## EMBRACE CHANGE IN THE CENTURY OF ENGINEERING 掌握變革 · 擁抱工程世紀

# MECHANICALAND AEROSPACE ENGINEERING



## What is Mechanical & Aerospace Engineering (MAE)?

Mechanical and Aerospace Engineering has developed into a broad and versatile set of disciplines covering most society-transforming technologies such as energy generation and storage, renewable energy systems, automotive engineering, advanced materials development and production, the built environment, precision engineering, design and manufacturing of engineering components and systems, sensors and actuators, automation systems, propulsion systems, aerodynamics and aeroacoustics.

OUR MISSIONS

To produce high quality ME and AE graduates with a global outlook and all-round capability

CURRICULUM

HIGHLIGHTS

University Core

Education

Engineering

Introductory

To produce outstanding ME and AE researchers with a global outlook and leadership potential

To instill an innovative departmental culture embraced by all stakeholders

## Why MAE?

### The MAE Department provides:

- A unique curriculum which integrates fundamental principles and hands-on laboratory experience;
- State-of-the-art laboratories and computing facilities: students can design, practice and experiment;
- World-class academic innovators;
- Wide range of career opportunities

(QS World University Rankings by Subject 2019 : Engineering - Mechanical, Aeronautical & Manufacturing)

## Fruitful Student Life

Developing students' personal and professional skills and fostering innovative thinking are significant elements of our program. Apart from study, a variety of outreach programs, including co-op programs, international exchanges, mentorship programs, activities organized by the Mechanical and Aerospace Engineering Students Association (MAESA), the Aero Team, the American Institute of Aeronautics and Astronautics (AIAA) Student Branch at HKUST and the Institution of Mechanical Engineers (IMechE) Student Chapter at HKUST, etc., are available to students for enriching their university life and advancing their soft skills. Therefore, our graduates are highly sought after by leading companies for their strong analytical skills, competence and innovative mindset.

## Mechanical Engineering Foundation and Core Courses Fundamental Knowledge

### Basic Electronics

- Mechanism of Machinery
- Statics & Dynamics

### Core Study

- Design
- Mechanics & Materials

### Practical

- Final Year Design Project
- Industrial Training & Labs

## Overseas Exchange

Internships & Co-op Program

International Competitions

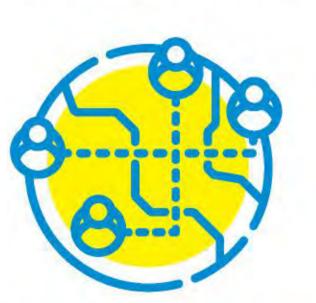
In-depth Option

Research Option

## Career Prospects

### Diverse Career Opportunities

The key employment sectors for BEng in Mechanical and Aerospace Engineering graduates are:











Design and Manufacturing



Others
(strategic business analysis and start-ups)

## Alumni Sharing

Ms Chan Lok Sang, Yoyo Class of 2012 Chief Engineer in Operating Department Shun Tak - China Travel Ship Management Ltd

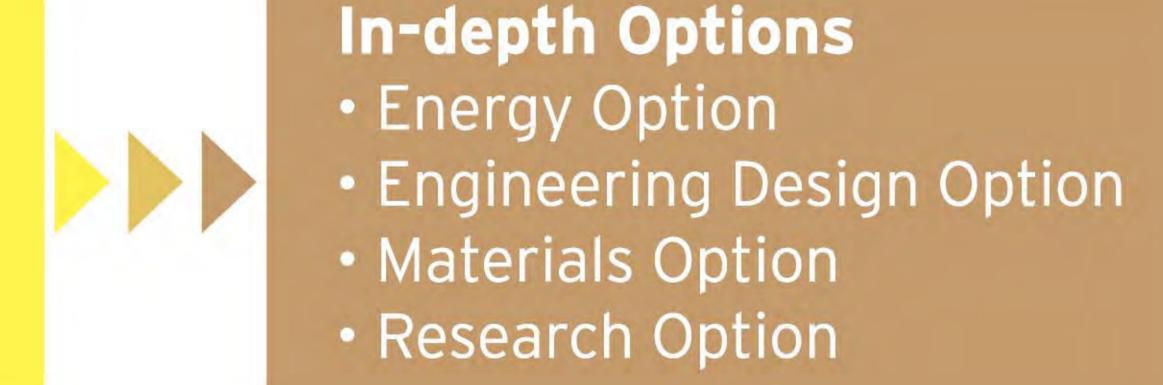
Many people who work at sea agree; 'Merchant navy is not a job, but a lifestyle'. Working and living on foreign-going merchant navy ships is nothing anyone on shore could easily imagine. Being a marine engineer onboard one not only has to operate and maintain everything in a miniature society under a very robust and demanding environment, but the part where one has to stay away from home and most other connections for 6

