جامعة البيان

Academic Program Description

Al-Bayan University

Technical College of Engineering

2025-2026

Department of Medical Instruments Engineering Techniques

2025/9/1

University	Al-Bayan University
Faculty	College of Technical Engineering
Department	Medical Instruments Engineering Techniques
Title of Academic Program	
Degree	Bachelor in Power Mechanic Engineering Techniques
Type of Study	Year
Date of Preparing the Course Description	01-09-2025
Date of Completing the Course Description	10-09-2025

Head of Department

Sign

Name Dr.Aqeel Nafea Abdulalteef

Date 10-9-2025

Deputy Dean for Scientific Affairs

Sign

Name Nouf Thabet Mahmood

Date 10-9-2025

This File has been Checked by Quality Assurance Section

Head of Quality Assurance Section

Sign

Name Maryam Qutaiba Abdulrazzaq

Date 10-9-2025

Approved by The Dean

Prof. Mohanad Sameer Jabbar

1. Program Vision

The vision of the Medical Instruments Technical Engineering Department is to qualify the student to be an applied engineer familiar with modern technologies in the field of medical equipment engineering. In addition to that, providing an academic environment and community services that keep pace with the rapid development in the field of medical devices, and providing the latest study programs to keep pace with the scientific departments corresponding to the Department of Medical Equipment Technology Engineering in reputable Arab and international universities.

2. Program Mission

The mission of the Medical Instruments Technical Engineering Department is to provide an educational, technical and research environment for students through modern educational programs and curricula that demonstrate the importance of this specialization. Providing scientific and practical approaches and advanced applied research to simulate the needs of the labor market, openness to health institutions, and contribute to improving the health situation at the international and regional levels.

3. Program Objectives

- Graduating of an engineering staff with scientific and practical skills in diagnosing and repairing malfunctions resulting in medical devices.
- Preparing qualified engineers who have the ability to keep pace with the rapid development in the field of medical devices and provide them with the necessary skills to develop and modernize medical devices.
- Installing and operating various electronic and electromechanical medical devices, both diagnostic and therapeutic.
- Contributing and supervising the maintenance, maintenance and calibration of various medical devices.
- Designing, developing and trying to find alternatives for some parts related to medical devices.
- Carrying out scheduling and programming of periodic maintenance work.

4. The Program Accreditation

N/A

5. Other External Influences

N/A

6. Program Structure

Course Structure	Number of Courses	Credit Units	(%)	Reviews
Institutional Requirements				
College Requirements				
Department Requirements				
Summer Training				
Other				

7. Program Description

Year / Level	Course Code	Course Name	Credit Hours	
			Theoretical	Practical
4th		Medical instrumentation (III)	2	3
		Control system	2	2
		Engineering of radiation instruments	2	2
		Medical laser systems	1	2
		Advanced logic design	2	2
		Management	2	

	Computer application	1	2
	English language	1	
	Project		6

8. Expected learning outcomes of the program

➔ Knowledge

Outcome Learning 1	The student should be capable of proposing plans and work programs, especially in the maintenance of medical devices.
Outcome Learning 2	They should be able to handle various types of medical devices, including their installation, operation, applications, and software.
Outcome Learning 3	The student should also be able to analyze and evaluate the performance of medical devices, identify maintenance and improvement needs, enhancing their understanding of maintenance and development processes in the medical field.
Outcome Learning 4	they should be able to analyze the needs of the job market and the aspirations of medical device companies, applying the acquired knowledge and skills effectively to meet those needs.

➔ Skills

Outcome Learning 1	The student should be able to carry out maintenance and repair operations for various medical devices, enhancing their technical and practical skills in the field.
Outcome Learning 2	They should be capable of handling modern technology and tools used in the maintenance and development of medical devices, thus enhancing their capabilities in modern technology and innovation.
Outcome Learning 3	The student should have the ability to analyze data and prepare detailed technical reports on the performance of medical devices and suggest necessary improvements, developing their skills in communication and analysis.
Outcome Learning 4	They should be able to deal with problems and make technical and engineering decisions in the medical work context, fostering their abilities in problem-solving and making independent and responsible decisions.

➔ Values

Outcome Learning 1	The student should be capable of developing innovative solutions to enhance patient care and deliver exceptional medical services.
Outcome Learning 2	They should be able to establish partnerships with healthcare institutions to exchange knowledge and practical experiences.
Outcome Learning 3	The student should be able to promote health awareness and educate the community about the importance of health and safety.
Outcome Learning 4	They should be able to contribute to the development of policies and regulations related to medical devices to ensure their quality and safety.

9. Teaching and Learning Strategies

Lectures and theoretical lessons.	Workshops and training courses.	Applied projects and case studies.
training on quality tools and techniques.	Online educational resources.	

