If you are looking for a topic for your Master dissertation and PhD thesis , please browse through the list of available topics below:

- Civil Engineering
- Mechanical and Manufacturing Engineering
- Electronic and Electrical Engineering
- Chemical and Energy Sustainability Engineering

For information on additional requirements and the application process for specific topics, please contact relevant supervisor.

Civil Engineering

Research Area	Title	Project Description	Supervisor	Email (@unimas.my)	Requirement for applicant
Cementitious materials	Durability of alkali activated materials in aggressive environment	Reactions of aggressive ions with binder products are also among the major factors that are associated with durability performance of concrete structures. Physical and chemical reactions can take place simultaneously between ions and hydration products and must be emphasized when assessing durability performance of a structure. Since AAM and geopolymer binders are relatively new compared to OPC based binder, thus detailed track record of its durability is scarce. Therefore, further detailed study is required to understand the behavior of AAM and geopolymer binders.	Dr Idawati Ismail	iidawati	Email directly to supervisor
Cementitious materials	Relationship between binder types and performance	The understanding of binder chemistry, and its effect on the mechanical and durability properties of alkali-activated slag/fly ash binders, is still very limited. The chemistry of the resulting binding gels is the main consideration in understanding the mechanism of formation of alkali-activated materials, and its structural development as a function of curing time.	Dr Idawati Ismail	iidawati	Email directly to supervisor
Ground improvement	Email directly to supervisor	Email directly to supervisor	Dr Norazzlina M.Sa'don	msazzlin	Laboratory testing and analytical modelling

techniques of peat and soft soils					
Strength prediction optimization of timber connections	Email directly to supervisor	Email directly to supervisor	Dr Abdul Razak Abdul Karim	akarazak	Laboratory testing and mathematical modelling
Environmental Engineering	Dry Composting Toilets for Sustainable Living in Rural Areas	This project involves a comprehensive study on the design of a suitable composting toilet for communities living in rural areas, and assessment for sustainability in terms of livelihood, public health and socio-economics.	Ir Dr Leonard Lim	llpleonard	Candidate with background knowledge of sustainable development and willing to travel into rural area is preferred for this project
Environmental Engineering	Development of Reactor for Chloride Removal from Industrial Sludge	This project consists of a study on the extraction of chloride from industrial sludge, followed by the development of a reactor for the removal of chloride in pilot scale.	Ir Dr Leonard Lim	llpleonard	Candidate with prior experience in water and wastewater treatment will be given priority
Sediment Transport	Incipient Motion and Sediment Particle Propagation Theory	The critical condition that is just adequate to initiate particle motion is termed as incipient motion. Currently, majority of the literature are for loose boundary channel with unlimited depth and supply of sediment such as alluvial channels as compares to rigid boundary channel with limited sediment depth and supply such as concrete drains. Due to this, the Shields diagram and related equations which were developed for loose boundary channels have been used to design rigid boundary channels despite the difference in boundary conditions. Existing studies on rigid boundary channels have shown that the sediment particles are eroded at lower critical values than that predicted by Shields diagram for alluvial channels. On the other hand, equations that are specifically developed for rigid boundary channel tend to become less accurate as the thickness of sediment deposits increased. The understanding on how the sediment deposition thickness will affect the incipient	Dr Charles Bong Hin Joo	bhjcharles	Applicant who are reasonably well versed in mathematical formulation and also willing to do some experimental work. Both Masters or PhD are welcomed.

