Department of Mathematics

4.2 Programme learning outcomes:

Aims

1. To cultivate mathematicians, researchers, and scientists who possess the competence to advance their acquired knowledge in mathematics and mathematical thinking skills in both disciplinary and interdisciplinary areas of specialisation such as pure mathematics, software, financial and managerial mathematics, biomathematics, data science, and financial statistical methods 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 mathematicians, researchers, and scientists who

• Possess a strong foundation of theoretical and applied knowledge to conduct advanced-level studies in the field of mathematics; have internalised mathematical thinking; and are capable of formulating mathematical models and solution methods for theoretical or applied problems by employing their mathematical thinking 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 mathematics and mathematical thinking skills in disciplinary and interdisciplinary areas of specialisation such as pure mathematics, software, financial and managerial mathematics, biomathematics, data science, and financial statistical methods,

• Are able to use mathematical 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 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) State the definitions and theorems in fundamental areas of mathematics such as geometry, analysis, linear algebra, abstract mathematics, and differential equations, establish connections between them and explain their applications.

PO-2) Identify standard and complex mathematical problems, solve these problems with analytical and/or numerical methods and prove the validity of a mathematical proposition through various proof techniques using their theoretical and applied knowledge of mathematics and mathematical thinking skills.

PO-3) Develop mathematical models for real-life problems and generate valid solutions based on these models using their theoretical and applied knowledge of mathematics and mathematical thinking skills.

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

PO-5) Advance their acquired knowledge in mathematics and mathematical thinking skills in both disciplinary and interdisciplinary areas of specialisation such as pure mathematics, software, financial and managerial mathematics, biomathematics, data science, and financial statistical methods.

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

PO-7) Follow scientific and technological developments in mathematics 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 mathematics.

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

Occupational Profile of Graduates

Graduates of the Bachelor Programme in Mathematics are individuals educated with the awareness that mathematics is the key to science, providing the models and structures essential for conducting research and generating knowledge that adds value to life across the fundamental sciences such as physics, chemistry, and biology, as well as in the health sciences, engineering applications, economics, the social sciences, and the humanities.

They possess a strong foundation in mathematics; advanced abstract reasoning skills; high competence in solving complex problems; and a robust academic background in diverse areas such as advanced theoretical mathematics, applied mathematical modelling, algorithm development, and data analysis. They are equipped to integrate mathematical thinking with other scientific fields and engineering practices, and are qualified for employment in various sectors.

Department of Mathematics

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

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

Graduates who have completed the "Theoretical Mathematics Certificate Programme" may work in educational and R&D institutions and organizations.

Graduates who have completed the "Software Certificate Programme" may work in technology and software companies, as well as in educational and R&D institutions and organizations.

Graduates who have completed the "Finance and Managerial Mathematics Certificate Programme" may work in the finance sector, insurance sector, corporate accounting departments, budget and planning units, and educational and R&D institutions and organizations.

Graduates who have completed the "Biomathematics Certificate Programme" may work in the R&D departments of public and private sector organizations conducting research in fields such as epidemiology, genetics, ecology, and medicine, as well as in educational and R&D institutions and organizations.

Graduates who have completed the "Data Science Certificate Programme" may be employed in technology companies, the finance sector, retail and e-commerce, healthcare services, manufacturing and logistics, public services, institutional data analysis departments, corporate IT units, and educational and R&D institutions and organizations.

Graduates who have completed the "Financial Statistical Methods Certificate Programme" may work in the banking and financial services sector, investment and portfolio management sector, insurance sector, and educational and R&D institutions and organizations.

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.