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Compilation of Research Articles (Scopus Index) by UniKL MITEC Researchers

TABLE OF CONTENTS

1

Title:
Analysis of Hydrophobic-Silver Nanoparticle Coating to Inhibit Cooling Water Corrosion in Cooling Systems

Journal:
Advanced Structured Materials, Volume 173, 2023

Document Type:
Book Chapter

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Abstract:
As cooling systems become an essential part of industrial plants, the utilization of corrosion-prone carbon steel turns extensively high as well. A cooling system is a collection of equipment responsible for cooling and releasing heat to the surroundings with regards to plant's safety and productivity. The application of carbon steel for its economical factor has exposed the metal of low corrosion resistance to conditions that cause deterioration of materials as well as the performance of system. Therefore, realizing the action of protecting carbon steel can be impactful, the present study aims to (i) investigate the cooling water corrosion inhibition offered by hydrophobic-silver nanoparticle coating on carbon steel in cooling system setting and (ii) evaluate effects of pH on the rate of corrosion in the cooling system. The analyses comprise of Tafel analysis and scanning electron microscopy (SEM) exhibited successful improvement of corrosion resistance on coated carbon steel exposed to environments with varied pH for 24 h, whereas acidic setting and high chloride content had rapidly increased the carbon steel's corrosion rate after 7 days. Nonetheless, the integration of 3-aminopropyltriethoxysilane (APTES) with silver nanoparticles is a promising future to the retardation of cooling water corrosion.

2

Title:
Design Optimization of Shell and Tube Heat Exchangers: Effect of Baffles Design

Journal:
Advanced Structured Materials, Volume 173, 2023

Document Type:
Book Chapter

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Abstract:
All industrial applications use a heat exchanger as a device for transferring heat in both cooling and heating processes. Heat exchangers can be divided into several types but the present study focuses on shell and tube heat exchangers (STHX). Nowadays, the STHX type is preferable due to its capacity to transfer heat in a large amount. The present study aims for optimum design parameter identification for the baffles of STHX. The STHX with newly designed baffle was analyzed for its performance in terms of the rate of pressure drop and the heat transfer coefficient of STHX.

3

Title:
Effect of thermal annealing on ZnO/AlN/GaN/AlN heterostructure grown on Si substrate by radio frequency sputtering

Journal:
Applied Physics A: Materials Science and Processing, Volume 129, Issue 5, 2023

Document Type:
Article

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Abstract:
The influence of high thermal annealing on the surface morphological, structural and optical properties of ZnO/AlN/GaN/AlN layers grown on Si substrate by MBE was investigated. The ZnO thin film was deposited on AlN/GaN/AlN heterostructures by radio frequency (RF) sputtering machine. Thermal annealing at different temperatures (600 °C and 800 °C) was applied to the sample in vacuum tube furnace with the existence of nitrogen flow. The surface morphological, structural and optical properties of samples were investigated by field emission scanning electron microscopy (FESEM), atomic force microscopy (AFM), high-resolution X-ray diffraction (HR-XRD), and Raman spectroscopy, respectively. The ideal thermal annealing temperature is found to be 600 °C, which results in the films having the least amount of dislocation density, based on the findings of the optical and structural evaluation.

4

Title:
Heat transfer analysis of Maxwell hybrid nanofluid with fractional Cattaneo heat flux

Journal:
Alexandria Engineering Journal, Volume 72, 2023

Document Type:
Article

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Abstract:
Hybrid nanofluids are widely used to improve the efficiency of a thermal system in many aspects of engineering and science. Therefore, the current work is design to investigate the heat transfer of Cu-Fe_3O_4 nanoparticles in water base Maxwell fluid flow over a cone, which is kept in a porous medium. Additionally, the fluid experiences magnetic field and thermal radiation effects. As a result, the impacts of volume fraction, porosity, magnetic field, and thermal radiation are properly taken into account. It is observed that increasing temperature time relaxation with constant temperature fractional derivative decreases the thermal gradient, whereas increasing temperature fractional derivative parameter with constant time relaxation increases the thermal gradient. Moreover, adding 1% Cu-Fe_3O_4 increases the heat transfer rate of the fluid up to 1.13% and 1.24% when Rd=0 and Rd=0.2, respectively. On the other hand, the heat transfer rate of Maxwell fluid decreases up to 0.5% in the presence of a magnetic field specifically considering M=2 without thermal radiation.

5

Title:
Integrating a Hydrogen Fuel Cell in a Vehicle as a Hybrid for a Sustainable Energy Application

Journal:
Advanced Structured Materials, Volume 173, 2023.

