewer Home (Sources)
1- Logic Circuits and Microprocessors - Communications Specialization. Technical and Vocational Training Corporation - Saudi Arabia 2-Digital Fundamentals, Thomas L.Floyd, Eleventh Edition. 3-Digital Design, M.Morris Mano, Prentice-Hall, 5th, 2013. 4- Digital Technology, Misty E. Vemaat, Discovering Computers 2018. 5- Computing Essentials, Timothy J. O'Leary, McGraw-Hill Education,	A Books References that Recommended With it (Magazines Scientific , reports ,....)

2017.	
Technical Institute website / Mosul	for - the reviewer Electronic, Sites The Internet
13. Plan Curriculum Development	
1- Curriculum Development 2- Laboratories Development 3- Continuing Education Courses 4- Showing Scientific Films 5- Holding Scientific Visits 6- Organizing Study Groups	

1. Educational institution	the university Technology Northern
2. Academic department/center	Mosul Technical Institute/ Medical Instrumentation Techniques
3. Course name/code	AC circuits
4. Available forms of attendance	theoretical + Practical
5. Semester/year	courses
6. Number of study hours (total)	4 hours / week x decision =60 hours (theoretical And my work)
7. Date this description was prepared	7/1/2024

• Course objectives

- The student should be able to find the frequency, period and wavelength of an AC sine wave.
- The student should be able to find the average voltage and square root of an AC sine wave.
- The student should learn how to calculate the impedance of capacitor, inductor and resistance in AC circuits.
- The student should be able to calculate the voltage, current and phase difference of capacitor, inductor and resistance in pure AC circuits.
- The student should learn how to calculate the voltage, current and phase difference of capacitor, inductor and resistance in series AC circuits.
- The student should learn how to calculate the voltage, current and phase difference of capacitor, inductor and resistance in parallel AC circuits.
- The student should be able to find the resonant frequency, quality factor and bandwidth difference in series and parallel.
- The student should be able to apply Thevenin and Norton theorems to AC circuits.

^ Course Outcomes, Teaching, Learning and Evaluation Method

A- Cognitive Objectives

- A1- The student will learn the basics of alternating current and its related components such as inductors and capacitors.
- A2- Enabling students to analyze alternating current circuits using mathematical tools and modern techniques.
- A3- Understanding the practical applications of alternating current in various devices and systems.
- A4- Studying electrical theories related to alternating current such as Kirchhoff's laws..

B - Course specific skill objectives.

B1- The student should have the ability to think and solve problems and electrical circuits.

B2- The student should have the ability to analyze and think scientifically by applying laws.

B3- The ability to conduct scientific investigations related to aspects of electrical circuits -

Teaching and learning methods

1- Theoretical lectures

-2 Scientific discussion in classrooms

-3 Small group method

-4 Conducting practical experiments in laboratories

-5 Study seminars and presentation of the latest scientific developments globally by students

6- Scientific films and other means of clarification

7- Methodological training

8- Summer training

Evaluation Methods

☐ Oral and written tests

☐ Midterm and final exams

☐ Practical reports

☐ Homework

☐ Daily assessment

C- Emotional and value-based objectives

C1- Motivating students to be interested in studying alternating current and understanding its importance in daily life applications.

C2- Building confidence in the ability to understand, analyze and apply the concepts of alternating current.

C3- Instilling values of accuracy and commitment in working on alternating current circuits, whether in design or analysis.

C4- Enhancing the ability to work in teams and exchange ideas about designing and analyzing circuits.

D- General and transferable skills (other skills related to employability and personal development).

D1- Gaining the experience that qualifies them to deal with the necessities of life, including experience in the field of connecting alternating electrical circuits.

D2- Gaining the experience that qualifies them to deal with electrical circuits and their components, voltage sources and electrical measuring devices.

