

AU RESEARCH NEWSLETTER

Academic Year 2023/2024
Volume 3, Issue 5

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UNLEASHING THE TRANSFORMATIVE POWER OF AI IN ENGINEERING EDUCATION



As a keynote speaker of the 21st International Multi-Conference on Systems, Signals & Devices (SSD'2024), Professor Zabalawi – President of the Australian University, gave a talk on: Unleashing the Transformative Power of AI in Engineering Education. Professor Zabalawi pointed out that Artificial Intelligence (AI) is revolutionizing engineering education by providing dynamic,

personalized learning experiences and enhancing the efficiency of educational processes. Through AI-driven tools, students can access tailored tutoring, real-time feedback, and adaptive learning pathways that cater to individual needs and learning paces. Furthermore, AI enables the analysis of vast amounts of data to identify trends, predict outcomes, and optimize resource allocation, thereby improving the overall quality of education. By integrating AI into engineering curricula, educators can foster a more engaging and interactive learning environment, preparing students with the critical skills required for the evolving technological landscape. This transformative power of AI not only enhances the learning experience but also equips future engineers with the expertise needed to innovate and excel in their fields.

AU 6TH CALL FOR INTERNAL FUND

In February 2024, AU Scientific Research Center released the 6th Call for Research proposals.

The focus of the Call was focus on the following main fields:

- Water and Environment
- Renewable Energy
- Robotics and Artificial Intelligence
- Cybersecurity
- Advanced Materials and Manufacturing
- Electric Vehicle Cars
- Digital Transformation (e.g., Education, Health, Finance, Society, etc)
- Innovation and Entrepreneurship
- Business Management, Finance, and Marketing

This Call offered different types of grants:

- Seed grant,
- Collaborative research grants between AU colleges and schools (e.g. CoB & CoE, CoE & Aviation, CoB & Aviation), and
- AU-CQU and AU-Idaho University multidisciplinary research proposals.

The submission of the proposals was open until March 10th, 2024.

This Call was open to the entire AU faculty members. The seed and collaborative proposals were reviewed internally while the AU-CQU research grant proposals were evaluated by up to three external reviewers in addition to internal review by the Scientific Research Center. Figure 1 summarized submitted research applications.

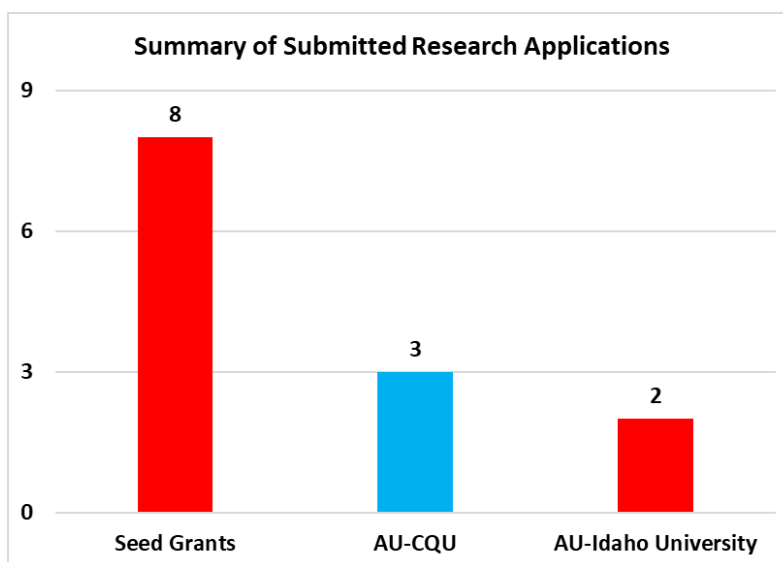


Figure 1. Summary of submitted research proposals

KFAS 1st Call for Research Proposals (15th January – 15th April 2024)

KFAS officially announced the First Call for Proposals - 2024 (15th January 2024 - 15th April 2024). The new KFAS 2022-2024 strategy is focused on funding research projects that address key, national priority areas, through basic, applied and policy research. Proposals in these domains were eligible:

- Health,
- Education,
- Energy,
- Environment,
- Water,
- Food Security and
- Digital Transformation.



