

## Why Pursue Master of Science in Engineering (Aeronautics) at UPNM?

• UPNM is the first higher learning institution in Malaysia that offers Master of Science in Engineering (Aeronautics) program blended with defence and security elements.

• The syllabus has been designed similar as courses available at The Institut Supérieur de l'Aéronautique et de l'Espace (ISAE-SUPAERO), France.

• Prospective students will get first hand exposure from lecturers with military background.

• UPNM/ATMA have more than 20 years experience in conducting tertiary academic programs with qualified lecturers.

## Entry Requirement

A bachelor's degree in either Engineering or Science with minimum CGPA of 2.5 or equivalent, from UPNM or any university recognised by the Government of Malaysia. Candidate with a CGPA lower than 2.5 must have sit for internal assessment;

or

Other qualifications that are recognised by the Senate that is obtained through Accreditation of Prior Experiential Learning (APEL) or Recognition of Prior Learning (RPL);

and

Other requirements as required by the programme where applicable.

## Contact Us

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## Course Structure\*

First Semester		
Course Code	Course	Credit
PPS4201	Research Methodology	1
MAE4923	Advanced Mathematics	3
MAE4314	Aircraft Structures & Modeling	4
MAE4334	Structures and Vibration	4
MAE4413	Advanced Flight Dynamics and Control	3
MAE4703	Research Project Proposal	3
		<b>Credit 18</b>
Second Semester		
MAE4513	Propulsion	3
MAE4123	Aircraft Materials and Structures	3
MAE4614	Advanced Aerodynamics	4
MAE4813	Aircraft Design Project	3
MAE4706	Research Project Paper	6
		<b>Credit 19</b>
Short Semester		
MAE4912	Revolution Military Affair	2
MAE4422	Aircraft Control - Guidance	2
MAE4622	Flight Characteristics	2
		<b>Credit 6</b>

\*Suggestion for one (1) year completion (FULL TIME)

### Mode of Learning

Coursework with lectures, lab work, projects and a dissertation.

Must complete 43 credits.

### Tuition Fee

Full Time  
Local student - RM12,800.00  
International student - RM21,250.00

### Duration of Programme

Full-time : 1-3 years  
Part-time : 2-6 years



UNIVERSITI PERTAHANAN NASIONAL MALAYSIA  
KEWAJIPAN, MARUAH, INTEGRITI

# Master of Science in Engineering (Aeronautics)

(Coursework Mode)

Faculty of Engineering



## Course Synopsis

### Research Methodology

This course introduces students to requirements of research, which is the core necessity of any piece of work or idea. The subject scope encompasses research methods, research life cycle and processes, identifying problem area of research, formulating research methodology, tools for experimentation and analysis of findings, conducting and managing investigation and experiments, intellectual rights and discussions on prevailing issue in research.

### Advanced Mathematics

Advanced engineering mathematics will cover from differential equations until complex analysis with MATLAB being embedded inside the course. The aim is to increase the students competency in assimilating any engineering problems using MATLAB as a tool.

### Aircraft Structure And Modelling

This course addresses the load cases and load-calculation methods applied to aircraft structures under present-day requirements. This course also presents the main functions of the computer aided design (CAD) software using either CATIA or Solid Works, which is widely used in the aeronautical engineering. This course will also cover the finite element method (FEM) using PATRAN-NASTRAN which considers aeronautical structure-oriented applications.

### Structures And Vibration

This course presents the hypotheses and gives the conditions in which thin - and thick-shell theories are used for aeronautical applications. This course also presents methods for modal analysis. The theory is applied to real systems and put into practise by exercises and lab works (simulations on the computer).

### Flight Dynamics And Control

Dynamics systems refer to systems evolving and represent a broad class of systems. The modern theory of dynamics systems deals with fundamental questions concerning the stability and performances. This course introduces the representation of dynamical systems in the time-domain and the frequency domain, tools for analysis and the servo-loop control theory.



### Research Project Proposal

This course introduces students on how to do research, identify problems, propose solutions to problems, formulate objective of the research and gather relevant information with regard to the problem. Research topics will covering various engineering areas related to military and defence industries.

### Propulsion

This course addresses the study of a wide range of theories, methods and tools used in propulsion. This course will also address optimisation of engine concerning flight conditions and off-design conditions.

### Aircraft Materials And Structure

The course describes the relationship between structural requirements and engineering properties as well as standard methods for testing related mechanical properties such as strength, creep, fatigue, toughness and impact resistance. Students will be exposed to the metallic and non-metallic material use in aeronautical applications and the behaviour of these materials when subjected to loading. At the end of the course, a case study will be used to introduce failure analysis involving composite material, enable students to perform fabrication process of composite components and finally analyse by applying inspection and maintenance methods widely used in airframe repair.

### Advanced Aerodynamics

This course introduces the central theoretical and experimental concepts of aerodynamics applied to canonical geometries, such as airfoils, three-dimensional wing, and flight at low and high speed flow. This course will also introduces the Computational Fluid Dynamics (CFD) through the usage of commercially available software.

### Aircraft Design Project

This course allows students to emphasis step by step design of aircraft structures, apply the concepts and methods presented in other courses. It is intended to provide to realistic understanding of the design process and how to manage a project.

### Research Project Paper

This course introduces students on how to do research, identify problems, propose solutions to problems, formulate objectives of the research and gather relevant information with regard to the problem. It will expose students on literature survey in order to understand the nature of the problem and investigate work done by other researchers in line with their research. This course will also provide a platform for students to plan and manage their project within a stipulated time frame. Research topics will covering various engineering areas related to military and defence industries.

### Revolution in Military Affairs (RMA)

RMA Students will be exposed to current issues related to the RMA which includes among others the revolution in defence and military technologies including the management and operational issues.

### Aircraft Control And Guidance

This course concern the design of systems to control the desirable dynamic properties of an aircraft piloted along a flight plan. This course also gives an overview of main techniques for monitoring and guiding planes well as the Flight Management system which guides the aircraft along the flight plan.

### Flight Characteristics

This course addresses the study of fundamentals of aircraft flight quality. Control issues will be reviewed, along with practical control systems. Influence of aircraft flexibility will be explored concerning the impact on aircraft dynamic behaviour. Finally, tail plane surface sizing will be inferred from issues mentioned above.