months makes this career very challenging. I am very thankful to HKUST for giving me various opportunities which widened my horizon, and I am even more thankful to the MAE department for having encouraged and introduced us different career prospects; I would not have become a proud sailor otherwise.

### Mr Wong Man Hang, Henry Class of 2014 Graduate Engineer Cathay Pacific

Being an avid aviation enthusiast, I found my sense of belonging in this university. HKUST not only has experienced professors and teaching staff, but also offers unlimited opportunities to students with passion in this field. As international exposure is conducive to students' career development, HKUST endeavors to provide a blend of

overseas exchange and internship opportunities for students to broaden their horizon. I was fortunate enough to intern at Boeing and Cathay Pacific during my school time. These internships fortified my aviation interest and laid a solid foundation for my career.













### Mechanical and Aerospace Engineering





Engineering involves the acquisition and application of scientific, mathematical, economic, social, and practical knowledge to solve problems in our daily lives. Engineering is everywhere in the world around us.

Mechanical Engineering is one of the earliest branches of engineering, which has been traditionally associated with power generation, mining, machinery, and manufacturing, design, development, construction, and early testing of aircraft and space vehicles. Examples of the different aspects of mechanical engineering that have transformed our society include automobiles, aircraft, rockets, spacecraft, ships and submersibles, robots, wind turbines, material coatings, offshore structures, refrigeration systems, and manufacturing systems.

Aerospace engineering is a significant branch in Mechanical Engineering; it deals with the design, development, construction, testing and all technological aspects of aerial and space vehicles, such as aircraft and spacecraft. It includes broad disciplines of aeronautical engineering and astronautical engineering, covering the operation of these vehicles both within the earth's atmosphere and beyond.

In practice, mechanical and aerospace engineers conceive, plan, design and direct the manufacture, distribution, and operation of a wide variety of devices, machines, and systems used for energy conversion, environmental control, materials processing, transportation via air, space and land, and the manufacture of consumer products.

#### Why HKUST MAE?



A unique curriculum
which integrates
fundamental principles and
hands-on laboratory
experience



State-of-the-art laboratories and computing facilities: Students can design, practice and experiment



World-Class Academic Innovators



Wide range of career
opportunities:
Transportation,
Building and Infrastructure,
Energy and Environment,
Design, Manufacturing,
Aeronautics, and
Astronautics

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To enhance students' communication skills and widen their exposure to the industry, HKUST MAE provides a wide range of enrichment activities.

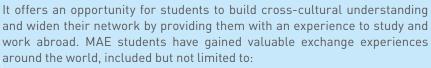
#### **Co-Op Programs**

The credit-bearing program enables the final year students to gain practical work experience and valuable engineering design opportunities in the engineering sector. MAE students have gained valuable experience in:

- China Aircraft Services
- CLP
- Compass
- HAECO
- HAESL
- HK Ferry
- Jardine Group (JEC)
- Johnson Controls
- MTR Corporation
- Ove Arup & Partners (HK)
- SAE
- Towngas
- UGL



#### **International Exchange Program**





- University of California Berkeley, USA
- Georgia Institute of Technology, USA
- University of Michigan, USA
- University of Minnesota, USA
- INP Grenoble, France
- Royal Institute of Technology, Sweden
- Technical University of Denmark
- KAIST, Korea
- Kyoto University, Japan
- National University of Singapore
- Tsinghua University, China



#### **Undergraduate Research Opportunities Program (UROP)**

UROP provides a unique opportunity for undergraduate students to engage in academic research to help them develop a broad and insightful perspective of their areas of interest.

