University of Nizwa

COLLEGE OF ENGINEERING AND ARCHITECTURE

11th NATIONAL SYMPOSIUM ON ENGINEERING FINAL YEAR PROJECTS

TOWARDS ADVANCED TECHNOLOGY PRACTICE

ONLINE SYMPOSIUM

Abstracts

Contact us on: Tel: 25446200 , Email : nsefyp@unizwa.edu.om

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College of Engineering & Architecture
University of Nizwa

Vision

To be a premier and innovative College of Engineering & Architecture highly recognized by the industry, accreditation bodies and international institutions.

Mission

To educate students to be problem-solvers with innovative qualities to address current and future challenges, achieve quality applied innovative research and serve the advancement of society and culture of Oman with commitment to sustainable development.

WELCOME ADDRESS

Prof. Dr. Hussein Ali Al Abdulqader

The National Symposium in Engineering Final Year Projects NSEFYP is an annual event organized by the College of Engineering and Architecture at the University of Nizwa. Based on the success of the previous symposiums and achievement of their objectives since 2011, it has been decided to continue working on this engineering event in its 11th version with the support and sponsorship of the distinguished Chancellor of Nizwa University Prof. Dr. Ahmed Ben Khalafan Al Rawahi and here we are gathering online on 10th of May 2022 for the 11th National Symposium in Engineering Final Year Projects (11th NSEFYP). The symposium provides a platform for Students from different engineering disciplines and from various Engineering Colleges and Universities in Oman and outside Oman for the annual meeting and participation in the latest research and innovations in the fields of Engineering and Technology.

The theme of the 11th NSEFYP is “Toward Advanced Technology Practice” to enhance the spirit of innovation among our dear students and its impact on the technological development associated with this industrial and technological revolution. The main objectives of the symposium are to disseminate and share knowledge among the students and academics in the research area of applied sciences, engineering and architecture as well as their potentials for industrial applications. To expose students to research culture, new ideas and academic writing.

Research papers extracted from Engineering Final Year Projects, from various Colleges and Universities will be presented and discussed through 10 online sessions aimed to encourage the active participation and cooperation in the Engineering field and working as a team with a spirit of creativity, innovation and the ability to propose appropriate solutions to the engineering problems.

This year in the 11th NSEFYP-2022, (63) accepted papers out of (66) submitted papers, which indicate the high quality of the submitted papers, students will present their paper online through Google meet platform. Students from 12 different Universities and Colleges in the Sultanate of Oman (Sultan Qaboos University, University of Nizwa,

National University of Science and Technology, University of Technology and Applied Science with its different branches of Nizwa, Ibra, Al Musanah , Sohar and Shinas , also University of Buraimi , Middle East College , Sohar University, Sur University College and from outside Oman, from IRAQ (Mosul University) are gathered in order to exchange and share their experiences, ideas, and research results about all engineering aspects. In addition, students will foster their communication with researchers and practitioners working in a wide variety of engineering areas and to expose research frameworks, methodologies, tools, and applications within different scientific institutes.

All the accepted papers are characterized by high quality, in which the organizers and the reviewers made sure that the accepted research papers are of high quality to match with the level and reputation of this Symposium, and to come up with our students to the required scientific and research levels. I would also like to inform you that selected papers from this Symposium will be published in the Journal of Engineering and Technology, which is published at the University of Technology in Baghdad, Iraq.

I would like to express my sincere gratitude to Prof Dr. Ahmed Bin Khalfan Al Rawahi T.H. Chancellor of the University for his continuous encouragement and support to such an events and to our guest the keynote speaker Dr. Abdulaziz Rashid Al Hashimi from Petrol Development Oman (PDO) for his valuable lecture titled “Demanded Advanced Skills in Industry”. Special thanks to Dr. Wameath Abdul Majeed, Chairman of the Organization Committee and to all members of the Organization Committee and other Supporting Committees for their appreciated hard efforts to complete this important event. Many thanks to all participants and wishing them a fruitful discussion to achieve the objectives of this symposium.

Thank you

Prof. Dr. Hussein Ali Al Abdulqader
Symposium Chairman / Dean
College of Engineering and Architecture

KEYNOTE SPEAKER PROFESSIONAL INFORMATION

Full Name	Dr. Abdulaziz Rashid Al Hashimi
Position Title	Reservoir Engineer
Organization	Petroleum Development Oman
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Lecture Tittle	Highly Demanded Advanced Skills in Industry

Lecture Summary

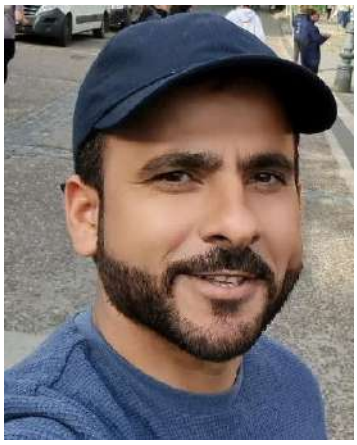
High school students are under the pressing burden to choose their specialization upon college admission. They usually select the specialization with high employment probabilities. This choice comes at most times with the expense on their personal preferences and inclination. However, employment market is evolving and changing at fast paces, therefore, employee demand for different disciplines and specialization is changing in less than 4-5 years students spend in undergraduate studies.

Academic institutions take the burden to equip their graduates with the skills needed by government, business, industry, and other employing bodies. However, this has been a challenging task due to the highly changing employment ecosystem around the world and the exponential improvement of communication.

Knowledge is now highly available and the answer to any question is now available with a simple web search. Also, social platforms with different focus and content has allowed the exchange of information and experience to be handy at any moment. One question one can post in a given platform and answers will be provided and assessed. Hence, academia might rightly respond by shifting towards empowering students and graduates with higher proportions of relevant advance skills required by employers.

New skills such as mastering artificial intelligence (AI), digitalization and automation are highly demanded with the availability of rich asset of information and data. This lecture will take this topic and try to shed some light on what students should seek as skills during their studies and to have better job opportunities and successful careers.

Keynote Speaker Short Bio-Data



Dr. Abdulaziz Rashid Al Hashimi
Reservoir Engineer
Petroleum Development Oman

I have a BSE in petroleum engineering (SQU, 1999), MEng in Chemical Engineering (University of Tulsa, Oklahoma, USA, 2002) and PhD in chemical engineering (Imperial College London, UK, 2008).

I taught different courses in during my employment in SQU such as chemistry for petroleum engineering, petroleum refining, colloids and interface science, heat transfer and thermodynamics. I served as a chair of department curriculum and accreditation committee (2014-2018), with the outcome of renewal of ABET accreditation of the two programs in the department by 2019. Also, I served and chaired the department industrial training committee (2010-2015). I also worked in research projects with a total fund of around 6 million USD. The main area of research was chemical enhanced oil recovery with funding from Petroleum Development Oman (PDO) and SNF (France). The outcome of these research projects has been published in 40 peer reviewed journal papers, 24 conference papers, and one patent.

I was awarded “SQU Diligent Researcher Award” in May 2016. Also, I got promoted to Associate Professor in 2014. After 20 years in SQU, I got employed in petroleum engineering by PDO since 2019.

PAPERS PRESENTED IN
11TH NATIONAL SYMPOSIUM ON ENGINEERING FINAL YEAR PROJECTS

Topics of Interest	Papers
Architecture and Interior Design	ARCH S1-01 to ARCH S1-05 ARCH S2-01 to ARCH S2-05
Chemical and Petrochemical Engineering	CHEM S1-01 to CHEM S1-09 CHEM S2-01 to CHEM S2-08
Civil and Environmental Engineering	CIVIL S1-01 to CIVIL S1-08 CIVIL S2-01 to CIVIL S2-04
Electrical and Computer Engineering	ELEC S1-01 to ELEC S1-07 ELEC S2-01 to ELEC S2-07 ELEC S3-01 to ELEC S3-04
Mechanical Engineering	MECH S1-01 to MECH S1-06

Sl No	Code	Title of the Paper
1	ARCH S1-01	Marine Life Exhibition Maather Khalid Al Jabri, Dr. Ayman Khalil, Dr. Mohamed Abdelhady
2	ARCH S1-02	STEM Center for the Development of Children's Talents in Muscat Khulood Said AL Amri, Dr. Mohamed Abdelhady
3	ARCH S1-03	Quriyat ITC Project On the coast of Quriyat near the port of Quriyat in the Governorate of Muscat Sumaya Salim Sulaiman al Rawahi, Dr. Mohammed Faisal Al Kazee
4	ARCH S1-04	"Commercial mixed-use building" - Commercial & Administrative mixed-use building in al-Qurum Marwa Abdullah AL-Butrani, Dr. Mohammed Faisal Al Kazee
5	ARCH S1-05	Sustainable neighbourhood design project - Muscat, Oman Sawsan Domi, AlBayan AlShukaili
6	ARCH S2-01	The Diamond of Sunrise - A Beachside Resort Project at Ras Al Had Bushra Badar AL-kalbani, Mr. Samir Al Qeisi
7	ARCH S2-02	Blue Ocean Paradise - A Touristic Resort at Ras Al-Shajar Safa Ali Al-Maqaimi, Mr. Samir Al-Qeisi
8	ARCH S2-03	"Commerce, leisure. and culture" a mixed-use center on Mazoon street Safa Hamood Al-Toubi, Mr. Samir Al Qeisi
9	ARCH S2-04	"La Mosquée Transparent" - Marseille Islamic Cultural Centre Safa Nasser Ali Alazwani, Mr. Samir Al-Qeisi
10	ARCH S2-05	Al Mehwar Consultancies office Khulood Said Al-hadrami, Dr. Luai Al jubori
11	CHEM S1-01	Flow velocity simulation of diffuser augmented wind turbine Salim Abdullah Muftah Al Haddadi, Othman Abdullah Khalifah Al Maimani, Ayoub Murad Hassan Al Balushi, Marwan Huwayshel Sulaiyem AlJassasi, Saad A. Mutahser Al Jaberi

