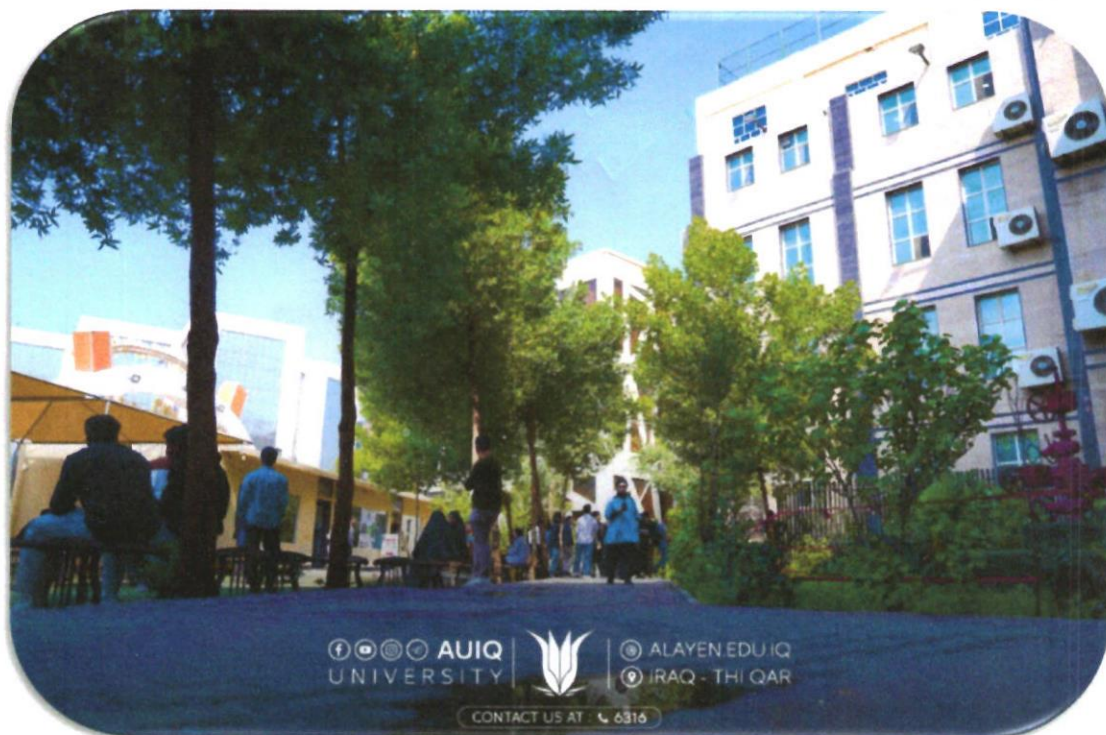


Alayen Iraqi University
جامعة العين العراقية



First Cycle – Bachelor's Degree (B.Sc.) – Laser & Optoelectronics Engineering

بكالوريوس - هندسة الليزر والالكترونيات البصرية



وزارة التعليم العالي والبحث العلمي
جامعة العين العراقية
كلية الهندسة
قسم هندسة الليزر والالكترونيات البصرية
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1. Mission & Vision Statement

Vision Statement

Excellence in laser engineering and optoelectronics, competing locally and globally to serve the community and promote sustainable development while upholding professional ethics.

Mission Statement

We aim to develop innovative professionals in laser and optoelectronics engineering, equipping them with the skills needed to compete globally. We emphasize ethical commitment to societal development and sustainability through high-quality academic programs that foster competitiveness and community engagement.

2. Program Specification

Programme code:	B.Sc. on Laser & Optoelectronics Eng.	ECTS	240
Duration:	4 levels, 8 Semesters	Method of Attendance:	Full Time

Laser & Optoelectronics specialization is a vast and varied field, and the university is well-prepared to support it. The Department of Lasers and Optoelectronics is divided into two key branches: Laser Engineering and Optoelectronics. Students begin their studies in the first year, which continues for four years. The initial two years provide a general education for both branches, while the specialization takes place in the third and fourth years. During these years, students can take specialized courses such as laser physics, spectroscopy, laser design, laser systems, optical communications, and optoelectronics. They also have access to specialized laboratories focused on laser principles, applications, systems, and optical communications. This area of study has recently become popular, with some drawn to its applications in fields like surgery and ophthalmology, while others see it as a means to drive technological advancements for the benefit of society.