Document Type:
Book Chapter

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Abstract:
The current energy source for a typical transportation vehicle is mainly non-renewable energy such as fossil fuel. The combustion of fossil fuel in the engine will produce carbon emissions into the air. This is called greenhouse gas (GHG) emission. High amount of GHG in the atmosphere will result in advanced greenhouse effect that will result in higher global temperature every oncoming year. The solution to reduce GHG released into the atmosphere is by reducing the usage of combustion engine vehicles on the road. Therefore, an electric vehicle (EV) is the ideal type of transportation as it emits zero-carbon emission. However, a typical EV is too expensive, takes too long to recharge and relies on lithium ion for the battery structure where lithium is a non-renewable source and can deplete in the future. Hence, a hydrogen fuel cell is a device that exploits the energy transfused between oxygen and hydrogen molecules into water and electrochemical energy that could directly be connected to a load for power consumption. Since oxygen and hydrogen are renewable and abundant resource on earth, this project focuses on the study of utilizing a hydrogen fuel cell as an energy source for a clean and hybrid transportation vehicle. Furthermore, this project aims to develop a remote control (RC) car that uses the hydrogen fuel cell technology as a hybrid to drive the motor of the car by supplying hydrogen and oxygen to the fuel cell. By accomplishing the development of this prototype, it would simulate the possibility of using hydrogen fuel cell technology to power a real hybrid passenger vehicle achievable in real-life applications.

6

Title:
Mechanical and Thermal Properties of Polylactic Acid Composites Filled with Iron Particles

Journal:
Advanced Structured Materials, Volume 173, 2023.

Document Type:
Book Chapter

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Abstract:
An additive manufacturing process was used to fabricate different samples using polylactic acid and iron particle filament. Different processing parameters like temperature were used to produce different samples. The samples were tested for the mechanical and thermal testing using tensile, flexural, structural and thermogravimetric and differential scanning calorimetry, respectively. Results showed that the composites showed a lower trend of mechanical properties compared to the neat polylactic acid. It was also noticed that the parameters had minimal effects on the thermal properties of the composites. The structural changes were also noticed minimal.

7

Title:
Mechanical and Thermal Properties of Polylactic Acid/Carbon Fiber Composites

Journal:
Advanced Structured Materials, Volume 173, 2023

Document Type:
Book Chapter

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Abstract:
Polylactic acid-based composites were prepared using carbon fibers. A 3D printer was used to fabricate different samples using three different temperatures such as 190, 200, and 210 °C. Different testings such as tensile, flexural, and thermogravimetric analysis and Fourier transform of infrared spectroscopy were used to characterize the samples. Result analysis showed that the composite exhibited lower properties than the neat PLA samples. The results for the parameter variation have minimum effects on the properties of the composites.

8

Title:
Mode II Debonding Characterization of Adhesively Bonded Aluminum Joints

Journal:
Advanced Structured Materials, Volume 173, 2023.

Document Type:
Book Chapter

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Abstract:
Adhesive joints as versatile methods offer several advantages, including eliminating galvanic corrosion for metallic adherents and overall weight saving. This work's goal is to establish a systematic methodology for determining the strain rate-dependent interface properties of adhesively bonded joints loaded in mode II. Double lap joints consisting of aluminum Al 6061-T6 bonded with polymer adhesive were used to investigate the delamination failure process. The strain rate-dependent interface properties were determined based on hybrid experimental and computational approaches. Both experiments and finite element simulations were conducted at displacement rates of 5, 50, and 500 mm/min using an end-notch flexure specimen. The strain rate-dependent interface strength properties were verified based on the finite element simulation results. The experimental and simulated mode II load–displacement curves showed promising findings and correlation. Hence, establishing a validated methodology fulfills the industrial requirement of an accurate predictive model with a minimum number of testing and material property data.

9

Title:
Preface

Journal:
Advanced Structured Materials, Volume 173, 2023.

Document Type:
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10

Title:
The effect of augmented reality mobile learning in microeconomic course

Journal:
International Journal of Evaluation and Research in Education, Volume 12, Issue 2, 2023.

Document Type:
Article

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Abstract:
Recently, there has been a surge of interest for students to use technology while engaging in their learning. Augmented reality is one of the technologies found suitable for use in the educational field, such as in science, mathematics, and engineering. However, it is not yet being explored in the Microeconomics course. Therefore, this study investigated the effectiveness of using augmented reality, namely Augmented Reality Mobile Learning in Microeconomic courses (ARMLAAPPS). This study used a quasi-experimental design, and two groups were involved: the control and experimental groups. They are undergoing teaching and learning sessions using ARMLAAPPS and conventional teaching methods. This study indicates that students in the experimental group showed a significantly higher visualization skills level than those in the control group after teaching and learning. Besides, this study also found that ARMLAAPPS can assist in highlighting student-centered learning, stimulating student interest and curiosity, increasing student cognitive, affective, and psychomotor processes, and increasing student involvement in the information-seeking process. Educators are suggested to use augmented reality in their teaching and learning since it has effectively enhanced students' visualization skills and promoted a better understanding of knowledge.

