Automotive and Robotics Engineering

Introduction

As part of Computer Engineering, this program helps students develop the ability to analyze, design and build mechanical and automated electronic systems for automotive parts and manufacturing processes using design tools used in global industries today. It includes the design and development of 3D mechanical systems, electronics and computer systems, robotic and automation systems, and automotive and operations engineering.

Vision

Becoming the most admired Automotive and Robotics Engineering program, which focus in intelligent automation system for well being, in providing young talented student with pride.

Mission

To contribute to the global community through the provision of world-class education by:

1. Educating students with the knowledge and skills of science and technology for the design, analysis, and application of mechanical and automation systems particularly for the automotive industry in a creative and resourceful manner.
2. Preparing graduates to become the future leaders in the global community with dignity, charm and discipline mind, while being sensitive to the social, environmental, and economic context.
3. Conducting high impact applied research in the field of engineering to improve quality of life and to contribute to the society which serves the profession of the faculties and enriches the students with contemporary issues.

Program Objective

The objectives of the program are:

1. Productively involved in identifying and solving engineering problems by creatively applying engineering principles in the broad areas of automotive and robotics engineering.
2. Attain successful careers with leadership positions in industry, academia, and public service.
3. Adapt to new technologies, tools and methodologies to respond to the rapidly changing world by continuously updating and renewing their knowledge throughout their careers.

Student Outcomes

At the end of the program, graduates will have these following competencies:

1. An ability to apply knowledge of math, science, and engineering.
2. An ability to design and conduct experiments, as well as analyze and interpret data.
3. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
4. An ability to identify, formulate, and solve engineering problems.
5. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
6. An ability to function on multidisciplinary teams.
7. An understanding of professional and ethical responsibility.
8. An ability to communicate effectively.
9. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
10. A recognition of the need for, and an ability to engage in life-long learning.

11.   A knowledge of contemporary issues.

Prospective Career of the Graduates

1.   Automotive Automation Engineer
2.   Automated Driving Engineer
3.   Vehicle System Integration Engineer
4.   Automotive Electronic Test Engineer
5.   Industrial Robotics Integration Engineer
6.   Automation-based Solution Engineer
7.   Intelligent Embedded System Designer
8.   Technopreneur

Curriculum

The program combines the curriculum of Computer Engineering Department in BINUS UNIVERSITY and Automotive Engineering and Technology College in Aso College Group, Japan. As one of the oldest department in BINUS UNIVERSITY, Computer Engineering has obtained the 'A' grade accreditation, which is the highest grade from the National Accreditation Board for Higher Education. On the other hand, Aso College of Automotive Engineering and Technology, as one of the 12 colleges in Aso College group, has achieved 100% graduate employment rate, thanks to the highly qualified lecturers with long industrial experience, and the state-of-the-art equipments.

Core of the curriculum of Automotive and Robotics Engineering program is derived from the internationally acknowledged curriculum guideline developed by the Institute of Electrical and Electronics Engineers (IEEE), and Association for Computing Machinery (ACM). The curriculum is directed toward the design, construction, implementation, and maintenance of intelligent automation system, particularly in automotive industry, by the adoption of the state-of-the-art curriculum from Aso College of Automotive Engineering and Technology. In general, there are three areas of study in the program, which are: electronics & embedded system engineering; Intelligent automation system engineering; and mechanical & automotive system engineering.

The mechanical and automotive system engineering area provides students with the ability to design mechanical system in general, and automotive system and its development in particular, using knowledge in strength of materials, mechanical design, mechanical dynamics, and using 2D & 3D CAD tools.
The electronics and embedded system engineering area will enable the students to design electronics systems, microcomputer systems, and the interfacing the world with sensors and actuators.
The intelligent automation system engineering area is where students learn to apply artifiicial intelligence into machine by signal processing, automatic control, and other computational intelligences.

The program is a 4-year (8-semester) study program that rewards bachelor degree in computer engineering for the graduates after completing 146 credit hours of courses. The students will study in Fukuoka, Japan, at the end of the third year to complete some courses in Aso College of Automotive Engineering and Technology during the summer course period. The students will do internship and final project in the final year as a culmination of the undergraduate study in the program. The program curriculum is arranged in a well-ordered progression in order to assure smooth acquisition of knowledge and skills in all three mentioned areas of study, with a strong emphasis in hands on learning through projects. The following table outlines the distribution of courses in four years:

1st year	Basic courses to support abilities in automotive, electronics, and computer systems engineering
2nd year	Engineering fundamental courses for automotive, electronics, and computer systems engineering
3rd year	Technically required courses for intelligent automotive and robotics systems engineering
Summer Course	Special courses and trainings of automotive engineering in Japan
4th year	Internship and final project in company

Course Structure

Sem	Code	Course Name	SCU	Total
1	CHAR6016	Character Building: Pancasila	2	20
	SCIE6031	Physics I	4	
	MATH6097	Chemistry	4	
	MATH6096	Calculus	4	
	AREN6001	Introduction to Automotive & Robotics Engineering	4	
	ENGR6012	Drafting	2	
2	CHAR6017	Character Building: Kewarganegaraan	2	20
	SCIE6036	Physics II	4/2	
	COMP6252	Algorithm and Programming	4/2	
	MATH6101	Engineering Mathematics I	4	
	STAT6107	Probability and Statistics	2	
3	MATH6104	Engineering Mathematics II	4	20
	MATH6105	Discrete Mathematics	2	
	CPEN6112	Electric Circuit Theory	2/1	
	CPEN6113	Electronic Devices	4/1	
	ENTR6057	Entrepreneurship I	2	
	AREN6003	Strength of materials	2	
	AREN6002	2D CAD Drafting	2	
4	CPEN6145	Control System	2/1	20
	CPEN6115	Digital System	5/1	
	MATH6106	Numerical Methods	2	
	CPEN6116	Computer Networks	4/1	
	AREN6015	3D CAD Basic	2	
	CHAR6018	Character Building: Agama	2	
5	CPEN6117	Computer Organization and Architecture	4	20
	SCIE6037	Biology	2	
	CPEN6118	Digital Signal Processing	2/1	
	CPEN6146	Advanced Control System	2/1	
	AREN6016	Mechanical engineering	4/1	
	ISYS6330	Database Design & Application	2/1	

Sem	Code	Course Name	SCU	Total
6	AREN6017	Operations Engineering	4/1	21
	AREN6018	Automotive engineering	2/1	

	CPEN6144	Computational Intelligence	4/1	
	CPEN6121	Microcontroller Design and Application	5/1	
	CPEN6120	Computer System Development and Methodology	2	
7	AREN6009	3D CAD Advanced*	4	20
	AREN6010	Manufacture Training*	4	
	AREN6011	Internship	4	
	COMP6169	Operating Systems	2	
	AREN6019	Robotics and Industrial Automation	2/1	
	ENTR6058	Entrepreneurship II	2	
8	AREN6014	Final Project	6	6
			TOTAL CREDIT 146 SCU	

*) Summer courses in Fukuoka – Japan