

FACULTY OF ENGINEERING AND ARCHITECTURE

BULLETIN

●JUNE 2024●

WHAT YOU WILL READ IN THIS ISSUE:

News from Faculty

Actuel Topics in Engineering and Architecture

Academic and Scientific Activities

FACULTY OF ENGINEERING AND ARCHITECTURE

NEWS FROM THE FACULTY

• MONTHLY • BULLETIN

JUNE 2024

COMPUTER ENGINEERING

GRADUATION PROJECT PRESENTATIONS WERE MADE

In the Graduation Project course of the Department of Computer Engineering, students presented their projects developed throughout the year in front of the jury. While innovative projects were seen in the presentation, the prominent topics such as artificial intelligence, game development, robotics, cyber security were very interesting.





We wish success to the future computer engineers who made presentations in the Department of Computer Engineering Graduation Project course and wish them success in their education and working life.

● ELECTRICAL AND ELECTRONICS ENGINEERING ●

THESIS DEFENCE

Karamanoğlu Mehmetbey University Institute of Science, Department of Physics Student Leman Gökçen GERELEGİZ Master's Thesis Defense was held.



INDUSTRIAL ENGINEERING



IGU INDUSTRIAL ENGINEERING PROGRAM HAS GAINED THE RIGHT TO USE THE TURKISH QUALIFICATION & FRAMEWORK LOGO

The Industrial Engineering Program, which carrying out education been and has training activities under the of Istanbul Gelişim University Faculty of Engineering and Architecture since 2011, has achieved a new The Industrial Engineering success. Undergraduate Program, which was accredited for 6 years by the international organization "Accreditation accreditation Engineering and Technology" Board for (ABET) in 2019, has been placed in the Turkish Qualifications Framework as of May 9, 2024. congratulate Department the We Engineering Undergraduate Industrial Program and the faculty members for this success, which is the product of an intensive and systematic work process.

INDUSTRIAL ENGINEERING



Assist Prof. Binnur Gürül participated as a jury in the master thesis defense at Istanbul Aydin University on May 31, 2024.



Assist Prof. Binnur Gürül participated as a jury in the master thesis defense at Istanbul Esenyurt University on June 13, 2024.



APPOINTMENT OF RESEARCH ASSISTANT

As of 03.06 2024, Nesrin Kolukırık has been appointed to the staff of "Research Assistant" at the Faculty of Engineering and Architecture, Department of Industrial Engineering. We congratulate her and wish her success in her duty.

We received the opinions of Research Assistant Nesrin Kolukırık about her career.

graduated from Istanbul University-Department Cerrahpasa, of Industrial Engineering in 2017. In 2021, I graduated from Istanbul University-Cerrahpasa, Department of Industrial Engineering, by examining studies on statistical process control in lowvolume production in my thesis. In 2023, I started my doctorate education in Istanbul University-Cerrahpasa, Department Industrial Engineering and I keep going. As of 2024, I started to work as a Research Assistant at Istanbul Gelişim University, Department of Industrial Engineering.

INDUSTRIAL ENGINEERING



Assist Prof. Binnur Gürül participated as a jury in the master thesis defense at Istanbul Esenyurt University on June 13, 2024.

T.C.

İSTANBUL KÜLTÜR ÜNİVERSİTESİ

LİSANSÜSTÜ EĞİTİM ENSTİTÜSÜ

COVİD-19 PANDEMÎ DÖNEMÎ VE SONRASI
TOPLUMDA VE E-TİCARET ALÇISINDAKÎ DEĞİŞİMLER

Working in Industrial
Engineering, Assist Prof.
Binnur Gürül
participated as a jury in
the PhD thesis defense
at Kocaeli University on
June 14, 2024.