11

Title:
The Supply Chain Resilience of the Commercial Vehicle Business During the Implementation of the National Recovery Plan

Journal:
SpringerBriefs in Applied Sciences and Technology, 2023.

Document Type:
Book Chapter

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Abstract:
The COVID-19 pandemic has brought dramatic changes in many business sectors, particularly the commercial vehicle business, which before the COVID-19 pandemic has already experienced a slowdown due to uncertainty in global supply and demand. The introduction of the movement control order (PKP) and several other measures to curb the spread of the COVID-19 epidemic have exacerbated the efforts to recover from the current challenges. This study investigates the effect of COVID-19 disruption on supply chain resilience among commercial vehicle businesses in Malaysia. The results show that all variables significantly influence the supply chain resilience capability in the commercial business sector except for the risk management culture, which requires further validation. In the event of a disruption, the supply chain resilience capability of the organization is critical to absorb and adapt to the changes caused by the interruption and innovatively seek improvement in the operation to become stronger and prepared for any similar disruption in the future. The findings of this study provide valuable information to the business practitioner affected by the COVID-19 pandemic. It also enriches the knowledge of academicians for similar research in supply chain resilience field.

12

Title:
Measuring the Awareness on Safety Management and Behavior: A Case Study in a Service-Based Company in East Coast Malaysia

Journal:
SpringerBriefs in Applied Sciences and Technology, 2023.

Document Type:
Book Chapter

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Abstract:
Safety is always considered as a major concern by all organizations. Thus, activities related to awareness on safety have been implemented to inculcate employee's involvement and commitment toward safety. Based on recent trends, the number of cases related to worker's accidents at workplaces are still occurring. Past research revealed that working conditions can be improved if the organization is enhancing practices in safety management. The purpose of this study is to measure the level of safety management and behavior at workplaces. This is quantitative research whereby a survey questionnaire was used among employees from several service-based companies. The Statistical Package for Social Sciences (SPSS) version 21 has been used for data analysis. Mean analysis was conducted to calculate the level of safety from the aspect of commitment, training, involvement, communication, feedback, rules, and procedures. The result showed that the level of safety management and behavior is considered as high. The main reason is due to extensive training and activities related to safety by the organization. The results from this research can be used for future research related to safety at workplaces.

13

Title:
Women's Behavior Toward the Supply Chain Roles in Malaysia

Journal:
SpringerBriefs in Applied Sciences and Technology, 2023.

Document Type:
Book Chapter

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Abstract:
Nowadays, the role of women in the supply chain is undoubtedly critical in most sectors, with an average of 41% of the supply chain workforce in 2021 being women. Although the significant contributions of women to the supply chain function, there is still a lack of understanding of women's behavior toward the role in supply chain management (SCM), a male-dominated field that is the subject interest of the study. The study has used the groundwork of theory planned behavior (TPB) to facilitate the investigation and the development of a hypothesis. In doing so, the research has collected feedback from 102 respondents for the structural equation modeling analysis using SmartPLS 3.0. The data was then verified and analyzed against five hypotheses that statistically support the path of the relationship. The results indicated that all developed exogenous constructs in the TPB framework statistically influence the endogenous construct (behavior interest) of the women toward the role in SCM. This study contributes new insight to understand the women's behavior toward the SCM role, which is still lacking in the SCM field.

14

Title:
The Impact of Industry 4.0 on Innovative Organisations, A Thematic Review Using the PRISMA Statement 2020

Journal:
International Journal of Interactive Mobile Technologies, Volume 17, Issue 9, 2023.

Document Type:
Article

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Abstract:
The fast growth of technologies during the Industry 4.0 era resulted in new or evolved organisations forming. Throughout the Fourth Industrial Revolution, the interaction between technology and humans evolved. Furthermore, the skills and capacities of individuals and organisations are changing due to the abundance of technology. This study investigated the impact of industry 4.0 on innovative organisations and used thematic analysis to identify the major themes. VOS viewer content analysis and critical terms of occurrences analysis were used to identify the major themes. In addition, the PRISMA statement 2020 is applied for the methodological part. The results indicate three significant themes business models, innovative organisations, and digital transformation. The findings show that changes in the global economy and market needs are forcing businesses to adopt technical breakthroughs made possible by digital transformation. it is considered that adequate resources, experienced and capable workers, and well-organized, adequately adaptable, and creative procedures are required for innovative organisations. In addition, HRM practises in the digital era must incorporate teleworking, promote employee engagement in achieving the aim of digital transformation, and incentivise a proper leadership style. Also, technological advancement drives businesses to innovate in their everyday production, supply, value chains, and numerous operations, allowing them to adapt quickly to client requests.