Sl No	Code	Title of the Paper
12	CHEM S1-02	Effect of metals doped TIO2 composite on degradation of methylene blue Asila Abdulaziz Al.Shukri, Fatema Abdullah Al.Yaaqubi Salam K. Al-Dawery
13	CHEM S1-03	Methane pyrolysis and steam reforming for hydrogen production using cold fly jet plasma Ibrahim Mohammed Juma AL-ghafri, Musab Juma Nasib AL-marzoqi
14	CHEM S1-04	Clean energy from plastic: production of pyrolysis oil from plastic waste Anafal Al Araimi, Pradeep Kumar Krishnan
15	CHEM S1-05	Intensification of the gases produced from H2O-CO2 plasmolysis Muna Musabah ALmamari, Moza Salim Alhasani Dr. Wameath Abdul.Majeed, Dr. Hazim Fhdhil Abbas
16	CHEM S1-06	Petroleum refinery waste water treatment using silica nanoparticles Amna Wahab Yahya Abdullah Al Rasbil, M. Geetha Devi
17	CHEM S1-07	Development of natural degradable nanocapsules for the delivery of antibacterial drug Sara Abdullah Al Shukaili, Rahma Salim Al hashmi, Riham Fairuz Yousuf Fairuz, Geetha Devi
18	CHEM S1-08	Calcium carbonate nanoparticle mediated treatment of grey water Hajer Ahmed Ali Al-Lezamil, Geetha Devi, Khadija Salim Abdullah Al Balushi
19	CHEM S1-09	Refinery waste water treatment using biochar derived from municipal solid waste Ilham Shabir Khatry, Faisal Al-Qartoubi, Abdulrahman Al-Jadidi, Geetha Devi
20	CHEM S2-01	Corrosion inhibition studies of mild steel pipe using nano thin films Hebatallah AL Jabri, Geetha Devi
21	CHEM S2-02	Columns studies on sorption of organic compounds from industrial wastewater using green algae ulva lactuca Naama Al Hashemi, Nabila Al Rashdi

Sl No	Code	Title of the Paper
22	CHEM S2-03	Troubleshooting of the gas sweetening unit by reducing foaming in absorber Khalid Juma Hamood A- Kharusi, Geetha Devi
23	CHEM S2-04	Production of biodegradable plastic film from waste banana (musa) peels Amna Saud Alharrasi, Varghese Manappallil Joy
24	CHEM S2-05	Treatment of oil produced water from oil wells using innovative agro residue-based technology Wadha Said Al-muqbali, Maather Mahfud Al-saadi, Dr. Rajamohan Natarajan
25	CHEM S2-06	Biological treatment of waste water and study the potentiality of biogas production Noor Al-Shukail, Noura Al Balushi, Shabib Al Rashdi
26	CHEM S2-07	Isolation and characterization of cellulose nanofiber obtained from agriculture waste Aasma Abdul Qadeer, Shabib Al Rashdi, Noura Al Balushi
27	CHEM S2-08	Isolation and characterization of hemicellulose a and b from date palm empty fruit bunch by potassium hydroxide extraction Namariq Ally, Shabib Al Rashdi, Noura Al Balushi
28	CIVIL S1-01	Study efficiency of using GGBS materials as replacement of cement in the concrete Adbulaziz Fahad Bari Alnaimi and Hussin Yahia
29	CIVIL S1-02	Manufacturing hempcrete blocks as a sustainable alternative to concrete Zeyad Abduljalil Al Balushi, Zeinab Abayazid Zain and Hussin Yahia
30	CIVIL S1-03	Correlation between stabilized soil properties and stabilizer content Noor Abri, Rihab Al Yahmadi and Subhi Ali
31	CIVIL S1-04	Treatment of the Sea Water Mixed Concrete with Palm Leaves Ash Ahmad Salah Nassef, Manar Alfarsi, Shouq Alwahibi, Shouq Aljabri and Aisha Al-Masaoudi
32	CIVIL S1-05	Simulation Study on Flexural Behavior of High-Performance Reinforcement Concrete Beam Under Static Loading Omar Abdelaziz Salam, Qadir Bux alias Imran Latif

Sl No	Code	Title of the Paper
33	CIVIL S1-06	Using Medical Waste for Improving Concrete Performance Ahmad Salah Nassef, Asila Al Naqbi, Balaqis Sheibani, Lamyaa Maqbali, Buthaina Al Badi
34	CIVIL S1-07	Characterization and Stabilization of Al-Khod expansive soil Al-Hasnaa Al-Adwani
35	CIVIL S1-08	Developing the public transportation system at Muscat International Airport Sulaiman Salim Al-Wahaibi, Yusra Naser Abdelhalim and Hussin Yahia
36	CIVIL S2-01	Treatment of domestic wastewater by using azolla plants Balaqis Al-Abri, Noura Al Balushi and Shabib Al Rashdi
37	CIVIL S2-02	Disinfecting Aflaj Water Using Advanced Solar Oxidation Process Saada saif nasser al maqimi and Sreddhar Reddy
38	CIVIL S2-03	Biogas production potential from palm waste in Sultanate of Oman Manar Al-Jassasi, Shabib Alrashdi and Noura Albalushi
39	CIVIL S2-04	Assessment of COVID 19s impact on construction SEMs growth in Sultanate of Oman Wesal Khalifa Ali Al-Khanbashi, Hussin Yahia
40	ELEC S1-01	Toward Meeting the Electric Needs of Oman in 2025 Osama A. Marzouk Ahmed A. Arman Marwan M. Al Saadi Ahmed S. Al-Maqbali Sulaiman S. Al Sharji
41	ELEC S1-02	Piezoelectric sensor in energy harvesting technology Mohammed Ghusn Yahya Al Hinaey , Mohamed Yousuf.S
42	ELEC S1-03	Experimental investigation of the performance of a solar still with rotating cylinder Ibrahim Abdallah Hilal Sulaiman Al-Kharusi*, Issa Khalifa Darwish Masoud Al Fajarani, Khalaf Salim Abdullah Said Al Jarradi, Mohan Chandrasekharan Chandra
43	ELEC S1-04	Smart Solar Power Station for Isolated Houses in Oman Badar Nasser Sulaiman Al-Habsi and Vineeth V V

Sl No	Code	Title of the Paper
44	ELEC S1-05	Techno economic feasibility analysis of a solar photovoltaic powered air conditioning system Manal Khamis Al Shibli , Afrah Khamis Al Aisaee, Asila Nasser Al Shibli, Mr.Arun S Gopinath
45	ELEC S1-06	Design and implementation of a hybrid system Maryam M. Habash, Yousef A. Mahdi, Ayman I. Ahmed, Fawaz Y. Abdullah, Mohammad T. Yaseen
46	ELEC S1-07	Simulation of protection functions for industrial induction motors Mohammed H. Al-Nasseri, Mohammed S. Al-Majarfi, Ibrahim N. Al-Sinani, Dr. Razzaqul Ahshan and Dr. Abdelsalam Elhaffar
47	ELEC S2-01	IoT based multipurpose remote health survillance system Ruwaida Mohammed Saeed AlKindi, Yumna Nasser Sulaiman AlJahwari, Sindhu S Nair, Mohammed Jubair Meera Hussain, Mayasa Said Suliman AlKindi
48	ELEC S2-02	Design and development of smart irrigation system for improved water energy efficiency Mansoor Hamed Wani Shamis Al-Jadili, Markandan Rengasamy Muthusamy, Chethan Godlumane Ramesh, Nabhan Mubarak Saleem Saif AL- Saadi, Salim Obaid Salim Al Talaii, Abdullah Said Rashid AL- Ruzeiqi
49	ELEC S2-03	A Smart Elevator Control System Yasmine Salim Al-Housniya, Ibtisam Yaqoob Al Kharusi, Dr. Ali A. Titinchi
50	ELEC S2-04	Comparison of different Median Filters in removal of high density noise Amira Alriyami, Samiya Al Busaidi, Mithaa Al Nasseri
51	ELEC S2-05	Disease detection system based on human eye images Saif S. Mahmood, Mohammed M. Qasim, Fawaz Y. Abdullah, and Mohammed T. Yaseen
52	ELEC S2-06	Web and Arduino based exclusive COVID-19 patient monitoring and tracking Nashua Mohammed Abdallah Karshub Zahra Salim Mohammed Said Al Hajri Mujeebudheen Khan

Sl No	Code	Title of the Paper
53	ELEC S2-07	Numerical and experimental assessment of integrated antennas with photovoltaic solar cells Ahmed Al-Alawi, Said Al-Gheilani, Ahmed Al-Zeidi and Mohammed M. Bait-Suwailam
54	ELEC S3-01	Toward smart cities in oman: smart bus station over iot technology Taif Al-azizi – Sura Al-yarubi – Hala Al-sulaimi – Bushra Al-hadrami – Dr. Wisam Al-Azzo
55	ELEC S3-02	Smart Glasses System for Car Drivers Safety Abdulaziz S. Abdulhamid, Nori R. Nori, Fawaz Y. Abdullah, Mohammad T. Yaseen
56	ELEC S3-03	Health monitoring system using IoT Venkat Garagaparthi, Lakshmi Garagaparthi, Atef Abusalim
57	ELEC S3-04	Raspberry Pi Based Image Analysis Technique to Determine the Ripeness and Grading of Tomatoes Rajwa Yousuf AL-rashdi Jamaludeen
58	MECH S1-01	Experimentation and Numerical study of Formability in Deep Drawing Process Fakrudeen Ali Ahamed Jainulabdeen, Mohammed Rashid Said Al-Azwani, Husam Sulaim Khamis Al Suleimani, Amin Gharib Rabi'A Al Siyabi, Tariq Issa Sulaiman Al-Abri, Idris Ibrahim Khalfan Thalith Al Shukaili and Amjad Abdullah Mohammed Al-Suleimani
59	MECH S1-02	CFD analysis on centrifugal pump for the investigation of variations in discharge and efficiency with respect to the inlet and outlet pressures using two fluids Nasser Said Nasser Albakri, Hussian Abdullah Ahmed Albalushi, Hamed Salim Hamed Almaawali and Anand Narayanan Nair
60	MECH S1-03	Converting waste heat of vehicles exhaust gases into a useful source of energy O. Alsalmi, E. Alsubhi, A. Alhadhrami, A. Al-Janabi

Sl No	Code	Title of the Paper
61	MECH S1-04	Investigation on the effect of aspect ratio on flexural behavior of aluminum sandwich composite Ganesh Radhakrishnan, Al-Haitham Mohammed Sulaiman Al-Hattali, Al Muntaser Nasser Al-Yahyai, Al-Muntaser Nasser Omar Al-Riyami and Al-Muatasim Dawood Al-Hadhrami
62	MECH S1-05	Comparative studies on corrosion behavior of low carbon steel and galvanized steel in various conditions Iftikhar Al Saadi
63	MECH S1-06	Experimental study on influence of stress concentration in the flexural stability of aluminum hollow tube Ganesh Radhakrishnan, Sami Sulaiman Al Khusaibi, Amjad Juma Al Subaihi, Alazhar Zahir Al Ismaili and Alsalt Malik Almaani

MARINE LIFE EXHIBITION

*** Student Name: Maather Khalid Al Jabri and supervisor,**
Supervisor Name: Dr. Ayman Khalil and Dr. Mohamed Abdelhady
***email: srmmrs2003@yandex.ru, maather.eng@gmail.com, and aymangadir@suc.edu.om**

DESIGN BRIEF:

Marine life exhibition is a tourist and entertainment project **Figure 1.** The project is located in Khasab city in the Musandam Governorate, Oman as shown in **Figure 2** life, its purpose is to attract tourists, economic development, and urban renewal. The idea of the project is to create an entertainment project that provides education and entertainment at the same time. Since the world has become interested in fish and marine life in general, it was necessary to keep pace with the development in this field. The project includes marine exhibitions, an aquarium, a marine animal care department, research laboratories, in addition to outdoor recreational spaces. These papers deal with some information about the aquarium exhibition project. The result obtained from the study of the project is the creation of a unique marine life exhibition in Oman, there is no similar building in the modern concept of this project.