DEPARTMENT OF INDUSTRIAL ENGINEERING 2023-2024 TERM GRADUATION DESIGN PROJECT PRESENTATIONS WERE HELD









Graduation Design Project Defense Exams of students of the Department of Industrial Engineering were successfully held in the Ergonomics Laboratory J-287 between June 3-4, 2024. Each student presented and defended their Graduation Project in front of a jury consisting of 3 faculty members within an average of 20 minutes allotted to them. We wish success to all our students who have reached the graduation stage in their future studies.

CIVIL ENGINEERING



Assist. Prof. Dr. Mustafa
Yurdabal APAK has joined
to Civil Engineering
Academic Staff.



Res. Assist. Kemal
ERTUNÇ has joined to
Civil Engineering
Academic Staff.



Res. Assist. Şeyhmus
Can TUNÇ has joined to
Civil Engineering
Academic Staff.

ERASMUS+ MOBLITY



One of our department memberS, Assist. Prof. Dr. Sajedeh Norozpour Sigaroodi visited Państwowa Akademia Nauk Stosowanych University in Poland, one of the universities we have an agreement with, between 20–24 May within the scope of Erasmus + Staff Mobility program.

Our department member, who was hosted by Magdalena Bojarska, Erasmus+ Institution Coordinator in Jaroslaw, held meetings where cooperation and mutual experiences were shared. We congratulate our faculty member and thank our partner university for their hospitality.

ARCHITECTURE



The 13th "Let Childhood Stay with Us Workshop" was held on 11.05.2024. The workshop covers the topic of that period with different disciplines. Lecturer Burak Kaan Yılmazsoy is also included in the scientific committee of the workshop.





On 03.06.2024, Assoc. Prof. Türkan Uzun (PhD), one of our faculty members, took part as a guest in the doctoral thesis defense of Said Sham, a doctoral student at Istanbul Okan University, titled "Guidelines for Sustainable Development of Timimoune City: Algeria".



On 04.05.2024, Lecturer Burak Kaan Yılmazsoy also participated in the Planning and Environment Commission study of the Chamber of Architects Istanbul Metropolitan Branch as a member.

ARCHITECTURE



The subject of the Final jury, which was held under the supervision of Burak Kaan Yılmazsoy Lecturer scope within the of **MIM108** Introduction to **Architectural** Design II course, was "Rooftop design and structure relationship in the archaeological excavation site". An all-day jury evaluation was held with invited jury member Mine Çiçek.



On 04.06.2024, a surprise birthday celebration was held on Lecturer Burak Kaan Yılmazsoy's birthday by the students of MIM202 Architectural Design II and MIM108 Introduction to Architectural Design II Project courses.



"Arc420 Diploma Project" course advisors consist of Department of Architecture Faculty Members Prof. Harun Batırbaygil (PhD), Assist. Prof. Semih Göksel Yıldırım (PhD), Assist. Prof. Ömer Saatçioğlu (PhD), Assist. Prof. Murat Arapoğlu (PhD), and Assist. Prof. Mahmoud Zin Alabadin (PhD). The final jury was held on May 30, 2024. Assist. Prof. Semih Göksel Yıldırım (PhD) and Assist. Prof. Mahmoud Zin Alabadin (PhD) groups jointly organized the final jury and Assoc. Prof. İlke Ciritci (PhD) and Assist. Prof. Ahmad Reshad Noori (PhD) were also participated as the guest jury members.



• ARCHITECTURE •





AERONAUTICAL ENGINEERING

A HIGHLY ANTICIPATED EVENT AT GELIŞIM UNIVERSITY'S FACULTY OF ARCHITECTURE AND ENGINEERING: TUSAŞ CONFERENCE



Dear Members of Gelişim University,

A special event took place at our Faculty of Architecture and Engineering with the participation of Dr. Caner Şentürk, Structural Design Engineering Manager from Turkish Aerospace Industries (TUSAŞ). This conference stood out with a comprehensive presentation focusing on Turkey's aviation history.