In the first level, students are introduced to the basics of laser science, while the second level covers core topics that prepare them for specialized research in their later years. Therefore, graduates with a degree in Laser Science and Optoelectronics are trained to understand the significance of research in enhancing their education, aligning with the university and college's mission statements. By Level 4, students can select more than half of their credits, choosing modules that represent the diverse nature of lasers to ensure a comprehensive understanding necessary for their degree. This flexibility enables students to pursue their varied interests within the field, with guidance from their personal tutors.

The research mindset is cultivated from the beginning through practical exercises incorporated into lecture modules or offered in dedicated practical sessions, research seminars, and one-on-one tutoring. A mandatory field course must be completed in Level 1 to progress to Level 2, while optional field courses are available in Level 4. In Level 4, all students engage in an independent research project, which can focus on areas such as medical, industrial, defense, business analytics, or data analysis (4 credits), or be centered on a field or laboratory project (4 credits). Academic tutoring in Levels 1 and 2 is conducted by the same personal tutor, ensuring consistency and ongoing support. This tutoring includes workshops on skills like library usage and presentation techniques, followed by assessed tasks such as essay writing and presentations, allowing students to apply these skills in



relevant contexts. Opportunities for international experiences and practical training are also available, with accommodations made for individual needs in consultation with the appropriate tutor.

3. Program Objectives

PEO1: Possess the necessary skills to ethically apply engineering methods in laser and optoelectronics engineering.

PEO2: Ability to take the initiative to explore better career options by conducting applied scientific research to keep pace with technological developments in the field of laser and optoelectronics engineering.

PEO3: Improving leadership skills by engaging in community volunteer work to promote sustainable development.

4. Student Learning Outcomes

Lasers and Optoelectronics is a field that combines laser technologies, which are based on "light amplification by stimulated emission of radiation" (lasing), and optoelectronics, which focuses on semiconductor devices that manipulate light. Graduates of this program gain insights into the historical and technical aspects of laser science, as well as a deeper understanding of its diverse applications in areas such as medicine, science, industry, communication, protection systems, and measurement. The program takes four years to complete and leads to a bachelor's degree. The curriculum is designed to prepare students for careers in various fields, including medicine—such as bloodless surgery and ophthalmic treatments—as well as industry, defense, and commercial products.

Knowledge

A1 The ability to apply modern knowledge, techniques, skills, and tools effectively.

A2 The ability to utilize appropriate knowledge in mathematics, science, engineering, and technology.

A3 The ability to perform standard measurements and tests, as well as analyze, interpret, and apply the results

A4 The ability to design a system or process that addresses engineering challenges within one's area of expertise.

A5 The ability to diagnose, analyze, and solve general engineering problems.

A6 The ability to apply grammatical rules and understand their relevance in engineering sciences.

Skills

B1 The ability to work collaboratively within a technical team and take on leadership roles.

B2 The ability to communicate effectively, both verbally and in writing, using diagrams and technical documentation, and to access necessary information sources.

B3 The ability to engage voluntarily in self-education and pursue lifelong professional development.

Ethics

C1 The ability to recognize and adhere to professional and ethical responsibilities, respect diversity, and promote inclusivity.

C2 The ability to evaluate the environmental, economic, and social impacts of engineering solutions at both local and global levels.



C3 The ability to maintain quality, adhere to deadlines, and commit to continuous improvement.

5. Academic Staff

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6. Credits, Grading and GPA

Credits

Al-Ayen Iraqi University adopts the **Bologna Process** and uses the **European Credit Transfer System (ECTS)** for measuring student workload and academic progress.

- The **total number of ECTS credits** required to complete the Bachelor's degree in Laser & Optoelectronics Engineering is **240 ECTS**.
- The Program is structured across **8 semesters**, with **30 ECTS per semester**.
- Each **1 ECTS credit** corresponds to **25 hours** of student workload, which includes both structured learning (lectures, labs, tutorials) and unstructured learning (individual study, assignments, projects).