		motion characteristics and the difference in mechanics of sediment movement for rigid and loose boundary is still lacking in the literature. A single equation that could unify both the rigid boundary and loose boundary conditions is still non-existence. The current study aims to understand how the sediment deposits thickness will affect the incipient motion characteristics and determine when (at what sediment depth ratio) the rigid boundary channel will behave as loose boundary channel. The current study will involve incipient motion experiment in rectangular flume. Water level and discharge will be slowly increased and the flow velocity will be measured using electronic flow meter once incipient motion of particle is observed. Findings from the current study are expected to produce a single incipient motion equation that is applicable for both rigid and loose boundary channels which are important in the understanding of sediment transport.			
Hydraulics	Investigation of the Factors Influencing the Efficiency of Hydraulic Flushing of Sediment in Open Channel.	Sediment deposition in open channel is a serious problem due to negative effects that it might cause such as flash flooding (due to reduction of channel carrying capacity) and pollution from the pollutant existed in the sediment. In European countries, various techniques have been developed for sediment removal in sewer system and hydraulic flushing is the most applied technique. Various experimental studies are available in the literature on the effect of flushes and it was observed that the factors that have effect on flush cleaning efficiency are: i) height of water stored upstream of flushing device prior to flushing; ii) partial exposure of deposit downstream or initial water depth downstream; iii) number or frequency of flushes; iv) distance of sediment deposit from flushing device; v) sediment cohesiveness and void ratio; and vi) sediment	Dr Charles Bong Hin Joo	bhjcharles	Applicant are willing to do some experimental work. The topic is for Master's degree but can be extended to PhD level.

		thickness. Other factors that may have influence on the flushing efficiency which are lacking in the literature are the opening size of the flushing device, the duration of the flush and the sediment bed length which will be the focus of the current study. The current study aims to determine the effect of gate opening angle, the duration of flushing and length of sediment bed on the efficiency of flush cleaning for a tipping sediment flush gate. This will be done through experimental work using open channel flume. By understanding the effects of these factors, a relationship for the flush cleaning efficiency of a tipping sediment flush gate will be established and thus the optimum design for the gate will be recommended. Results from the current study could provide the basis and recommendations in the design and installation of tipping sediment flush gate for onsite open channel which could potentially reduce the cost of labor for manual cleaning of sediment and lessen the expenditure for sedimentation management.			
Peat Geotechnics	Modelling of the Rate Dependent Behaviour of Penetrometers for Improved Geotechnical Characterisation of Peat	Peat is a highly organic geotechnical material with extreme compressibility and low shear strength. Because of these unfavourable engineering properties, the predominant preference whenever construction on peat is unavoidable is either total avoidance or total removal of peat. However, these methods are not always viable especially if the peat area is vast and the peat depth exceeds a few metres. Sarawak has the most peat affected areas in Malaysia, with depths reaching up to 20 m. These areas coincide with the upcoming SCORE and Pan Borneo Highway projects. In cases where any infrastructure construction on peat is unavoidable, careful measurement of the undrained strength of peat is required for proper geotechnical stability analyses of	Dr Fauzan Sahdi	sfauzan	Good in experimental and analytical skills. Require PhD and Master students

		infrastructures founded on peat. Due to the difficulty in sampling peat for laboratory strength measurements, there is an increased reliance on in-situ investigation tools such as the CPTU, T-bar and ball penetrometers to measure the undrained strength of peat. However, the resistance (used to derive the undrained strength) of these penetrometers have been shown to decrease with increasing penetration velocities (rate dependent). This implies that any geotechnical design utilising the undrained strength measured at a standard penetration velocity of 20 mm/s may err on the unsafe side. This proposed research aims at understanding the penetration rate dependent behaviour of these penetrometers in peat, via extensive laboratory modelling using miniaturised CPTU, T-bar and ball penetrometers under variable rate penetration test conditions on compressed reconstituted peat samples. This proposed study will also include complementary permeability, consolidation and strength tests on reconstituted peat using the conventional triaxial and oedometer tests. It is envisaged that this proposed research can lead to recommendations for suitable penetration rates and bearing capacity factors (linking penetration resistance to the undrained strength of peat) to ensure accurate undrained strength measurements during penetrometer field testing.			
Water resources	Impact of climate change on water resources	The study of rainfall forecasting plays an important role to a country such as Malaysia where the rain is abundant. Malaysia receives rainfall from 2000 mm to 4000 mm annually where it is greatly influenced by two monsoon periods in November to March and May to September. The state of Sarawak is well known for its long and wide rivers and rivers have always been the main	Assoc. Prof. Dr Nasser Rostam Afshar	anrostam	Phd

