

**Department of Chemistry**

**4.2 Programme learning outcomes:**

**Aims**

1. To cultivate chemists, researchers, and scientists who possess the competence to advance their acquired knowledge in chemistry and analytical thinking skills in both disciplinary and interdisciplinary areas of specialisation such as quality in chemistry, biochemical technologies, polymer technologies, pharmaceutical applications, environmental and food technologies and, who are thereby equipped with the ability to lay the foundations for future technologies and to utilise them effectively.
2. To enhance students' awareness of social responsibility and commitment to the common good by equipping them with the ability to act responsibly in ways that promote environmental awareness, sustainability, accessibility, inclusivity, and well-being, as well as fostering their critical thinking and ethical decision-making skills.
3. To develop and implement innovative educational approaches that meet current scientific and societal challenges, broaden students' career prospects and scientific proficiency, and promote interdisciplinary interaction and specialization.
4. To build stronger links between the university and industry that enable students to develop problem-solving, entrepreneurial, and lifelong learning skills, strengthen their theoretical knowledge through practice, and enhance their employability.
5. To actively integrate artificial intelligence and technological solutions into education and research, continuously enhance digitalisation initiatives, and consequently apply teaching, learning, and assessment methods that address current demands.
6. To increase the Department's international recognition and facilitate the exchange of knowledge and experience among faculty and students at national and global levels through national and international academic exchange programmes, collaborative projects, and dual degree opportunities.

**Objectives**

The objective of this programme is to cultivate chemists, researchers, and scientists who

- Possess a strong foundation of theoretical and applied knowledge to conduct advanced-level studies in the field of chemistry; skilled in working in chemistry laboratories; have comprehended analytical methods used in the field; and are capable of understanding the operating principles of instruments and interpreting their outputs; and have developed analytical thinking and problem-solving skills,
- Act responsibly in ways that promote environmental awareness, sustainability, accessibility, inclusivity and well-being and who have acquired skills in critical thinking, entrepreneurship, problem solving, ethical decision-making, and lifelong learning,
- Have the skills of using and developing current artificial intelligence and information technologies and the competence to advance their acquired knowledge in chemistry and analytical thinking skills in disciplinary and interdisciplinary areas of specialisation such as quality in chemistry, biochemical technologies, polymer technologies, pharmaceutical applications, environmental and food technologies,
- Are able to use chemistry terminology in both Turkish and English, conduct field-related research, collaborate in team-based settings, and effectively present their work,
- Have the competence to work in managerial, research, and applied roles in national and international institutions in both the public and private sectors as individuals with the ability to

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define their career goals and manage their professional development and who are committed to professional ethical values.

### Programme Learning Outcomes

Upon successful completion of the programme, students will be able to

PO-1) Explain fundamental concepts in the field of chemistry, analyse chemical processes at the molecular level and apply laboratory techniques specific to the field.

PO-2) Design experiments and develop methods for solving problems in the field of chemistry, solve problems using appropriate analytical methods and techniques, collect data and analyse and interpret the results using their theoretical and applied knowledge of chemistry.

PO-3) Generate solutions to the unforeseen and complex problems encountered in the field of chemistry through employing research methods, developing new strategic approaches and taking responsibility using their theoretical and applied knowledge of chemistry.

PO-4) Synthesise knowledge acquired from different disciplines through an interdisciplinary approach.

PO-5) Advance their acquired knowledge in chemistry and analytical thinking skills in both disciplinary and interdisciplinary areas of specialisation such as quality in chemistry, biochemical technologies, polymer technologies, pharmaceutical applications, environmental and food technologies.

PO-6) Use at least one programming language and computer and artificial intelligence technologies widely employed in chemistry for problem-solving, data analysis, and simulations.

PO-7) Follow scientific and technological developments in chemistry and related fields, assess career opportunities, identify personal and professional development goals, and adopt lifelong learning strategies to achieve these goals.

PO-8) Act with a sense of social responsibility and justice and in accordance with professional ethical principles, quality standards, and universal values by taking into account potential legal and societal consequences of their scientific research and professional activities.

PO-9) Work effectively both independently and as part of a team.

PO-10) Access reliable sources of information, conduct literature reviews, and design and carry out academic research in the field of chemistry.

PO-11) Effectively communicate chemistry topics, research, and problem solutions to all relevant stakeholders using appropriate chemistry terminology, both orally and in writing, in Turkish and in English.

### Occupational Profile of Graduates

Graduates of the Bachelor Programme in Chemistry are equipped with in-depth knowledge of chemistry, strong laboratory skills, and advanced analytical thinking and problem-solving abilities. They possess a broad and versatile academic foundation in areas such as new product development, quality enhancement, formulation, production process control, chemical and waste analysis. With the ability to integrate their knowledge in chemistry with other scientific disciplines and engineering applications, they are well-prepared for employment across a variety of sectors and represent the type of professionals most needed in industrialised societies.

Graduates may pursue academic careers by continuing their studies in master's and doctoral programmes in chemistry or other related fields and may take part in scientific projects conducted at universities and research centres.

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In addition to the high-quality discipline-specific education they receive:

Graduates who have completed the “Quality Training in Chemistry Certificate Programme” may work in quality control units within the chemical industry.

Graduates who have completed the “Pharmaceutical Products Certificate Programme” may work in the pharmaceutical industry in areas such as the cultivation, composition, and analysis of medicinal plants, active pharmaceutical ingredient (API) design, synthesis, quantification, and analysis, as well as in educational and R&D institutions.

Graduates who have completed the “Biochemical Technologies Certificate Programme” may work in pharmaceutical and biotechnology companies, biochemistry and molecular biology laboratories, the food and fermentation industries, and fields related to the environment, agriculture, veterinary science, and medicine, in addition to educational and R&D institutions.

Graduates who have completed the “Polymer Technology Certificate Programme” may work in industries such as plastics, automotive, packaging, electronics, and textiles, as well as in educational and R&D institutions.

Graduates who have completed the of the “Food Chemistry Certificate Programme” may work in food analysis laboratories, food production facilities, public institutions, import-export companies, and educational and R&D organisations.

Graduates who have completed the “Environmental Chemistry Certificate Programme” may work for environmental consultancy firms, industrial organisations, environmental laboratories, municipalities, public institutions, and educational and R&D institutions.

### **Graduation Requirements**

The Bachelor’s Degree is awarded to students who have successfully completed all courses in the curriculum, and have obtained accumulative grade point average of at least 2.0 on scale 2.0-4.0.