FINAL YEAR PROJECT TITLES FOR ACADEMIC YEAR 2016/2017

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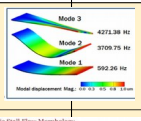
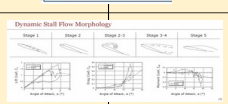
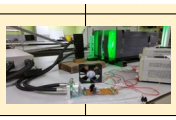
No	Title	Synopsis	Requirement	Remarks	Lecturer/ Research Area
SYSTEM & DESIGN					
1	Fabrication and hardware development of retractable directional antenna for stationary ground station.	This project will fabricate and develop hardware for pan tilt mechanisms of retractable directional antenna for USM Space System Laboratory (USSL) ground station.	Interest in Mechanical Design and Electronic Design.	Taken	Dr Nurulasikin / System Design
2	Development of 3-DOF rotational motion platform for dynamic simulator.	This project will develop 3-DOF platform mechanism for dynamic simulator and simulate the system in 3D motion.	Interest in Mechanical Design and CATIA.		Dr Nurulasikin / System Design
3	Development of a Remotely Piloted Airship System.	This project will develop electronic hardware and firmware for Remotely Piloted Airship System and perform ground/flight test.	Interest in Electronic, microcontroller and C++ software.		Dr Nurulasikin / System Design
4	Parameters Optimization For Enhanced Visual Tracking	▪ Process of tracing, classifying and determining the dynamic configuration of one or many moving objects in each image frame ▪ Estimates the trajectory of an object ▪ Tracks the object over sequences of image			Dr Parvathy
5	An Enhance Image Segmentation for Object Recognition	To develop a hybrid algorithm that integrates evolutionary algorithm with existing image segmentation algorithm. The idea of hybridizing may refined the segmentation quality by providing the anti-noise ability. In addition, it initializes the cluster centers optimally, thus faster segmentation.			Dr Parvathy
6	Path Planning for a Perpetual Solar-Powered Flight across Regions around the World	The idea of the study is to elevate the ability of conventional solar-powered unmanned aerial vehicle (UAV) for use as a satellite or commonly known as pseudo-satellite (pseudolite). However, any solar-powered systems require extensive mission operation planning to ensure power obtained able to sustain a level flight. Thus, in this study, the best UAV configurations are simulated at various locations around the world to determine the feasibility of a solar-powered UAV to sustain continuous non-stop mission.			Dr Parvathy
7	Commissioning of the Ground Control station for HAB System	This project will conduct software- hardware integration for HAB Ground control system. Student also need to improvise the GUI of the system, develop a ground control mobile apps, conduct functionality test and prepare detailed user manual .	Basic knowledge in programming, embedded system/electronics and spacecraft subsystem design.	Student will use Visual Basic and C# for software improvement. This project will participate in INNOVATE 2017 (Microsoft Track)	Dr. Norilmi / Spacecraft Design
8	Dynamics of Airship-drone System	This study will develop a mathematical modelling of an airship-drone system. Student will investigate the dynamics of the model and conduct a parametric study.	Knowledge in programming (MATLAB / Mathematica),		Dr. Norilmi / Spacecraft Design
9	Design Analysis and Fabrication of MYSat Structure	This project will conduct a design analysis on the MYSat's structure. The design optimization will be applied and proceed with fabrication of prototype model. This project includes design verification by conducting mechanical test on the prototype.	Knowledge in Solidwork/ Catia and ANSYS		Dr. Norilmi / Spacecraft Design
10	Modeling of electromagnetic wave propagation in lower ionosphere using Finite Difference Time Domain method	This project will develop programming to model electromagnetic propagation lower ionosphere to study the characteristic of the vertical electric field	Skills in computer programming (Matlab / Mathematica / Fortran / C++). Good fundamental in Mathematics is an advantage.	Hardworking and able to work with less supervision	Siti Harwani / Space environment modeling
11	Space mission characterization and analysis for university Cube-sat	In order to send a spacecraft to orbit, we need to design a mission that reliable and low cost. This study needs to analyze qualitative mission objectives for Cube-sat, mission requirements and constraint. Finally we will be able to finalize good mission objectives that will meet all the requirements.	Have a good analytical and critical thinking skills. Good writing skills	Hardworking and able to work with less supervision	Siti Harwani / Space mission and analysis design
