

Bachelor of Engineering (Hons) Materials and Manufacturing Engineering **KP/JPS(KA5911)06/10**

Materials engineers investigate how different materials can be most usefully applied in society, whilst manufacturing engineers take raw materials and basic components and turn them into products. This programme offers education and research for the development and application of new materials. It aims to provide graduates with an in-depth knowledge and understanding of the characteristics of various materials that are vital for Malaysian industry to adopt innovative manufacturing processes to give local products a competitive edge in the world market. It applies principles of the sciences and engineering to understand the characteristics of materials and manufacturing processes. Thus, this course contributes to the scientific knowledge and bridges the gap between modern chemistry and physical mass, manufacturing technology and mathematical analysis. The course structures and syllabuses are designed for graduates to be equipped with the essential technical knowledge and skills required by many companies and industries.

Programme Objectives

The Programme Objectives describe the career and professional accomplishments that the Materials and Manufacturing Engineering programme would prepares the graduates to achieve in a few years after their graduation. Programme of Materials and Manufacturing Engineering should be able to:

1. Provide students with the fundamentals of materials science and manufacturing engineering that will enable them to succeed in engineering practice and research, and in postgraduate studies.
2. Prepare students to work with high ethical standards and with an understanding of the role of engineering in the sustainable economy and the environment.
3. Provide students with the understanding of the value of life-long learning and Continuous Professional Development (CPD) and the ability to engage in further growth through activities such as continuing education and technical training.
4. Prepare students to assume technical leadership and managerial positions in industries that require their specialised knowledge of materials science and manufacturing engineering.

Programme Outcomes

Upon completing this programme, the student is expected to attain the following:

- i. Ability to acquire and apply knowledge of mathematics, science and engineering fundamentals in materials science and manufacturing systems;
- ii. Acquired comprehensive technical competence in materials science and manufacturing engineering to design and conduct experiments, as well as to analyse and interpret data;
- iii. Ability to identify, formulate, and solve engineering problems;
- iv. Ability to utilise systems approach to materials science and manufacturing design and evaluate operational performance;
- v. Ability to apply the materials science and manufacturing engineering principles of design for sustainable development;
- vi. Understanding of professional and ethical responsibilities and commitment to them;
- vii. Ability to communicate effectively in written, oral, and visual form, with engineers and the community at large;
- viii. Ability to function effectively as an individual and in a group with the capacity to be leader or manager;

- ix. Understanding of the social, cultural, global and environmental responsibilities of a professional engineer; and
- x. Recognising the need to undertake life-long learning, and possessing /acquiring the capacity to do so.

Careers

Graduates may seek employment in a wide range of manufacturing industries such as in process engineering and quality control in most production lines, R&D in various industries, materials related research in multinational companies and research institutes, semiconductor fabrications, nanotechnology and nano-materials, special metals and composites, new ceramics, sustainable energy and fuel cells, etc.

Subjects

Year 1

Circuit Theory
Computer Aided Design and Programming
English for Engineering
Statics
Engineering Thermodynamics I
Material Science
Solid Mechanics I
Manufacturing Technology I
Mathematics for Engineering I
Mathematics for Engineering II
Dynamics

Year 2

Fluid Mechanics I
Polymer Science and Technology
Electrical Machines
Signals, Circuits and Systems
Renewable Energy
Phase Transformations and Heat Treatment
Numerical Methods and Statistics
Industrial Automation and Computer-Aided Manufacturing
Industrial Engineering
Corrosion Engineering
Basic Economics, Accounting and Management

Year 3

Foundry Engineering
Process Control and Instrumentation
Heat and Mass Transfer
Engineering Ceramics
Materials Testing and Fracture Analysis
Physical Metallurgy
Law for Engineers
Industrial Training

Year 4

Engineering Composite Materials
Manufacturing Technology II
Quality and Reliability Engineering
Materials Selection and Alloy Design
Engineer in Society
Project

Elective Engineering Subjects* (Choose 2 subjects)

Computer Aided Design and Manufacture
Mechanics of Machines
Engineering Analysis
Artificial Intelligence
Computational Mechanics

Elective Engineering Related Subjects* (Choose 1 subject)

Project Management
Entrepreneurship
Management Principles

*Subject to change/availability

MQA Subjects

Bahasa Kebangsaan/Foreign Language
Pengajian Malaysia
Pendidikan Moral/Pengajian Islam

University Subjects

Co-Curriculum
Sun Zi's Art of War and Business Strategies