Dr. Şentürk extensively discussed the development of Turkey's aviation sector, highlighting significant projects and initiatives by TUSAŞ, accompanied by photographs depicting their on-field activities. Throughout the event, he delivered a presentation supported by various photographs showcasing technological advancements over the years and the evolution of structural design.



AERONAUTICAL ENGINEERING



Our students had the opportunity to actively engage with Dr. Şentürk, posing questions and gaining insights directly from the expert about topics of interest in the industry. His informative responses and industry experiences significantly contributed to the academic and professional development of our students.

At Gelişim University, we are committed to organizing such events to strengthen our students' theoretical knowledge with practical experiences and enhance their industry connections. By staying updated on innovations in aerospace engineering, we aim to continue supporting our students' success in the field.

We extend our gratitude to Dr. Caner Şentürk for sharing invaluable insights with us. We are thankful for his inspiration and the profound knowledge he imparted to our students.

Once again, we thank our students and participants, and look forward to gathering together for future events.

FACULTY OF ENGINEERING AND ARCHITECTURE

ACTUEL TOPICS IN ENGINEERING AND ARCHITECTURE

• MONTHLY • BULLETIN

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COMPUTER ENGINEERING

CLAUDE 3.5 SONNET SURPASSES CHAT GPT-40

Anthropic's mid-range model, which in various evaluations surpasses Anthropic's current top-end model, Claude 3 Opus, and even OpenAl's GPT-40, beating other well-known competitors.

Claude has released Claude 3.5 Sonnet.

Claude 3.5 Sonnet is available for free on Claude.ai and the Claude iOS app, with higher speed limits for Claude Pro and Team plan subscribers. The Anthropic API is also available through Amazon Bedrock and Google Cloud's Vertex AI.

	Claude 3.5 Sonnet	Claude 3 Opus	GPT-4o	Gemini 1.5 Pro
Visual math reasoning MathVista (testmini)	67.7% 0-shot CoT	50.5% 0-shot CoT	63.8% 0-shot CoT	63.9% 0-shot CoT
Science diagrams AI2D, test	94.7% 0-shot	88.1% 0-shot	94.2% 0-shot	94.4% 0-shot
Visual question answering MMMU(val)	68.3% 0-shot CoT	59.4% 0-shot CoT	69.1% 0-shot CoT	62.2% 0-shot CoT
Chart Q&A Relaxed accuracy (test)	90.8% 0-shot CoT	80.8% 0-shot CoT	85.7% 0-shot CoT	87.2% 0-shot CoT
Document visual Q&A ANLS score, test	95.2% 0-shot	89.3% 0-shot	92.8% 0-shot	93.1% 0-shot

COMPUTER ENGINEERING

Anthropic claims that Claude 3.5 Sonnet "sets new industry standards for graduate-level reasoning (GPQA), undergraduate-level knowledge (MMLU), and coding proficiency (HumanEval)." The model shows improved abilities in nuance, humor and understanding of complex instructions, and is very good at producing high-quality content with a natural tone.

Running twice as fast as Claude 3 Opus, Claude 3.5 Sonnet is suitable for complex tasks such as context-aware customer support and multi-stage workflow orchestration. In an internal agency coding evaluation, Claude 3.5 Sonnet achieved a significant edge, solving 64% of problems compared to 38% for Claude 3 Opus.

The model also demonstrates improved visual capabilities, outperforming Claude 3 Opus in standard visual benchmarks. This improvement is particularly noticeable in tasks that require visual reasoning, such as interpreting graphs and tables. Claude 3.5 Sonnet can accurately decipher text from imperfect images, which can be used as a valuable feature for industries such as retail, logistics and financial services.

ELECTRICAL AND ELECTRONICS ENGINEERING

INNOVATION IN THE ELECTRONICS WORLD: MAJOR ADVANCEMENT IN FOLDABLE SCREEN TECHNOLOGY

The future of electronic devices is being reshaped by foldable screen technology. Recent announcements reveal that one of the major electronics manufacturers, TechFlex, is preparing to launch its next-generation foldable screens. This new technology will allow users to experience more flexible and portable devices.