Figure 1. Marine life exhibition.

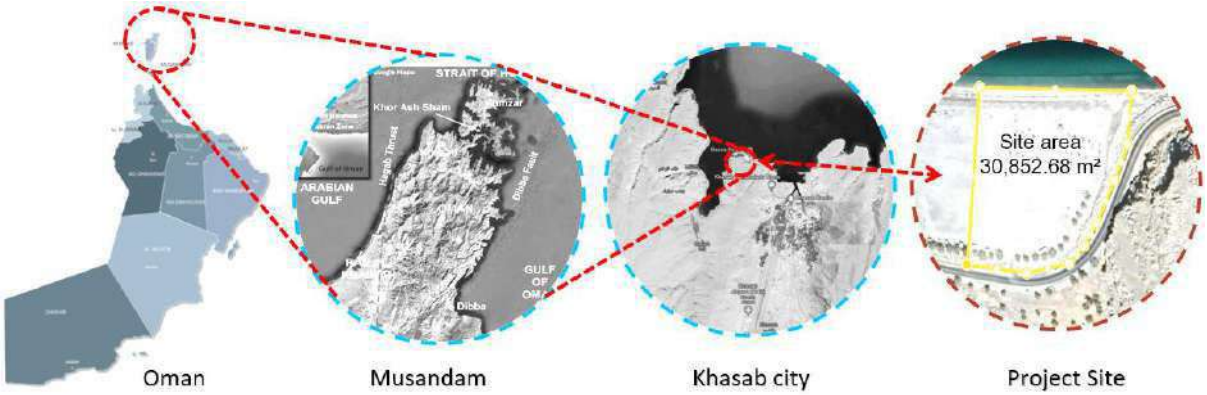


Figure 2. Project location.

Keyword. Exhibitions, Aquarium, Marine, Entertainment.

STEM Center for the Development of Children's Talents in Muscat

Khulood Said AL Amri and supervisor Dr. Mohamed Abdelhady
akalamri127@gmail.com, srmmrs2003@yandex.ru,
Email: akalamri127@gmail.com

DESIGN BRIFE:

STEM Center for the Development of Children's Talents: It is a project specialized in developing children's talents in science, technology, innovation, mathematics and engineering. The aim of the project is to develop children's minds and explore and develop their talents in research, experiments, and many useful activities in a way that does not inspire them a spirit of boredom and raise educated generations aware of scientific and technological development.

Figure 1. STEM Center for the Development of Children's Talents.

PROJECT LOCATION:

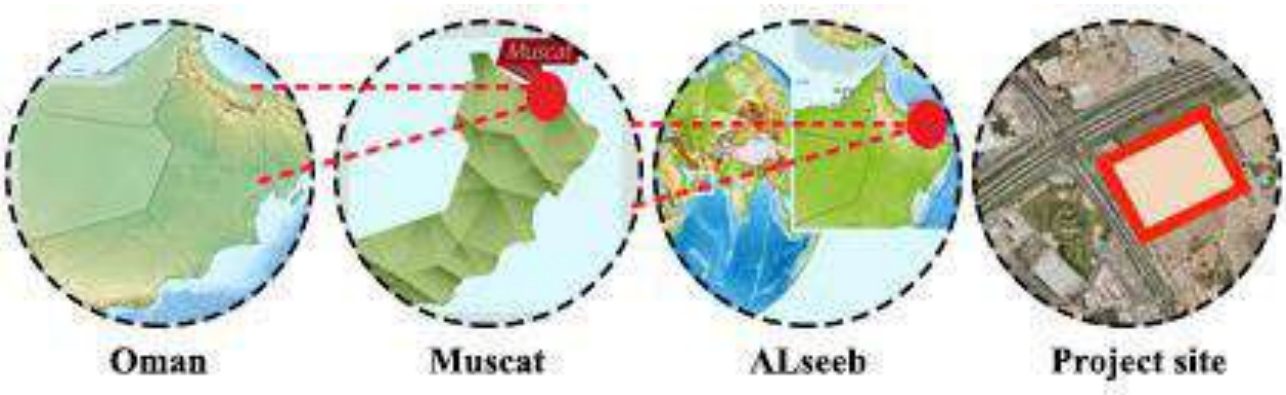


Figure 2. Project location.

Keyword: STEM, Children's, Talents.

Quriyat ITC Project
On the coast of Quriyat near the port of Quriyat in the Governorate of Muscat

Student: SUMAYA SALIM SULAIMAN AL RAWAHI

Supervisor: Dr. Mohammed Faisal Al kazee

University of Nizwa, Department of Architecture and Interior Design, Nizwa, Oman
***email: faisal.kazey@unizwa.edu.om**

DESIGN BRIFE:

The main objective of my project is to present a project that will be an important tourist destination in the Governorate of Muscat. One of the main components of the project will be the hotel and chalets. To increase the efficiency of the project, we need factors that attract tourists such as restaurants, cafes, a golf course and a garden also, two main plazas, dancing fountains and a walkway.

The Project Component:

- Main Activities

1. the accommodation use:
    - Hotel
    - Chalets
2. the leisure activity
    - Coffee shops
    - Restaurant

- Sub activates
    1. Administration
    2. open space and land scape
        - Golf area
        - Plaza
        - Garden
        - Play ground
        - Out swimming pool

"COMMERCIAL MIXED-USE BUILDING"

COMMERCIAL & ADMINISTRATIVE MIXED-USE BUILDING IN AL-QURUM

Student: Marwa Abdullah AL-Butrani
Supervisor: Dr. Mohammed Faisal AL-Kazey
University of Nizwa, Department of Architecture and Interior Design, Nizwa, Oman
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DESIGN BRIFE:

The project is a mixed-use building, which is a commercial, administrative, recreational and service project. It serves all segments of society. The project consists of two main parts:

1. commercial part

It is an integrated shopping center. It contains many diverse activities that provide the visitor with an integrated shopping and entertainment experience. Among the most important sections are:

- Hypermarket
- Retails
- Exhibitions

2. Administrative Part:

The other section of the project is that it contains various companies and exhibitions in addition to restaurants serving each floor. As it is considered one of the investment projects, it contains:

- Diverse companies
- Gallery
- Convention Hall
- Meetings Hall

There are other sections such as:

3. Entertainment Part:

This section is a complement to the project to take some rest and enjoyment through it. It includes:

- Cinema
- bowling
- Playing area
- Restaurants
- cafes

4. Services Part:

This section contains the stores in addition to the rooms belonging to the maintenance work.

SUSTAINABLE NEIGHBOURHOOD DESIGN PROJECT MUSCAT, OMAN

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Department of Civil and Architectural Engineering, College of Engineering,
University of Buraimi, P O Box 890, P C 512, Buraimi, Oman

DESIGN BRIFE:

The project is a Design of a sustainable neighborhood near Muscat, Sultanate of Oman. This design project aims to achieve the sustainable design of residential neighborhoods in hot climates. This neighborhood is including both multi-story apartment complexes and different sizes of single-family units. The design of this project is focusing more on "green" and sustainable ideas. Sustainable housing can be achieved by applying many concepts such as building orientation, shading devices, and high mass materials for construction. In addition, Many sustainable solutions used in this design included energy, water, and mobility. The design focused on integrating passive design solutions in buildings like passive cooling to minimize energy consumption. Roads are designed to accommodate bicycles and walkways. Utilizing solar energy to generate domestic hot water, and Utilizing storm water for landscaping. In addition, urban green spaces and solid waste management have been added to this design project.

Keyword. Neighborhood; Hot Climate; Residential Unit; Passive Design

The Diamond of Sunrise
A Beachside Resort Project at Ras Al Had

Student: Bushra Badar AL-kalbani

Supervisor: Mr. Samir Al Qeisi

University of Nizwa, Department of Architecture and Interior Design, Nizwa, Oman
***email: samir.alqeisi@unizwa.edu.om**

DESIGN BRIFE:

The main aime for my project is to provide a project that will be a landmark for Sultanate of Oman. One important component's will be high rise hotel and to be more effective and more relation with site also we will add chalets to the project and attract different type of users.

To increase the efficiency of the project, we need factors that attract tourists, such as adding entertainment activities (restaurant & cafes), health and athletic activities (spa, yoga hall & outdoor swimming pool), and cultural activities(galleries).

The Project Component :

- Main Activities
    1. Residential activities.
    2. Entertaining activities.
    3. Healthy and athletic activities.
    4. Commercial activities.
    5. Cultural activities.
- Sub activites
    1. Administrative activities.
    2. Serving activities.

Blue Ocean Paradise
A Touristic Resort at Ras Al-Shajar

Student: Safa Ali Al-Maqaimi

Supervisor: Mr. Samir Al-Qeisi

University of Nizwa, Department of Architecture and Interior Design, Nizwa, Oman
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DESIGN BRIFE:

The project is a touristic resort in a coastal area, which is provides hospitality, relaxation, leisure and entertainment experience. It serves the groups and individuals.

The project consists of :

- five main activities

These are the basic components of the project, which include the hospitality and entertainment activities for the guests, and also the main and essential part of the resort project.

1. Hospitality
2. Leisure
3. Health
4. Sport
5. Commercial

- Sub activities

These are the supporting components of the main components and consist of administrative and operational functions .

1. Administration
2. Services

"COMMERCE, LEISURE. AND CULTURE"
A MIXED-USE CENTER ON MAZOON STREET

Student: SAFA HAMOOD AL-TOUBI

***Supervisor: Mr. Samir Al Qeisi**

University of Nizwa, Department of Architecture and Interior Design, Nizwa, Oman
***email: samir.alqisi@unizwa.edu.om**

DESIGN BRIFE

The project is a "functional" mixed-use building, the main objective of which is to achieve commercial success for the building and its neighborhoods. It consists of 4 main activities: administration and office activities, commercial and retail activities, recreational and social and cultural activities. Serves all age groups.

