



Interdisciplinary Research Policy of Azerbaijan Technical University

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Purpose	The purpose of this policy is to support and promote interdisciplinary research by fostering collaboration across diverse fields, encouraging innovation, and ensuring that all participants adhere to shared values, ethical standards, and best practices.

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Interdisciplinary Research Policy

Vision and Mission

The vision of AzTU's Interdisciplinary Research Policy is to cultivate an environment where collaboration across disciplines becomes the foundation for solving complex, multifaceted problems. The mission is to enable the university to lead in impactful, transformative research by breaking down traditional academic boundaries, promoting cross-disciplinary synergy, and driving innovations that address regional and global challenges. AzTU is committed to fostering high-quality, high-impact research that advances scientific, technological, societal, and policy knowledge while improving the quality of life on a local, national, and global scale.

Objectives

The key objectives of AzTU's Interdisciplinary Research Policy are:

- **Facilitate Cross-Disciplinary Collaboration:** To create opportunities and support for researchers from diverse disciplines to work together on projects that address complex global, national, and regional challenges that are beyond the scope of individual disciplines.
- **Promote High-Impact and Innovative Research:** To encourage the creation of new knowledge, technologies, and methods that have high potential for scientific, social, and economic impact.
- **Support Research Excellence and Leadership:** To foster an environment that enables AzTU faculty and researchers to become leaders in interdisciplinary fields, recognized for groundbreaking work that combines knowledge from multiple domains.
- **Enhance Local and Global Partnerships:** To build and sustain strong partnerships with academic, governmental, industrial, and community stakeholders to support and enhance the scope and impact of interdisciplinary research.
- **Develop Human and Institutional Capacities:** To strengthen the skills and institutional frameworks necessary to support and sustain interdisciplinary research, including investment in infrastructure, professional development, and research mentoring.

Key Principles

AzTU's Interdisciplinary Research Policy is founded on the following principles:

- **Collaboration and Teamwork:** Interdisciplinary research is driven by collective intelligence. Researchers from different academic backgrounds bring unique expertise, and their collaborative efforts lead to innovative, integrative solutions.
- **Creativity and Innovation:** The policy encourages thinking beyond traditional disciplinary confines and promotes creative problem-solving through novel interdisciplinary approaches. The university actively supports the exploration of new methodologies, technologies, and research paradigms.
- **Inclusivity and Equity:** Research teams should reflect the diversity of thought, expertise, and backgrounds. The policy emphasizes inclusivity by welcoming contributions from all

disciplines and encouraging underrepresented groups to actively participate in interdisciplinary research.

- **Sustainability and Societal Impact:** The policy emphasizes research that leads to sustainable solutions, particularly those that have the potential to address pressing societal challenges such as climate change, public health crises, urban development, and social equity.
- **Global Relevance and Connectivity:** AzTU encourages interdisciplinary research that addresses challenges on a global scale, while also engaging local and regional issues. This principle supports the university's ambition to be an internationally connected and relevant institution.

Research Focus Areas

AzTU will prioritize interdisciplinary research in the following focus areas, which align with both its strategic priorities and global imperatives, with a particular emphasis on engineering fields:

- **Sustainable Engineering and Infrastructure:** Research on the design and development of sustainable infrastructure, including energy-efficient buildings, renewable energy systems, smart grid technologies, and sustainable transportation solutions. This includes integrating engineering principles with environmental science to address challenges such as climate change, resource depletion, and environmental degradation.
- **Advanced Materials Engineering:** Focus on the creation and application of new materials with enhanced properties for various industries, including nanomaterials, biomaterials, and smart materials. Research will target applications in electronics, construction, energy storage, and medical devices.
- **Robotics and Automation:** Interdisciplinary research in robotics, automation, and mechatronics, with a focus on developing intelligent systems for manufacturing, healthcare, agriculture, and service industries. This includes the integration of AI, machine learning, and advanced control systems for enhanced robotics functionality.
- **Artificial Intelligence and Machine Learning:** Research on the development of AI algorithms, machine learning models, and data analytics techniques to enhance engineering systems. Applications include smart cities, automated manufacturing, predictive maintenance, and intelligent transportation systems.
- **Energy Systems and Power Engineering:** Research in the development of efficient, sustainable, and resilient energy systems, including renewable energy sources (solar, wind, geothermal), smart grids, energy storage technologies, and energy management systems. This research aims to address the global energy crisis while minimizing environmental impact.
- **Telecommunications and Network Engineering:** Focus on advancing communication technologies, such as 5G, satellite communications, wireless networks, and cybersecurity in network systems. Research will explore enhancing connectivity, reducing latency, and improving data security across industries, including telecommunications, finance, and healthcare.