10. Evaluation Methods

Diagnostic Assessment

Formative Assessment

Summative Assessment

11. Faculty Members

Titles	Specialization		Numbers	
	General	Special	Staff	Lec
Prof	Computer Science Electrical Engineering	Computer Science Electrical Engineering	2	
Ass. Prof	Environmental Engineering	Environmental Engineering	1	
Lecturers	Electrical Engineering	Electrical Engineering	5	
	Biomedical Engineering	Biomedical Engineering		
	Communications Engineering	Communications Engineering		
	Laser Engineering	Laser Engineering		
	Materials Engineering			
Ass. Lecturers	Biomedical Engineering	Biomedical Engineering	7	
	Network Engineering	Network Engineering		
	Electrical Engineering	Electrical Engineering		
	Biomedical Engineering	Biomedical Engineering		

Program Skills

Year/Level	Course Code	Course Title	Primary or Optional	Learning Outcomes Required from the Program											
				Knowledge				Skills				Values			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
4th		Medical instrumentation (III)		/	/	/	/		/	/		/			/
		Control system		/	/	/	/	/	/	/		/			/
		medical laser		/	/	/		/	/	/		/			/
		Computer application /4		/	/	/	/	/	/	/		/	/		/
		Advance logic Design		/	/	/		/	/	/		/			/
		Engineering of radiation instruments		/	/	/	/	/	/	/		/	/		/
		Occupational Safety		/	/	/	/		/	/		/			/
		Management		/	/	/	/	/	/	/		/			/
		English language/4		/	/	/		/	/	/		/	/		/

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Course Description (1)

1. Course Title	**Medical Instrumentation (III)**
2. Course Code	
3. Semester/Year	**2025-2026**
4. Description Preparation Date	**1-9-2025**
5. Available Attendance Form	**Classroom weekly attendance**
6. No. of Hours (Total)	**150**
7. No. of Credits (Total)	**7**
8. Course Administrator Name	**Dr. Ali Mahmood**
9. E-mail	Ali.m @albayan.edu.iq

10. Course Objectives

Knowledge	A1	Studying the medical device as a concept of a device
	A2	Studying the entire design of the medical device
	A3	Knowledge of all entire circuits of the medical devices and their operation
	A4	Using and dealing with all medical devices
Skills	B1	Ability of dealing with various medical devices
	B2	Operation and maintenance of the medical devices
	B3	Ability of designing electronic circuits
	B4	Ability of using the medical device
Values	C1	Attracting students and gaining their love for the material and respecting the lesson
	C2	Achieving pleasure with the benefit of the study material and thus stimulating follow-up in the student
	C3	Generating new ideas when understanding the subject from the theoretical and practical side and asking smart questions in order to achieve full and optimal benefit
	C4	Achieving the concept of support and teamwork as a team

11. Teaching and Learning Strategies

1.	Demonstrate a thorough understanding of electronic systems and relevance in the medical field.	**4.**	Critical analysis and interpretation of data obtained from electronic measurements in medical electronic systems

2.	Apply theoretical knowledge to solve problems and troubleshoot electronic circuits used in medical devices.	**5.**	Effective and professional communication about medical electronic systems, both orally and in writing
3.	Evaluate the suitability of different electronic circuits for specific medicine applications	**6.**	Develop students' knowledge and skills in designing, analyzing, and troubleshooting electronic circuits used in medical devices

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12. The Structure of the Course					
Week	**Hours**	**RLOs**	**Topic/Subject Name**	**Learning Method**	**Evaluation Method**
1st , 2nd	4	Study and learn surgical systems in general and in specific	General systems & specialized tools in general surgery	Theoretical & Practical	Quiz & Exams
3rd , 4th , 5th	6	Learn about specialized systems and their tools	Specialized systems and inst.	Theoretical & Practical	Quiz & Exams
6th , 7th	4	Knowledge of microsurgery tools for eyes	Ophthalmic microsurgical Inst.	Theoretical & Practical	Quiz & Exams
8th , 9th	4	Study and knowledge of the open heart system, blood vessels and heart	Open heart & cardiovascular	Theoretical & Practical	Quiz & Exams
10th	2	Study the heart and lung system and identify its components	Heart-lung machine	Theoretical & Practical	Quiz & Exams
11th , 12th	4	Study and knowledge of the kidney system and its electronic structure	Kidney machine	Theoretical & Practical	Quiz & Exams
13th , 14th	4	Study and knowledge of surgical thermal permeability and its working principle	Surgical diathermy	Theoretical & Practical	Quiz & Exams

15th , 16th , 17th	6	Knowledge of the artificial organs of both internal and external types	Artificial organs – internal & external	Theoretical & Practical	Quiz & Exams
18th , 19th , 20th	6	Study the work of dental system and composition	Dental system	Theoretical & Practical	Quiz & Exams
21st , 22nd	4	Study and knowledge of gynecological tools and systems	Gynecology Inst.	Theoretical & Practical	Quiz & Exams
23th , 24th	4	Recognition of the ultrasonic assistive device	Ultrasonic assisting device	Theoretical & Practical	Quiz & Exams
25th , 26th	4	Study of logical auditory surgical units and knowledge of their components	Audio logical surgical units	Theoretical & Practical	Quiz & Exams
27th , 28th	4	Study and know what the anesthesia device is and its construction	Anesthetic units	Theoretical & Practical	Quiz & Exams
29th , 30th	4	Learn about the intens care unit and components	Intensive care units	Theoretical & Practical	Quiz & Exams

13. Course Evaluation

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

14. Learning & Teaching Resources

Required textbooks (curricular if any)	• S. Ananthi, 2005 , " A textbook of medical Instruments"
Main References (sources)	• John R. Cameron, James G. Skofronicks, "Medical Physics," John Wiley and Sons Inc., New York, 1978. • Navin.C. Nanda, "Doppler Echocardiography", Lea & Febiger, USA, 2nd Edition, 1993. • Peter Strong, "Biophysical Measurements", Tektronix Manual, Beaverton, Oregon, 1970.
Recommended Books & References (Scientific Journals, Reports …)	• Willis. J. Tompkins, John G. Webster, "Design of Microcomputer Based Medical Instru mentation", Prentice Hall International Inc, London, 1981 • R.S. Khandapur, "Hand Book of Biomedical Instrumentation," Tata McGraw Hill Pub lishers, New Delhi,1990.
Websites or Electronic References	Medical Text Books for sale | eBay