#### **Industrial Training**

This training course aims to broaden students' understanding of engineering practice and enhance their appreciation of the knowledge acquired from the classrooms in a simulated industrial environment.

#### Mentorship Scheme

It offers students an early connection with industrial professionals from MAE related sectors for valuable insight and career advice. The scheme also brings invaluable long-term knowledge-sharing and friendship between mentors and mentees.





#### **ACCREDITATION BY HKIE**

The HKUST BEng in Mechanical Engineering and BEng in Aerospace Engineering are accredited by the Hong Kong Institute of Engineers (HKIE).

Graduates are qualified to join the HKIE formal training scheme in the related discipline offered by major Hong Kong companies. The training, plus a period of practical experience, can lead to the status of Professional Engineer.

#### **CAREER PROSPECTS**

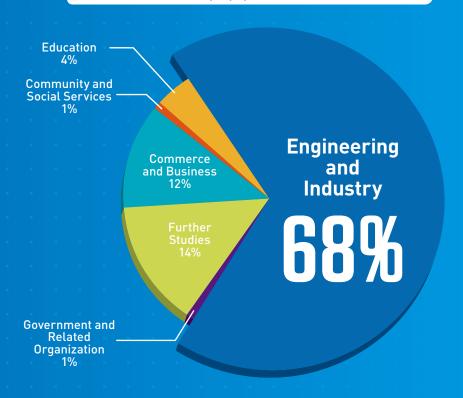
In Hong Kong, mechanical and aerospace engineers are in strong demand and are sought after by companies in sectors as diverse as utilities, transportation, infrastructure, the built environment, environmental services, precision design and manufacturing, and automation. There are also numerous work opportunities in strategic planning, management, and investment in advanced technology sectors. The careers of HKUST mechanical and aerospace engineers span the globe. Many of our graduates manage significant international projects, are employed in strategic management, or have become entrepreneurs.

Graduates may also consider pursuing further studies, i.e., M.Sc., M.Phil., or Ph.D. degrees at local and overseas Universities.



#### First Job of MAE Graduates-Class

(by Employment Sector)



#### **ADMISSION**

Under the 4-year School-based program, all students will be admitted to the Engineering School for their 1st year of study. Students will have at least one year to explore various programs before declaring their majors. Interested students should apply for MAE as a major through the major selection exercise.



Application via
School-based
Admission

Successful Admission in SENG Application for Enrolling in MAE via Major

Selection Exercise

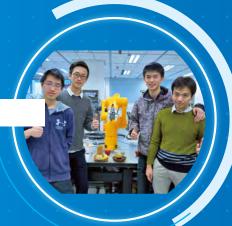
Year 1

Mechanical and Aerospace Engineering

Year 2 to 4







#### **HKDSE Entry Requirements**

#### The University requires

4C + 2X

(four core subjects plus two electives)

4C + M1/M2 + 1X

(four core subjects with Mathematics Extended Module 1 or 2 plus one elective)

#### **Direct-Entry Admission Applications**

Local students holding international qualifications, local sub-degree and post-secondary or other qualifications may apply for program enrollment via submitting applications through HKUST Online Application System.

Please visit http://join.ust.hk/ for more information about application procedure and important dates.

#### **ALUMNI SHARING**

#### Mr. Chu Chung Ki Bryan (Class of 2012)

Junior First Officer Cathay Pacific Airways



My interest in aviation stems from my teenage years. My major was Mechanical Engineering and being trained as an engineer not only equipped me with technical knowledge and analytical skills, it also highlighted the importance of being a team player which is crucial to my career. I was very fortunate to be offered a Co-op program opportunity with Hong Kong Aircraft Engineering Co. Ltd. in my final semester. It was a 6-month internship program which enabled me to gain working experience in an aviation company. Apart from academic studies, I joined the Hong Kong Air Cadet Corps No. 605 (HKUST) Squadron that offered weekly training, various flying scholarships and aviation programs. After graduation, I joined Cathay Pacific as a cadet pilot and I'm currently working as a Junior First Officer on the Boeing 777 fleet.