12	Modelling of ionosphere behavior prior to large earthquakes	This topic will cover the ionosphere parameter study for precursor of earthquake. The objectives of this study included data analysis from Envisat database and identify the anomalous behavior in several ionosphere parameters.	Have a good analytical and critical thinking skills.	Hardworking and able to work with less supervision	Siti Harwani / Space environment modeling

13	Aerial Image of Monitoring USM Campus Surrounding Area for Traffic Congestion Problems	Collaboration work with School of Biology, Main Campus	1. Capable to use Solid Work 2. Have a skill in ansys software 3. Knowledge in selection of material	Matlab and Solid Works	Dr Elmi / Control Group,ISI LAB
14	Hybrid Structure of Experimental Testbed unit for Otto Cycle Engine Analysis	Collaboration work with Department of Mechanical Engineering, UiTM	1. Capable to use Solid Work 2. Have a skill in ansys software 3. Knowledge in selection of material	Matlab and Solid Works	Dr Elmi / Engine Group, ISI LAB
15	Feature Classification for AeroComposite Panel Defects Detection using Motion Image	Collaboration work with Aerospace Industry	1. Understand in Manufacturing Tools. 2. Programming Skill	Matlab (Image Procesing, Feature Analysis)	Dr Elmi / Inspection Group, ISI LAB
16	Manufacturing Tools for Process Improvement in Aerospace Industries; A case study and Solution.	Collaboration work with Aerospace Industry	1. Understand in Manufacturing Tools. 2. Programming Skill	Matlab(Database Management)	Dr Elmi / Mfg Group, ISI LAB
17	Evaluating combustion characteristics of biomass liquid jet fuel using different type of atomisers	This study is designed to evaluate combustion characteristics such as spray penetration, droplet size distribution, and flame structure of biofuels in a simple combustion chamber equipped with various types of atomisers. The evaluation will be performed using FLUENT. At the end of the study, the effect of fuel atomiser and fuel properties on combustion characteristics will be observed.	1.Simulation using Fluent 2. Knowledge in Chemical properties		Dr Nurul Musfirah
18	Exploring the effect of ambient condition and engine deterioration for aircraft powered with bio-jet fuel	This study is to investigate how deterioration will effect upon aircraft operational effectiveness such as net and specific thrust, fuel usage as well as it's effect upon creep life and pollution generation. Upon completing the study, student should learn to model and evaluate the engine using Gas Turbine Simulation Program (GSP). Student also should be able to relate fuel properties with phenomenon related to deterioration and the effectiveness of the gas turbine operation.	1. Simulation using Gas Turbine Simulation Program (GSP) 2. Knowledge in Chemical properties		Dr Nurul Musfirah
19	UAV path-planning algorithm and hardware developments for agricultural monitoring activities.	To develop a path planning algorithm that is not only run in simulation mode, but also able to perform in real-world environment using a quadcopter. (MATLAB/Arduino/Rasberry Pi/Quadcopter) Note : The student has a chance to enter The Innovate Malaysia 2017.		The student may refer to my previous FYP projects for better understanding.	Dr Ahmad Faizul
21	Design and develop a hardware controller for USM's Iron bird.	This research is to develop a controller for the USM's Iron Bird. The Iron Bird model has been designed and in this research, the student has to develop the controller using Arduino/Motorola or any controller board to link the motion from simulation into the real motion of the Iron Bird. Note : The student has a chance to enter The Innovate Malaysia 2017.		The iron bird aircraft model is currently in the Flight Mechanic Lab	Dr Ahmad Faizul
21	Design an Active Noise Cancelling (ANC) to suppress the noise - to study the noise level within the enclosed cabin.	Our world is full of noises, finding a quiet & confortable place such as in a classroom, train cabin is getting difficult. This research is to develop a device /controller to suppress the noise so that the noise level inside the cabin can be reduced. Note : The student has a chance to enter The Innovate Malaysia 2017 and also commercialize the product.		The ANC is currently becoming a luxury feature for high-end cars such as e.g. rolls-royce or luxury headphones e.g., BOSE.	Dr Ahmad Faizul