TechFlex's new screens stand out for their durability and image quality. Developed especially for smartphones, tablets, and laptops, these screens will offer great convenience in daily use. Company officials state that the screens are durable enough to withstand thousands of folds without any performance loss.

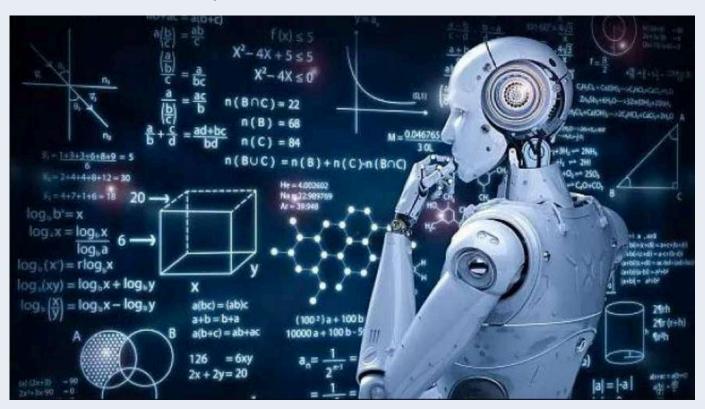
Jane Smith, CEO of TechFlex, commented on the matter, saying, "Foldable screen technology will completely transform user experience. With the innovations we have made in this field, electronic devices will become more functional and user-friendly."

The new foldable screens will be available for sale worldwide in the coming months. This development has created a lot of excitement in the electronics world, and users are eagerly awaiting the benefits of the new technology.

INDUSTRIAL ENGINEERING

SCHEDULING WITH ARTIFICIAL INTELLIGENCE: A NEW ERA IN INDUSTRIAL ENGINEERING

Industrial engineering is a branch of engineering that deals with the planning, design, management and improvement of production and service processes. Scheduling, an important part of this field, is a method used to determine how resources and jobs will be allocated over certain periods of time. Scheduling can be applied in a wide range of applications, from production lines to hospital operations. However, complex and dynamic structures may cause traditional scheduling methods to be inadequate.



INDUSTRIAL ENGINEERING

Machine learning is a particularly effective method for scheduling problems. Can make predictions for future transactions by learning from past data and experiences. For example, machine learning algorithms can be used to predict when a machine on a production line will require maintenance. In this way, unexpected malfunctions are minimized and production interruptions are prevented.

Genetic algorithms are another artifical intelligence technique used to find optimal or near-optimal solutions to scheduling problems. These algorithms produce solutions by mimicking the process of biological evolution. Genetic algorithms find the most appropriate solution by evaluating various possibilities and use biological concepts such as crossover and mutation in this process.

Artificial neural networks, on the other hand, are inspired by the working principles of the human brain to solve scheduling problems. These networks can learn complex associations and make predictions thanks to their multi-layered structure. In production processes, artificial neural networks can be used to optimize workflow and use resources in the most efficient way.

Artificial intelligence-based scheduling makes significant contributions to industrial engineering by enabling fast and accurate decisions in flexible and dynamic production environments. Artificial intelligence-supported scheduling systems provide effective tools to reduce costs and increase customer satisfaction while increasing the competitiveness of businesses. Therefore, artificial intelligence and scheduling are seen as one of the important components of the future in industrial engineering.

CIVIL ENGINEERING

WE TOOK RES. ASST. KEMAL ERTUNÇ'S OPINION ABOUT HIS ACADEMIC CAREER AND STUDY AREA.

Hi, can you tell us about yourself and your academic background?

"I am Kemal ERTUNÇ. I was born in Isparta in 1998. After my primary and secondary school education, I graduated from Isparta Anadolu High School in 2018 and was entitled to enter the Department of Civil Engineering at Süleyman Demirel University. After completing my bachelor's degree in 2022, I started my master's degree at Süleyman Demirel University and I am still continuing my postgraduate education. At the same time, I have been working as a research assistant at Istanbul Gelisim University since June 2024."

