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

Academic Program and Course Description Guide

2024

Academic Program Description Form

University Name: .University of Thi-Qar.....

Faculty/Institute: College of Engineering.....

Scientific Department: Biomedical Engineering .....

Academic or Professional Program Name: Biomedical Engineering .

Final Certificate Name: BSc. in Biomedical Engineering.....

Academic System: Bolonga Process.....

Description Preparation Date: 10-4-2024

File Completion Date: 15-10-2024

Signature:

Head of Department Name:

Prof. Dr. Rafid M. Hannun

Date: 15-10-2024

Signature:

Scientific Associate Name:

Prof. Dr. Mushtaq I. Hassan

Date: 15-10-2024

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date: 17/10/2024

Signature:

Approval of the Dean

Prof. Dr. Adnan A. Ugla

17- Oct. 2024

1. Program Vision

The Department of Biomedical Engineering looks forward to building engineering knowledge and developing biomedical engineering solutions that contribute to improving healthcare in Iraq.

2. Program Mission

1- To prepare well-qualified biomedical engineers and researchers to serve the needs of the healthcare institution as well as the needs of the academic institution.

2- Graduate students use their knowledge to solve practical biomedical problems within a scientific, economic, social, environmentally friendly and ethical framework.

3- To provide highly equipped and trained biomedical engineers.

4- To create a fruitful research environment in the field of biomedical study.

5- To prepare future scientific leaders by enhancing students' capabilities and leadership skills.

3. Program Objectives

1. Preparing students to serve their community by providing suitable scientific atmosphere that encourages their creativity and growth.
2. Contributing to the scientific research.
3. Employing technology for serving humanity through the interaction between the engineering sciences and the biomedical sciences. Figuring out new topics, methods, and ideas to serve humanity.
4. The BME dept. continuously collaborates with other researchers from outside the department and especially from the medical field to identify

and address problems to solve in order to help the local community. It also encourages students to pursue ethical research path and promotes moral values inside them. Students with the highest ranks are encouraged and promoted.

5. Contributing positively to knowledge spreading in the society through holding conferences, open lectures, and meetings.
6. The department graduates are well prepared to enroll in prestigious graduate programs and research centers, locally and globally.

4. Program Accreditation

Does the program have program accreditation? And from which agency?

No

5. Other external influences

Is there a sponsor for the program?

No

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	5	11	%3.667	
College Requirements	6	30	%10	
Department Requirements	48	259	%86.333	
Summer Training	2	0	0	
Other	0	0	0	

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

7. Program Description				
Year/Level	**Course Code**	**Course Name**	**Credit Hours**	
1- FIRST COURSE	BME101	Engineering Mechanics	**theoretical**	
	BME102	Intro to Biomedical Engineering I	**theoretical**	**practical**
	ER104	General Biology	**theoretical**	**practical**
	ER105	Derivative and integration	**theoretical**	
	ER108	Engineering WorkShop	**theoretical**	**practical**
	UR101	Arabic language skills	**theoretical**	
1- SECOND COURSE	BME103	Anatomy I	**theoretical**	**practical**
	BME104	Electric Circuits I	**theoretical**	**practical**
	ER107	Computer Science	**theoretical**	**practical**
	ER103	Chemistry	**theoretical**	**practical**
	ER106	Engineering Drawing	**theoretical**	
	UR102	Basics of english language	**theoretical**	
2- THIRD COURSE	ER205	Applied Mathematics	**theoretical**	
	BME201	Science and Strength of Materials	**theoretical**	
	BME202	Anatomy II	**theoretical**	**practical**
	BME203	Intro to Biomedical Engineering II	**theoretical**	**practical**
	BME204	Medical Physics	**theoretical**	**practical**
	UR202	English language skills	**theoretical**	
2-FORTH COURSE	BME205	Digital Electronics	**theoretical**	
	ER207	Computer programming	**theoretical**	**practical**
	BME206	Electric Circuits II	**theoretical**	**practical**
	BME207	Biochemistry	**theoretical**	**practical**
	BME208	Biomaterials Engineering	**theoretical**	
	UR201	Human rights and democracy	**theoretical**	
3-FIFTH COURSE	BME301	Analog Electronics	**theoretical**	**practical**