FLUIDS					
22	Investigation and Optimization of the Propeller Performance for Indoor Flight	The goal of this project is to understand the dynamics of indoor flight propellers and optimize their performance through detailed experimental study of different propeller designs and powerplant options.			Dr Ahmad Zulfaa
23	Investigation and Optimization of the Design and Performance of Indoor Planes	The goal of this project is to understand the influence of design parameters on the flight performance of indoor airplanes and improve their flight times through detailed experimental study of different airplane designs.			Dr Ahmad Zulfaa
24	Modeling and Simulation of the Free-flight of Indoor Airplane Models	The goal of this project is to understand and model the flight dynamics of indoor airplanes and simulate their flight trajectories through detailed numerical study.			Dr Ahmad Zulfaa
25	Studies on laminar and turbulent Reynolds number for standardized nasal cavity	Experimental studies to identify the standard Reynolds number to differentiate laminar and turbulent flow for nasal cavity. Previous researches implemented Reynolds number for flow inside cylinder as reference which is <2000 for laminar. However, nasal geometry is curvaceous and new standard Reynolds number for laminar and turbulent need to be identified.	Students will need to simplify the current 3D model to get better view, then build the 3D model via 3D printing from supplier and perform the experimental works to capture the flow via relevant methods.		Dr Lee Chih Fang
26	Computational studies on nasal model of patient with septal deviation	Development of 3D model from CT scans obtained from AMDI, using MIMICS or other relevant software into CATIA V5 model. Then modification to be performed in CATIA before exporting to ANSYS for meshing and then, running the airflow simulation to get detailed overview on the patient with septal deviation.	Students will be required to analyze the impact of the diseases by comparisons with healthy standardized model.		Dr Lee Chih Fang
27	Nasal airflow simulation of patient with allergy rhinitis	Development of 3D model from CT scans obtained from AMDI, using MIMICS or other relevant software into CATIA V5 model. Then modification to be performed in CATIA before exporting to ANSYS for meshing and then, running the airflow simulation to get detailed overview on the patient with allergy rhinitis.	Students will be required to analyze the impact of the diseases by comparisons with healthy standardized model.		Dr Lee Chih Fang
28	Investigation on nasal airflow of patient with nasal polyps	Development of 3D model from CT scans obtained from AMDI, using MIMICS or other relevant software into CATIA V5 model. Then modification to be performed in CATIA before exporting to ANSYS for meshing and then, running the airflow simulation to get detailed overview on the patient with nasal polyps.	Students will be required to analyze the impact of the diseases by comparisons with healthy standardized model.		Dr Lee Chih Fang

29	Developments of Residual Distribution Methods to Simulate Tsunami Flow	The work involves rigorous mathematical and code developments to predict tsunami flow. The work will be extending the current in house research code, and will require the use of Maple or Mathematica to perform the mathematical analysis.	A very challenging topic. The student must have a solid background in aerodynamics and enjoy doing mathematics and computer programming.		Dr Farzad
30	Verification and Validation of In-House CFD Research Code	This research requires testing of the in-house research code solving three dimensional fluid flow problems. It involves setting up various problems, performing the meshing, running the code, extract the data and analyze the results using Tecplot software.	Must at least know C++ programming and comfortable with the flow physics of simple aerodynamics problems. Intermediate level of difficulty.		Dr Farzad
31	Including Turbulence-Model in In-House CFD Research Code	To implement RANS-type of turbulence model in the Residual-Distribution in-house CFD code. The work requires extensive code development and validation.	Must enjoy programming and have some knowledge of turbulence flow. Intermediate level of difficulty.		Dr Farzad