Water resources		transportation and still are in certain remote areas. Unfortunately, these areas are expected to experience frequent flood events as well as possible receding water level in rivers based on the findings of previous studies. If the projections are accurate, the productivity of these activities will be reduced, hence, in a longer term may affect the economy of the state as whole as well. Therefore, there is an urgent need for existing knowledge on rainfall behavior to be revised as effects of climate change with the intention that the state can fully utilize the favorable conditions and make scientific based decisions in the future. Further study in rainfall forecasting focusing on the state of Sarawak as suggested by Christensen et al (2207) is indeed very crucial to improve the estimation accuracy for long-term rainfall prediction. Long-term prediction is important for planning and management in various sectors where rain is considered as a major driving factor such as agriculture and water resources.			
Water resources	Cost benefit analysis and flood damage mitigation in the Sarawak	Aim of this research is to investigate the application of cost benefit analysis methods in decision-making on a desired flood protection strategy in the Sarawak. After a discussion of history and developments in flood protection in the Sarawak, the method of cost benefit analysis is presented as a useful instrument in decision-making. Further-more, the economic analysis of flood protection strategies is firstly approached from a theoretical point of view. Subsequently the economic analyses carried out in practice are described for practical cases, the study on "emergency retention areas" and the dike reinforcement program in the river system. If the economic analysis, when correctly applied, can provide important rational information in the decision	Assoc. Prof. Dr Nasser Rostam Afshar	anrostam	Phd or Pg

		making process.			
Management	Development of Value Engineering (VE) in Sarawak	The increased global competition and complexity within the Malaysian automotive and construction industries have led organizations to find ways to maximize their products' values, processes, projects or services within a total system while controlling the costs. This can be achieved through Value Engineering (VE), one of the key methods in cost management, which aims to provide better products or services for less cost.	Assoc. Prof. Dr Nasser Rostam Afshar	anrostam	Phd or Pg
Hydraulic Machinery	Hydro Rice Milling Machine	Some undeveloped Sarawak rural communities still follow the traditional way of harvesting paddies that is through traditional cutting them off. The grain will be collected and then undergo a process of husking to remove the chaff (the outer husk of the grain). Husking is done manually by beating or foot husk. The process of husking is so time consuming as some times, only one person participates, with sifters confining husked rice. The developed Sarawak rural communities use a rice miller to remove the chaff as a replacement of the traditional methods of husking. A rice miller or rice huller is an agricultural machine used to automate the process of removing the chaff. These machines are most widely developed and used throughout Asia. The most popular type is the Engelberg huller. The Engelberg huller uses steel rollers to remove the husk. A rice miller is able to use several sources of power, such as gasoline and electricity. In the case of gasoline powered engine rice huller, the rise of fuel prices in recent year has rendered gasoline engine uneconomic while the electricity dependence rice huller has been just so inconvenience such that many rural and remote areas in Sarawak are still left without any electricity coverage.In this study, the feasibility of implementing	Assoc. Prof. Dr Nasser Rostam Afshar	anrostam	Phd

Research Area	Title	Project Description	Supervisor	Email (@unimas.my)	Requirement for applicant
		hydropower generated rice milling machine is investigated. The possibility is investigated through laboratory testing in both Hydraulic Laboratory of Civil Engineering Department and Control/Fluid Laboratory of Mechanical and Manufacturing Engineering Department.			
Geotechnics of Slurry - Backfill	Mathematical formulation of factors affecting total stress propagation anomaly in cemented slurry deposition within narrow walls	The conventional theory used to determine the total stress (pressure) in as proposed by Janssen (1895) has not fully explained the stress behaviour of material with transient properties such as cemented slurry. In cemented slurry, the properties change with time due to cementation process. Recent published data from full scale experimentation support the hypothesis. This research project will investigate the factors affecting the total stress propagation (increase) anomaly in the cemented slurry during deposition within narrow walls and formulate them mathematically. The objective of the research will be achieved by carrying out laboratory experiments using a novel experimental system by investigating the effect of temperature increase and the effect of wall friction. The expected outcome from this proposed research is to come up with improved theory to better explain the total stress propagation in depositing cemented slurry within narrow walls, i.e. by establishing mathematical formulation between wall friction, temperature increase and total stress.	Dr AlSidqi Hasan	halsidqi	Bachelor in Civil Engineering for Master applicant

Master in Civil Engineering for PhD applicant |

Mechanical and Manufacturing Engineering

Research Area	Title	Project Description	Supervisor	Email (@unimas.my)	Requirement for applicant