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Course Description (2)

1. Course Title	**Control system.**
2. Course Code	
3. Semester/Year	**2025-2026**
4. Description Preparation Date	**15/9/2025**
5. Available Attendance Form	**Weekly**
6. No. of Hours (Total)	**120 h**
7. No. of Credits (Total)	**6 units**
8. Course Administrator Name	**Dr. Nouf T. Mahmood**
9. E-mail	**Noof.t@albayan.edu.iq**

10. Course Objectives

Knowledge	A1	The student knows the definition of Control system
	A2	How to engage colleagues and stakeholders in managing information knowledge and control systems.
	A3	Design and simulation of control system by Matlab
	A4	To provide adequate knowledge in the time response of systems and steady state err
Skills	B1	The student can recognize the control system of accord basic knowledge in obtaining the open loop.
	B2	The student can identify the Design and implementation of control system
	B3	The student performs a technique of built Modelling and Simulation of Dynamic Systems.
	B4	Learning closed–loop frequency responses of systems
Values	C1	Enhancing safety and security
	C2	Commitment to sustainable development.
	C3	
	C4	

11. Teaching and Learning Strategies

1.	Theoretical lectures in classrooms	4.	

2.	**Practical lectures on transducers and electronic circuit in Lab**	**5.**	
3.	**Seminars and workshops**	**6.**	

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12. The Structure of the Course

Week	Hours	RLOs	Topic/Subject Name	Learning Method	Evaluation Method
1	2 Pr.+ 2 Th.	Study Introduction to linear control engineering.	Introduction to linear control engineering.	Lecture/ Laboratory	Quiz, Mid Exam, Seminar, Laboratory
2,3	2 Pr.+ 2 Th.	Study Mathematical backgroun lap lace transform, complex variable, matrices.	Mathematical background; lap la transform, complex variable, matrices.	Lecture/ Laboratory	Quiz, Mid Exam, Seminar, Laboratory
4,5,6	2 Pr.+ 2 Th.	Study Transfer function, block diagram representation and reduction, signal flow diagram	Transfer function, block diagra representation and reduction, sig flow diagram.	Lecture/ Laboratory	Quiz, Mid Exam, Seminar, Laboratory
7,8,9	2 Pr.+ 2 Th	Study Time domain analysis, steady – state transient analysi	Time domain analysis, steady – st transient analysis.	Lecture/ Laboratory	Quiz, Mid Exam, Seminar, Laboratory
10,11	2 Pr.+ 2 Th.	Study Stability analysis; Routh Nyquist.	Stability analysis; Routh, Nyquis	Lecture/ Laboratory	Quiz, Mid Exam, Seminar, Laboratory
12,13	2 Pr.+ 2 Th.	Study Root locus technique	Root locus technique	Lecture/ Laboratory	Quiz, Mid Exam, Seminar, Laboratory
14,15,1	2 Pr.+ 2 Th.	Study Frequency domain analys Eainmargin, phase margin an bode plot.	Frequency domain analysis, Eainmargin, phase margin and bo plot.	Lecture/ Laboratory	Quiz, Mid Exam, Seminar, Laboratory
17,18	2 Pr.+ 2 Th.	Study Frequency domain synthesis, phase lead.	Frequency domain synthesis, pha lead.	Lecture/ Laboratory	Quiz, Mid Exam, Seminar, Laboratory
19,20	2 Pr.+ 2 Th.	Study Compensation, phase – l compensation lag – lead compensation.	Compensation, phase – lag compensation lag – lead compensation.	Lecture/ Laboratory	Quiz, Mid Exam, Seminar, Laboratory
21, 22,23,24	2 Pr.+ 2 Th.	Study PID controllers design.	PID controllers design.	Lecture/ Laboratory	Quiz, Mid Exam, Seminar, Laboratory
26, 27	2 Pr.+ 2 Th.	Study State space representatio and analysis	State space representation and analysis	Lecture/ Laboratory	Quiz, Mid Exam, Seminar, Laboratory

28, 29	2 Pr.+	Study State diagram; analogu computer.	State diagram; analogue comput	Lecture/ Laborator	Quiz, Mid Exam, Seminar, Laboratory
30	2 Pr.+	Study Block diagram representation.	State diagram; analogue comput	Lecture/ Laborator	Quiz, Mid Exam, Seminar, Laboratory

13. Course Evaluation	
Distributing grades out of 100 according to the tasks assigned to the student, such as daily preparation, daily exams, oral exams, monthly exams, seminars, reports, etc.	
14. Learning & Teaching Resources	
Required textbooks (curricular if any)	**Katsuhiko Ogata, Modern Control Engineering, 5th Edition**
Main References (sources)	**Katsuhiko Ogata, Modern Control Engineering, 5th Edition**
Recommended Books & References (Scientific Journals, Reports …)	**Franklin G.F., Powell J.D,.Emami-Naeini A,. Feedback Control of Dynamic Systems, Pearson, Upper Saddle River, New Jersey, 5th edition, 2006.**
Websites or Electronic References	**IEEE**

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Course Description (3)