	BME302	Physiology	**theoretical**	
	BME303	Advanced Biomaterials: Bio Printing and Bio Fabrication	**theoretical**	
	BME304	Medical Measurements I	**theoretical**	**practical**
	BME305	Transport Phenomena in BME	**theoretical**	
	BME306	Optics in Biomedical Engineering	**theoretical**	
3- SIXTH COURSE	BME307	Biomedical Signals processing	**theoretical**	
	BME308	Engineering Analysis and Numerical Methods	**theoretical**	
	BME309	Rehabilitation Science	**theoretical**	
	BME310	Thermodynamics in BME	**theoretical**	
	BME311	Medical Lasers	**theoretical**	**practical**
	BME312	Biomedical Circuits & Electronic	**theoretical**	**practical**
4- SEVENTH COURSE	BME401	Pathology	**theoretical**	**practical**
	BME402	Control Systems I	**theoretical**	**practical**
	BME403	Medical Measurements II	**theoretical**	**practical**
	BME404	Biomedical Engineering Systems	**theoretical**	**practical**
	BME405	Tissue Engineering	**theoretical**	**practical**
	BME406	Biomedical CAD/CAM	**theoretical**	**practical**
4- EIGHTTH COURSE	BME407	Control Systems II	**theoretical**	**practical**
	BME408	Artificial Organs	**theoretical**	**practical**
	BME409	Microprocessor & Microcontroller	**theoretical**	**practical**
	BME410	Bio Electronic Devices & Applications	**theoretical**	**practical**
	BME411	Surgical Robots	**theoretical**	**practical**
	BME412	BIO Instrumentation Design I	**theoretical**	**practical**
5- NINETH COURSE	BME501	Engineering Project I	**theoretical**	**practical**
	BME502	Biomedical sensors	**theoretical**	**practical**
	BME503	Biomedical Statistics	**theoretical**	**practical**

	BME504	BIO Instrumentation Design II	**theoretical**	**practical**
	BME505	Clinical Engineering	**theoretical**	**practical**
	BME506	Biomedical Computer Desgin	**theoretical**	**practical**
5- TENTH COURSE	BME507	Engineering Project II	**theoretical**	**practical**
	BME508	Medical Image Processing	**theoretical**	**practical**
	BME509	BIO Instrumentation Design III	**theoretical**	**practical**
	BME510	Biomechanics	**theoretical**	
	BME511	Artificial Neural Network in BME	**theoretical**	
	ER401	Engineering Ethics	**theoretical**	

8. Expected learning outcomes of the program

Knowledge	
Apply the principles of engineering, biology, and medicine to solve problems in human health: Students can demonstrate this by completing projects or research that use engineering principles to solve problems in biology or medicine. For example, they could design a new medical device, develop a new drug delivery system, or create a new computer model of a biological system.	• Design and develop biomedical devices and systems: Students can demonstrate this by completing projects or research that involve the design and development of biomedical devices or systems. For example, they could design a new prosthetic limb, develop a new medical imaging system, or create a new software program for medical diagnosis.
Skills	
• Conducting research in the field of biomedical engineering: Students can demonstrate this by conducting research in a biomedical engineering laboratory. They can work on a project that investigates a new biomedical technology, develops a new biomedical device, or studies a biological system using engineering principles.	• Communicate effectively with engineers, scientists, and clinicians: Students can demonstrate this by communicating effectively with engineers, scientists, and clinicians. They can do this by writing reports, giving presentations, or participating in team meetings.
• Working effectively in teams: Students can demonstrate this by working effectively in teams. They can do this by participating in group projects,	• Apply ethical and professional principles in biomedical engineering. This outcome requires students to be aware of the ethical and professional responsibilities of biomedical

working on research teams, or volunteering for community service projects.	engineers. They should be able to make ethical decisions in their work and maintain professional standards in the field.
Ethics	
• Be lifelong learners. This outcome requires students to be committed to lifelong learning. They should be able to identify and acquire new knowledge and skills as needed to stay current in the field.	• To be creative and innovative. This outcome requires students to be able to think creatively and come up with new and innovative solutions to problems. They should be able to see the world in new ways and find new ways to solve problems.
• Be entrepreneurial. This outcome requires students to be able to think and act like entrepreneurs. They should be able to identify and develop new career opportunities in the field of biomedical engineering.	Follow up on graduates and know their performance