CFD	Please email supervisor for enquiry	Computational fluid dynamics, bearing designs, Non-Newtonian flows behavior, hemodynamics, composite based material for 3D printing technology	Ir Dr Mohd Danial Ibrahim	imdanial	Passionate
HVAC	Please email supervisor for enquiry	Piping designs layout, safety cabinets design layout	Ir Dr Mohd Danial Ibrahim	imdanial	Having basic knowledge on four main elements of Mechanical Engineering, i.Fluid dynamics, ii.Thermodynamics, iii.Materials, and iv.Static & dynamics Please email for more inquiries
Energy Efficiencies in Plants and Industries	Please email supervisor for enquiry	Pump/Fan/Compressor/Boiler system optimization in plants all over Malaysia. Site(s) will be confirmed upon enrollment.	Ir Dr Mohd Danial Ibrahim	imdanial	Students who are willing to go on site all over Malaysia Passionate Having basic knowledge on four main elements of Mechanical Engineering, i.Fluid dynamics, ii.Thermodynamics, iii.Materials, and iv. Static & dynamics
Innovation in Engineering Designs	Please email supervisor for enquiry	New modifications in any engineering machineries aimed at improving their performance. Comparison before and after is a must. Comparison must be accompanied with numerical model and experimental model regardless the percentage of improvements made.	Ir Dr Mohd Danial Ibrahim	imdanial	Passionate Having basic knowledge on four main elements of Mechanical Engineering, i.Fluid dynamics, ii.Thermodynamics, iii.Materials, and iv.Static & dynamics

					Please Email for more inquiries
Renewable Energy	Development of Microalgae Production for Biodiesel	Development a method for efficient microalgae production, cost effective harvesting and oil extraction for biodiesel.	AP Dr Abu Saleh Ahmed	aasaleh	
Alternative Fuel	Bioethanol Production from Pineapple Waste as an Alternative Fuel for Automotive Engines	Production of bioethanol from waste pineapple and study of engine performance and emission analysis	AP Dr Abu Saleh Ahmed	aasaleh	To be dedicated and industrious for the project
Bienergy	New Bioenergy Source for Bioethanol from Ubi Gajah in Malaysia	Production of bioethanol from Ubi gajah and characterize as a clean fuel for engines	AP Dr Abu Saleh Ahmed	aasaleh	
Production Operations Research	Capacity Utilization Modeling for Product Process Machinery	Conceptual Model Building, Mathematical Model Building,Simulation, Model Testing, Model Validation, Research Project will be executed at industry	Prof Dr M.Shahidul Islam	mislam	Research at Master level: Graduation in Mechanical, Civil, Electrical and Chemical Engineering, Industrial experience minimum 3 years

Research at PhD level: Master in Mechanical, Civil, Electrical and Chemical Engineering and Operations Research and Minimum 2 years industrial experience |
Production Operations Research	Productivity Modeling for Product Process Machinery	Conceptual Model Building, Mathematical Model Building,Simulation, Model Testing, Model Validation, Research Project will be executed at industry	Prof Dr M.Shahidul Islam	mislam	
Production Operations Research	Seawater Desalination Process Model	Conceptual Model Building, Mathematical Model Building,Simulation, Model Testing, Model Validation, Research Project will be executed at industry	Prof Dr M.Shahidul Islam	mislam	
Production Operations Research	Input-Output Optimization Of Production Process for Achieving Economic and Environmental Sustainability	Conceptual Model Building, Mathematical Model Building,Simulation, Model Testing, Model Validation, Research Project will be executed at industry	Prof Dr M.Shahidul Islam	mislam	