The project consists of 4 main activities:

1_ Commercial and retail activities: It is one of the most important pillars of the project that achieves the main objective of the project, as it contains both:

- **Gift markets**
- **Large Commercial**
- **Medium Commercial**
- **Small Commercial**

2_ Administrative and office activities: It is the second pillar of the commercial success of the project, where investors can invest in these office activities, including:

- **Company (A)**
- **Company (B)**
- **Medium Offices**
- **Small Offices**

3_ Recreational activities: They are additions that increase the achievement of the goal of the project as well, and they are among the factors that attract people to this center in order to take a break and enjoy as well. Leisure activities are:

- **Cinema**
- **Video Games**
- **Café**
- **Restaurants**
- **Gym**
- **Snack bar**

"La Mosquée Transparent"

Marseille Islamic Cultural Centre

Student: Safa Nasser Ali Alazwani

***Supervisor: Mr. Samir Al Qeisi**

University of Nizwa, Department of Architecture and Interior Design, Nizwa, Oman

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DESIGN BRIFE:

The design will focus on three main elements:

The project is the Islamic Cultural Centre in Marseille This city is famous for the largest number of French Muslims with many immigrants. Marseille Islamic Cultural Centre, which is a cultural centre that promotes religious education and awareness in society.

The project consists of three main sections:

1. Religious department.

It is the main centre in the building and contains prayer halls for men and women.

2. Cultural department.

This section completes the first section with its definition of Islamic culture, as it contains:

- Quranic School
- Exhibitions
- Library
- Auditorium
- Multi-Purpose Hall

3. Entertaining department.

This section is an extension of the project to take a break and

enjoy it. It includes:

- Shops
- coffee shops

Al MEHWAR CONSULTANCIES OFFICE

Student: Khulood Said Al-hadrami

Supervisor: Luai Aljubori

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DESIGN BRIFE:

Engineering Consultancy is an independent local engineering consulting firm which specializes exclusively in Civil Engineering Drawings, Construction Supervisions, Quantity Surveying, Subdivision of Plots, Perspective and Models, exterior and interior design.The project is Engineering consultation office that works on (architectural, interior, decor, gardens). Engineering consultants provide clients with technical solutions and engineering advice. These highly skilled consultants meet with clients to discuss their technical needs, then project-manage the implementation of technical solutions in accordance with industry regulations. It's serving Popole, companies, employs who prepare to build house, restaurants, hotels, clinics, spas, etc. The office looks to create a new architecture for a happy life. The aim of this project is to create a contemporary creative space with a minimum of distracting elements, so that designers and architects could focus on their projects as much as possible, however using green spaces to feel fresh and comfortable.

The project consist of:

1. Public areas:

- Reception and waiting area.
- WC

2. Private areas:

    - Offices
    - Meeting rooms
    - Manger room

3. Semi public:

    - Studio
    - Pantry

Keyword. Buliding for engineers, design and implement, Architecture .

Flow Velocity Simulation of Diffuser Augmented Wind Turbine

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Abstract. Wind energy technologies have become one of the fastest growing energy sources in the world and it symbolizes a feasible alternative, as it is a virtually endless resource. The wind power generation is proportional to the wind speed by cube; therefore, a large power output increase is attained, if it is possible to give even a slight increase in the velocity of the approaching wind to a wind turbine. The approach to increase the wind speed at the location of wind turbine is shrouded it by a diffuser with different configurations. in this project diffuser type with a brim was used to accelerating the wind at the turbine location. SolidWorks flow simulation was used to optimize the geometric dimensions of the selected diffuser. The results show that increase in wind speed of 2.6 times as much as the approaching wind speed

Keyword. Wind energy; diffuser; SolidWorks flow analysis; Wind Power augmentation

Effect of metals doped TiO2 composite on degradation of methylene blue

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Abstract. A catalyst composed of titanium dioxide and metals with presence of UV light and normal light is used for the degradation of methylene blue. In this project, Fe+3 and Co+2 are doped with TiO2 were prepared using Sol Gel method and wet impregnation methods. The results showed that the degradations of methylene blue using different prepared catalysts were: 80% using pure TiO2 with UV irradiation; 60% and 70% using sol-gel 1g Fe doped TiO2 with UV and normal lights respectively; 90% and 50% using sol-gel 2g Fe doped TiO2 with UV and normal lights respectively. For the case of prepared catalyst by mixing metal-TiO2, the degradations of methyl blue were 50% and 35% using Fe-TiO2 with UV and normal lights respectively; 50% using Co-TiO2 with both UV and normal lights.

Keyword. Methylene blue; photo oxidation; metals doped TiO2

METHANE PYROLYSIS AND STEAM REFORMING FOR HYDROGEN PRODUCTION USING COLD FLY JET PLASMA.

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ABSTRACT

Nowadays, there is many gases effecting to the environment specially on the atmosphere like global warming, and of these gases is Methane, because it is a toxic gas and does not serve the economy sector. In this research, methane has converted to the Hydrogen which has its usage in the industrial sector in short time, high quality of hydrogen production and environmentally safe. Conversation has done by inters Methane into the reactor and shoot it by friendly non-thermal plasma which generated by using power supply in different magnitude and using argon as plasma generated gas in different flow rate. Therefore, 13 experiments have been conducted for the methane and other 13 experiments for steam reforming methane using different conditions. After doing the experiment at 3.5 volt and 6 l/min the concentration of hydrogen was 4264ppm, this condition was the highest concentration of hydrogen obtained, also for the steam reforming of methane using 3.5volt and 6 l/min the concentration of hydrogen was 6524ppm means the steam reforming of methane increase the concentration of hydrogen. In addition, another minor gases were produced such as, CO2 & C2H6, and the highest concentration of C2H6 was obtained at 2.5 volt and 6L/min of argon gas.

KEYWORD. Abstract; Introduction; Conclusion; Data Analysis; etc.,

CLEAN ENERGY FROM PLASTIC: PRODUCTION OF PYROLYSIS OIL FROM PLASTIC WASTE

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Abstract. Plastic materials' applications are expanding on a daily basis due to their unique properties, which enable them to replace other materials in their applications while still meeting customer needs thanks to advanced technology. In the Sultanate of Oman, 20.9% of solid wastes are plastics. As a result, more plastic is produced, which leads to an increase in plastic waste. Since it is produced from an unsustainable crude oil source using a high-energy consuming method, plastic waste contributes significantly to the soil, water, and even air pollution. As a result, they are non-biodegradable, resulting in high greenhouse gas emissions, a plastic waste crisis, and the non-renewable fossil fuel petroleum being depleted. One of the methods for handling plastic waste that has been developed is the energy recovery process. Since petroleum was the primary source of plastic, converting it to liquid oil through the pyrolysis process had tremendous potential, as the resulting oil had a high calorific value comparable to commercial fuel. Pyrolysis of plastics is a chemical reaction that includes breaking down larger molecules into small molecules by using heat. As a result, the aim of this study is to catalytically pyrolyze most commonly plastic waste (PET, HDPE) into a liquid oil using a spent FCC catalyst. This will contribute to the plastic waste management program while also providing a renewable energy source that can be used in boilers combustion and engines fueling, reducing plastic waste. Pyrolysis has been found to be an excellent solution for transforming Petro-plastics into different functional products, with liquid oil production reaching up to 80%, according to previous studies. This study conducted Pyrolysis of PET and HDPE plastic waste the poly fuel produced was analyzed by Gas Chromatography (GC) instrument and compared with commercial diesel properties.

Keyword. Pollution, Plastic waste, Pyrolysis, Liquid oil, poly fuel, FCC Catalyst, PET, HDPE

Intensification of the Gases Produced From H_2O-CO_2 Plasmolysis

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Abstract:

In line with the developments of the world, especially the development in the industrial field and the increase in the number of factories. Exacerbated one of the environmental problems, namely global warming. From this point of view, we conducted this study to take advantage of these harmful gases and convert them into gases of high economic value using cold plasma. In this development study, the size of the reactor was enlarged and the order of gases entering from the holes was changed to get the best results. During the process, the plasma is inserted into two holes. The other hole is filled with a mixture of water vapor and carbon dioxide. On the other hand, argon gas is introduced and the other hole is connected to a gas ratio analysis device. The process is controlled by plasma control and setting power supply (volts), and argon gas flow. We have obtained many readings and results and compared them by drawing a model to find the appropriate conditions for producing the largest amount of hydrogen. the reaction was CO_2 and water vapor in plasma. The best result was 1352 ppm of hydrogen and 5386 ppm of ethylene acetylene in the experiment number 2 when the flow rate was 10 liters/minute and the voltage was 2 volts.

Keyword: plasma; plasmosis; micro GC inficon ; multi flying jet plasma reactor.

PETROLEUM REFINERY WASTE WATER TREATMENT USING SILICA NANOPARTICLES

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Abstract. The main objective of this study was to synthesize silica nanoparticles for the reduction of organics from refinery waste water. The characterizations of the nanoparticles were carried out using Scanning Electron Microscopy (SEM), Energy Dispersive X-ray Analysis (EDX), Fourier Transform Infrared Spectroscopy (FTIR), and X-Ray Diffraction (XRD). The synthesized nanoparticles were employed in the reduction of organics from petroleum refinery effluent by performing a series of batch experimental studies by varying the solution pH, contact time, dosage of nanoparticles and stirring speed. The experimental results demonstrate that the maximum reduction in chemical oxygen demand (COD) was obtained at pH 4.0, stirring speed of 125 rpm, mixing time of 90 minutes and 0.5 g dosage of silica nanoparticles.

Keyword. Chemical oxygen demand; Organics; Silica nanoparticles; Refinery waste water.

DEVELOPMENT OF NATURAL DEGRADABLE NANOCAPSULES FOR THE DELIVERY OF ANTIBACTERIAL DRUG

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Sara Abdullah Al Shukaili, Rahma Salim Al hashmi, Riham Fairuz Yousuf Fairuz and Geetha Devi*

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Abstract.

This research project aimed to develop natural degradable capsules from carboxy methyl cellulose (CMC) and chitosan using dip coating method by depositing oppositely charged biopolymers on colloidal particles followed by elimination of the template. A model antibacterial drug, ciprofloxacin hydrochloride was encapsulated into these hollow capsules and the release study was performed at different environmental conditions by changing the permeability of the capsule wall. The characterization techniques employed are UV-Vis spectrophotometer, Dynamic Light Scattering (DLS), Scanning Electron Microscopy (SEM), Fourier Transform Infrared Spectroscopy (FTIR), and X-Ray diffraction. The outcome of the research suggests an easy and effective antibacterial drug delivery system from natural degradable Nano capsules

Keyword. Carboxy methyl cellulose; Chitosan; Ciprofloxacin hydrochloride; Nanotechnology

CALCIUM CARBONATE NANOPARTICLE MEDIATED TREATMENT OF GREY WATER

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Abstract. Nanotechnology is one of the emerging technologies with unique functionalities and great potential in removing pollutants from waste water. The present study focused on the synthesis of calcium carbonate nanoparticles using homogenisation process. The nanoparticles were characterised using Scanning Electron Microscopy (SEM), Fourier Transform Infrared Spectroscopy (FTIR), and X-Ray Diffraction (XRD). The synthesised nanoparticles were employed in the batch treatment of grey water by varying the solution pH, stirring time; stirring speed and dosage of calcium carbonate nanoparticles.The pollutant removal efficiency of the nanoparticles were assessed by measuring the Chemical Oxygen demand (COD), Total Suspended solids (TDS), Total dissolved solids (TDS), Dissolved oxygen (DO) and turbidity. The study shows that the optimum pollutant removal efficiency was obtained at pH 8.0, stirring speed of 100 rpm, mixing time of 75 minutes and 0.7 g dosage of calcium carbonate nanoparticles.