1. Course Title	**Engineering of Radiation Instruments.**
2. Course Code	
3. Semester/Year	**2025-2026**
4. Description Preparation Date	**1/9/2025**
5. Available Attendance Form	**Daily attendance**
6. No. of Hours (Total)	**60 theoretical hours, 2hours per week** **60 practical hours, 2hours per week**
7. No. of Credits (Total)	**6**
8. Course Administrator Name	**Dr. Asaad Abdulhussain Mozan**
9. E-mail	**Asaad.a@albayan.edu.iq**

10. Course Objectives

Knowledge	A1	A study of the structure of the atom, atomic and nuclear radiation, their effects on human body, and their applications in medical devices.
	A2	Competence in troubleshooting and resolving issues with medical radiological equipment.
	A3	The ability to research and prepare the perfect setting for every device.
	A4	Recognizing how radiation interacts with matter.
Skills	B1	**The ability to measure radiation doses and dose measurement devices.**
	B2	**Preparing research and studies to improve and develop the work of medical radiation devices.**
	B3	**Installation and operation of medical radiation devices.**
	B4	**Equipping technical staff with the skills to operate and service medical laser systems.**
Values	C1	**Scientific integrity**
	C2	**Sincerity and loyalty.**
	C3	**Truthfulness**
	C4	**Respect for professional ethics.**

11. Teaching and Learning Strategies

1.	**Lectures**	4.	**Theoretical exams (daily,termly, and final)**
2.	**Science laboratories**	5.	**Practical exams**

3.	**Visual aids and scientific models**	**6.**	**Assignments**

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12. The Structure of the Course

Week	Hours	RLOs	Topic/Subject Name	Learning Method	Evaluation Method
1st , 2nd	**4**	Atomic structure and atomic radiation	Atomic structure and atomic radiation	**Theory lectures**	Exam and homework
3rd , 4th	**4**	The nuclear and nuclear radiation	The nuclear and nuclear radiation	**Theory lectures**	Exam and homework
5th , 6th	**4**	Interaction of radiation with matter.	Interaction of radiation with matter.	**Theory lectures**	Exam and homework
7th , 8th , 9th	**4**	Radiation detection & engineering radiation detectors.	Radiation detection & engineering radiation detectors.	**Theory lectures**	Exam and homework
10th , 11th , 12th	**4**	Engineering of radiation dosimetry and dosimeters.	Engineering of radiation dosimetry and dosimeters.	**Theory lectures**	Exam and homework
13th , 14th	**4**	Radiation protection.	Radiation protection.	**Theory lectures**	Exam and homework
15th , 16th	**4**	Engineering of body scanners.	Engineering of body scanners.	**Theory lectures**	Exam and homework
17th , 18th	**4**	Production of X – rays.	Production of X – rays.	**Theory lectures**	Exam and homework
19th , 20th	**4**	Clinical radiation generators.	Clinical radiation generators.	**Theory lectures**	Exam and homework
21st , 22nd	**4**	Dose distribution and scatter analysis.	Dose distribution and scatter analysis.	**Theory lectures**	Exam and homework
23rd , 24th	**4**	A system of dosimetric calculations.	A system of dosimetric calculations.	**Theory lectures**	Exam and homework
25th , 26th	**4**	Treatment planning.	Treatment planning.	**Theory lectures**	Exam and homework
27th , 28th	**4**	Engineering of electron beam therapy.	Engineering of electron beam therapy.	**Theory lectures**	Exam and homework
29th , 30th	**4**	Brachy therapy.	Brachy therapy.	**Theory lectures**	Exam and homework

13. Course Evaluation	
Weighting of the 100-point grade according to student assignments, which include daily preparation, daily and oral exams, monthly and written exams, reports, and other tasks	
14. Learning & Teaching Resources	
Required textbooks (curricular if any)	**1- Physics for Scientists and Engineers with Modern physics, Eighth Edition.** By: Raymond A.Serway and John W.Jewett,Jr. **2- The physics and Radiation Therapy.** By: Faiz khans.

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Course Description (4)

1. Course Title	**Medical Laser System**
2. Course Code	
3. Semester/Year	**2025-2026**
4. Description Preparation Date	**1-9-2025**
5. Available Attendance Form	**Mandatory daily presence**
6. No. of Hours (Total)	**60 theoretical hours, 2hours per week** **60 practical hours, 2hours per week**
7. No. of Credits (Total)	**6**
8. Course Administrator Name	Dr,Alaa hussien
9. E-mail	

10. Course Objectives

Knowledge	A1	**An investigation into the production of various lasers and their utilization in medical equipment.**
	A2	**Competence in disassembling and analyzing laser components, determining the function of each part.**
	A3	**Competence in troubleshooting and resolving issues with medical laser equipment.**
	A4	**Competence in setting up and analyzing the ideal operating conditions for various devices.**
Skills	B1	**Equipping technical staff with the skills to operate and service medical laser systems.**
	B2	**Preparing research and studies to improve and develop the performance of medical laser devices.**
	B3	**Serving on committees focused on medical laser technology.**
	B4	**Installing and operating medical laser devices.**
Values	C1	**Accuracy, dedication, and adherence to standards and specifications for medical laser devices.**
	C2	**Collaborating with physicians and other medical staff.**
	C3	**The responsibility for maintaining patient safety by accurately operating medi devices.**
	C4	**A medical laser engineer is dedicated to maintaining high professional standa and pursuing ongoing professional development.**

11. Teaching and Learning Strategies

1.	Lectures	4.	Theoretical exams (daily,termly, and final)
2.	Science laboratories	5.	Practical exams
3.	Visual aids and scientific models	6.	Assignments