#### Ms. Chan Lok Sang Yoyo (Class of 2012)

Chief Engineer in Operating Department
Shun Tak - China Travel Ship Management Ltd [Turbojet]

Many people who work at sea agree; 'Merchant navy is not a job, but a lifestyle'. Working and living on foreign-going merchant navy ships is nothing anyone on shore could easily imagine. Being a marine engineer onboard one not only has to operate and maintain everything in a miniature society under a very robust and demanding environment, but the part where one has to stay away from home and most other connections for 6 months makes this career very challenging. I am very thankful to HKUST for giving me various opportunities which widened my horizon, even more thankful to the MAE department for having encouragintroduced us different career prospects; I would not have become a proud sailor otherwise. Though I have now shifted from Ocean going trade to River trade, I am proud to be a sailor and proud to have graduated from HKUST.



#### Mr. Chen Haoran Jeff (Class of 2015)

Cofounder and Chief Technical Officer Lumen Labs (HK) Limited



Studying in MAE at HKUST was a very rewarding experience. I had a strong interest in aeronautical engineering. Back at the time when I had just started my undergraduate study, myself and a couple other students who shared the same interests started the "Aeronautics Interest Group". With generous support from the department, the group grew from a few students to a 20 people student team who now participate in the annual International Design/Build/Fly competition.

The experience of starting up the student organization inspired me to take the path less travelled to start my own company immediately after I graduated. So, after graduation, I started Lumen Labs (HK) Limited and launched the world's first bicycle helmet with integrated lights and turn signals. In 2017 our company won the Design Museum Design of the year award as well as the Red Dot Design award. All these successes would not have been possible without the technical training that HKUST provides.

#### **CURRICULUM HIGHLIGHTS**

#### **Bachelor of Engineering in Mechanical Engineering**

The BEng (Mechanical Engineering) program is designed for students who aspire to become high-caliber Mechanical Engineering professionals in Hong Kong. The program integrates fundamental Mechanical Engineering principles and core science via theoretical learning and practical hands-on laboratory experiences. The curriculum is composed of a balanced coverage of Mechanics and Materials, Thermal and Fluids, Control and Design in the foundation year, accompanied by additional training to provide quantitative analytical skills. Mechanical Engineering students are expected to graduate with an interwoven body of theoretical and practical Mechanical Engineering knowledge that nurtures them to develop innovative engineering solutions.

#### **Bachelor of Engineering in Aerospace Engineering**

The BEng (Aerospace Engineering) program is designed for students who aspire to become high-caliber professionals in aeronautical and aerospace industries in the Pearl River Delta Region and beyond. The program covers all the fundamental aspects of the field, from aerodynamics, aircraft structure, propulsion and controls to aviation safety and also offers flexibility in choice of advanced core electives. Our curriculum not only emphasizes realistic engineering problems in aerospace and related areas, buť alső enábles students to apply advanced kňowledge and concepts to the interdisciplinary study of an overall system in their final year aerospace design project. Graduates are expected to pursue a professional career in the field pertinent to aircraft services, component manufacturing and maintenance.

- University Core Education
- Engineering Introductory Courses
  - Engineering Fundamentals

#### Mechanical Engineering Foundation and Core Courses

#### Fundamental Knowledge

- Basic Electronics
- Fundamental Design
- Statics & Dynamics

#### **Practical**

- Final Year Design Project
- Industrial Training & Labs

#### Core Study

- Design
- Mechanics & Materials
- Themofluids

#### Aerospace Engineering Foundation and Core Courses

#### Fundamental Knowledge

- Basic Electronics
- Fundamental Design
- Mechanics

#### Core Study

- Aerodynamics & Propulsion
- Aircraft Design
- Aircraft Structures

#### **Practical**

- Final Year Aerospace Design Project
- Industrial Training & Labs

#### **Indepth Options**

- Energy Option
- Engineering Design Option
- Materials Option
- Research Option



#### **Overseas Exchange**

**Internships** 

Co-Op



#### **Indepth Options**

Research Option

#### Minor in Aeronautical Engineering

Qualified students may apply to study for a minor program in addition to their major. The MAE Department offers a minor program in **Aeronautical Engineering**, which covers topics such as aerodynamics, aircraft structure, and aerospace systems. Graduates will be able to pursue a broad career in those areas.



#### **CONTACT US**

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