Can you tell us about your field of study and current developments in your field?

"During my master's degree, I took part in a study on Determining the Dynamic State of Sandwich Nanocomposite Cylindrical Panels and I am currently working on my master's thesis on the stability of functionally graded cylindrical shells under lateral compression."

CIVIL ENGINEERING

What are your thoughts on IGU Civil Engineering Department?

"The need for shelter has been the first and most basic need of mankind and the oldest known engineering is civil engineering. We need to be aware of this and take civil engineering seriously accordingly. As a new member of Istanbul Gelisim University, I see that the Civil Engineering diploma is a very valuable and internationally recognized since our university has ABET accreditation."

What advice would you give to our students?

"In many respects, university life is a period in which you experience firsts in your life and take your first steps into adulthood. Therefore, the university period is an opportunity to broaden your perspective on life and add value to your surroundings and yourself. One of our goals should be to integrate the experiences gained here into your profession as a civil engineer after graduation and to do your job properly."

MECHATRONICS ENGINEERING

BIOMIMETRY - NANOSCIENCE IN NATURE - 2

PREPARED BY: ASSIST. PROF. DR. CANSU NOBERI

Biomimetric Design Approaches

The goal of biomimetics is to create products and processes that can adapt to nature in a long-term way. Therefore, there are many different elements that biomimetic materials are aimed to have. The most important of these elements is "sustainability".

- **Sustainability:** Biomimetics follows the basic principles of life. They follow principles such as development from simple to complex, optimizing the use of energy, symbiotic relationships, and the use of environmentally friendly materials. The products and processes developed as a result of following these principles ensure that we are in harmony with the environment we live in.
- **Performance Improvement:** If a design strategy is not effective in nature, it is doomed to disappear. After all, nature has created these strategies over 3.8 billion years by testing them in all possible extreme conditions and destroying the ones that failed. Biomimetics helps to learn these successful survival strategies and thus improve products.
- Energy Conservation: Energy is much more expensive in nature than in the human world. The biggest source of energy in nature is the sun. Plants survive by obtaining energy from the nutrients obtained from sunlight and animals survive by obtaining energy from the nutrients obtained from plants and/or hunting. Nature has developed incredible systems and designs to optimize the use of energy in this energy scarcity. By imitating these systems and designs, energy consumption can be optimized and technologies can be developed to use energy more efficiently.

MECHATRONICS ENGINEERING

- Reducing Costs: Nature shapes using what already exists because it
 is cheap to shape and expensive to use raw materials. By learning
 how to build with nature's shaping strategy, less raw materials are
 needed.
- Eliminating and Redefining the Concept of Garbage: By studying how
 matter and nutrients are transformed within a habitat and applying
 this to our own processes, we can optimize the use of resources and
 avoid unnecessary waste.

An in-depth study of nature reveals many inspiring examples:

- Birds, ants, bees and turtles can navigate and fly without any devices.
- The bat's multi-frequency transmitter is much more efficient and sensitive than man-made radar.
- Mussels have a very strong attachment to rocks.
- Dragonflies can maneuver better than the best helicopter.
- The air conditioning and ventilation systems in termite towers are far superior to those built by humans in terms of equipment and energy consumption.
- The photosynthesis of leaves produces 300 billion tons of sugar a year, the largest chemical process in the world.

MECHATRONICS ENGINEERING

Examples of Biomimetric Materials KEVLAR

A company (Dupond), one of the world's largest chemical producers, launched a massive research project to study the spider web and solved the molecular structure of the spider web. By imitating this material, the strongest material known today was produced: KEVLAR

Kevlar is a material consisting of very strong fibers of very light carbon origin. Today, Kevlar is used in the production of armor, strong ropes and fire protective clothing. It is also used in ropes to stop airplanes, mine shoes and in the space industry.

