Al-Furat Al-Awsat Technical University

Engineering Technical College-Najaf

Description of courses

Laser and Optoelectronics technical engineering

Prepared by: Staff of the Laser and Optoelectronics technical engineering Department

2022/2023

Introduction

The educational program is considered a coordinated and organized package of academic courses that include procedures and experiences organized in the form of academic vocabulary, the main purpose of which is to build and refine the skills of graduates, making them qualified to meet the requirements of the labor market. It is reviewed and evaluated annually through internal or external audit procedures and programs such as the external examiner program.

The description of the academic program provides a brief summary of the main features of the program and its courses, indicating the skills that students are working to acquire based on the objectives of the academic program. The importance of this description is evident because it represents the cornerstone of obtaining program accreditation, and the teaching staff participates in writing it under the supervision of the scientific committees in the scientific departments.

This guide, in its second edition, includes a description of the academic program after updating the vocabulary and paragraphs of the previous guide in light of the latest developments in the educational system in Iraq, which included a description of the academic program in its traditional form (annual, quarterly), in addition to adopting the description of the academic program circulated according to the book of the Department of Studies 3/2906. On 5/3/2023 with regard to programs that adopt the Bologna Process as a basis for their work.

In this area, we can only emphasize the importance of writing descriptions of academic programs and courses to ensure the smooth conduct of the educational process.

Concepts and terminology:

<u>Description of the academic program</u>: The description of the academic program provides a brief summary of its vision, mission, and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

<u>Course Description</u>: Provides a necessary summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve, demonstrating whether he or she has made the most of the available learning opportunities. It is derived from the program description.

<u>Program Vision:</u> An ambitious picture for the future of the academic program to be a developed, inspiring, motivating, realistic and applicable program.

<u>The program's mission</u>: It briefly explains the goals and activities necessary to achieve them, and also defines the program's development paths and directions.

<u>Program objectives</u>: These are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

<u>Curriculum structure</u>: All courses/study subjects included in the academic program according to the approved learning system (semester, annual, Bologna track), whether it is a requirement (ministry, university, college, or scientific department), along with the number of study units.

<u>Learning outcomes</u>: A consistent set of knowledge, skills, and values that the student has acquired after the successful completion of the academic program. The learning outcomes for each course must be determined in a way that achieves the program objectives.

<u>Teaching and learning strategies</u>: They are the strategies used by the faculty member to develop the student's teaching and learning, and they are plans that are followed to reach the learning goals. That is, it describes all curricular and extracurricular activities to achieve the learning outcomes of the programmed.

Academic program description form

University name: Al-Furat Al-Awsat Technical University

   College/Institute: Najaf Technical College of Engineering

   Scientific Department: Department of Laser Technology and Opto-Electronic Engineering

Name of final degree: Bachelor of Engineering in Laser and Opto-Electronic Technologies

   Academic system: semester system

   Description preparation date: 2/20/2024

   Date of filling the file: 2/20/2024

The signature :

Name of department head:

 Dr. Abdullah Ali Qasim

the date :

the signature :

Name of scientific assistant: Dr. Basil Nouri Abdel

the date :

Check the file before

 Division of Quality Assurance and University Performance

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

   the date

   the signature

Authentication of the Dean

1. **Program vision**

The Department of Laser and Electro-Optics Technology Engineering at Al-Furat Al-Awsat Technical University / College of Engineering Technology / Najaf seeks to be an essential source in preparing specialized cadres with high efficiency in laser and electro-optics technology engineering, which will cover wide sectors of work in the industrial, engineering and medical fields in the public sectors. The vision for the program was reviewed through communication with employers and identifying the needs of the labor market in the private sector in particular and state departments in general.