Electronic and Electrical Engineering

Research Area	Title	Project Description	Supervisor	Email (@unimas.my)	Requirement for applicant
Machine learning, Pattern recognition, Incremental learning, Feature extraction, Concept drift	Please email supervisor for enquiry	Please email supervisor for enquiry	Dr Annie Joseph	jannie	Matlab
Image Processing, Computer Vision, Neural Networks, Artificial Intelligence, Pattern Recognition, etc.	Various titles related to theoretical, fundamentals, or applications in medical / biometrics / transportation / quality assessment, etc.	Please contact Supervisor for further information	Ir Dr David Bong Boon Liang	bbldavid	Strong interest and passion in research. Some basic programming knowledge (Matlab, C, etc.) is advantageous.
Electrical Power	Determination of the diameter of carbon steel pipes which will provide a safe clearance (point of no eddy current) around electricity carrying cables suspended within them with spaced insulators	The overall aim of this research is to eventually enable electric power transmission from Sarawak to Semanjung Malaysia. 630 km separates Sarawak with her vast hydroelectric potential and Semanjung Malaysia which depends mostly on gas for electric power. Undersea XLPE (cross linked polyurethane) cables have been deemed impossible after a study by Sarawak Energy Berhad (SEB) because of the large capacitance loss. Also the cost of the previously proposed undersea cable between Sarawak and Semanjung Malaysia was equivalent to the cost of a Bakun dam. As a comparison of current carrying capacity of undersea cables versus bare overhead cables, the longest undersea power cable in the world so far is 580 km, 450kV, 700MW XLPE HVDC cable between Norway and Netherlands. While the longest bare overhead line is the	Dr Ir Prashobh Karunakaran	kpkumar	Pass PKET or PKEK degree

		2,385 km, 600kV, 7.1GW HVDC Rio Madeira transmission link in Brazil. A close second is the 2,090 km, 800kV, 7.2GW HVDC Jinping-Sunan transmission link in China. Therefore cables with insulation surrounding them are far less capable than bare overhead cables. Thus if cables can be laid undersea just like bare overhead lines, the furthest points in Malaysia, that is Lahad Datu to Pulau Langkawi (a distance of 2,219 km) can be connected. Added to the above statistics, underground cables fail much more often than overhead cables and the overall cost of underground cables is up to 400% higher than bare overhead cables.This research envisages HV (High Voltage) cables straddled with spaced ceramic or plastic insulators at the center of pipes from Lundu, Sarawak all the way to Johor. But pipes around conductors will generate eddy currents and thereby waste energy as heat. This research will study the safe clearance between bare copper electric cables and carbon steel pipes such that there is no eddy current loss. GIL(Gas Insulated Lines) which was developed by Siemens is a similar idea but with a focus to achieve maximum transfer of electric power. GIL uses SF6 (Sulfur Hexafluoride) which is ranked as the most potent Greenhouse gases. GIL uses aluminum while this research proposes carbon steel pipes which the oil and gas industry of Malaysia already has an expertise in.			
Electrical Power	Switch gear switching safety	There have been many fatalities for	Dr Ir	kpkumar	

	device	people performing switching of high voltage switchgears. Therefore there is a need for an automation which is easily transported and moved to site to enable switching personnel perform switching from a distance away from the switchgear. Most fatalities upon investigation are caused by gross neglect by the switching personnel or by the last person who handled the switchgears. For the former case there was one incident in SEB (Sarawak Energy Berhad) in 2014 where a SEB staff saw that the oil level in the switchgear was low but presumed that it was enough to switch the switchgear safely. The switchgear exploded and the personnel had second degree burns. For the latter case in Semanjung Malaysia, four staff of TNB (Tenaga National Berhad) were killed as an 11kV switchgear exploded; the root cause was discovered to be a fuse jumped with a copper wire by the last switching personnel.	Prashobh Karunakaran		
Fuzzy sets theory, Fuzzy systems, Failure analysis, Failure Mode and Effects Analysis	Please email supervisor for enquiry	Please email supervisor for enquiry	Dr Tay Kai Meng	kmtay	Students who are really interested and have patients in research.
NanoICs	Synthesis of Ultra Low Power Fast Adders Using Reversible Logic.	This research takes on a formidable question as to what is the next generation of digital systems as technology shrinks to nanoscale. Obviously the most anticipated area of discussion is ultra-low power devices that could function at very low power and could sustain with the energy harvested from RF and other sources. In view of these	Dr Lakshmanan Gurusamy	glakshmanan	Very basic knowhow of quantum computing, Willingness to work independently and enthusiastic in trying out new areas and new avenues, Java or C