Although Kevlar is not as strong as spider web, it is the strongest material produced by humans. For example, a pistol bullet can penetrate anything, but not a fabric made of Kevlar.



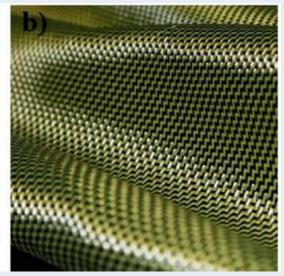


Figure 1. Spider web (a) and kevlar material (b)

MECHATRONICS ENGINEERING

SELF-CLEANING SURFACES - FABRICS

The Lotus flower is usually found where there is dirt. The special feature of the lotus flower is that it cleans the dirt and dust on it with raindrops. The nano spikes on the leaf structure prevent sticking. Every foreign particle accumulated on these nano-peaks slides off the leaf surface by colliding like billiard balls. Today, this plant is used in the production of coating materials for building surfaces (an exterior coating material called Lotusan has been commercially produced).



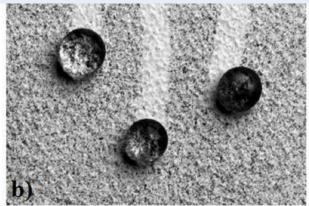


Figure 2. Lotus flower (a) and self-cleaning surface (b)

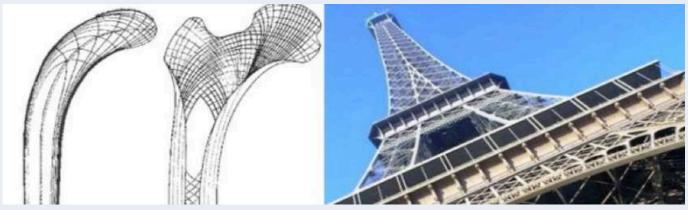


Figure 3. The Eiffel Tower, which has an extremely strong and robust design, was built based on the thigh bone in our body. (Skedros and Brand, 2011)

MECHATRONICS ENGINEERING

Other examples of biomimetric materials can be listed as follows;

- The V-shaped flight of birds to save energy has inspired airplane designs.
- The wide tail of whales has provided a clue for the use of monopalettes, which combine two feet used by swimmers. This is very important for fast diving.
- The burdock plant attaches to clothes and it is not easy to separate clothes from this plant. Velcro straps, which are designed to be used in the clothing industry in zero gravity, were inspired by this plant.
- The engineers who designed the bullet train realized the method in herons and applied it to the bullet train. It was determined that these birds increase the speed thanks to their beaks.
- Neural networks used in artificial intelligence and information technologies were designed with inspiration from the human brain.
- Inspired by and imitating the sensors that allow dolphins to communicate, alarm systems that detect and warn the tsunami in advance have been developed.

YAZILIM MÜHENDİSLİĞİ

AGILE AND SCRUM PRACTICES IN SOFTWARE DEVELOPMENT

Agile and Scrum are widely used methodologies to make software development processes more efficient, flexible, and adaptive. Both approaches revolve around specific principles and practices that enable teams to produce faster, higher quality, and customer-focused solutions.



SOFTWARE ENGINEERING

The Agile Approach

Agile is a methodology that emphasizes flexibility and quick adaptation in software development processes. The Agile Manifesto, published in 2001, outlines the core principles and values of Agile. These principles highlight individuals and interactions, working software, customer collaboration, and responding to change. Agile allows software projects to be conducted in short, iterative cycles (iterations or sprints). At the end of these cycles, a working piece of software is delivered, and the team incorporates customer feedback for improvements in the next cycle. This enables projects to quickly adapt to changing customer requirements and market conditions.