32	Experimental Study on Wind Turbine Ventilator performance for USM Engineering campus	This project focuses on airflow rate measurement of wind turbine ventilator to best suit our USM Engineering campus environment. It requires the student to establish an experimental setup to measure the airflow rate, capture the flow images (smoke wire, camera,), analyze the performance and propose for further improvement if necessary.	Strong Aerodynamics background; CAD skill; Hands-on skill; Good with video/camera; Independent; Like to explore new things; Must be physically fit to climb on top of the wind tunnel test section for set up.	Involves wind tunnel testing	Dr Noorfazreena / Aerodynamics
33	Design and Development of Glider Launcher	This project aims to design and develop a glider launcher to be used for ESA 244 class project. It requires the student to analyze the existing glider launcher, improvise, fabricate and design a new and practical glider launcher.	High interest in Aerodynamics; CAD skill; Hands-on skill; Independent; Like to explore new things; Must be physically fit to work under the sun/windy condition around the campus	Involves field testing under hot sun/rain	Dr Noorfazreena / Aerodynamics
MATERIALS & STRUCTURES					
34	High Temperature Mechanical Properties of Bio-Composite Materials.	1. To manufacture bio-composite materials. 2. To perform high temperature mechanical test on the bio-composite materials. 3. To evaluate the performance of the bio-composite materials at high temperature.	Composite materials manufacturing and experimental testing.	Must be hardworking, punctual and disciplined.	Dr. Aslina / Composite materials
35	Post-fire Mechanical Properties of Sandwich Composite Materials.	1. To manufacture sandwich composite materials. 2. To perform post-fire test on the sandwich composite materials. 3. To evaluate the post-fire performance of sandwich composite materials.	Composite materials manufacturing and experimental testing.	Must be hardworking, punctual and disciplined.	Dr. Aslina / Composite materials
36	High Temperature Properties of Composite Laminates due to Fuel Attack.	1. To manufacture composite laminates materials. 2. To measure the moisture uptake of the laminates due to fuel immersion. 3. To perform high temperature mechanical test on the composite laminates. 4. To evaluate the performance of the composite laminates at high temperature due to fuel attack.	Composite materials manufacturing and experimental testing.	Must be hardworking, punctual and disciplined.	Dr. Aslina / Composite materials
37	Development of wind turbine blades utilizing bio-composites.	Wind turbine blades are traditionally manufactured using carbon fibre reinforced polymer (CFRP) composites which are often very expensive. This research project will explore the usage of natural fibres and bio-composite hybrids as the sustainable substitutes to the CFRP composites.			Dr Mohd Shukur Zainol Abidin
38	Development of crash resistance car bumpers based on bio-composites and hybrids.	Car bumpers are designed to sustain impact force and damage. This project will explore the viability of using natural fibre as the replacements for commercially available glass reinforced composites.			Dr Mohd Shukur Zainol Abidin
39	Constituent measurements and mechanical properties of natural fibre reinforced composites.	The mechanical and physical properties of composite are highly governed by the fibre, matrix and void content. However the traditional methods such as composite burn off and acid digestion are not compatible with bio-composite materials. This project will explore novel methods to evaluate the constituents of various bio-composites.			Dr Mohd Shukur Zainol Abidin
40	Helicopter Main Rotor Blade	Design, analysis and fabricate		Already taken	Dr A Halim
41	Adjustable Engine Mount for Ultralight Helicopter	Design, analysis and fabricate		Already taken	Dr A Halim
42	Development of FEM Code Using Beam Element for Dynamic Analysis	Project task : i) Develop FEM code that can estimate the natural frequencies, mode shapes and amplitude responses of a cantilever beam structure.			Dr. Norizham
43	Parametric study of pitching airfoil using Leishmann Beddoes Dynamic Stall Model	Project task : i) The project objective is to study the effect of pitch amplitude and frequency on lift and moment coefficient. The project will employ semi empirical unsteady aerodynamics flow model that can capture dynamic stall phenomena.			Dr. Norizham
44	Evaluation of Dual Coloured Particle Image Velocimetry	Project task : i) Develop dual coloured illumination system for flow field measurement. Student will modify the current setup (single colour) to accommodate dual colours.			Dr. Norizham