Grading

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

GRADING SCHEME				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group	A – Excellent	امتياز	90 – 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors

(50 - 100)	C – Good	جيد	70 – 79	Sound work with notable errors
	D – Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب - قيد المعالجة	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				
Number Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Calculation of the Cumulative Grade Point Average (CGPA)

1. The CGPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

CGPA of a 4-year B.Sc. degree:

$$CGPA = [(1^{st} \text{ module score} \times ECTS) + (2^{nd} \text{ module score} \times ECTS) +] / 240$$

7. Curriculum/Modules

Semester 1 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
URDEM	Democracy and Human Rights	33	17	2.00	B	
URCOM	Computer Fundamentals and Programing	48	27	3.00	B	
DRAW110	Engineering Drawing	108	67	7.00	B	
PHYS111	Physics	63	62	5.00	B	
MATH110	Mathematics	63	87	6.00	B	
LAER110	DC Electrical Circuits	93	32	5.00	C	
LAER111	Laser Sciences	33	17	2.00	C	

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
URENG1	English Language	33	17	2.00	B	
URARA	Arabic Language	33	17	2.00	B	
MATH120	Fundamentals of Engineering Mathematics	63	87	6.00	B	
LAER120	AC Electrical Circuits	108	42	6.00	C	



LAER121	Geometrical Optics	33	42	3.00	C	
LAER122	Mechanical Engineering	93	57	6.00	C	
LAER123	Software Engineering	63	12	3.00	C	
WORK120	Workshop Technology	48	2	2.00	B	

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
URBRC	Crimes of the Defunct Baath	33	17	2.00	B	
MANG210	Principles of Management	33	17	2.00	S	
URENG2	New Headway Plus	33	17	2.00	B	
MATH 210	Engineering Matheematics	63	87	6.00	B	MATH120
LAER210	Fundamentals of Electronic Devices	108	42	6.00	C	LAER120
LAER211	Electromagnetic Fields	93	57	6.00	C	
LAER212	Materials Science	93	57	6.00	B	

Semester 4 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
STAT220	Engineering Statistics	33	92	5.00	B	
MATH 220	Analytic Mathematics	63	87	6.00	B	MATH120
LAER 220	Electronic Circuits	93	32	5.00	C	LAER1120
LAER 221	Digital Combinational Systems	93	7	4.00	C	
LAER 222	Laser Physics	93	32	5.00	C	
URARA2	Arabic Language II	33	17	2.00	B	
URCOM2	Computer Fundamentals and Programing II	48	27	3.00	B	

Semester 5 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
LAER310	Numerical and Engineering Analysis	93	82	7.00	B	MATH 220
LAER311	Wave Propagation	48	27	3.00	C	LAER211
LAER312	Optoelectronics	33	67	4.00	C	
LAER313	Digital Sequential Systems	93	32	5.00	C	LAER 221



LAER314	Nonlinear Optics	63	62	5.00	C	LAER121
LAER315	Industrial Laser Applications	78	47	5.00	C	
LAER316	Laser Safety	18	7	1.00	C	

Semester 6 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
LAER320	Medical Laser Applications	48	52	4.00	C	
LAER321	Spectroscopy	63	37	4.00	C	
LAER322	Optical Systems Design	63	62	5.00	C	LAER121
LAER323	Communications Theory and Networks	93	57	6.00	C	
LAER324	Computer Architecture	123	52	7.00	C	
LAER325	Quantum Mechanics	48	52	4.00	C	
TRAN#90	Summer Training					

Semester 7 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
PROJ410	Project I	75	25	4.00	C	
LAER410	Laser Power Supply	63	62	5.00	C	LAER120
LAER411	Laser Detection Systems	63	87	6.00	C	
LAER412	Control Theory	48	52	4.00	C	LAER 210,220
LAER413	Optical Fibers	63	62	5.00	C	
LAER414	Elective I	33	42	3.00	E	
LAER415	Elective II	33	42	3.00	E	

Semester 8 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
PROJ420	Project II	75	25	4.00	C	
LAER420	Laser Design Technology	63	87	6.00	C	LAER 222
LAER421	Digital Image Processing	78	22	4.00	C	
LAER422	Control Engineering	78	47	5.00	C	LAER210,220



LAER423	Optical Communications	63	62	5.00	C	LAER 323
LAER424	Elective III	33	42	3.00	E	
PRET421	Professional Ethics	33	42	3.00	S	

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