

## **Bachelor of Engineering (Hons) Mechatronics Engineering** **KP/JPS(KA7017)07/11**

Mechatronics engineering is an emerging field of engineering that integrates mechanical engineering, electronics, and computer engineering and information technology. It includes robotics and automation systems, precision engineering, micro electromechanical systems (MEMS) and many other leading-edge technologies. The core activities within mechatronics focus on the development and integration of intelligent sensors, industrial automations, robotics, actuators, microsystems and advanced decision-making and control strategies. This programme is meticulously designed in response to the rapid growth of interest in mechatronics and precision engineering. It aims to produce graduates who demonstrate capabilities as effective problem solvers and are knowledgeable in applying logical, critical and creative thinking to a range of challenges and problems. They will also display effective communication skills, be able to integrate well into the industry and contribute positively as a professional to the community.

### **Programme Objectives**

The Programme Objectives describe the career and professional accomplishments that the Mechatronics 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 mechatronics 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. Ability to acquire and apply knowledge of science and engineering fundamentals;
- ii. Acquired in-depth technical competence in precision engineering, control theory, computer science, mathematics and sensor technology to design enhanced or 'smart' products, processes and systems;
- iii. Ability to undertake problem identification, formulation and solution;
- iv. Ability to utilise systems approach to design and evaluate operational performance;
- v. Ability to apply to the principles of mechanical systems and electronics engineering for sustainable development;
- vi. Understanding of professional and ethical responsibilities and commitment to them;
- vii. Ability to communicate effectively, not only with engineers but also with the community at large;
- viii. Ability to function effectively as an individual and in a group with the capacity to be a 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**

Mechatronics engineers can work in any industry that develops, uses, designs or manufactures integrated and 'smart' devices. Opportunities exist in manufacturing, research and even sales and marketing. Mechatronics devices consist of products in medicine and surgery, agriculture, buildings, homes, automobiles, toys, intelligent aids for the elderly and the disabled, and in the entertainment industry. The UTAR Mechatronics Engineering focuses on the precision engineering that covers equipment makers, tooling, precision products and precision processes.

## **Subjects**

### **Year 1**

English for Engineering  
Manufacturing Technology I  
Dynamics  
Mathematics for Engineering I & II  
Digital Electronics  
Basic Electronics  
Statics  
Computer Aided Design and Programming  
Engineering Thermodynamics I  
Circuit Theory  
Introduction to Electrical Machines and Power Systems  
Basic Economics, Accounting and Management

### **Year 2**

Mechanical Engineering Design I  
Computer Aided Design and Manufacture  
Signals, Circuits and Systems  
Analogue Electronics  
Fluid Mechanics I  
Numerical Methods and Statistics  
Artificial Intelligence  
Microprocessor and Microcontroller Systems  
Law for Engineers

### **Year 3**

Control Systems  
Process Control and Instrumentation  
Automation and Robotics  
Project Management  
Industrial Training  
Engineer in Society  
Entrepreneurship

## **Year 4**

Digital Control Theory  
Power Electronics and Drives  
Embedded System Design  
Modelling of Mechatronics Systems  
Machine Vision  
Project

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

Mechatronics System Design  
Mechanics of Machines  
Quality and Reliability Engineering  
Mini Project  
Kinematics and Dynamics of Robot  
Mechanical Vibrations

\*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