		requirements, this project aims in designing high speed ultra low power arithmetic circuits using reversible logic to be used in DSP and multimedia processors.			
Design for Test (DFT) and Built In Self Test (BIST)	Arithmetic BIST for Multiplier Accumulator Unit (MAC)	An efficient MAC Unit is the heart of real time DSP and Mulltimedia Systems. Research into MAC Unit designs and datapath circuits is an ongoing process to have low power, high speed and most of all fault free architectures. In this project BIST is incorporated into the MAC architecture with the following criteria in included: -Fault coverage -Hardware overhead -Performance Penalty -Test Set Size	Dr Lakshmanan Gurusamy	glakshmanan	Verilog or VHDL, HDL languages, arithmetic Algorithms, some knowledge in BIST but not essential, ability to work on FPGA Board.
Nanomaterials	Fabrication and Characterization of nanostructured CdTe/CdS Thin-Film Solar Photovoltas (PV)	Photovoltaic (PV) solar energy conversion is an attractive method for clean energy generation. PV technology comes at the top of the renewable energy as a whole and therefore worldwide research is continuing to develop low-cost high-efficiency solar panels. The biggest challenge posed in any form of solar cells if the efficiency of energy conversion. Due to involvement of industry, lab-scale efficiency has rapidly improved from 16.5% in 2001 to 20.4% within the last few years. The aim of this research is to fabricate and characterize the electrodeposition of CdTe/CdS on FTO/ITO substrate and to analyze the morphological, structural, optical and the electrical characterization of the CdTe/CdS structure and the effect of molar concentration of CdSO4 and TeO2 solutions on CdTe thin film with	Dr Lakshmanan Gurusamy & Dr Muhammad Kashif	glakshmanan or kmuhammad	Nanomaterials, Willingness to work independently and enthusiastic in trying out new areas and new avenues.

		the intension of improving the optical absorption efficiency further.			
Low Power Embedded Systems	Ultra Low-Power FPGA based wireless sensor node with customized event-based Architecture for Biomedical Applications.	Wireless sensor network (WSN) have been emerging rapidly in recent times. WSN could monitor cardio-respitory rhythm,, pulse oximetry, body temperature, arterial pressure, ECG or EEG, depending on the clinical scenario. Ultra-low power Wireless Sensors (WS) typically consists of (i) sensors, (ii) energy harvesting transducers, (iii) a radio link and a microcontroller. To, minimize the power wastage , the microcontroller is designed as event based which means, the processor starts its data processing and driving its output only at desired time and hibernates when there is no event.	Dr Lakshmanan Gurusamy	glakshmanan	Able to wok on embedded systems,Digital Design and either of HDL, C or Fuzzy logic knowledge is an added advantage, Able to work independently.
DNA Computing	Bio-Inspired Computing for Network Management System (PhD Level)	New computing paradigms such as bio-inspired computing using DNA is extremely attractive due to its massive parallel computing capabilities. In this project, the student is expected to model and simulate a network management system using bio-inspired computing by designing and synthesizing actual DNA sequences.	Dr Nordiana Rajaee	rnordiana	
DNA Computing	Modelling of Job Scheduling Problem with Self Assembled DNA (PhD Level)	DNA computing has emerged as a new computing paradigm which is widely applied in various fields from mathematics, engineering to social sciences. In this project, the student is expected to model a job scheduling problem with self-assembled DNA sequences.	Dr Nordiana Rajaee	rnordiana	Please email supervisor for enquiry
Digital Signal Processing	Android-based Music Emotion Classifier (Master Level)	Music Emotion Classification (MEC) has been widely studies to accurately tag, segment and categorize music similarities for the purpose of	Dr Nordiana Rajaee	rnordiana	