The Scrum Framework

Scrum is a framework based on Agile principles that enables software development teams to manage projects more effectively. Scrum defines specific roles, events, and artifacts for project management. The Scrum team consists of three main roles: Product Owner, Scrum Master, and Development Team. The Product Owner defines and prioritizes product requirements. The Scrum Master ensures that the team correctly follows Scrum processes and removes any impediments. The Development Team is responsible for completing the tasks defined for each sprint.

Scrum includes specific events for managing projects: Sprint Planning, Daily Scrum Meetings, Sprint Review, and Sprint Retrospective. During Sprint Planning, the team determines the tasks to be completed during a sprint. Daily Scrum meetings are short daily meetings where the team evaluates progress and identifies obstacles. In the Sprint Review meeting, completed tasks are reviewed, and feedback is gathered. During the Sprint Retrospective, the team evaluates the sprint process and identifies opportunities for improvement.

SOFTWARE ENGINEERING

Benefits of Agile and Scrum

Agile and Scrum practices offer numerous benefits to software development processes. These methodologies enable teams to respond quickly and effectively to customer needs. Through short iterations and regular feedback cycles, product quality is continuously enhanced. Additionally, Agile and Scrum improve communication and collaboration within the team, leading to more efficient and effective project completion. Ultimately, Agile and Scrum enhance flexibility, adaptability, and quality in software development projects, supporting customer satisfaction and business success.

FACULTY OF ENGINEERING AND ARCHITECTURE

ACADEMIC AND SCIENTIFIC ACTIVITIES

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ACADEMIC AND SCIENTIFIC ACTIVITIES

• ELECTRICAL AND ELECTRONICS ENGINEERING •

Constrained Linear Model Predictive Control for an Artificial Pancreas

Our faculty member Faycal Saffih published the article titled "Constrained Linear Model Predictive Control for an Artificial Pancreas". This study addresses limited linear model predictive control methods for artificial pancreas systems and offers a significant advance in diabetes management.

For detailed information and the entire article, you can click on the link https://ieeexplore.ieee.org/document/10536796

INDUSTRIAL ENGINEERING



Working in Industrial Engineering Department, Prof. Kenan Ozden's article titled "A Conceptual Framework and a Recommended Model for Examining the Effectiveness of the Defense System Against Ballistic Missiles" has been accepted to be published in Istanbul Gelisim University Journal of Social Sciences (IGUJSS)



Assoc. Prof. Umut Hulusi İnan's article titled "Analysis of the Impact of Demographic Characteristics and Business Conditions on Employee Job Satisfaction" has been be published Çanakkale Onsekiz Mart University Journal of Advanced Research in Natural and Applied Sciences

ACADEMIC AND SCIENTIFIC ACTIVITIES

CIVIL ENGINEERING

The project titled "Dynamic and Stability Analysis of Heterogeneous Axially Rotational Symmetric Shells under Temperature Effect" conducted by Prof. Dr. Beytullah TEMEL, a faculty member of Çukurova University Civil Engineering Department, in which Assist. Prof. Dr. Ahmad Reshad NOORI, Head of our Civil Engineering Department, is a researcher, has been entitled to be supported for 30 months within the scope of TUBITAK's "Special Call for Universities in Earthquake Region-BINBİRÇABA". PhD students Res. Assist. Burkay SİVRİ and Osman AYAZ (Hasibullah RASOOLI) are working as fellows in the project.



• ARCHITECTURE •

The article titled "Redesigning Course Improvement Plan; A Case Study Based on Learning Outcomes in Engineering Education" by Assist. Prof. Semih G. Yıldırım (PhD) and Assoc. Prof. Stuart W. Baur (PhD) is published in the June 2024 issue of the "Asean Journal of Engineering Education" of Universiti Teknologi Malaysia (UTM). The journal is included in the "other international journal" group in Turkey and is indexed in the Asian Science Citation Index (ASCI) and MyJurnal, the Malaysian National Index.

Access to the article; https://ajee.utm.my/index.php/ajee/article/view/141



• TAG •

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