2. **Program message**

Preparing distinguished engineers in the fields of laser and electro-optics technology engineering, which will help build and develop graduates and rising engineering cadres in the same field in the future, and contribute to providing the community with applied scientific research and studies that aim to solve developmental issues, as well as seeking to enhance the college's role in building institutions and developing engineering work in a way that It achieves the concept of comprehensive development within the framework of humanitarian and scientific engineering values and concepts, and finally builds and consolidates cooperative relationships with all entities working in the engineering and medical fields that are in harmony with the aspirations of the labor market locally and globally.

3. **Program objectives**

A. The department seeks to graduate qualified engineers in the laser and optoelectronics specializations who have the ability to design, analyze, find appropriate solutions to practical problems, and deal with advanced technology with high skill.

B. Preparing qualified graduates to participate in conferences, workshops, and development seminars inside and outside Iraq, and to work in research centers.

C. Engage in preparing practical research in the field of lasers and electro-optics to develop a solution to practical problems and contribute to community service by placing graduates in the labor market and refining their practical skills according to local requirements.

D. Active participation in community development, promoting the organization of conferences and seminars, as well as continuing education in the field of technical

engineering, and adopting a methodology for continuous improvement in all activities.

4. Programmatic accreditation

Both

5.Other external influences

There is no third-party sponsor of the course. The only official body sponsoring the program is Al-Furat Al-Awsat Technical University, which is a government university and one of the formations of the Iraqi Ministry of Higher Education and Scientific Research.

6.Program structure

Program structure	Number of courses			
Enterprise requirements College	4	**4**	**%0.0166**	Basic
requirements Department	4	**18**	**%0.075**	choice
requirements	32	**164**	**%68.8**	
summer training				
Other				

7. Program description

Year/level	Course or course code	Name of the course or course	Credit hours	
			theory	practical
First level	ATU15011	mathematics	4	1
	ATU15012	Computer principles Technology	2	2
	ATU15013	workshops	0	3
	ATU15014	DC electrical circuits	4	2
	ATU15015	Democracy and human rights	2	0
	ATU15016	Laser foundations	4	2
	ATU15017	English	1	0
	ATU15021	Principles of mathematics	6	0
	ATU15022	Digital principles and logic	4	4
	ATU15023	AC electrical circuits	4	4

	ATU15024	Laser physics	4	4
	ATU15025	Arabic	1	0
	ATU15026	Engineering drawing	0	4
second level	ATU15031	Computer programming language	1	2
	ATU15032	Applied mathematics	6	
	ATU15033	Electronic	4	4
	ATU15034	Stable electromagnetic fields	4	
	ATU15035	Probability theory	4	
	ATU15036	optics	4	4
	ATU15037	Baath Party crimes	2	
	ATU15041	Advanced mathematics	6	
	ATU15042	Dynamic electromagnetic fields	4	
	ATU15043	Electronic applications	4	4
	ATU15044	Digital technologies	4	4
	ATU15045	Laser detection systems	4	
	ATU15046	Signs and systems	4	
Third level	ATU15051	Digital applications	4	4
	ATU15052	Advanced electronic applications	4	4
	ATU15053	Optical electronics	4	
	ATU15054	Engineering analyses	4	
	ATU15055	Communication theory	4	4
	ATU15056	Quantum mechanics	4	
	ATU15061	Communications circuits and networks	4	4
	ATU15062	Control theories	4	
	ATU15063	Propagation of waves	4	
	ATU15064	Numerical analyses	4	4
	ATU15065	Spectra	4	
	ATU15066	Industrial laser applications	4	4
Forth level	ATU15071	Graduation Project		6
	ATU15072	Fibreoptics	4	4
	ATU15073	Advanced control engineering	4	4

	ATU15074	Signal and digital image processors	4	4
	ATU15075	Professional ethics	2	
	ATU15076	Laser design	6	
	ATU15081	Graduation Project		6
	ATU15082	Medical laser applications	4	4
	ATU15083	Systems and visual signal processing	4	4
	ATU15084	Gas and plasma discharge	4	
	ATU15085	computer networks	4	4
	ATU15086	Nanofabrication techniques	4	

8. Expected learning outcomes of the program Knowledge

Learning Outcomes 1 - Training students to increase intellectual awareness and the correct method of practical and scientific thinking.