D3- Gaining experience in reverse engineering electronic maps

11. structure The decision / Level the first

The week	Hours	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
the first	2	-	Course introduction,	Theoretical lectures	Exams Daily Short Duties

			learning objectives, course content	and scientific discussion Showing scientific films, the latest developments and means of clarification	Home, Exams Quarterly And final
the second	2	Finding the frequency and wavelength of the sine function and the constants of the form constant and the maximum constant	Sinewave function, frequency period, wavelength, angular measurement characteristic value of the voltage and current of sinewave form factor, peak factor	=	=
the third	2	Finding the phase difference, lead and delay between sinusoidal signals	Phase angle, lead and lag, phasor diagram examples	Theoretical lectures and scientific discussion Showing scientific films, the latest developments and means of clarification	Exams Daily Short Duties Home, Exams Quarterly And final
Fourth	2	Finding the impedance, voltage and current for pure resistive, capacitive and inductive circuits	Purely resistive circuit Purely inductive circuit Purely capacitive circuit	Theoretical lectures and scientific discussion Showing scientific films, the latest developments and means of clarification	Exams Daily Short Duties Home, Exams Quarterly And final
Fifth	2	Find the impedance, voltage and current for each of the RL-RC series circuits.	RL series circuits RC series circuits Examples	=	=
Sixth	2	Finding the impedance, voltage and current for each of the RLC series circuits	RLC series circuits examples	=	=

Seventh	2	Finding the impedance, voltage and current for each of the RL – RC parallel circuits	RL parallel circuits RC parallel circuits Example	=	=
The eighth	2	Finding the impedance, voltage and current for each of the RLC parallel circuits	RLC parallel circuits Examples		
Ninth	2		RLC parallel-series circuits Examples		
tenth	2	Finding the series resonant frequency and the specificity constant	Resonance series and Quality factor		
eleventh	2		Resonance Parallel circuits Examples	Theoretical lectures and scientific discussion Showing scientific films, the latest developments and means of clarification	Exams Daily Short Duties Home, Exams Quarterly And final
twelfth	2		Solving various examples of series and parallel resonant circuits	=	=
thirteenth	2	Knowing the power triangle and the relationship between them and how to apply its laws	Power consumed, power factor, power triangular	=	=
fourteenth	2		Examples about power triangular	=	=
fifteenth	2	Application of theories in AC circuits	Thevenin's theorem and Norton		

			theorem in AC circuits		
8 Structure Infrastructure					
1- Books The reporter Required					
2- the reviewer Home (Sources)					
A Books References that Recommended With it (Magazines Scientific , reports ,....)			1- Charles K. Alexander, Mathew NO Sadiku "Fundamental of electric circuit",3rd. 2- Road M. Rasheed, "Lectures electric circuits", Part2.		
for - the reviewer Electronic, Sites The Internet			Technical Institute website / Mosul		

13.plan development The decision Academic

- 1- development Curricula
- 2- development Laboratories
- 3- Courses education continuous
- 4- an offer films Scientific
- 5- stay Visits Scientific
- 6- to organize Episodes Academic

1. Educational institution	the university Technology Northern
2. Academic department/center	Department of Medical Instrumentation Techniques / Mosul Technical Institute
3. Course name/code	control
4. Available forms of attendance	theoretical + Practical
5. Semester/year	courses
6. Number of study hours (total)	4 hours / week x decision =60 hours (theoretical And my work)
7. Date this description was prepared	7/1/2024

1. Course Objectives • Understand the principles of electrical control in medical devices. • Distinguish between open-circuit and closed-circuit control circuits. • Examine control components of both open and closed-circuit types. • Design and analyze control systems.
10. Course Outcomes, Teaching, Learning and Evaluation Methods
A- Cognitive Objectives After completing the lesson (lecture) the student will be able to: A1- Know the technology of automatic control systems. A2- Distinguish between open-loop and closed-loop control systems. A3- Know the types of industrial controllers. A4- Evaluate the performance of the control system.
B - Course specific skill objectives. B1- Knowledge of automatic control systems technology. B2- Distinguishing between open-loop and closed-loop control systems. B3- Knowledge of types of industrial controllers. B4- Evaluation of the performance of the control system.
Teaching and learning methods
1- Theoretical lectures -2 Scientific discussion in classrooms -3 Small group method -4 Conducting practical experiments in laboratories -5 Study seminars and presentation of the latest scientific developments globally by students 6- Scientific films and other means of clarification 7- Methodological training 8- Summer training
Evaluation Methods
☐ Oral and written tests ☐ Midterm and final exams ☐ Practical reports ☐ Homework ☐ Daily assessment
C- Emotional and value-based objectives C1- He has academic and technical information, experience and skill in the field of control circuits and control systems of various types. C2- He can keep pace with the rapid development in the field of modern control devices C3- He can manage, prepare and implement periodic programs for maintenance and continuity of control devices..
Teaching and learning methods
• Theoretical lectures • Scientific discussion in classrooms • Small group method • Conducting practical experiments in laboratories • Study seminars and presentation of the latest scientific developments globally by students • Scientific films and other means of clarification

- Methodological training
- Summer training

Evaluation Methods

- Oral and written tests
- Midterm and final exams
- Practical reports
- Homework
- Daily assessment

D- General and transferable skills (other skills related to employability and personal development).