9. Teaching and Learning Strategies

Staff involved in the degree program utilize a wide range of teaching methods that they deem the most appropriate for a particular course. These include:

• Lectures where the students write information presented to them via slide show, overhead or written by the lecturer;

• Lectures where the students have some printed notes/handouts and may annotate, or expand these during a spoken lecture;

• Lecture material placed on web-pages or other e-learning environment;

• Small group and large group tutorial sessions;

• Question and answer sessions during lectures or staff Office Hours;

• Laboratory sessions.

10. Evaluation methods

Evaluation Methods to be used are:

- Written examinations (Summative assessment);
- Oral presentations of individual and group work;
- Individual written project report(s) of both individual and group projects;
- Homework;
- Take home exams;
- Practical skills will be assessed through laboratory experiments, write – ups, coursework reports, project reports and presentations;
- Experimental, research and design skills will be assessed through laboratory experiments write–ups, coursework reports, project reports and presentations;
- Presentation skills through group presentations and poster presentations.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor	Mechanical Eng.	Thermal Eng.	Energy, Renewable, Biomedical		1	
Assist. Professor	Physical Science	Communication	Biosensor		1	
Lecturer	Computer Eng.	Computer Eng.	Biocomputer		1	
Lecturer	Control Eng.	Control Eng.	Bio-Signal, Control Eng.		1	
Lecturer	Biology	Biology			2	
Lecturer	Material Engineering	Material Engineering			1	
Lecturer	Physical science	Physical science			1	
Lecturer	Biomedical Eng.	Biomedical Eng.			1	
Lecturer	Biomedical Eng.	Biochemical Eng.			1	
Lecturer	Electrical Eng,	Electrical Eng,			1	
Lecturer	Computer science	Computer science			1	
Lecturer	Mechanical eng.	Thermal1			1	

Lecturer	Law	Law			1	
Lecturer	Accounting	Accounting			1	
Assist Lecturer	Electrical Eng,	Electrical Eng,			3	
Assist Lecturer	Material Engineering	Material Engineering			2	
Assist Lecturer	Biomedical Eng.	Biomedical Eng.			1	
Assist Lecturer	Biology	Biology			2	
Assist Lecturer	Computer science	Computer science			1	
Assist Lecturer	Physical science	Physical science			1	
Assist Lecturer	Mechanical Eng	Mechanical Eng			1	
Assist Lecturer	Physical Education	Physical Education			1	

Professional Development

Mentoring new faculty members

D1. Apply in depth problem solving and analytical thinking to a diverse range of problems;

D2. Use appropriate multi-disciplinary skills to solve Biomedical Engineering problems, combining the biological and engineering knowledge gained through the degree;

D3. Demonstrate numeracy and literacy in written reports, project work and examinations;

D4. Learn effectively for the purpose of continuing professional development and in a wider context throughout their career.

Professional development of faculty members

D1. Apply in depth problem solving and analytical thinking to a diverse range of problems;
D2. Use appropriate multi-disciplinary skills to solve Biomedical Engineering problems, combining the biological and engineering knowledge gained through the degree;
D3. Demonstrate numeracy and literacy in written reports, project work and examinations;
D4. Learn effectively for the purpose of continuing professional development and in a wider context throughout their career.