The goal is to not only expand and build a growing body of knowledge in each key area, but also to ensure the translation and adoption of research outcomes from these research grants, as a means to foster and advance social and economic growth nationally, as well as contribute to scientific advancement globally. In addition to these priority areas, the call was also open to proposals on science, innovation and technology (STI) in a broader sense. However, priority will be given to the seven domains mentioned above. Figure 2 summarizes the submitted proposals by departments.

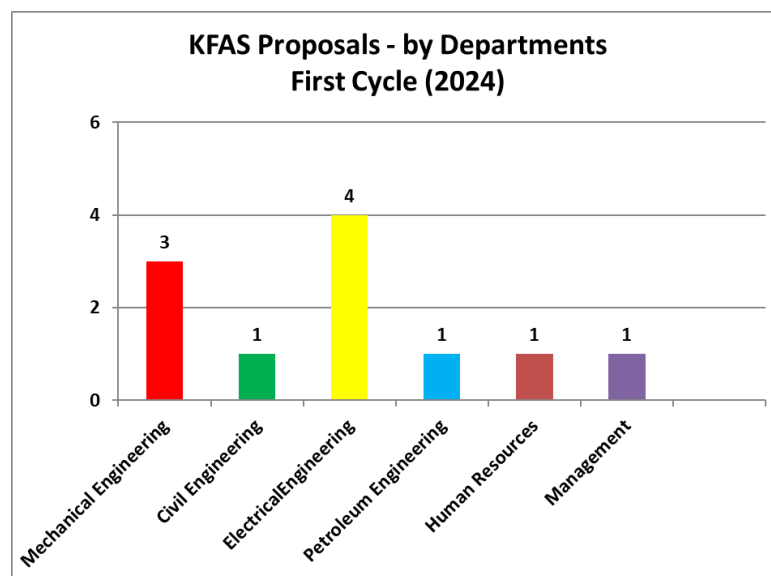


Figure 2. Summary of the submitted proposals by department.

RESEARCH SEMINARS

FLAX FIBER REINFORCED CONCRETE FOR SUSTAINABLE BUILDING MATERIAL



Industries are increasingly seeking to produce materials from natural resources, such as natural fibers, to mitigate climate change, promote economic growth, and reduce energy consumption. This research, presented by **Dr. Zainab al Hajaj**, investigates the impact of incorporating flax fibers into concrete at different fiber content levels, focusing on compressive strength, split tensile strength, and compressive modulus of elasticity. The study found that flax fiber reinforced concrete significantly improves compressive strength and modulus of elasticity, with enhancements noted up to 1% fiber by weight of concrete. Incorporating flax fibers into concrete offers substantial mechanical performance benefits, positioning it as a viable sustainable construction material for building applications.

THE INTERSECTION OF AI AND RENEWABLE ENERGY: EXPLORING NEW HORIZONS FOR ELECTRICAL ENGINEERS



In this seminar, **Ms. Hebah Abbas** discussed the innovative intersection of Artificial Intelligence (AI) and renewable energy. The talk covered a wide array of topics, including how AI can enhance the efficiency of renewable systems, enable predictive maintenance, optimize energy use, and forecast energy demand. Case studies of successful AI implementations in the energy sector were highlighted. Attendees were inspired to think innovatively about their role in integrating AI with renewables and envision how they can contribute to a sustainable future. This seminar provided an opportunity for students to witness the transformative potential of these technologies and the exciting career opportunities that lie at this intersection.

SUSTAINABILITY IN OIL AND GAS INDUSTRY



The world faces its greatest balancing act – to provide reliable, accessible, and affordable energy to meet growing demand while rapidly decarbonizing for a sustainable future. In this talk, **Dr. Fajhan Al-Mutairi** discussed how the energy industry is addressing this challenge. New technologies that reduce carbon emissions were explored, as well as changes in our energy systems, and how digital tools are making everything more efficient and sustainable. The participants had the chance to learn more about the exciting changes that are helping to protect our planet's future.