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12. The Structure of the Course					
Week	**Hours**	**RLOs**	**Topic/Subject Name**	**Learning Method**	**Evaluation Method**
1	**4**	Laser generation.	Laser generation.	Theory lectures	Exam and homework
2	**4**	Laser generation.	Laser generation.	Theory lectures	Exam and homework
3	**4**	Types of laser.	Types of laser.	Theory lectures	Exam and homework
4	**4**	Types of laser.	Types of laser.	Theory lectures	Exam and homework
5	**4**	Light and light propagation in glass fiber.	Light and light propagation in glass fiber.	Theory lectures	Exam and homework
6	**4**	Light and light propagation in glass fiber.	Light and light propagation in glass fiber.	Theory lectures	Exam and homework
7	**4**	Light and light propagation in glass fiber.	Light and light propagation in glass fiber.	Theory lectures	Exam and homework
8	**4**	Optical fiber wave guide, band width distance product	Optical fiber wave guide, band width dista product	Theory lectures	Exam and homework
9	**4**	dispersion and pulse spreeding	dispersion and pulse spreeding	Theory lectures	Exam and homework
10	**4**	maximum allowable data rate, fiber power losses.	maximum allowable data rate, fiber power losses.	Theory lectures	Exam and homework
11	**4**	Transmitter devise and circuits (communication LEDs)	Transmitter devise and circuits (communication LEDs)	Theory lectures	Exam and homework
12	**4**	Transmitter devise and circuits (communication LEDs)	Transmitter devise and circuits (communication LEDs)	Theory lectures	Exam and homework
13	**4**	Injection lasers	Injection lasers	Theory lectures	Exam and homework
14	**4**	modulators	modulators	Theory lectures	Exam and homework
15	**4**	Receiver devices and circuits photo diode light detector.	Receiver devices and circuits photo diode light detector.	Theory lectures	Exam and homework
16	**4**	Receiver devices and circuits photo diode light detector.	Receiver devices and circuits photo diode light detector.	Theory lectures	Exam and homework

17	**4**	PIN photo diodes, photo multiplier.	PIN photo diodes, photo multiplier.	Theory lectures	Exam and homework
18	**4**	Avalanche photo diode (APD),	Avalanche photo diode (APD),	Theory lectures	Exam and homework
19	**4**	Avalanche photo diode (APD),	Avalanche photo diode (APD),	Theory lectures	Exam and homework
20	**4**	Transmission technology	Transmission technology	Theory lectures	Exam and homework
21	**4**	fiber technology	fiber technology	Theory lectures	Exam and homework
22	**4**	Splices	Splices	Theory lectures	Exam and homework
23	**4**	couplers	couplers	Theory lectures	Exam and homework
24	**4**	Laser applications in surgical oncolog	Laser applications in surgical oncology	Theory lectures	Exam and homework
25	**4**	Ophthalmic laser applications	Ophthalmic laser applications	Theory lectures	Exam and homework
26	**4**	Laser skin treatments	Laser skin treatments	Theory lectures	Exam and homework
27	**4**	Dental laser applications	Dental laser applications	Theory lectures	Exam and homework
28	**4**	Laser hazards	Laser hazards	Theory lectures	Exam and homework
29	**4**	the standard level for a safe working environment, lab – safety.	the standard level for a safe working environment, lab – safety	Theory lectures	Exam and homework
30	**4**	the standard level for a safe working environment, lab – safety.	the standard level for a safe working environment, lab – safety.	Theory lectures	Exam and homework

13. Course Evaluation	
Weighting of the 100-point grade according to student assignments, which include daily preparation, daily and oral exams, monthly and written exams, reports, and other tasks	
14. Learning & Teaching Resources	
Required textbooks (curricular if any)	
Main References (sources)	An introduction to the laser theory an application By M.N. Avadhanulu and P.S. Hemne
Recommended Books & References (Scientific Journals, Reports …)	Advanced Optics and Lasers by Roman Schmied
Websites or Electronic References	

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Course Description (5)

1. Course Title	Advanced logic design ALD
2. Course Code	
3. Semester/Year	First semester /2025-2026
4. Description Preparation Date	1-9-2025
5. Available Attendance Form	Lecture attendance
6. No. of Hours (Total)	120
7. No. of Credits (Total)	6
8. Course Administrator Name	Dr. Ali Majeed
9. E-mail	

10. Course Objectives

Knowledge	A1	Artificial intelligence .
	A2	Simulation and modeling .
	A3	Image processing and communications .
	A4	Digital control system .
Skills	B1	Digital Circuit Design
	B2	Boolean Algebra & Minimization Techniques
	B3	Finite State Machines (FSMs)
	B4	Programmable Logic Devices (PLDs)
Values	C1	Precision and Accuracy
	C2	Innovation and Creativity
	C3	Logical Reasoning
	C4	Critical Thinking

11. Teaching and Learning Strategies

1.	Hands-On Lab Work and Experiments	4.	Flipped Classroom Approach

2.	Problem-Based Learning (PBL)	**5.**	Peer Learning and Group Wo
3.	Interactive Lectures with Live Demonstrations	**6.**	Use of Simulations and Virtual Labs