D1- Gaining the experiences that qualify them to deal with the necessities of life, including experience in the field of maintenance of control devices.

D2- Gaining the experiences that qualify them to deal with control circuits.

D3- Gaining the experiences in reverse engineering electronic maps for control devices.

D4- Gaining the skills necessary to identify and repair faults and maintain various control devices

12. structure The decision / Level the second

The week	Hours	Required learning outcomes	Unit name/topic	Teaching method	Evaluation method
the first	2	Distinguish between open-loop and closed-loop control system	Introduction and knowledge about control engineering, open circuit and closed circuit	Theoretical lectures, scientific discussions, screening of scientific films, the latest developments and means of clarification	Exams Daily Short Duties Home, Exams Quarterly And final
the second	2	Knowing the components of the receiver and how it works	Industrial control of electric motors (receiver)	=	=
the third	2	Knowing what a relay is, its types, and how to connect it to motors to protect it	Use of relays in controlling motor operation	Theoretical lectures, scientific discussions, screening of scientific films, the latest developments and means of clarification	Exams Daily Short Duties Home, Exams Quarterly And final

Fourth	2	Knowing the structure of a single-phase motor and building the power circuit and control circuit for a single-phase and three-phase motor to achieve the motor start and stop	Control system for single and three phase motor	Theoretical lectures and scientific discussion Showing scientific films, the latest developments and means of clarification	Exams Daily Short Duties Home, Exams Quarterly And final
Fifth	2	Know the purpose of the block diagram and the theories used to simplify simple systems.	Transfer function - Block diagrams - Algebra and simplification	=	=
Sixth	2	Learn Mason's Rule and how to simplify a complex control system using Mason's Rule,	Signal Flow Graph, and Mason's Rule.	=	=
Seventh	2	The purpose of using the Laplace transform and how to use it	Math Review - Laplace Transform	=	=
eighth	2	Ability to convert sine and exponential functions to algebraic functions	Solving linear differential equations using Laplace's method		
Ninth	2	Draw the s-plane by identifying the poles and zeros to determine the stability of the system	Identify the s-plane Identify the poles and zeros of s-plane control systems Determine the stability level		
tenth	2	Distinguish between types of input signals (step function, slope function, and acceleration function)	Types of input signals		
eleventh	2	How to be able to classify control systems by type and rank of the system	Classification of control systems (type and rank of the system))	Theoretical lectures and scientific discussion	Exams Daily Short Duties

				Showing scientific films, the latest developments and means of clarification	Home, Exams Quarterly And final
twelfth	2	Finding the steady-state error of a different input signal by finding the error coefficients	Steady-state error	=	=
thirteenth	2	Finding the transient response of the system by the denominator of the transfer function	Transient response of second-order systems	=	=
fourteenth	2	Analysis of the control system by finding the time specifications of the system (delay time, peak time, rise time, maximum overshoot, dwell time)	Time response of a second-order system - factors determining stability	=	=
fifteenth	2	Drawing a closed-loop control system using proportional, differential and integral controllers and knowing the operating principle of each controller.	Electronic controllers - their types - proportional, differential and integral.		

13. Structure Infrastructure

The Control Book by Assistant Professor Diaa Mahdi Faris	1- Books The reporter Required
Electrical control technology book233	2- the reviewer Home (Sources)
	A Books References that Recommended With it (Magazines Scientific , reports ,....)

Technical Institute website / Mosul

for - the reviewer Electronic,
Sites The Internet

14. Plan Curriculum Development

- 7- Curriculum Development
- 8- Laboratories Development
- 9- Continuing Education Courses
- 10- Showing Scientific Films
- 11- Holding Scientific Visits
- 12- Organizing Study Groups