EXCELLENCE MINDSET IN CONSTRUCTION PROJECTS EXECUTION



A construction project begins with a societal need and a business plan from an organization. This seminar held by **Mr. Sherry Oommen** provided an overview of the environment and context in which a construction project is conceived and executed. It aimed to raise awareness that achieving excellence in construction projects requires attention not only during the construction stage but throughout all stages—from the inception of the idea to the successful operation of the final product. Lessons learned from recent projects that could foster healthy dialogue among various stakeholders, promoting an excellence mindset in construction project execution in Kuwait, were also examined

SHAPING THE FUTURE OF AUTOMOTIVE: POWERTRAIN TECHNOLOGIES AND INNOVATION TRENDS"



This seminar, held by **Dr. Wissam Bou Nader** was a unique opportunity to learn about the cutting-edge advancements that are propelling the automotive industry forward. The complexities of new powertrain technologies, from electric and hybrid powertrains to revolutionary internal combustion engines were revealed, highlighting their environmental benefits and performance enhancements. Additionally, this presentation emphasized the significance of sustainability and eco-friendly solutions, showcasing how the adoption of electric and hybrid powertrains is reducing carbon emissions and increasing fuel efficiency. This presentation aimed to inspire and inform about the forces shaping the future of automotive powertrain technology. It was an opportunity to engage in meaningful discussions and envision the road ahead in the automotive industry.

TESTING METHODS IN TRIBOLOGY OF POLYMERIC COMPOSITES



This talk describes some of the testing methods commonly used in tribology. It illustrates the contact of solid mechanics and the nature of surface interaction. With the advent of sustainable development, composite materials now become more prominent in many applications. Many natural fibers in polymeric composites are being introduced in the aviation industry, construction, industrial applications, automotive parts, bearing, and many others, making tribo-testing more demanding. Relevant to this, the testing methods elaborated in this talk focus on the different types of wear test rigs used for testing of solid specimens for composite materials. The talk delivered by **Dr. Umar Nirmal** differentiates mechanisms of wear and

sliding friction of materials subjected to different wear test rigs which are built based on ASTM standards simulating the real-time conditions.

CARBON CAPTURE, TRANSPORTATION, AND STORAGE (CCTS) - RESEARCH AND EDUCATION CHALLENGES AND OPPORTUNITIES



The CO₂ buildup and implications for climate change and its effect on the future of the earth are of great concern to all of us. However, the International Energy Agency (IEA) 2022 Stated Policy (STEPS) and the Shell Sky scenarios, both aggressive decarbonization forecasts, of the world energy outlook show an ongoing, long-term role for oil and gas. In this talk **Prof. Eissa Alsafran** discussed some of the ways the petroleum industry can lead the decarbonization effort which include developing and supporting the growth of CCUS, geothermal, and hydrogen technologies through research and education. Therefore, the PE industry is part of the solution and has a major role in energy transition to combat climate change. In addition, petroleum engineers

will continue to have relevance and renewed importance in the energy transition because of their unique set of skills and competencies in fluid flow in conduits and porous media that lend themselves to CCUS and geothermal energy extraction. Petroleum engineering, with its unique blend of skills and technologies, is unmatched and needed for a long time.

THE IMPACT OF THE SIMULATIONS' PREDICTION POWER ON THE NANOTECHNOLOGY REVOLUTION



The presentation was about the history of Nanotechnology, how and when it started, and its impact on our lives. The focus of the talk was about the prediction power of the modeling and simulations. A comparison between experimental findings and theoretical simulations were illustrated by showing some examples, including **Dr. Ali Al-Zubi's** published research findings.

HEALTH AND SAFETY CULTURE AT WORK



This seminar delivered by **Eng. Dhuha Alkandari** on "Health and Safety Culture at Work," highlighted the importance of fostering a strong safety culture and how everyone can contribute. The roles of leaders, employees, and effective communication in maintaining a safe workplace was explored during seminar. Through simple examples and practical tips, the participants learned how to make safety a team effort and address common challenges.

HIGH VOLTAGE SUBSTATIONS



A power system relies heavily on the presence of substations, which play a vital role in its overall functioning. Substations serve as crucial hubs for transmission and distribution lines, acting as the terminations for these lines. They are equipped with switchgear and provide housing for various essential components. In addition to these basic functions, substations also incorporate facilities necessary for ensuring system security and control. This presentation, delivered by **Eng. Tasneem Alaradah** explicitly outlined the specific equipment included within a substation.