Skills

Learning Outcomes 2 Increase students' practical skills through training in laboratories on using the tools required to solve experimental problems.

Learning Outcomes 3 - Increasing theoretical skills, mechanisms and theories used to solve theoretical problems and training students on the correct methods for solving mathematical problems.

- Training students on the correct way to transform the presented problem into a logical problem and the proper thinking to solve the presented logical problems.

Value

Learning Outcomes 4 - Increase students' cognitive awareness and support them in the mechanisms used to evaluate results and determine their level of knowledge.

- Training teaching and technical staff on the approach followed and effective mechanisms for the success of knowledge outcomes.

Learning Outcomes 5 - Enabling students to work under conditions of high pressure and brainstorming while maintaining the calm required in the educational process.

- Enabling teaching staff to work under high-pressure conditions and approving their accurate scientific and educational output.

9. Teaching and learning strategies

- Using modern means, which are renewed to the extent required by the head of the scientific department and the dean of the college, according to the available material resources.

- Using the traditional classical method in the educational process, according to the opinion of some teachers, as well as according to the requirements of the cognitive subject (pen and blackboard method).

- Using brainstorming, surprise questions, and improvised answers to train the student to solve the problems presented to him, thus enabling him to make a quick decision with the lowest possible error rate.

10. Evaluation methods

Several methods are used to evaluate students, including:

- Surprise exam method.

- Style of daily duties.

- Periodic weekly reporting method.

- The method of presenting lectures by students to evaluate their level of understanding and comprehension.

- Simple explanation style.

- How to solve examples on the board.

Professional development

Orienting new faculty members

The teaching staff of the department (permanent staff, lecturers, and contracts) is directed through several axes:

The first axis: Guidance in department council sessions. Periodic sessions of the Department Council are held, during which the teaching staff are introduced to the required directives and informed of ways to implement them.

The second axis: personal guidance. In this axis, it is based on the results of the analysis of the data that are obtained through student questionnaires or through the personal inspection of the Department Head in his usual rounds or through field tours conducted by both the Dean of the College and the Assistant Dean for Scientific Affairs, Postgraduate Studies and Social Affairs. Students and the head of the department.

Professional development for faculty members

The department's faculty members are developed along two axes:

The vertical axis: where their teaching and training skills are raised by putting them in various courses held by the Center for Continuing Education at the University Presidency or the Continuing Education Unit in the college to build a scientific teaching base according to correct theoretical scientific foundations based on the latest rules in the teaching and learning processes acquired by the masters. Old teaching staff in the department and transferring it to new teaching staff.

Horizontal axis: In this axis, teachers are asked to increase their personal scientific space by publishing scientific research in solid international journals, providing all means of moral support to them, increasing their exposure to modern software, and keeping up with developments.

12. **Acceptance criterion**

The department's admission system follows the regulations and strategies followed in the Iraqi Ministry of Higher Education by following the regulations and laws that are published in the central admission guide. The legal regulations for this are applied to the various categories of students and the various admission channels. These instructions, rules and regulations are followed in both the morning and evening study programs alike.

13. **The most important sources of information about the program**

Procedures followed by the Iraqi Ministry of Higher Education and Scientific Research. The Iraqi Technical Education Quality Assurance Council and the procedures issued by the Scientific Supervision and Evaluation Agency/Department of Quality Assurance and Academic Accreditation - Accreditation Department. As

well as the presidency of Al-Furat Al-Awsat Technical University / Department of Quality Assurance and University Performance.

14. **Program development plan**

- Updating the academic program to suit the practical knowledge that is in harmony with the requirements of the labor market.

- Training technical personnel in the department to increase scientific, cultural and psychological awareness so that the educational process is controlled in a manner consistent with the outcomes of science and learning.

- Increasing cultural awareness and brainstorming for students.

- Begin involving teaching staff in intensive courses to increase cognitive awareness about brainstorming mechanisms.