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12. The Structure of the Course					
Week	**Hours**	**RLOs**	**Topic/Subject Name**	**Learning Method**	**Evaluation Method**
1	2	Artificial intelligence .	Artificial intelligence .	Lecture	Exam
2	2	Simulation and modeling .	Simulation and modeling .	Lecture	Exam
3	2	Control system	Control system	Lecture	Exam
4	2	Image processing a communications .	Image processing a communications .	Lecture	Exam
5	2	Real - time system .	Real - time system .	Lecture	Exam
6	2	Microelectronics technology .	Microelectronics technology .	Lecture	Exam
7	2	VLSI system .	VLSI system .	Lecture	Exam
8	2	Advanced compu architecture .	Advanced computer architect .	Lecture	Exam
9	2	Robotics and automation	Robotics and automation	Lecture	Exam
10	2	Topics in digital system .	Topics in digital system .	Lecture	Exam
11	2	Digital control system	Digital control system	Lecture	Exam
12	2	Signal processing	Signal processing	Lecture	Exam
13	2	Reliability engineering .	Reliability engineering .	Lecture	Exam
14	2	Fault diagnosis .	Fault diagnosis .	Lecture	Exam

15	2	Microcomputer system desig	Microcomputer system design	Lecture	Exam

13. Course Evaluation	
14. Learning & Teaching Resources	
Required textbooks (curricular if any)	Introduction to Advanced Logic Design Key Concepts in ALD Boolean Algebra and Logic Gates Combinational Logic Design Sequential Logic Circuits
Main References (sources)	• Digital Design" by M. Morris Mano and Michael D. Ciletti • "Fundamentals of Logic Design" by Charles H. Roth Jr. and Larry L. Kinney • "CMOS VLSI Design: A Circuits and Systems Perspective" by Neil Weste and David Harris
Recommended Books & References (Scientific Journals, Reports …)	• IEEE Transactions on Computers • IEEE Transactions on Very Large Scale Integration (VLSI) Systems • International Conference on Computer-Aided Design (ICCAD) Proceedings
Websites or Electronic References	• Google scholar, libgen.is,pdf drive • Xilinx and Intel FPGA Documentation

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Course Description (6)

1. Course Title	**Project Management**
2. Course Code	**--**
3. Semester/Year	**2025-2026**
4. Description Preparation Date	**1/9/2025**
5. Available Attendance Form	**lecture**
6. No. of Hours (Total)	**60 study hours, two hours per week**
7. No. of Credits (Total)	**4**
8. Course Administrator Name	Dr. Zaid Ahmed Mohammed
9. E-mail	zaid.a@albayan.edu.iq

10. Course Objectives

Knowledge	A1	Providing students with concepts related to the administrative activities carried out by organization and their applications.
	A2	Introducing the student to the principles and elements of project management strateg in terms of planning, scheduling and controlling activities.
	A3	Emphasis on quantitative methods to consider all administrative activities and function the project.
	A4	The new relationship of Japanese management compared to American managem (Western in general).
Skills	B1	Effective communication and organization skills.
	B2	Risk management, problem solving and the ability to properly distribute tasks and role
	B3	Manage time efficiently.
	B4	Leadership and negotiation skills.
Values	C1	The value allocated to the life of the project (planned value).
	C2	The value of the integrated work related to planning (earned value).
	C3	The true value of the work done (expenditure).
	C4	

11. Teaching and Learning Strategies

1.	Lectures	**4.**	Detailed presentations
2.	Homework	**5.**	Research projects
3.	Exams	**6.**	Report preparation

جامعة البيان

12. The Structure of the Course					
Week	**Hours**	**RLOs**	**Topic/Subject Name**	**Learning Method**	**Evaluation Method**
1st	2	Understand the basic concepts of project management.	Introduction to project management objective and trade offs. Cost – schedule – performance.	Lecture	Tests, daily attendan exams, reports
2nd	2	Understand the basic stages and develop skills in project management	Planning and control in projects : Planning Scheduling Controlling	=	=
3rd	2	Knowing the basic concepts of scheduling, its types and methods, and building basic project management skills.	Scheduling methods.	=	=
4th	2	Knowing the concept of the Gantt chart and enhance the learners ability to manage projects effectively and coordinate tasks in a visual and organized manner.	Gantt chart.	=	=
5th	2	Knowing the basic concepts of networking methods and how to use them in project management.	Networks methods.	=	=
6th	2	Knowing the concept of fixed time networks and how to use it effectively in managing	Constant – time network.	=	=

		complex projects that require precise time control.			
7th , 8th	4	Knowing the concept of the PERT network and identify its components and enhance the learners ability to use it in project planning	Pert network.	=	=
9th , 10th	4	Enhance skills in project planning and critical activity analysis	Critical path method.	=	=
11th	2	Understand and apply the precedence planning method effectively in project management.	Precedence diagramming method.	=	=
12th,13th	4	Making informed decisions about choosing the project location, which contributes to improving the project's feasibility	Project phases: choice of project location.	=	=
14th	2	Understand process design concepts and develop development skills.	Process design.	=	=
15th	2	Understand project needs, improve performance, reduce risks and increase returns.	Choice of technology.	=	=
16th,17th	4	Understanding financial fundamentals, assessing needs and feasibility, analyzing the cost of replacement versus maintenance and analyzing customer needs helps in making informed decisions	Financial analysis. Purchase of new machine. Machine replacement. Layout of facilities.	=	=

		that contribute to improving performance.			
18th	2	Human Resources Planning, understanding the role of the project manager or the person responsible for managing the workforce, to ensure the organization and coordination of the work team to enhance productivity	Managing the work force in project who manages the work force. Principles in decision of work – force management.	=	=
19th	2	Understanding Japanese organizational culture in the workplace, respect and career progression, communication in the workplace, training and workforce development	Japans work – force management.	=	=
20th	2	Improve skills and knowledge, understand modern performance appraisal methods, design and implement effective and use technology to evaluate new performance.	New approach to evaluation performance.	=	=
21st	2	Understanding material types and classification, inventory management, selecting suppliers, quality and safety standards in handling materials, sustainability in materials management and monitoring techniques	Materials handling.	=	=