THE ROLE OF TRACERS TECHNOLOGY APPLICATION IN CHARACTERIZING AND MONITORING KOC RESERVOIRS



Tracers are substances with physical, chemical, biological, or radioactive properties that can help identify, observe, or follow the behaviour of various processes. They are used in the oil industry to qualitatively or quantitatively gauge how fluid flows through the reservoir. This presentation, delivered by **Dr. Ali Qubian**, focused on the role, function, and types of tracer applications as a means of reservoir monitoring and characterization. Additionally, it highlighted the field application of a state-of-the-art tracer technology, namely 'Partitioning Inter-well Tracers (PITT),' in a pilot study to determine the remaining oil saturation and communication pathways. Knowing the remaining oil saturation is crucial for reducing the decision risk of enhanced oil recovery (EOR) measures and accurately designing EOR projects.

AI REVOLUTION IN GEOTECHNICAL ENGINEERING



It is almost impossible these days to escape the new technologies and concepts such as Big Data, Internet of Things (IoT), Machine Learning (ML), and Artificial Intelligence (AI). In the field of geotechnical engineering, there is currently a rapid increase in innovations linked to the development of these technologies. One aspect that was considered in this presentation, delivered by **Dr. Rodaina Aboul Hosn** is how AI models can help in transforming data into knowledge/tools that geotechnical engineers can use to optimize their designs. This presentation highlights different applications of AI to predict many aspects of geotechnical engineering where uncertainty exists such as soil properties, constitutive relationships, prediction of settlement, bearing capacity, and internal erosion. Applications at different scales will be

considered as well.

HOW DO I DEAL WITH AI REPLACING MY ROLE IN THE FUTURE?



The one of the most recent challenges of our time is the potential impact of AI on our careers. The lecture, delivered by **Ms. Manuela Plizga LLB** aimed to broaden the horizons, offering insights on how to manage job insecurity, empower yourself, nurture your emotional resilience, and turn adversity into triumph. In addition, inspiration from the best practices in the world were presented. After the seminar, you will strengthen your strategies for navigating this evolving landscape and emerge stronger than ever.

FUNDAMENTALS OF AN ENGINEER'S HEALTH, SAFETY, SECURITY & ENVIRONMENT



This compact comprehensive session, delivered by **Eng. Noor Adel Alsadi, MPH**, covered key topics such as distinguishing hazards from risks, the importance of inspections and audits, strategies for preventing dropped objects and ensuring safety while working at height, alongside managing fire and electrical hazards. Ideal for engineers at all levels, this presentation is a gateway to mastering safety protocols and leadership in the engineering domain, ensuring a safer work environment for everyone in accordance with IOSH standards.

SELF-CLEANING NANOCOATINGS FOR MINIMIZING THE IMPACT OF DUST DEPOSITION ON SOLAR CELLS



Self-cleaning is one of the most attractive techniques to mitigate the effect of dust settlement on the surfaces of photovoltaic devices. The core problem of soiling in harsh weather environments like Kuwait was discussed in this talk by **Dr. Feras Alzubi**. The work of utilizing and employing metal oxides nanoparticles like TiO₂ and ZnO as self-cleaning nanocoatings on solar cells were primarily presented in this talk. The properties and effectiveness of the nanocoatings against the power production efficiency of solar cells is systematically investigated and presented.

EXPLORING THE IMPACT OF PROJECT BASED LEARNING: INSIGHTS FROM THE OIL & GAS INDUSTRY



The presentation, jointly delivered by **Eng. Ahmad Al-Harbi** and **Eng. Batoul Asad** explores the personal benefits of an AU graduate from the different Project-Based Learning (PBL) courses. It will highlight how PBL integrates intelligent tools and technologies, enhancing both students' and instructors' learning experiences. In addition, the presentation will show how the PBL approach fosters deeper learning by engaging individuals heavily in projects and offering the required soft skills to solve real-life problems, and improving personal skills, creativity, adaptability, and the ability to overcome challenges. The PBL approach in education greatly impacts individuals' futures, exemplified through real-life scenarios.