12. Acceptance Criterion

1- Central admission

2- Private evening study

3- Central morning private education

4- Study in Iraq (from other countries)

13. The most important sources of information about the program

Ministry directives

14. Program Development Plan

Increase the number of courses to teach the program

Program Skills Outline														
				Required program Learning outcomes										
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
1–FIRST COURSE	BME101	Engineering Mechanics	Basic												
	BME102	Intro to Biomedical Engineering I	Basic												
	ER104	General Biology	Basic												
	ER105	Derivative and integration	Basic												
	ER108	Engineering WorkShop	Basic												
	UR101	Arabic language skills	Basic												
1–SECOND COURSE	BME103	Anatomy I	Basic												
	BME104	Electric Circuits I	Basic												

	ER107	Computer Science	**Basic**													
	ER103	Chemistry	**Basic**													
	ER106	Engineering Drawing	**Basic**													
	UR102	Basics of english language	**Basic**													
2–THIRD COURSE	ER205	Applied Mathematics	**Basic**													
	BME201	Science and Strength of Materials	**Basic**													
	BME202	Anatomy II	**Basic**													
	BME203	Intro to Biomedical Engineering II	**Basic**													
	BME204	Medical Physics	**Basic**													
	UR202	English language skills	**Basic**													

2-FORTH COURSE	BME205	Digital Electronics	**Basic**												
	ER207	Computer programming	**Basic**												
	BME206	Electric Circuits II	**Basic**												
	BME207	Biochemistry	**Basic**												
	BME208	Biomaterials Engineering	**Basic**												
	UR201	Human rights and democracy	**Basic**												
3-FIFTH COURSE	BME301	Analog Electronics	**Basic**												
	BME302	Physiology	**Basic**												
	BME303	Advanced Biomaterials: Bio Printing and Bio Fabrication	**Basic**												
	BME304	Medical Measurements I	**Basic**												

	BME305	Transport Phenomena in BME	**Basic**													
	BME306	Optics in Biomedical Engineering	**Basic**													
3-SIXTH COURSE	BME307	Biomedical Signals processing	**Basic**													
	BME308	Engineering Analysis and Numerical Methods	**Basic**													
	BME309	Rehabilitatio n Science	**Basic**													
	BME310	Thermodyna mics in BME	**Basic**													
	BME311	Medical Lasers	**Basic**													
	BME312	Biomedical Circuits & Electronic	**Basic**													
4-SEVENTH COURSE	BME401	Pathology	**Basic**													
	BME402	Control Systems I	**Basic**													

	BME403	Medical Measurements II	**Basic**													
	BME404	Biomedical Engineering Systems	**Basic**													
	BME405	Tissue Engineering	**Basic**													
	BME406	Biomedical CAD/CAM	**Basic**													
4–EIGHTTH COURSE	BME407	Control Systems II	**Basic**													
	BME408	Artificial Organs	**Basic**													
	BME409	Microprocessor & Microcontroller	**Basic**													
	BME410	Bio Electronic Devices & Applications	**Basic**													
	BME411	Surgical Robots	**Basic**													

	BME412	BIO Instrumentation Design I	**Basic**												
5–NINETH COURSE	BME501	Engineering Project I	**Basic**												
	BME502	Biomedical sensors	**Basic**												
	BME503	Biomedical Statistics	**Basic**												
	BME504	BIO Instrumentation Design II	**Basic**												
	BME505	Clinical Engineering	**Basic**												
	BME506	Biomedical Computer Desgin	**Basic**												
5–TENTH COURSE	BME507	Engineering Project II	**Basic**												
	BME508	Medical Image Processing	**Basic**												

	BME509	BIO Instrumentation Design III	**Basic**													
	BME510	Biomechanics	**Basic**													
	BME511	Artificial Neural Network in BME	**Basic**													
	ER401	Engineering Ethics	**Basic**													

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

Course Description Form

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

Course Objectives	• ..... • ..... • .....

9. Teaching and Learning Strategies

Strategy	

10. Course Structure

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

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

1. Course Name: Analog Electronics
2. Course Code:
3. Semester / Year: First semester, 2024−2025
4. Description Preparation Date: 16/10/2024
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total) :60 hours
7. Course administrator's name (mention all, if more than one name)
Name: M.Sc. Taif Nabeel Muslim Email: taifnabeel@utq.edu.iq
8. Course Objectives