22nd	2	Understand the basics of the system Identify system elements and data, planning and coordination, determining material needs	Concepts of MRP system. Elements of MRP system.	=	=
23rd	2	Understand the basics of Material Requirements System and Point of Order System, the difference between the two approaches and determining when to use each system based on the nature of the operations and production volume. Understand the basics of Material Requirements System and Time-Specific System, choose the most appropriate system based on the nature of the work, production volume and stability of demand	MRP versus order – point system. MRP versus just in time system.	=	=
24th,25th	4	Understand how to coordinate and divide activities, identify the relationship between activities, plan activities well, organize resources and use software	Activities in project: Coordination of project activities. Activities breakdown.	=	=
26th	2	Understand the importance of measuring project progress, understand the tools and techniques needed to measure and evaluate project progress, using digital tools, quantitative	Measuring project process tools. Purpose of work measurement.	=	=

		and qualitative analysis and reporting			
27th	2	Understanding of methodologies, improving process efficiency, ability to collect and analyze data and develop and implement sustainable solutions	Methods study.	=	=
28th	2	Understanding performance measurement, types of measurements, ability to analyze and apply continuous improvement practices	Types of work measurements.	=	=
29th	2	Comprehensive understanding of the concept of time study, improving the efficiency of operations and reducing waste.	Time study.	=	=
30th	2	Developing time management skills, the ability to plan, organize and apply effective strategies to make the most of the available time.	Time management.	=	=

13. Course Evaluation	
The grade is distributed out of 100 according to the tasks assigned to the student, such as daily preparation, and daily, oral, monthly and written exams, reports, etc.	
14. Learning & Teaching Resources	
Required textbooks (curricular if any)	
Main References (sources)	"Project Management: A Systems Approach to Planning, Scheduling, and Control" ل Harold Kerzner "Agile Project Management: Creating Innovative Products" ل Jim Highsmith "Project Management: The Managerial Process" ل Eric W. Larson, Clifford F. Gray "Construction Project Management: A Practical Guide to Field Construction Management" ل S. Keoki Sears, Richard H. Clough, Glenn A. Sears "PMP Project Management Professional Study Guide" Phillips, Joseph (2004). McGraw-Hill/Osborne. p. 354.
Recommended Books & References (Scientific Journals, Reports …)	Arab Projects Magazine: Publishes challenging research and articles on project management.
Websites or Electronic References	SABIS Academy Platform: Contains articles and studies related to project management Aamal Website: Provides a group of articles related to project management and business development Project Website: Contains articles and lessons on project management

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Course Description (7)

1. Course Title	**Computer Applications 4**
2. Course Code	
3. Semester/Year	**Annually 2025-2026**
4. Description Preparation Date	**1/9/2025**
5. Available Attendance Form	**Attendance**
6. No. of Hours (Total)	**Theoretical Lessons 30 Hours** **Practical Lessons 60 Hours**
7. No. of Credits (Total)	**3**
8. Course Administrator Name	Dr. Mohammed Emad
9. E-mail	Mohammed.E@albayan.edu.iq

10. Course Objectives

Knowledge	A1	The student should be able to prepare and formulate presentations.
	A2	The student should be able to summarize reports and convert them into brief presentations.
	A3	The student should have the required personality to present their report in the least amount of t with the best amount of information.
	A4	
Skills	B1	The student should be able to prepare a small number of slides with minimal content to pre important information.
	B2	The student should be able to use PowerPoint professionally.
	B3	The student should be able to prepare a presentation for their graduation project.
	B4	The student should possess sufficient skills for delivering presentations.
Values	C1	The student should be able to convey a complete and clear idea in a short time.
	C2	The student should be able to use body language appropriately to engage with the audience.
	C3	
	C4	

11. Teaching and Learning Strategies

1.	Theoritical Lessons	**4.**	Brain Storming
2.	Practical Experiments	**5.**	Seminars
3.	Discussions	**6.**	Additional Projects

جامعة البيان

12. The Structure of the Course					
Week	**Hours**	**RLOs**	**Topic/Subject Name**	**Learning Method**	**Evaluation Method**
1	1 T 2 P	Familiarize with the PP work environment benefits, and the concept of applied presentations.	Introduction to PowerPoints	Theory + Practical	Daily and Monthly Exa Homeworks Reports Seminars
4-2	1 T	Build a basic presentation by utilizing templates provided by the program, as well as learn how to save and edit the presentation.	Basics of Presentations	Theory + Practical	
56-	2 P	Use professional navigation between slides, both manually and automatically.	Transitions between Slides	Theory + Practical	
8-7	1 T	Animate objects within the slides (entry, movement, and exit).	Animations in Slides	Theory + Practical	
9	2 P	Student presentations to practice delivery techniques.	Seminar	Theory + Practical	
14-10	1 T	Use artificial intelligence techniques in preparing and designing slides.	AI Apps for preparing and design Slides	Theory + Practical	
20 - 15	2 P	Design presentations for graduation projects.	Presentations of Final Year Projec	Theory + Practical	
30-21	1 T	Utilize advanced CAD-CAM applications.	CAD – CAM Applications	Theory + Practical	