STRENGTHENING FOR EXISTING STEEL MEMBERS



This seminar, delivered by Dr. Seham Ahmed El Sa'eed presented guidelines for strengthening existing steel beams, columns, and connections. Relevant code requirements of the International Existing Building Code and the 2016 AISC Specification for Structural Steel Buildings will be discussed. Several rectification types will be presented, including welded plate reinforcing and the introduction of composite action. Using the design procedures of the 2016 AISC Specification, this seminar presented detailed life strengthening examples that can be used as a reference in future work.

RESEARCH CAPACITY BUILDING SEMINARS

AU-College of Business in collaboration with AU-Scientific Research Center organized another cycle of the Research capacity building seminars. The distinguished researchers from AU-College of Business and AU-Scientific Research Center delivered seminars on the following topics:

"FROM AN ABSTRACT IDEA TO AN ARTICLE THAT CAME INTO BEING - MANAGING INFORMATION AND COMMUNICATION OVERLOAD IN HIGHER EDUCATION INSTITUTIONS IN KUWAIT: PROSPECTING KEY SUCCESS FACTORS GAINED FROM THE COVID-19 EXPERIENCE



Advances in technology have paved the way for significant improvements in higher education. Evidence shows that Middle Eastern higher education institutions are increasingly engaged in digital transformation. This brought about significant pressures on individuals entailed by the challenging task of managing enormous volumes of information from digital communication channels. In this regard, the seminar delivered by **Dr. Mirna Safi** aimed to:

- Give a general idea about the objectives of this research paper: (a) explore the extent of information and communication overload accompanying this digital transformation in Kuwaiti higher education institutions, which has accelerated amid the COVID-19 pandemic; and (b) to assess the conditions that are used its effects.
- Briefly explain the methodology and results: A qualitative exploratory approach based on in-depth, semi-structured interviews with eight middle-level academic managers was employed. The review of participants' responses reveals the central role of academic managers in mitigating the magnitude of information and communication overload. This depends on managers' efforts to streamline the volume of information and the number of communications circulating within their units.
- Walk through the process of writing this paper: From Idea Development to Publication

HOW EDITORS AND REVIEWERS READ JOURNAL SUBMISSIONS



What editors of high-ranking academic journals look for when making decisions of desk rejecting or to send to reviewers? How to write a cover letter to avoid desk rejections? How to align your interests to the interest of the journal and the editor when preparing publications? These are some of the questions addresses in the seminar delivered by **Dr. Andri Ottesen**.

THE EVOLUTION OF THE RESEARCH IDEA



This seminar, delivered by **Dr. Vladimir Simovic** is intended to showcase the process of generating and developing research ideas over time, through multiple iterations and extensions in different research projects and with different funding authorities. It will provide valuable insights into the evolution of the research idea from concept to a tangible output with commercial potential

"I KNOW THAT I KNOW NOTHING" THE PERCEPTIONS OF REMOTE WORK COMPETENCIES OF THE PERSONS WITH DISABILITIES - ARTICLE DEVELOPMENT AND PUBLISHING JOURNEY