- **Mechanical and Civil Engineering Innovations:** Research in the optimization of mechanical systems and civil infrastructure, focusing on energy-efficient design, advanced manufacturing techniques, and sustainable construction practices. This includes developing smart materials, automation in construction, and the integration of engineering solutions to improve urban planning and infrastructure management.
- **Biomedical Engineering and Healthcare Technologies:** Research that integrates engineering principles with healthcare, including the development of medical devices, health monitoring systems, prosthetics, and biomedical sensors. This also includes innovative solutions for personalized medicine, rehabilitation technologies, and diagnostics.
- **Aerospace and Aeronautical Engineering:** Research in the design, development, and optimization of aerospace systems, including unmanned aerial vehicles (UAVs), satellite technology, and aviation safety. This also includes advancements in propulsion systems, aerodynamics, and space exploration technologies.
- **Environmental Engineering and Climate Solutions:** Research on the development of engineering solutions to mitigate environmental challenges, including water treatment, waste management, air quality control, and carbon capture technologies. This research area aims to create sustainable, scalable solutions that protect natural resources and address climate change.
- **Industrial Engineering and Supply Chain Optimization:** Research that applies engineering principles to optimize industrial systems, manufacturing processes, logistics, and supply chains. This includes the integration of automation, data analytics, and lean manufacturing techniques to improve efficiency, reduce waste, and increase productivity.

Integration of Engineering with Other Disciplines

AzTU recognizes that engineering research is most impactful when it is integrated with other academic disciplines. As such, engineering research will be cross-pollinated with fields such as:

- **Social Sciences and Policy Development:** Engineering solutions to address societal challenges, including policy implications of technological innovations, engineering ethics, and the social impact of automation and AI.
- **Economics and Business:** Research that examines the economic implications of engineering innovations, including cost-benefit analyses of new technologies, business models for the commercialization of research, and the impact of engineering advancements on industry and society.
- **Environmental Science and Sustainability Studies:** Collaborations between engineering and environmental sciences to develop sustainable technologies, assess ecological impacts, and create solutions for resource conservation and environmental protection.
- **Health and Medical Sciences:** Engineering in collaboration with medical sciences to develop technologies that enhance health outcomes, from biomedical devices to smart health monitoring systems.

Funding and Resources

AzTU is committed to supporting interdisciplinary research through targeted funding and resource allocation:

- **Seed Funding for Collaborative Projects:** AzTU will provide seed funding to support the early stages of collaborative interdisciplinary projects, allowing researchers to build teams, develop ideas, and seek larger-scale funding.
- **Research Grants:** AzTU will assist researchers in applying for national and international research grants that promote interdisciplinary collaboration, such as Horizon Europe, joint academic-industry initiatives, and government research funding.
- **Access to State-of-the-Art Facilities:** The university will ensure that interdisciplinary research teams have access to AzTU's cutting-edge research facilities, laboratories, and equipment that support a wide range of research activities.
- **Specialized Support:** AzTU will create dedicated research support teams to assist interdisciplinary researchers with project management, funding applications, administrative tasks, and networking.

Institutional Support

To facilitate the growth of interdisciplinary research, AzTU will provide institutional support through the following initiatives:

- **Research and Development Department:** AzTU will continue to develop and support specialized research centers that act as hubs for interdisciplinary research. These centers will foster collaboration among different faculties and departments and serve as a bridge between academia and industry.
- **Research and Teaching Synergies:** The university will promote the integration of interdisciplinary research into teaching, ensuring that students at all levels are exposed to and can contribute to real-world interdisciplinary projects.
- **Incentives and Recognition:** AzTU will create a framework of incentives, including financial awards, recognition, and career advancement opportunities, for faculty and researchers engaged in interdisciplinary research.
- **Professional Development and Training:** To equip researchers with the necessary skills for interdisciplinary collaboration, AzTU will offer training in cross-disciplinary communication, project management, and collaborative research techniques.

External Collaboration and Partnerships

AzTU is committed to fostering strong external relationships to enhance its interdisciplinary research:

- **Academic Partnerships:** Establish collaborations with universities, research institutions, and think tanks worldwide to foster knowledge exchange, joint publications, and collaborative research projects.

- **Industry Collaborations:** Strengthen ties with industry partners to ensure that interdisciplinary research addresses real-world problems and is driven by practical applications that can lead to technological innovations and commercialization.
- **Government and NGO Partnerships:** Collaborate with government agencies and non-governmental organizations (NGOs) to address policy issues, develop research agendas, and apply research findings to improve public services and governance.
- **International Research Networks:** AzTU will actively participate in international research consortia and collaborative platforms, ensuring its interdisciplinary research is globally connected and impactful.

Monitoring and Evaluation

To ensure that interdisciplinary research efforts are aligned with strategic goals and achieving measurable outcomes, AzTU will implement a comprehensive monitoring and evaluation framework:

- **Performance Metrics:** Regular assessments of research projects will be conducted, using metrics such as publications, patents, societal impact, and collaborations.
- **Research Outcomes Evaluation:** Projects will be evaluated on the basis of their contributions to knowledge, innovation, and the ability to address identified regional and global challenges.
- **Feedback Mechanisms:** Researchers will be encouraged to provide feedback on the effectiveness of interdisciplinary research initiatives, which will be used to continuously improve the university's research support infrastructure.

Conclusion

AzTU's Interdisciplinary Research Policy represents a strategic commitment to fostering a research culture where collaboration, innovation, and impact are at the forefront. By actively encouraging interdisciplinary collaboration and providing the necessary resources, AzTU aims to contribute solutions to some of the world's most pressing issues while positioning itself as a leader in cutting-edge research and innovation.