13. Course Evaluation	
Annual effort (50 points) is divided as follows: 25 points for each semester, which consists of the written exam (10 points), practical exam (10 points), and reports and attendance (5 points).	
14. Learning & Teaching Resources	
Required textbooks (curricular if any)	
Main References (sources)	- Microsoft PowerPoint Best Practices, Tips, a Techniques: An indispensable guide to master PowerPoint's advanced tools to create engag presentations - The Power of Ai Presentation Maker: Unleash Your Creative Potential
Recommended Books & References (Scientific Journals, Reports …)	
Websites or Electronic References	https://support.microsoft.com/home/

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Course Description **(8)**

1. Course Title	English Language
2. Course Code	
3. Semester/Year	**2025-2026**
4. Description Preparation Date	1/9/2025
5. Available Attendance Form	In-person lectures
6. No. of Hours (Total)	60
7. No. of Credits (Total)	30
8. Course Administrator Name	Asst. Lect. Noor Najem
9. E-mail	

10. Course Objectives:
A. Practice conversation in English.
B. Construct and use grammatically correct sentences.
C. Improve the four skills in general: reading, writing, speaking, and listening.

Knowledge	**A1**	Learn new vocabulary related to various topics in the coursebook.
	A2	Learn more about different cultures and lifestyles by reading about them.
Skills	**B1**	Improve the student's speaking skills.
	B2	Teach them how to write emails using formal language.
	B3	Improve their reading skills.
	B4	Improve their presentation skills in English.
Values	**C1**	**Global Communication**
	C2	**Career Opportunities**
	C3	**Cultural Exchange**
	C4	**Personal Development**

10. Teaching and Learning Strategies

1.	**Communicative Approach**	**4.**	**A mix of individual, pair, and group activities**
2.	**Task-Based Learning**	**5.**	**Authentic Materials**

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11. The Structure of the Course					
Week	**Hours**	**RLOs**	**Topic/Subject Name**	**Learning Method**	**Evaluation Method**
1	3	See the coursebook's Language Input	Unit 1/No place like home	**1. Communicative Approach 2. Task-Based Learning 3. A mix of individual, pair, and group activities**	Quiz
2	3	See the coursebook's Language Input	Unit 1/No place like home	**1. Communicative Approach 2. Task-Based Learning 3. A mix of individual, pair, and group activities**	Quiz
3	3	See the coursebook's Language Input	Unit 2/ Been there, done that!	**1. Communicative Approach 2. Task-Based Learning 3. A mix of individual, pair, and group activities**	Quiz
4	3	See the coursebook's Language Input	Unit 2/ Been there, done that!	**1. Communicative Approach 2. Task-Based Learning 3. A mix of individual, pair, and group activities**	Quiz
5	3	See the coursebook's Language Input	Unit 3/What a story!	**1. Communicative Approach 2. Task-Based Learning 3. A mix of individual, pair, and group activities**	Quiz
6	3	See the coursebook's Language Input	Unit 3/What a story!	**1. Communicative Approach 2. Task-Based Learning 3. A mix of individual, pair, and group activities**	Quiz
7	3	See the coursebook's Language Input	Unit 4/Nothing but the truth	**1. Communicative Approach 2. Task-Based Learning 3. A mix of individual, pair, and group activities**	Quiz

8	3	See the coursebook's Language Input	Unit 5/An eye to the future	**1. Communicative Approach 2. Task-Based Learning 3. A mix of individual, pair, and group activities**	Quiz
9	3	See the coursebook's Language Input	Unit 6/Making it big	**1. Communicative Approach 2. Task-Based Learning 3. A mix of individual, pair, and group activities**	Quiz
10	3	See the coursebook's Language Input	Unit 7/Getting together	**1. Communicative Approach 2. Task-Based Learning 3. A mix of individual, pair, and group activities**	Quiz
11	3	See the coursebook's Language Input	Unit 8/Going to extremes	**1. Communicative Approach 2. Task-Based Learning 3. A mix of individual, pair, and group activities**	Quiz
12	3	See the coursebook's Language Input	Unit 9/Forever friends	**1. Communicative Approach 2. Task-Based Learning 3. A mix of individual, pair, and group activities**	Quiz
13	3	See the coursebook's Language Input	Unit 10/Risking life and limb	**1. Communicative Approach 2. Task-Based Learning 3. A mix of individual, pair, and group activities**	Quiz
14	3	See the coursebook's Language Input	Unit 11/In your dreams	**1. Communicative Approach 2. Task-Based Learning 3. A mix of individual, pair, and group activities**	Quiz
15	3	See the coursebook's Language Input	Unit 12/It's never too late	**1. Communicative Approach 2. Task-Based Learning 3. A mix of individual, pair, and group activities**	Quiz

12. Course Evaluation	
10 marks for daily participation and homework 10 marks for a test 20 for a monthly exam 60 for the final exam	
13. Learning & Teaching Resources	
Required textbooks (curricular if any)	Soars, L. and Soars, J. (2003). New Headway Upper-Intermediate, Oxford University Press.
Main References (sources)	New Headway Plus [Intermediate] by Liz and John Soars, Oxford: Oxford University Press (2006),
Recommended Books & References (Scientific Journals, Reports …)	Morphy,A.J (1983) English Grammar in use. Cambridge:CUP
Websites or Electronic References	https://www.internationalstudent.com/essay_writing/essay_tips/ https://owl.purdue.edu/owl/general_writing/academic_writing/essay_writing/index.html https://www.ukessays.com/guides/how-to-write-an-essay.php https://www.grammarly.com/blog/verb-tenses/