Keyword. Calcium carbonate; Chemical Oxygen demand; Nanoparticles; Nanotechnology.

REFINERY WASTE WATER TREATMENT USING BIOCHAR DERIVED FROM MUNICIPAL SOLID WASTE

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Abstract. This research utilizes municipal solid waste from the landfill and converts them to biochar followed by activation process. The solid waste was pyrolyzed for 2 hours at 550ºC in the absence of oxygen to form biochar. The thermal and chemical activation of the biochar was carried out using potassium hydroxide (KOH) for 48 hours followed by a thermal treatment for 1.5 hours at 600˚C to obtain activated carbon. The activated carbon was used in the batch treatment of refinery effluent was performed by varying the effluent pH, dosage of activated carbon and contact time. The pollutant removal was monitored by measuring Dissolved Oxygen (DO), Total Suspended Solids (TSS), Chemical Oxygen Demand (COD), and Total Dissolved Solids (TDS). Characterization techniques employed where Scanning Electron Microscopy (SEM), and Fourier Transform Infrared Spectroscopy (FTIR). The experimental outcome suggest that solid waste from landfills can be a potential source for the production of activated carbon with little or no harm to environmental, thus reducing greenhouse gases from landfills and combating climate change.

Keyword. Biochar; Chemical Oxygen Demand; Dissolved Oxygen; Landfills.

CORROSION INHIBITION STUDIES OF MILD STEEL PIPE USING NANOTHIN FILMS

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Abstract. Oil and gas pipelines play an important role in distributing the energy resources needed to power communities. Corrosion is a major concern in oil transmission pipeline, and the corrosion issue would be effectively addressed by conventional corrosion control practices. The aim of this project is to apply nanotechnology in the prevention of corrosion in oil pipelines. The mild steel coupon specimen was collected from the PDO (Petroleum Development of Oman) to study the corrosion inhibition in oil pipe lines. The methodology employed for the development Nano coating was dip coating method in which the mild steel specimen was immersed in Poly Vinyl Butyrate – Poly Aniline – TiO_2 (PVB - PANI-TiO_2) solution. The polymerization process was used to synthesize PANI-TiO_2 powder. PVB-PANI-TiO_2 composite was characterized by using Fourier Transform Infra-Red Spectroscopy (FTIR) and X-Ray Detraction (XRD). Scanning Electron Microscopy (SEM) was used to study the surface morphology and the layer formation on the surface of mild steel coupon. Atmosphere test and Wet/Dry test were carried out to investigate the corrosion behaviour of coated mild steel. The study reveals that the Nano coating could increase the lifespan of the specimen and enhanced corrosion resistance of metal coated by PVB-PANI solution with 0.5g of TiO_2.

Keyword. Coating; Corrosion; Nanoparticles; Polyaniline; Titanium dioxide.

Columns studies on sorption of organic compounds from industrial wastewater using green algae Ulva Lactuca

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Abstract. The wastewater from the petroleum industry consists of a variety of pollutants like petroleum hydrocarbons, mercaptans, oil, and other organic compounds. Marine algae are one of the most common adsorbents and biofilters used for treating industrial effluent. This research investigates the ability of Ulva Lactuca for removing organic pollutants by a double-packed bed column. The analyzes of the green algae Ulva Lactuca and its properties were performed using Fourier transform infrared (FTIR) spectroscopy. It was found that % removal of COD at optimum parameters was 92 %. The main obtained results showed that both Ulva Lactuca dosage and column height are directly related to % removal of COD but the flow rate of untreated industrial wastewater is inversely related to % removal of COD. For each parameter, the optimum % removal of COD was found at column height of 48 cm, flow rate of 5 ml/min, and Ulva Lactuca dosages of 3 g.

Keyword. Double Packed bed column, Ulva Lactuca, Adsorption, Industrial wastewater, FTIR.

TROUBLESHOOTING OF THE GAS SWEETENING UNIT BY REDUCING FOAMING IN ABSORBER

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Abstract. In oil and gas industry, gas sweetening is essential process to remove the acidic gases such as H_2S and CO_2.The presence of these gases causes severe corrosion problems to the downstream process lines and equipment's. Primary, secondary, and tertiary amines are commonly utilized as sweetening solvents. This collection intends to provide a general overview of the sweetening process, as well as operating issues and troubleshooting techniques. The process achieves a higher loading capacity compared to single amine solvents, which leads to the design of smaller absorber columns with reduced number of trays. The gas sweetening plant designed to have the feed knock out drum (KOD), where the primary separation of gas, liquids and heavy particles take place. Washed gases passes through the mist mat provided in the upper section of the feed KOD and enters into the Absorber column. The lean Sulfinol-X absorbs the acid gas components; H_2S, CO_2 and other impurities from the feed gas ascending in the column and becomes a rich Sulfinol-X. Foaming is one of the most common and troubling operational issues encountered in gas sweetening unit. It causes direct impact on the capacity due to loss of optimum vapour-liquid contact inside the absorber column. Chemical anti-foam injections have been a typical way to eliminate foaming, frequent dosing of anti-foam can aggravate the condition. This study focuses troubleshooting of the GSU and to propose alternating techniques based on the operational parameters plus mechanism to control foaming. The simulation is performed using Aspen HYSYS V.9 Software to measure the H_2S and CO_2 removal concentrations. The findings and results are discussed for the absorber operating conditions after performing the experiment.

Keyword. Foaming; Gas sweetening Unit; Knock out drum; Sulfinol-X.

Production of Biodegradable Plastic film from Waste Banana (Musa) Peels

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Abstract. With the frequent use of plastic, and environmental concerns, the solution has become is to find an alternative to this plastic, by using a natural material in the production of bioplastic film, where the banana peel will be used. The responsible material for this process is treated, the laboratory production of the biodegradable film by hydrolysis and chemical addition. The viability of the produced materials to decompose was discussed, and discuss the results obtained. Finally, the idea of research is developed based on the results that appeared for the first sample, which is the best of all, whose criteria can be optimized according to the results of design expert software.

Keyword. Bioplastic; Film; Hydrolysis; Plastic; Chemical.

Treatment of Oil Produced water from Oil wells using innovative agro residue-based technology

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Abstract. In this study, a novel nano composite material, was synthesized from Modified Musa Sapientum Biomass and reduced Graphene Oxide using technique. The application of the synthesized nano composite for the treatment of Oil produced water was investigated. Under batch conditions, the effect of process parameters namely initial pH, composite dosage, and initial oil produced water COD, agitation speed and temperature on the percentage COD removal efficiency was studied.
Keywords: Nano composite, wastewater, efficiency

BIOLOGICAL TREATMENT OF WASTE WATER AND STUDY THE POTENTIALITY OF BIOGAS PRODUCTION

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Abstract. Biogas is one of the most sources of renewable and sustainable energy in the world. This study show the wastewater treatment and producing biogas by using sewage sludge and activated Carbone to provide biogas as an effective solutions to minimize the negative effects on the environment. A container filled with wastewater and activated carbon made from coconut shell to treat wastewater and other container was filled with wastewater and sewage sludge to study the possibility of sludge for water treatment and biogasproduction through anaerobic digestion. As a results, treated water with sewage sludge gave better values thanonly treated with activated carbon.

Keyword. Biogas, activated carbon, wastewater, sewage sludge, clean water.

Isolation and Characterization of Cellulose Nanofiber Obtained from Agriculture Waste

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Abstract. In this work, the fibers of date palm (DPFs) were used as a raw material to isolate CNFs with the intention of assessing its potential as reinforcements of composite materials in producing bioplastic. High-purity cellulose nanofibers were isolated from DPFs through an environmentally friendly, treatment process that combined chemical (alkali& bleaching) and mechanical (ball milling). High yield of CNFs were successfully extracted, with 50% CNFs from overall DPFs. SEM results revealed the effects of isolation treatments on fiber morphology and showed long, loose nanofiber bundles with 8–100 nm in diameter. FTIR results showed that noncellulosic components were effectively removed. X-ray diffraction analysis revealed the improved crystallinity of the processed fibers with high crystalline index of 69.78%. TGA results showed an enhanced in thermal properties of the nanofibers. The removal of hemicellulose and lignin increased the crystallinity of the fibers and the extracted CNFs was used in synthesis of bioplastic by using glycerol as plasticizer and corn starch as matrix using casting method. The feasibility study proved that NC production is feasible in Oman and was successfully yielding cellulose nanofibers with potential in advanced applications.

Keyword. Municipal Solid Waste, Agricultural waste, fiber, biomass, cellulose, date palm, nanocellulose, bioplastic.

ISOLATION AND CHARACTERIZATION OF HEMICELLULOSE A AND B FROM DATE PALM EMPTY FRUIT BUNCH BY POTASSIUM HYDROXIDE EXTRACTION

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Abstract. This study was conducted to investigate, characterize, and provide an optimal isolation procedure to obtain high purity and yield of hemicellulose from DPEFB. The DPEFB was grinded, sieved to a size of 200 - 710 µm and dried for 44 hr at 105°C. The extractives in DPEFB were removed in three extraction stages using ethanol-toluene, ethanol-only and water. The average extractive removal values were 8.17 ± 0.10 %, 1.61 ± 0.11% and 5.4 ± 1.1% for respective stages resulting in an overall extractive content of 15.2 ± 1.1 wt.%. The hemicellulose was extracted at 40°C for 4 hr using 3M KOH. The total hemicellulose yield was 36.9 ± 0.4 wt.%, while hemicellulose A (HA) and B (HB) yields were 29.0 ± 0.5% and 7.94 ± 0.08%, respectively. The corresponding empirical formula for HA and HB was C5H9.4O4.1 and C5H9.8O2.9, respectively. The obtained hemicellulose is closest to the empirical formula of xylose and arabinose, which further supports the findings by FTIR.

Keyword. OPEFB. Hemicellulose A (HA) and B (HB), ethanol-toluene, FTIR.