		automatic classification of emotive genres in media playback applications. In this project, student is expected to design and develop and android-based Music Emotion Classifier system.			
Digital Signal Processing	Audio Features Analysis for Music Mood Information Retrieval (Master Level)	The audio features in music can be grouped into three criteria: timbre, rhythm and pitch. In this project, the student is expected to analyze different features and signal properties in music for mood information retrieval.	Dr Nordiana Rajaee	rnordiana	
Engineering Education	Performance Measurement System for Students' Learning Outcomes Achievement (Master Level)	The attainment of Students' Learning Outcomes becomes a measurement which relates to knowledge, skills and behaviors that graduates should attain by the end of their studies. In this project, the student is expected to design and develop a performance measurement system to assess the students' learning outcomes achievement.	Dr Nordiana Rajaee	rnordiana	
Engineering Education	Statistical Analysis on OBE Learning Tools and Assessment Methods in FENG, UNIMAS (Master Level)	In Outcome-Based-Education, the learning process is a continual quality improvement process where the assessment of the learning outcomes provides information on how to improve the learning of the students. In this project, the student is expected to carry out statistical analysis using appropriate tools on the efficiency of learning tools and assessment methods implemented in Faculty of Engineering, UNIMAS.	Dr Nordiana Rajaee	rnordiana	
Nanodevices and materials	Oxide-based nanoelectronics, Carbon based nanoelectronics, Organic nanoelectronics	Solution processable nanowire FETs Assembly of field-effect transistors using semiconducting inks at low temperatures on large areas, and on optically transparent substrates, are finding potential applications in many	Dr Muhammad Kashif		Strong interest and passion in research. Some basic programming knowledge (Fabrication, Structural and Electrical

		areas including: sensors, RFID tags, memory elements, and flexible display applications. Single-crystalline semiconducting nanowires (NW) are offering potential breakthroughs in the area of high performance, low cost device assembly due to their proven high charge carrier mobility and compatibility with solution based assembly.		kmuhammad	Characterization) is advantageous
Functional Nanomaterials	Synthesis of different functional nanomaterials, such as metal nanoparticles, metal oxide nanowires and carbon nanotubes for a range of applications including physical, chemical and environmental sensors, energy scavenging materials, low-cost transparent conductors and optoelectronic devices	Materials with physical dimensions reduced to the nanoscale (less than 100 nm) can exhibit markedly different properties compared to those on larger length-scales. This is mainly a result of the massively increased fraction of atoms that are at the surface of the material or the confinement of charge carriers on length scales similar to their quantum mechanical wavelength. Much of the interest in nanotechnology stems from these unique quantum and surface phenomena that matter exhibits at the nanoscale. As the majority of the atoms in these nanostructures are a short distance from the surface, the optical and electrical properties of these systems can be strongly modified by changes in their environment, allowing a host of applications particularly in sensing. In recent years the techniques for growing and fabricating nanoscale materials have matured significantly, to the point where researchers are able to tailor their properties toward particular applications, allowing the production of truly functional nanomaterials, which utilize these properties and allow the fabrication	Dr Muhammad Kashif	kmuhammad	Strong interest and passion in research. Some basic programming knowledge (Fabrication, Structural and Electrical Characterization) is advantageous

		of range of new and exciting technologies. Synthesis of different functional nanomaterials, such as metal nanoparticles, metal oxide nanowires and carbon nanotubes for a range of applications including physical, Bio, chemical and environmental sensors, energy scavenging materials, low-cost transparent conductors and optoelectronic devices			
Energy Conversion	The research has focused on two fundamental aspects; Photovoltaic devices for converting solar radiation to electricity and light emitting diodes (LEDs) converting electrical energy to optical radiation with high efficiency	Photovoltaic device research has been conducted on a number of themes. The research ranges from inorganic material based thin film semiconductor solar cells to fourth generation organic-inorganic hybrid thin film devices. The research is concentrating on utilizing the advantages of organic and inorganic material systems in hybrid photovoltaic systems, using its core expertise in nanotechnology. Graphene/ Carbon nanotubes are utilized in these novel device architectures, as solution processable, flexible electrodes for photo-generated charge collection and transport. Further, inexpensive nanostructured material systems such as zinc oxide are also being explored for charge collection and transport to the electrodes. The research is aimed at improving the efficiencies of solution processable thin film photovoltaics, while keeping the potential cost low in utilizing printing technologies, which are on the verge of becoming a commercial reality, in a commercially relevant approach, applying large area photovoltaic mini-	Dr Muhammad Kashif	kmuhammad	Strong interest and passion in research. Some basic programming knowledge (Fabrication, Structural and Electrical Characterization) is advantageous

| | | modules. | | | |

Chemical and Energy Sustainability Engineering

Research Area	Title	Project Description	Supervisor	Email (@unimas.my)	Requirement for applicant
-	-	-	-	-	-