Course Objectives	• **Understanding basic electronic components.** • **Design and analysis of electronic circuits** • **Understanding frequency response of circuits and sig modulation.** • **Developing research and analytical thinking skills.**
9. Teaching and Learning Strategies	
Strategy	A. Theoretical lectures. B. Presentations and discussions. C. Self-reading and scientific research. D. Collaborate learning E. Continuous assessment
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1st	4	Student's grasp of the lecture content.	Semiconductor materials	Theoretical Lecture	Homework, daily quizzes, monthly exams, and final exams.
2nd	4	Student's grasp of the lecture content.	Semiconductor diodes	Theoretical Lecture	Homework, daily quizzes, monthly exams, and final exams.
3rd		Student's grasp of the lecture content.	Diode Equivalent Circuits, Dc characteristics.	Theoretical Lecture	Homework, daily quizzes, monthly exams, and final exams.
4th	4	Student's grasp of the lecture content.	Diode Applications: Rectifiers	Theoretical Lecture	Homework, daily quizzes, monthly exams, and final exams.
5th	4	Student's grasp of the lecture content.	Clipping & Clamping Circuits	Theoretical Lecture	Homework, daily quizzes, monthly exams, and final exams.
6th	4	Student's grasp of the lecture content.	Zener Diodes	Theoretical Lecture	Homework, daily quizzes, monthly exams, and final exams.
7th	4	Student's grasp of the lecture content.	Bipolar Junction Transistor (BJT): Operation of pnp & npn transistor	Theoretical Lecture	Homework, daily quizzes, monthly exams, and final exams.
8th	4	Student's grasp of the lecture content.	Characteristics of CE, CB & CC Configurations Operating Point and Operating Regions	Theoretical Lecture	Homework, daily quizzes, monthly exams, and final exams.
9th	4	Student's grasp of the lecture content.	Biasing the BJT	Theoretical Lecture	Homework, daily quizzes, monthly exams, and final exams.
10th	4	Student's grasp of the	Equivalent circuit model,	Theoretical Lecture	Homework, daily quizzes, monthly

		lecture content.	analysis of transistor		exams, and final exams.
11th	4	Student's grasp of the lecture content.	Design of dc bias circuits, design of current gain stabilized	Theoretical Lecture	Homework, daily quizzes, monthly exams, and final exams.
12th	4	Student's grasp of the lecture content.	Small Signal Low Frequency Analysis: Transistor amplifier	Theoretical Lecture	Homework, daily quizzes, monthly exams, and final exams.
13th	4	Student's grasp of the lecture content.	Comparison of BJT Amplifier Configurations	Theoretical Lecture	Homework, daily quizzes, monthly exams, and final exams.
14th	4	Student's grasp of the lecture content.	Cascading Amplifiers, Simplified Models	Theoretical Lecture	Homework, daily quizzes, monthly exams, and final exams.

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbo (curricular books any)	1. Electronic Devices and Circuit Theory. Robert L. Boylestad, Louis Nashelsky. 2. Electronic Circuits Handbook for Design and Application. F.A. Blosted.
Main referen (sources)	1. Boylestad, R., & Nashelsky, L. (2014). Electronic devices and circuit theory. Prentice Hall. 2. Blosted, F. A. (2020). Electronic circuits: Handbook for design and application. Wiley.
Recommended books and references (scientific journals, reports…)	" The Art of Electronics" by Paul Horowitz and Winfield Hill " .Fundamentals of Electric Circuits" by Charles K. Alexander and Matthew N. O. Sadiku. JOURNALS 1. IEEE Journal of Solid-State Circuits. 2. Microelectronics Journal. 3. International Journal of Electronics.

	4. Sensors and Actuators A: Physical.
Electronic References, Websites	1. https://ieeexplore.ieee.org/ 2. https://www.sciencedirect.com/ 3. https://www.allaboutcircuits.com/ 4. https://www.electronicshub.org/ 5. https://www.mdpi.com/ 6. https://dl.acm.org/

Course Description Form

1. Course Name: Electronics Laboratory
2. Course Code:
3. Semester / Year: First semester, 2024−2025
4. Description Preparation Date: 16/10/2024
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total) :78 hours
7. Course administrator's name (mention all, if more than one name)
Name: Msc. Ahmed abdulkadhim salih Email: ahmed.kadhem300@utq.edu.iq
8. Course Objectives