STUDY EFFICIENCY OF USING GGBS MATERIALS AS REPLACEMENT OF CEMENT IN THE CONCRETE

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Abstract. One of the most used materials in building construction is bricks and cement, but the increasing demand for construction, materials used in construction, and waste in construction and their increase led to thinking about developing new building materials. The traditional brick and its production cause several effects on the human being, his health, and the environment, as well as Cement production, is one of the biggest polluters, which in turn account for about half of all industrial carbon dioxide emissions worldwide. Therefore, the tendency was to search for ways to possibly reduce industrial waste harmful to the environment as GGBS and reused as construction material and represent the greatest opportunities for sustainability and greater assurance in the construction and sector for the use of blast furnace slag and fly ash. This study will focus on possibly reducing industrial waste harmful to the environment as GGBS and reused as construction material, to analyze the physical properties of normal concrete mixed with GGBS and to compare the workability & compressive strength of normal concrete and mixed with GGBS, where this study will give an evaluation and clear results of the feasibility of using GGBS in marine facilities in particular.

Keyword: Cement, block, waste and GGBS

MANUFACTURING HEMPCRETE BLOCKS AS A SUSTAINABLE ALTERNATIVE TO CONCRETE

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Abstract. Hempcrete is a construction material that is made using a combination of hemp hurds (fibers), lime and water. Hemp is an agricultural crop that is known as one of the world's first crops that has been used in different applications regarding construction. Hemp, when mixed a lime binder, is known to have many better properties compared to the traditional concrete. These properties include: High durability, lightweight, energy efficiency, good thermal insulation and acoustic insulation, resistance to fire and water as well as pests. However, the most notable property is that it is carbon negative and it last's hundreds of years in which the traditional concrete is the opposite of that and has a huge impact on the environment. With the dangerous increase in the emissions of carbon and other harmful gasses, it is very important and serious that the world needs to consider building technologies that are carbon negative and only in the last decade that people started to look into sustainable building construction which is putting pressure on improving the construction methods which eventually leads to the pursuit of new building materials and hempcrete is the solution to that because it is considered as a renewable resource. The aim of this study is to figure out the potential of using sustainable alternatives to traditional concrete and how it can affect the world positively and to introduce and recommend hempcrete as a sustainable building material in the construction market of Oman and introduce hemp as a renewable energy resource.

Keyword: Hemp; Concrete; Carbon Negative; Sustainability and Hempcrete

CORRELATION BETWEEN STABILIZED SOIL PROPERTIES AND STABILIZER CONTENT

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Abstract. Soil reinforcement is a technique used to improve the physical and mechanical properties of soil. The result of the cohesive and cohesionless soil using different type of reinforcement such as jute, coconut, leaf, bamboo fiber are taken from different studies. The effects of reinforcing different soils with different material on the strength and compaction characteristics of soil are considered. These effects are analyzed using statistical methods to determine some relationships reflecting the effects of the reinforcement content on the strength and compaction characteristics of the specified soils. Proper relationships are obtained for the geotechnical engineering uses.

KEY WORDS: Reinforcement, Compaction, , Moisture content, Dry unit weight.

TREATMENT OF THE SEA WATER MIXED CONCRETE WITH PALM LEAVES ASH

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Abstract. This project studied the partial replacement of cement content in the concrete by the palm ash in the presence of seawater as a full replacement of pure water in mixing of the concrete. The slump test was carried out for the fresh concrete and the concrete strength was tested after 7 and 28 days. 5% of the cement replacement with palm leaves ash in conjunction with full replacement of pure water with sea water achieved an 84.188% increase in the ultimate compressive strength after 28 days more than that gained by the normal concrete with the mixing sea water.

Keyword. Sea water; Palm ash; compressive strength; Workability; Partial replacement.

Simulation Study on Flexural Behavior of High-Performance Reinforcement Concrete beam Under Static Loading

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ABSTRACT

Portland cement, which is capable of binding all of these together in water, played a crucial role in the development of modern concrete during the 19th century.A new element was added recently to the developed concrete in order to create a concrete that meets endurance requirements, the maximum load to work on projects and large buildings and to keep pace with developments in this modern era. A study of the validity of the model (datum/reference study) was presented in this work, looks excellent agreement with the validation paper. Furthermore, the study discussed the distribution of cracks under tension and compression for NC. Additionally, NC models were compared with the experimental reference and their similarities were explained in detail. This comparison was further tested against similar the two materials in the literature. This study concluded that models can reliably predict concrete beam behavior since local responses were captured by reinforcement bars and the obtained response corresponded to what was observed experimentally. In conclusion, comparison of crack patterns in NC beams is presented and discussed.

Keywords: Normal Concrete(NC) , Flexural, Load-Deflection, and Moment-curvature.

Using Medical Waste for Improving Concrete Performance

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Abstract. Both of Bottom Ash (BA) and Fly Ash (FA) are the main outputs of the treatment of the medical wastes by incineration process. This project studies the effects of the partial replacement of the Ordinary Portland Cement (OPC) content in the concrete with the bottom and fly ash of the medical wastes. Either Fly Ash or Bottom Ash is used to replace the cement content at certain percentages. Both of the compressive strength and the workability are tested at 2.5%, 5% and 7.5% of the replacement. The 7.5% replacement of the cement with fly ash gives best compression strength.

Keyword. Treated Medical Waste; Fly Ash; Bottom Ash; Compressive strength; Workability.

Characterization and Stabilization of Al-Khod Expansive Soil Using Cement and Marble Powder

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Abstract. Expansive soil causes damage to the structures built on it. This is because of its volumetric changes where its volume increases when its water content increases and the volume decreases when its water content decreases. This research identifies the engineering properties of expansive soil brought from Al-Khod and investigates the use of cement and marble powder to stabilize the expansive soil. A number of tests were conducted to study the behavior of Al-Khod expansive soil, such as wet sieve analysis, Atterberg's Limits, compaction, free swell, swelling, consolidation and suction test.

Keyword. Expansive soil; Cement; Marble Powder.

DEVELOPING THE PUBLIC TRANSPORTATION SYSTEM AT MUSCAT INTERNATIONAL AIRPORT

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Abstract. The main focus of this study is to highlight the effort that is being made towards the developing of public transportation system in Oman especially at Muscat International Airport, since Oman is moving towards the developing of a proper integrated public transportation system which is going to contribute in making Muscat as a modern city where its residents can count on a proper transportation system for their travel and to decrease the dependency on using private vehicles. This study aim is to research about the public transportation services provided at Muscat International Airport, examine and analyze the service quality and passengers experience of the services currently provided, and that is going to be fulfilled by gathering user's level of satisfaction through a survey which contains set of questions that is related to the services provided at the airport and what is their overall opinion on the public transportation service and SPSS-V 22 was used to analyze the questionnaire data. As expected the results of the survey has reflected the opinion of the participants and their attitude towards the services where they think that the level of service provided is good and only few improvements that are required in order to attract people to use the services also participants acknowledge the efforts that has been made in this regard by the responsible authority but a change in the dependency from using private vehicles to public transportation can take a long time since the service provided has only been developed recently.

Keyword: Public Transportation, attitude, quality and passengers

TREATMENT OF DOMESTIC WASTEWATER BY USING AZOLLA PLANTS

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Abstract. This project aims to find the eco-friendly phytoremediation of wastewater using the Azolla plant. The Azolla Floating Plant is submerged in a basin containing domestic wastewater. A preliminary analysis before being treated with Azolla with the following parameters (COD), PH, (TSS), (TDS), and conductivity). Three cases have been studied, the sample under sunlight, shade, and the laboratory light). Every four days samples were analyzed. The results obtained from the sample under direct sunlight were effective and close to the ideal values that are in pure water with 37% removal in TSS, 99.6% TDS and 99.7% removal on COD .The results indicated that the Azolla plant is capable of treating domestic wastewater.

Keyword. Azolla, Treatment Wastewater, sunlight, shade, laboratory light

DISINFECTING AFLAJ WATER USING ADVANCED SOLAR OXIDATION PROCESSES

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Abstract. In this research efficiency of Soar water disinfection (SODIS) and SODIS+TiO_2+H_2O_2 for the inactivation of total coliform present in falaj water was determined by placing PET bottles filled with falaj water sample in the open air and in a solar reactor. The results show that SODIS+TiO_2+H_2O_2 outperforms SODIS. Using SODIS+TiO_2+H_2O_2, total coliform inactivation was achieved in 3 hours for open air reactors and 1 hour for solar reactors. Bacterial inactivation in SODIS is primarily caused by reactive oxygen species, whereas SODIS+TiO_2+H_2O_2 it is caused by reactive oxygen species and hydroxyl radicals.

Keyword. SODIS; Total Coliform; Falaj Water; Hydroxyl radicals

BIOGAS PRODUCTION POTENTIAL FROM PALM WASTE IN SULTANATE OF OMAN

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Abstract. In Oman, palm wastes are estimated at thousands of tons per year. Imagine that this huge amount of waste can be used as an alternative of energy or as a fuel. This project shows the possibility of obtaining cellulose from waste palm trees to protect Oman from the environmental damage caused by the burning of these wastes. The result that obtained from the first experiment that 80g of raw material gave about 2.5 – 3g of cellulose. In the second experiment, 3.3g of raw material gave about 1.8 – 1.9g of cellulose while in the third experiment 4g of same raw material of the second experiment gave about 1.5 - 1.6g of cellulose. The FTIR of the final products were shows the functional groups and compared with pure cellulose graph. The biogas produced at the end of this project by using anaerobic digester. The total volume of the anaerobic digester has been calculated as 7.2 m^3 to do the digestion process.

Keyword. Cellulose, Biogas, Autoclave machine, Alkaline treatment, Bleaching treatment, Anaerobic digester.

ASSESSMENT OF COVID 19s IMPACT ON CONSTRUCTION SEMs GROWTH IN SULTANATE OF OMAN

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Abstract. According to the current situation, the Covid-19 pandemic has affected the whole world. Most sectors have been affected by it and all the companies and businesses have faced revenue losses and many other adverse effects. But the most affected companies are SMEs. This study is aimed to evaluate the COVID-19's impact on construction SMEs' growth in Oman. The objectives of this research are to find out the factors that influence the performance of the construction sector and SMEs, to explore the consequences of Covid-19 and lockdown on construction SMEs' growth in Oman and to assess the short-term and long-term impacts of COVID-19 and provide recommendations to help SMEs in reducing business losses and survive through and after the crisis. In this research, qualitative and quantitative methods have been used via distributing 143 questionnaires and implementing three interviews with experts in the construction field. In the research, the top ten factors that influence the performance of the construction sector and SMEs, the top ten effects of Covid-19 on construction sectors and its SMEs, short-term and long-term impacts of COVID-19 and recommendations to help SMEs in reducing business losses and survive through and after the crisis have been found.