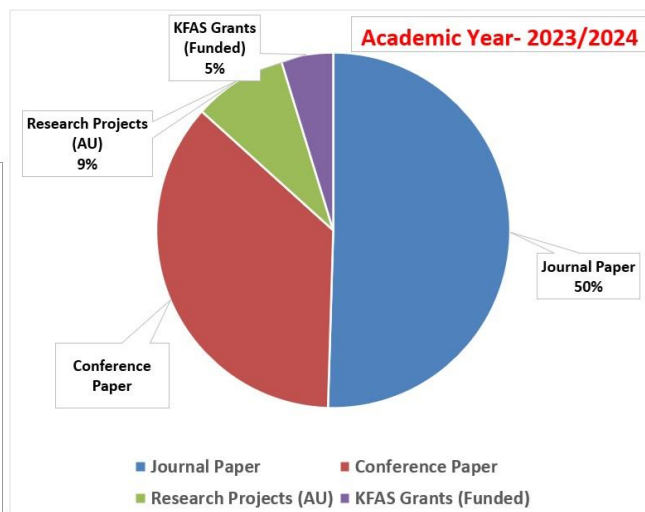
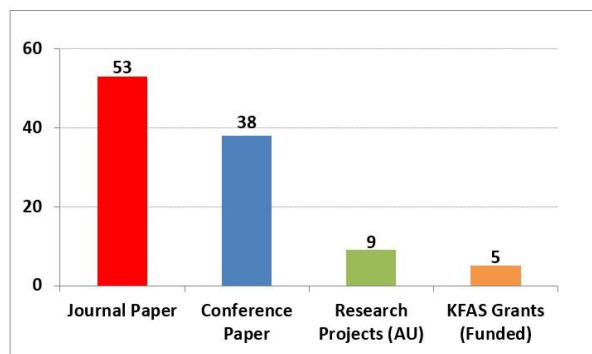


This seminar, delivered by **Dr. Vladimir Simovic** is intended to showcase the process of developing scientific article for publication in a highly ranked academic journal along with gaining valuable insights, sharing experiences, and fostering collaborative learning in the realm of academic publishing.

Publications: Journals, Conferences and Books

AU faculty members published a total of 91 research work covering the period from September 1st, 2023, through June 30th, 2024 (53 journal papers and 38 conference papers). AU faculty received 5 funded KFAS projects and 9 AU internal research grant as shown in the Figure below. Many peer-reviewed papers were published in Q journals (ranking based on Scopus).

Type	Total
Journal Paper	53
Conference Paper	38
Research Projects (AU)	9
KFAS Grants (Funded)	5
Grand Total	105



Approved KFAS Proposals



Dr Vladimir Simovic has received an approval on KFAS proposal entitled: Evaluating the impact of game-based learning on university students' skills development - a cross-cultural analysis the project will utilize the experimental approach to provide the empirical evidence for Kuwait of the impact of game-based learning on students' academic performance, digital skills development and motivation in the area of Digital marketing using a game simulation Simbound. No such data exists for Kuwait up to date. Besides in Kuwait, the research will simultaneously be conducted in universities in Australia, Turkey and Serbia.



Dr Nader Ghareeb has received an approval on KFAS proposal entitled: Digitalization of Office Ergonomics Concept for Employees' Wellbeing, Resilient and Innovative Workplace. The aim of the project was to interweave the new trends of the innovative workplace by introducing the digitalized wellbeing program to employees and enhance their resilience for faster response to issues they might encounter at their workplace.



conditions

Dr Feras Al-Zubi has received an approval on KFAS proposal entitled: Rapid Indoor Soiling Testing (RIST) System for Soiling and Dust Control in - Photovoltaics: Novel System, Measurement Process, and Prediction Models. Outdoor testing for soiling on PV panels often yields unpredictable results due to external factors such as rain, bird droppings, and air pollutants. To overcome these challenges, the proposed prototype of RIST system, an enclosed testing facility, replicates natural dust accumulation under controlled conditions. This system meticulously regulates factors like dust flow, airflow, humidity, and PV module temperature. It includes a measurement of photovoltaic characteristics to accurately assess PV performance and electrical output in varied dust



Dr Amin Al Ka'bi has received an approval on KFAS proposal entitled: Application of Programmable Logic Controllers and Artificial Intelligence in Optimizing Energy Consumption in Educational Institutions, Study Case: Australian University, Kuwait. Integrating Programmable Logic Controllers (PLCs) and Artificial Intelligence (AI) in educational institutions can significantly optimize energy consumption. PLCs automate energy management systems, while AI analyzes usage patterns to enhance efficiency. Together, they provide real-time adjustments and predictive maintenance, reducing waste and lowering costs. This synergy creates a sustainable, energy-efficient campus environment.



reduction of greenhouse gas emissions through new technologies.

