

## **Bachelor of Engineering (Hons) Biomedical Engineering** **KP/JPS(KA7016)07/11**

Biomedical Engineering is the application of engineering science and technology to the solution of problems in medicine and biology. It is also crucial in the design and development of medical equipment, connected health system and IT solution in the Healthcare Industries. Some of the applications include designing and producing artificial prosthesis and organs. This programme aims to produce biomedical engineering graduates in engineering design; biomedical treatment (engineering) and diagnostics; mathematical modelling; computational techniques and programming which include web and database skills and bioformatics; biomedical signal processing; medical imaging; biomechanics and biomaterials and biology for biomedical engineering applications in the clinical and healthcare industries.

### **Programme Objectives**

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

1. Establish a successful career either in managerial or technical leadership in biomedical engineering or related fields in industry and other organizations where an engineering approach to problem solving is highly valued.
2. Contribute significantly in a multidisciplinary work environment with high ethical standards and with an understanding of the role of engineering in the economy and sustainable development.
3. Excel in graduate study and research, reaching advanced degrees in engineering and related disciplines.
4. Achieve success in professional development through life-long learning and affiliated to internationally recognised professional bodies.

### **Programme Outcomes**

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

- i. Acquire and apply knowledge of fundamentals of engineering, biological and physiological based on the integration between information engineering, industrial engineering, medical and biological culture;
- ii. Demonstrate in-depth technical competence in the biomedical engineering discipline;
- iii. Undertake problem identification, formulation and solution;
- iv. Utilise a systems approach to design and evaluate operational performance;
- v. Understand the principles of sustainable design and development;
- vi. Communicate effectively, not only with engineers and medical clinicians but also with the community at large;
- vii. Understand the professional and ethical responsibilities and commitment to them;
- viii. Acquire interpersonal skills for both independent practice as a leader or manager and for effective team-working;
- ix. Understand the social, cultural, global and environmental responsibilities of a professional engineer and the need for sustainable development;
- x. Acquire expectation of the requirement to undertake lifelong learning and possessing the capacity to further broaden their cultural knowledge.

## **Careers**

Biomedical engineers may have job responsibilities such as designing new medical monitoring, diagnostic and therapeutic equipment, specifying setting-up and maintaining biomedical equipment, evaluating the safety, efficiency and effectiveness of equipment, planning data processing services and the development of associated computing programmes, analysing new medical procedures to forecast likely outcomes, designing and delivering technology to assist people with disabilities, and designing and developing equipment for medical imaging to display anatomical details or physiological functions. Biomedical engineers have the prospects of being advisors for marketing departments of companies and even hold management positions.

## **Subjects**

### **Year 1**

Mathematics for Engineering I  
Anatomy and Physiology I  
Thermo-Fluids I  
Structural Biochemistry  
Statics  
Basic Electronics  
English for Engineering  
Circuit Theory  
Engineering Computing  
Material Science

### **Year 2**

Mathematics for Engineering II  
Anatomy and Physiology II  
Thermo-Fluids II  
Signals, Circuits and Systems  
Digital Electronics  
Dynamics  
Numerical Methods and Statistics  
Computer Aided Design and Programming  
Electrical Machines  
Biomechanics I  
Analogue Electronics  
Artificial Organs  
Mini Project

### **Year 3**

Process Control and Instrumentation  
Biomaterials  
Medical Imaging  
Engineer in Society  
Industrial Training  
Basic Economics, Accounting and Management

## **Year 4**

Project  
Microprocessor and Microcontroller Systems  
Safety Design in Medical Devices  
Artificial Intelligence  
Project Management  
Law for Engineers

### **Elective Engineering Subjects\* (Choose 4 subjects)**

Industrial Automation  
Biomechanics II  
Biosensors  
Nuclear Medicine  
Computational Mechanics  
Electromagnetics & Superconductivity  
Cell & Tissue Engineering  
Molecular Biology  
Neurobiology

\*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