Keyword: Construction, SMEs, Covid-19, factors and effects

Toward Meeting the Electric Needs of Oman in 2025

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Abstract. An analysis for a conceptual design of a thermal power plant (with a power capacity of 1 GW) is provided. This power plant can help in meeting the expected increase in the electric demand for the Oman's dominant power system (2.4 GW between 2018 and 2025). A necessary fluid mass flow rate of 834.1 kg/s was predicted. The overall energy conversion efficiency (output useful electricity divided by input heat) was estimated to be 34.7%. The needed thermal energy is not restricted to a specific source, and solar heating is an option for supplying the needed heat.

Keyword. Power Plant; Power Station; Electricity; Energy; Thermal

PIEZOELECTRIC SENSOR IN ENERGY HARVESTING TECHNOLOGY

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Abstract. Renewable or non-renewable energy sources exist in the electricity market, but some countries have failed to meet their electricity demand due to population growth. To avoid such problems, alternating techniques can be used to generate electricity. At the same time, human sidewalks (stairs) waste a certain amount of energy. In this way, this wasted energy can be converted into useful electrical energy. This project focuses on energy harvesting technology with human footprints using piezoelectric sensors. The generated voltage status is displayed using the microcontroller (ATMega328P).

Keyword. Voltage Generation; Piezo Crystal; Interfacing Unit; DC and AC Load set up

EXPERIMENTAL INVESTIGATION OF THE PERFORMANCE OF A SOLAR STILL WITH ROTATING CYLINDER

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Abstract. Potable water production is a major challenge in Middle Eastern countries due to a shortage of freshwater resources such as lakes and rivers. Several countries rely on desalination to fulfill their freshwater requirements. Current desalination techniques in Gulf countries, including reverse osmosis and multi-stage flash distillation, are energy-intensive and expensive, consuming a considerable percentage of their revenues. The current study investigates a revolutionary new method of getting freshwater by increasing water evaporation via a rotating cylinder in a solar still. This innovative technology has the potential to boost the potable water supply by more than 300 percent when compared to a conventional solar still.

Keyword. Desalination, Evaporation, Solar energy, Rotating cylinder

Smart Solar Power Station for Isolated Houses in Oman

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Abstract. In the modern word, there is an increasing demand for electrical energy. Because of this, the non- renewable energy resources such as fossil fuels will be exhaust in short time. The proposed project will be beneficial to the people of Oman. In our project we are using the solar energy to produce electricity to meet the energy requirements of the remote houses in the rural area of Oman. The cost involved in laying the electrical network for those lesser number of consumers in the rural area as well as the maintenance cost involved for maintaining the network is very high. The proposed system can be used to produce electrical energy near to the isolated houses and it will be easy to deliver the power to the houses. In addition, energy demand and energy produced can be monitored to optimize the use of generated electricity. In our system, the light energy is harvested using solar module using MPPT (Maximum Power Point Tracking) technology and stored in the battery. The stored dc power is converted into ac power using pure sine wave inverter and supplied to the load optimally. In case of less energy production due to weather conditions or any other reasons, load optimization will be done and system serves the primary needs. On the other hand, if the energy is surplus, system stores the surplus energy in the battery and uses the stored energy when required.

Keyword. Solar Energy; PV (photovoltaic) Panels; Internet of Things (IoT); Cloud Server; Monitoring and Control etc.

TECHNO ECONOMIC FEASIBILITY ANALYSIS OF A SOLAR PHOTOVOLTAIC POWERED AIR CONDITIONING SYSTEM

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ABSTRACT

Nowadays the increased operation of air conditioners causes atmospheric emissions and higher electricity bills to reduce this two, we conducted a detailed feasibility analysis in replacing the grid electricity with the Solar PV was done using RETsecreen software. Sizing calculation was done for an air conditioning load of 3 kW and panels are sized accordingly with modules of 300 W. When the Natural gas based combined cycle power plant is replaced with PV, the emission will account to 3 tons of CO_2. Project will be feasible if the authorities can give a subsidy for the investors of at least 20 % in the initial investment and can adopt GHG reduction rate of 20 \$/tCO_2. Simple payback period become 8 years with a positive NPV of 1615\$. The analysis revealed that project will become attractive and feasible with the subsidies and policy making for the GHG credit rates and if the Project life expected is about 25 years.

Keywords. RETsecreen, Green House Gas Emission, Net Present Value, tones of CO_2

DESIGN AND IMPLEMENTATION OF A HYBRID SYSTEM

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Abstract. Today, one of humanity's greatest needs is to provide reliable and sustainable electricity. As electric energy is obtained from traditional and non-renewable sources such as (coal, gas, nuclear), and because these resources are polluting to the environment and also being relatively few, they will be exhausted with continuous use in the future. This led to drawing attention to renewable energy sources such as wind and solar energy. However, these sources alone do not meet the needs of consumers because of the variation in the intensity of solar radiation as well as the difference in wind strength, from one place to another and from time to time. Therefore, we designed and implemented a hybrid energy system device that combines two or more renewable energy sources such as wind and solar energy, to generate reliable and sustainable electricity

Keyword. hybrid system; solar energy; wind energy; **renewable energy**

SIMULATION OF PROTECTION FUNCTIONS FOR INDUSTRIAL INDUCTION MOTORS

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Abstract. Most common motors used in industry, commercial and residential sectors are induction motors with different types. Since industrial motors are large and expensive, it is necessary to protect those motors against various faults. To keep the loads at the rated torque, motors need a three-phase supply at almost constant temperature. However, if any phase is missed or the temperature of the windings rises, the motor may be damaged. However, it is necessary to design a protection system to trip the motor's circuit breaker in case of a one phase open circuit, unbalanced loading or if the motors temperature rises more than a pre-specified temperature. In general, the quality of the motor is based on the allowed limits of the supply voltage and its load. This paper presents the simulation of various protection functions of AC induction motors.

Keyword. induction motor; protection; thermal model; numerical relay.

IoT BASED MULTIPURPOSE REMOTE HEALTH SURVILLANCE SYSTEM

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Abstract. The health care sector of the Sultanate of Oman has witnessed admirable development over the last few decades. One of the relatively challenging parts is to provide healthcare in remote hamlets. The main objective of the project, titled "IoT Based Multipurpose Remote Health Surveillance System", is to develop medical briefcase that will help medical teams to work smartly, even in life-threatening situations. Another important problem is career-related diseases, which cause health issues. The designed project aims at health surveillance and ensures occupational risk prevention, which consists of a microcontroller-based data acquisition system with a sensor network. An intelligent IoT based remote monitoring is also incorporated to provide distant data supervising with the help of a dedicated server. The device helps to monitor various body parameters of a patient and update the same in the server. Specialists or medical assistant can view this data remotely and can decide on treatment remotely. In the current pandemic situation, this device can play a vital role in assisting the medical team to monitor the condition of patients remotely. The entire device with its accessories can be kept in a suitable case and that will help the medical team while traveling to remote areas for medical emergencies. In certain situations, it may be necessary to set up a temporary OP clinic to check the health status of inhabitants and in such situations, this device can act as a mobile unit for setting the camp.

Keyword. Internet of things, Health Surveillance, Medical Assistance, Remote Data Monitoring, Cloud computing, Data Acquisition System.

DESIGN AND DEVELOPMENT OF SMART IRRIGATION SYSTEM FOR IMPROVED WATER ENERGY EFFICIENCY

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Abstract—Agricultural farm is threatened by many problems, such as lack of modern agriculture technologies, water scarcity, and also rich content of salinity in water in Oman. Development of agriculture methods in Oman is must require and this intern depends on a modern irrigation system with minimal wastage of water. In this paper development of a smart irrigation system to minimize, the wastage of water by designing a novel nozzle using inventor software and a 3D printer is studied. A smart irrigation system circuit is designed with consideration of temperature, daylight sensor, day/day-night switch controller, soil moisture sensor, and solenoid valve or pump. This smart irrigation system is able to automatically start and stop the pump or solenoid valve based on the moisture content acquired from the soil moisture sensor. The measured sensor values are sent to the Arduino microcontroller for configuring the control algorithm. The system prioritizes irrigation operation by checking whether the farmer requires the irrigation during day time or both day and night time with help of light sensor and switch position and also checks for the temperature cut of limit as per the type of crops being irrigated. In this way, different types of crops can be watered depending on their varying water requirements.

Keywords: Agriculture; Smart-Irrigation; Sensors; Arduino; Water-management.

A Smart Elevator Control System

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Abstract. With the rising life standards and attention to human lifestyle and with the development in architectural engineering for multi floor building, the installation of elevators becomes an integral part of the infrastructure for the high buildings. The control system is essential for smooth and safe operation of the elevator. Hence for more efficient performance and maintenance, more importance is given to the design of an elevator control system. This project designs and implements a prototype of three levels elevator model with a flexible control system. The designed system is an example of a real time system with some sort of simple smartness. Two types of sensors are used in the elevator, these are infrared sensor to monitor the reach to the required floor and force sensor to warn if the weight of the passengers in the cabin is greater than the limit value. A stepper and servo motors are used as movement actuators to achieve the up/down movement of the cabin and the open/close of the cabin's door. Also the system offers an emergency pushbutton in case a critical circumstance occurs. Arduino platform is used to control the elevator operations. The final prototype has been tested with respect to the planed targets and showed very good level of efficiency, reliability, and safety.

Keyword. Elevator Control; Arduino Platform; Sensors; Smart System; Alarm System.

Comparison of different Median Filters in removal of high density noise

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Abstract. In this paper a comparison of different algorithms for filtering a noise affected gray or color image is carried out taking Salt & Pepper noise in general. The algorithms under consideration for comparison work on the concept of median where the noisy pixel is replaced with the median value and further how the selected filtering process are carried out without disturbing uncorrupted pixels present in the selected window. The algorithms under comparison are Mean Filter, Median Filter, Component Median Filter (CMF), Spatial Median Filter (SMF) and Adaptive Median Filter (AMF). The algorithms are tested against different grayscale and color images and compared with their Mean Square Error (MSE) and which method gives better Peak Signal-to-Noise Ratio (PSNR).

Keyword. Mean Filter, Median filter, salt and pepper noise, CMF, SMF, AMF.

DISEASE DETECTION SYSTEM BASED ON HUMAN EYE IMAGES

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Abstract. Life has become sophisticated and oriented towards advanced technology in all directions One example of this progress in the medical field. Disease detection device through the iris of the eye is one of the devices that contribute to the ease of examinations and speed of results. Where a person's condition can be diagnosed if the result is normal or abnormal, and then diagnose the type of disease or injury that he has. present a system which use correlation between medical pathology and different sectors from the surface of the iris. A computerized iris texture and color analysis reveals texture regions which offer useful information. Locations of those regions upon a segmented iridology charts point out an interrelation between map sectors and the projection of the internal body system. The final automatically generated diagnosis needs user approval, thus making the system semi-automatic.