Course Objectives	• **Understanding basic electronic components.** • **Design and analysis of electronic circuits** • **Understanding frequency response of circuits and sig modulation.** • **Developing research and analytical thinking skills.**
9. Teaching and Learning Strategies	
Strategy	A. Theoretical lectures. B. Presentations and discussions. C. Self-reading and scientific research. D. Collaborate learning E. Continuous assessment
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1st	4	Student's grasp of the lecture content.	Semiconductor materials	Theoretical Lecture and Practical	Homework, daily quizzes, monthly exams, and final exams.
2nd	4	Student's grasp of the lecture content.	Semiconductor diodes	Theoretical Lecture and Practical	Homework, daily quizzes, monthly exams, and final exams.
3rd		Student's grasp of the lecture content.	Diode Equivalent Circuits, Dc characteristics.	Theoretical Lecture and Practical	Homework, daily quizzes, monthly exams, and final exams.
4th	4	Student's grasp of the lecture content.	Diode Applications: Rectifiers	Theoretical Lecture and Practical	Homework, daily quizzes, monthly exams, and final exams.
5th	4	Student's grasp of the lecture content.	Clipping & Clamping Circuits	Theoretical Lecture and Practical	Homework, daily quizzes, monthly exams, and final exams.
6th	4	Student's grasp of the lecture content.	Zener Diodes	Theoretical Lecture and Practical	Homework, daily quizzes, monthly exams, and final exams.
7th	4	Student's grasp of the lecture content.	Bipolar Junction Transistor (BJT): Operation of pnp & npn transistor	Theoretical Lecture and Practical	Homework, daily quizzes, monthly exams, and final exams.
8th	4	Student's grasp of the lecture content.	Characteristics of CE, CB & CC Configurations Operating Point and Operating Regions	Theoretical Lecture and Practical	Homework, daily quizzes, monthly exams, and final exams.
9th	4	Student's grasp of the lecture content.	Biasing the BJT	Theoretical Lecture and Practical	Homework, daily quizzes, monthly exams, and final exams.
10th	4	Student's grasp of the	Equivalent circuit model,	Theoretical Lecture and	Homework, daily quizzes, monthly

		lecture content.	analysis of transistor	Practical	exams, and final exams.
11th	4	Student's grasp of the lecture content.	Design of dc bias circuits, design of current gain stabilized	Theoretical Lecture and Practical	Homework, daily quizzes, monthly exams, and final exams.
12th	4	Student's grasp of the lecture content.	Small Signal Low Frequency Analysis: Transistor amplifier	Theoretical Lecture and Practical	Homework, daily quizzes, monthly exams, and final exams.
13th	4	Student's grasp of the lecture content.	Comparison of BJT Amplifier Configurations	Theoretical Lecture and Practical	Homework, daily quizzes, monthly exams, and final exams.
14th	4	Student's grasp of the lecture content.	Cascading Amplifiers, Simplified Models	Theoretical Lecture and Practical	Homework, daily quizzes, monthly exams, and final exams.

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbo (curricular books any)	1. Electronic Devices and Circuit Theory. Robert L. Boylestad, Louis Nashelsky. 2. Electronic Circuits Handbook for Design and Application. F.A. Blosted.
Main referen (sources)	1. Boylestad, R., & Nashelsky, L. (2014). Electronic devices and circuit theory. Prentice Hall. 2. Blosted, F. A. (2020). Electronic circuits: Handbook for design and application. Wiley.
Recommended books and references (scientific journals, reports…)	" The Art of Electronics" by Paul Horowitz and Winfield Hill " .Fundamentals of Electric Circuits" by Charles K. Alexander and Matthew N. O. Sadiku. JOURNALS 1. IEEE Journal of Solid-State Circuits. 2. Microelectronics Journal. 3. International Journal of Electronics.