Dr Majdi Al Omari has received an approval on KFAS proposal entitled: Decarbonization of the Transmission Network Through Modernization of the Gas Insulated Switchgear (GIS) Using Clean Air Technology and Vacuum Interrupter. This research proposal aims to study the effectiveness of decarbonizing Kuwait's transmission network through the modernization of gas insulated switchgear (GIS) using clean air technology and vacuum interrupter. By reducing the power system's carbon footprint and improving the power grid's efficiency and reliability, this research is highly significant for the energy industry. The study aims to provide valuable insights into the optimization of the transmission network and



Dr Masoud Irannezhad has received an approval on KFAS proposal entitled: Kuwait Resilient Digital Twins System Development for Sustainable Urban Flash Flood Management - Phase 1 (KReDiTS-1). This research aims at applying DTs for simulating different climate change scenarios, identifying prone-areas to urban flash floods with high-risk populations, suggesting nature-based solutions, investigating different sustainable urban flash flood management strategies, and laying a foundation for flood-resilient infrastructure planning and implementation in Kuwait.

RESEARCH NEWS

AU CoB Scientific Conference 2024 - Announcement

The College of Business at Australian University, Kuwait is hosting a *19th International Strategic Management Conference* entitled:

Planning for industry 5.0: Human-Centric, Sustainable, and Resilient Organizations

The conference is organized by the International Strategic Management and Managers Association (ISMMA) in cooperation with Gebze Technical University, Turkey and Yildiz Technical University, Turkey. It will take place in Kuwait between the dates of October 30th and November 1st, 2024 at Australian University. The Conference mode is hybrid.

Publication Opportunities

Selected papers will have the chance to be published in renowned journals, including:

- International Journal of Organizational Leadership (indexed in the Emerging Sources Citation Index)
- Journal of Global Strategic Management (an internationally refereed journal published by the International Strategic Management and Managers Association, indexed in databases such as Cabell's, Asos, and the Global Impact Factor)
- Journal of Economics, Finance, and Accounting
- Journal of Management, Marketing, and Logistics
- Research Journal of Business and Management
- Journal of Business, Economics, and Finance

Multilingual Sessions

As part of the CEDIMES/CEDIFIRM network, which promotes the use of French in academia, we will also hold sessions in French. However, please note that all submissions and communications will be conducted in English.

Key Dates

- June 26, 2024: Due Date for Submission of Full Papers
- July 15, 2024: Notification of Acceptance/Revisions of Full Papers
- August 5, 2024: Due Date for Submission of Revised (Final) Papers
- October 7, 2024: Deadline for Early Registration

More Information

For further details about the Conference, visit our website:

[19th International Strategic Management Conference](#)

Holistic Approach towards Teaching & Learning: Pedagogical Explorations

The Teaching and Learning Center organized the Annual Forum on Holistic Approach towards Teaching & Learning Pedagogical Explorations on May 15, 2024, dedicated to exploring pedagogies that contribute to economic productivity and sustainable goals that contribute to the enhancement of individual and societal well-being. Quality of education is a high priority for development; this forum aims to develop a holistic approach towards Teaching and Learning, that integrates academic, social, and human capital developmental aspects aiming to cultivate a well-rounded education system. The forum will explore pedagogies that contribute to economic productivity and sustainable goals that contribute to the enhancement of individual and societal well-being.

THE ANNUAL TEACHING AND LEARNING CENTER FORUM

HOLISTIC APPROACH TOWARDS TEACHING & LEARNING: PEDAGOGICAL EXPLORATIONS

May 15th, 2024 | 9:00 AM - 4:00 PM | AU Auditorium

FORUM OBJECTIVE:

Quality of education is a high priority for development; this forum aims to develop a holistic approach towards Teaching and Learning, that integrates academic, social, and human capital developmental aspects aiming to cultivate a well-rounded education system. The forum will explore pedagogies that contribute to economic productivity and sustainable goals that contribute to the enhancement of individual and societal well-being.

AGENDA:

1. Keynote Speeches
2. Panel Discussion: 'Holistic Approach to Teaching and Learning'
3. Workshops: Pedagogical Explorations
4. Students Projects Exhibition

Please share with us any updates on your research, scholarly, or creative activities. Updates may be related to a paper that has been accepted for publication in a high-impact journal, a book chapter you've just published, or other updates you wish to share with our Scientific Research Center. Send details to research@au.edu.kw

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