Keyword. Eye Images; Iris; Data Analysis; Iridology.,

WEB AND ARDUINO BASED EXCLUSIVE COVID-19 PATIENT MONITORING AND TRACKING

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ABSTRACT

The recent outbreak of COVID-19 has taken the world by surprise, forcing lockdowns and straining public health care systems. COVID-19 is known to be a highly infectious virus, and infected individuals do not initially exhibit symptoms, while some remain asymptomatic. Thus, a non-negligible fraction of the population can, at any given time, be a hidden source of transmissions. In response, many governments have shown great interest in smartphone contact tracing apps that help automate the difficult task of tracing all recent contacts of newly identified infected individuals. However, tracing apps have generated much discussion around their key attributes, including system architecture, data management, privacy, security, proximity estimation, and attack vulnerability. Therefore, our proposed system web and Arduino based exclusive COVID-19 patient monitoring and tracking system help us in tracking and monitoring a COVID patient.

For this purpose, the COVID-19 patient information is recorded inside webappication. This application allows to know the location of the COVID-19 patient and helps to track them using Arduino. So that patient will be regularly monitored and the spread can be avoided. A website is designed for the project so that the necessary information of the patient can be stored.

Keywords: Covid-19,Transmitter, Receiver , Arduino Uno

NUMERICAL AND EXPERIMENTAL ASSESSMENT OF INTEGRATED ANTENNAS WITH PHOTOVOLTAIC SOLAR CELLS

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Abstract. This paper presents the numerical and experimental evaluation of antenna performance on top of photovoltaic (PV) solar cells for potential use in smart grid and power green networks. For convenience, a microstrip patch antenna was used in this assessment study, where the antenna has been designed, numerically simulated and experimentally tested, and after which, it was installed on top of PV solar cell at different orientations. Based on the results, the antenna has satisfactory performance when integrated with PV cells, which is promising to deploy in many applications, including smart grid networks.

Keyword. Antenna; patch antenna; photovoltaic; solar cells.

TOWARD SMART CITIES IN OMAN: SMART BUS STATION OVER IOT TECHNOLOGY

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Abstract. The design and development of a smart station for public bus transportation system are presented in this paper. The main objective is to add smartness to the public transportation network, via IoT technologies, to facilitate the use of the public buses by providing the people waiting in the bus station by an approximated time of the bus arrival. The developed system is affordable as it needs cheap units/modules: IR sensor, NodMcu module, and LCD display unit. The system is constantly updating the displayed information in every bus station about the approximated time of the bus arrival. This achieved through the IR sensors and the communications between the successive bus stations via IoT technologies. Accordingly, the buses' users waiting in the bus station may fill their waiting time by useful works like; reading, eating, working with laptop, ….etc. Also, it may attract the private car users to use instead the public transportation system with benefit of decreasing both the traffic jam, and the air pollution especially in a big cities.

Keywords: NodeMcu, smart bus station, LCD, IR sensor, IoT technology.

Smart Glasses System for Car Drivers Safety

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Abstract. Car accidents are a very serious problem in our world. Every year a lot of people lose their lives due to fatal car accidents. There are many reasons that cause car accidents. One of these reasons is drowsiness during driving. New technology can be used to avoid or reduce the number of car accidents. Here, we propose using smart glasses by drivers to provide alarm during driving if they feel drowsy. In addition, an alarm signal can be sent to near cars. Moreover, a message can be sent to the road office manager to avoid or reduce the case of the drowsy drivers. The proposed alerting system was fully implemented and tested. The implemented smart glasses system could be a good solution to decrease car accidents and save lives.

Keyword. Smart Glasses; Drowsiness Detection; Drivers Safety;

HEALTH MONITORING SYSTEM USING IoT

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Abstract. Healthcare is given extreme importance and the highest priority nowadays. Due to the recent covid19 pandemic, it has become clear that nothing can be taken for granted and many hidden diseases and viruses are unknown to mankind. It is essential to be aware of one's health.

In this project, a health monitoring system was designed and built that includes multiple sensors and devices such as a pulse oximeter, a temperature sensor that is used to monitor and detect changes that occur and store the information in the IoT cloud and alarm the staff if necessary.

Key Words: Health, IoT, SpO_2 Raspberry Pi

Raspberry Pi Based Image Analysis Technique to Determine the Ripeness and Grading of Tomatoes

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ABSTRACT

Color is frequently related with the quality of agricultural products. Checking for ripeness and grading fruits and vegetables is a well-known technique. Because of the high cost of fruit sorting and grading, most fruit processing firms rely on human to grade agricultural goods using their vision. This research provides a novel approach for determining tomato ripeness and grading based on color. Raspberry Pi development board, conveyor belt, servomotors, and USB camera are all included in this system. To process the image captured by the USB camera, the Raspberry Pi is coded in openCV-python. The frames were initially collected from the camera and transformed from RGB to HSV. The red and green masks were created using HSV values. If the number of colored pixels reaches the maximum, the raspberry pi sends a command, and the servo motor pushes the tomato into the designated collection container. The suggested system uses an image analysis technique to classify tomatoes and this technique significantly minimizes human labor and error, and it can also be used to determine ripeness and grading of other fruits and vegetables

Keywords: Image analysis technique, raspberry pi, ripeness and grading, color detection, tomato

Experimentation and Numerical study of Formability in Deep Drawing Process

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ABSTRACT

Deep drawing is a process of metal forming in which sheet metal is stretched according to the desired shape of the die. In this paper, Experimentation and Numerical study of formability of AA1100 in deep drawing process is carried out using ANSYS Workbench. Experimentation is done using Universal Testing Machine (UTM). Output responses such as thickness distribution and deformation are calculated from experiment. Major strain and Minor strain are calculated and Forming limit diagram is drawn to check the formability of AA1100. The thinning percentage is between 7 to 13% which indicates good formability The results from experimentation is compared with the analysis results using Ansys Workbench and error percentage between experimentation and numerical study is less than 2%.

Keywords: Deep Drawing, Thinning percentage, Deformation, Forming Limit Diagram

CFD analysis on centrifugal pump for the investigation of variations in discharge and efficiency with respect to the inlet and outlet pressures using two fluids

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Abstract. The aim of this study is to investigate the variations in head and efficiency of the centrifugal pump with respect to the inlet and outlet pressures using two fluids (water/ethanol), which is widely used in the oil and gas industry, and to propose the best design which will give us the most suitable outputs. This will be achieved by validating the results theoretically as well as using a CFD analysis. Both SOLIDWORKS and ANSYS fluent software are used for modeling analysis of the part respectively. The results had shown that ethanol provides maximum head when compared to water and also the efficiency increases with increase in RPM

Keyword. Fluent, CFD, Centrifugal Pump, Analysis

CONVERTING WASTE HEAT OF VEHICLES EXHAUST GASES INTO A USEFUL SOURCE OF ENERGY

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Abstract

Waste heat from car exhaust is 20%-40% of the total heat lost from the engine. The aim of this study is to develop a new heat recovery technique that could be used to convert the lost heat from exhaust to a useful source of energy which can be either heat or power. For just 6 thermoelectric generators, 50.2 W of power production was achieved, where system efficiency was found to vary between 18.5%-23.5%, depending on the surface temperature of the exhaust pipe. s on the surface temperature that is in contact with the hot side of the thermoelectric generators. Furthermore, the minimum power generated by the thermoelectric generators is equal to 4.5 Watt.

Keywords: *Heat Recovery, Exhaust Gases; Thermoelectric; Heat -to-Power; Internal Combustion Engines*

INVESTIGATION ON THE EFFECT OF ASPECT RATIO ON FLEXURAL BEHAVIOR OF ALUMINUM SANDWICH COMPOSITE

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Abstract. Sandwich composites are one such kind of light-weight composites developed for structural and vehicle body buildings etc. due to their remarkable features such as high specific strength, high toughness and resistance to inter laminar shear strength. In this study, commercially available Aluminium sandwich composite (ASC) laminate was considered for investigating its flexural behavior and buckling behavior as it was mostly used for various structural applications. Flexural analysis was done for different aspect ratios in order to analyze the influence of cross section of the specimen and support span on the flexural capability of the sandwich beam. The composite specimens prepared for flexural test consist of length 150 mm and widths 15, 12 and 10 mm. The flexural test was done for support span of 90, 110 and 130 mm respectively. The performance measures of flexural test are maximum bending load, deflection, flexural stiffness and inter-laminar shear stress. The flexural analysis revealed the fact that the aspect ratio appreciably affected the flexural capacity of the sandwich composite laminates.

Keyword. Sandwich composite, Flexural strength, Aspect ratio, Inter-laminar shear.

COMPARATIVE STUDIES ON CORROSION BEHAVIOR OF LOW CARBON STEEL & GALVANIZED STEEL IN VARIOUS CONDITIONS

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Abstract— Corrosion is one of the most common problems faced by metals. This study aims at comparative studies on corrosion behavior of low carbon steel and galvanized steel under various environmental conditions. Weight loss method will propose to determine corrosion rate of selected metals after immersion in Sodium Chloride (NaCl) solutions under various conditions of salinity, pH, time and temperature. It was concluded that corrosion rate increase with increase of salinity, decrease with increase of pH value, decrease with increase of time exposure, and increase with increase of temperature. Galvanized steel is stronger than low carbon steel in resistance to corrosion.

Keyword— corrosion rate, low carbon steel, galvanized steel, weight loss**.**

EXPERIMENTAL STUDY ON INFLUENCE OF STRESS CONCENTRATION IN THE FLEXURAL STABILITY OF ALUMINUM HOLLOW TUBE

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Abstract. Solid sections are gradually replaced by the hollow sections in most of the structural applications in various engineering fields due to their attracting features such as light-weight and high specific strength. In the present investigation, one such attempt was made to investigate in detail about the flexural capability of an aluminum hollow tube with square cross section. The objective of the investigation is to study about the influence of stress concentration on the flexural behavior of the hollow tube. The type of stress concentration considered in the investigation was through hole of different cross section and quantity. Three- point bending test with concentrated load is conducted on the specimens of hollow tube with different types of stress concentration such as circular hole, square hole and perforations. The load was applied manually during the bending test. The bending test was carried out on all specimens for various support span of 110, 130, 170 and 200 mm respectively. The output measures of the study are maximum bending load, deflection and flexural stiffness.

Keyword. Hollow tube, Flexural strength, Stress concentration, Aspect ratio, Support span.