	4. Sensors and Actuators A: Physical.
Electronic References, Websites	1. https://ieeexplore.ieee.org/ 2. https://www.sciencedirect.com/ 3. https://www.allaboutcircuits.com/ 4. https://www.electronicshub.org/ 5. https://www.mdpi.com/ 6. https://dl.acm.org/

Course Description Form

1. Course Name: **Signal processing**
2. Course Code:
3. Semester / Year: First semester, 2024−2025
4. Description Preparation Date: 16/10/2024
5. Available Attendance Forms:
6. Number of Credit Hours (Total) / Number of Units (Total) :60 hours
7. Course administrator's name (mention all, if more than one name)
Name: Msc. Ahmed abdulkadhim salih Email: ahmed.kadhem300@utq.edu.iq

8. Course Objectives	
Course Objectives	1. To teach students the concepts of digital and continuous signals, including mathematical representations, characteristics, and frequency content. 2. To teach students the concepts of digital and continuous systems, including representations, characteristics, and analysis techniques based on Fourier transforms and Z-transforms. 3. To introduce filter design concepts.

9. Teaching and Learning Strategies	
Strategy	A. Theoretical lectures. B. Presentations and discussions. C. Self-reading and scientific research. D. Collaborate learning E. Continuous assessment

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1st	4	Student's grasp of the lecture content.	Fundamental Digital Signal Processing, application of DSP , Continuous time signal vs. discrete time signal	Theoretical And practical Lecture	Homework, daily quizzes, monthly exams, and final exams.
2nd	4	Student's grasp of the lecture content.	Discrete time signal and sequence and continuous signal.	Theoretical And practical Lecture	Homework, daily quizzes, monthly exams, and final exams.
3rd		Student's grasp of the lecture content.	Standard of signal , Unit sample, Unit step , Unit ramp , Exponential sequence	Theoretical And practical Lecture	Homework, daily quizzes, monthly exams, and final exams.
4th	4	Student's grasp of the lecture content.	Classification of signal and system properties : Static and dynamic, shift invariant ,causal system	Theoretical And practical Lecture	Homework, daily quizzes, monthly exams, and final exams.
5th	4	Student's grasp of the lecture content.	Classification of signal and system properties : linear and stable system	Theoretical And practical Lecture	Homework, daily quizzes, monthly exams, and final exams.
6th	4	Student's grasp of the lecture content.	Convolution: Direct method ,graphical method, numerical method	Theoretical And practical Lecture	Homework, daily quizzes, monthly exams, and final exams.
7th	4	Student's grasp of the lecture content.	Convolution: continuous method ,graphical method, numerical method	Theoretical And practical Lecture	Homework, daily quizzes, monthly exams, and final exams.
8th	4	Student's grasp of the lecture content.	Correlation time sequence	Theoretical And practical Lecture	Homework, daily quizzes, monthly exams, and final exams.

9th	4	Student's grasp of the lecture content.	Frequency domain representation	Theoretical And practical Lecture	Homework, daily quizzes, monthly exams, and final exams.
10th	4	Student's grasp of the lecture content.	Discreet Fourier transform DFT,	Theoretical And practical Lecture	Homework, daily quizzes, monthly exams, and final exams.
11th	4	Student's grasp of the lecture content.	Inverse discrete Fourier transform IDFT	Theoretical Lecture	Homework, daily quizzes, monthly exams, and final exams.
12th	4	Student's grasp of the lecture content.	Fast Fourier transform	Theoretical And practical Lecture	Homework, daily quizzes, monthly exams, and final exams.
13th	4	Student's grasp of the lecture content.	Introduction to Z transform	Theoretical And practical Lecture	Homework, daily quizzes, monthly exams, and final exams.
14th	4	Student's grasp of the lecture content.	Properties Z transform	Theoretical And practical Lecture	Homework, daily quizzes, monthly exams, and final exams.

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

12. Learning and Teaching Resources

Required textbo (curricular books any)	Signal processing book
Main referen (sources)	▪ Hayes, Monson H. Schaum's Outline Digital Signal Processing. 1999. ▪ "Introduction to digital signal processing with computer Application", Paul Lynn, 1993.
Recommended books and references	1. IEEE Journal . 2. Biomedical Journal.

(scientific journals, reports…)	
Electronic References, Websites	1. https://ieeexplore.ieee.org/ 2. https://www.mdpi.com/ 3. https://dl.acm.org/