CURRICULUM

Bachelor of Automotive Engineering Education (BAEE) Study Program

Faculty of Engineering
Universitas Negeri Yogyakarta
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Contents

BACHELOR OF AUTOMOTIVE ENGINEERING EDUCATION
FACULTY OF ENGINEERING
UNIVERSITAS NEGERI YOGYAKARTA

A. Objective

The vision of the Automotive Engineering Education Study Program (BAEE) is "*to become a superior, creative and continuously innovative study program in the study of science and the application of automotive technology engineering including design, modeling, manufacture, and analysis based on piety, independence, and intelligence*" The vision is translated into five missions as follows:

1) Organizing academic education and professional education in automotive engineering to facilitate the development of students into graduates who uphold piety, autonomy, and intellect.
2) Carrying out basic and applied research in automotive engineering education.
3) Carrying out community service and community empowerment to encourage the development of social and natural potentials to realize people's welfare.
4) Realization of transparent and accountable study program governance.
5) Build resources and strengthen partnerships to achieve the vision.

Based on the vision and mission of the study program, four Program Educational Objectives (PEO) were formulated from the Bachelor of Automotive Engineering Education (BAEE) as follows:

1) Graduates have personality, social and professional ethics in accordance with the times.
2) Graduates are able to demonstrate mastery of automotive science and technology, namely designing, modeling, manufacturing, and analysis based on scientific studies.
3) Graduates are able to implement learning in accordance with the needs and developments in automotive technology;
4) Graduates are able to develop themselves creatively, innovatively, collaboratively, and communicatively by applying vocational knowledge and automotive engineering to the business world and other fields.

B. Programme Learning Outcomes (PLO)

There are 8 Learning Outcomes programs covering aspects of attitude, knowledge, and skills as follows:

1. Demonstrate attitudes based on religious values, nationalism, academic ethics, and professional ethics.
2. Apply basic science and mathematics knowledge in systematically developing automotive technology.
3. Analyze the development of automotive engineering education based on scientific methods and facts.
4. Planning automotive engineering lessons in accordance with the characteristics of students, the needs of the world of work, and the latest technology.
5. Conduct research and assessment of automotive engineering education to find a solution in the form of a scientific paper.
6. Carry out automotive engineering learning with approaches, strategies, methods, techniques, tactics, and learning models in accordance with the latest technology.
7. Demonstrate critical thinking, creative, innovative, communicative, adaptive, collaborative, and leadership skills.
8. Able to demonstrate independent, quality, and professionally measurable work in the automotive field.

The PLO's formulation for the BAEE SP refers to the qualification levels of the Indonesian Qualifications Framework (IQF). The IQF is a framework for ranking the qualifications of Indonesian human resources that juxtapose, equalize, and integrate the education sector with the training and work experience sectors in a workability recognition scheme tailored to the structures in various work sectors. IQF has nine groupings of qualification levels. Undergraduate graduates are equivalent to level 6.

The BAEE Study Program has 8 PLOs which are equivalent to 6 Subject Specific Criteria (SSC)-01 standards, including Knowledge and Understanding (KU), Engineering Analysis (EA), Engineering Design (ED), Investigations and Assessment (IA), Engineering Practice (EP), and Transferable Skills (TS). Mapping between PLOs of BAEE and ASIIN SSC-01 is described in following table.

Table 1 Relationship Between SSC and PLO

SSC		PLO							
		1	2	3	4	5	6	7	8
Knowledge and understanding (KU)									
KU1	Gained extensive technical knowledge as to engineering, mathematics and natural science with a view to mechanical engineering/process		✓						

	engineering/ chemical engineering, enabling them to carry out scientifically substantiated work and act responsibly in their professional activities;								
KU2	Gained an understanding of the multi-disciplinary context of Engineering Sciences.		✓						
Engineering Analysis (EA)									
EA1	Identify, formulate and solve problems peculiar to mechanical engineering / process engineering / chemical engineering based on the application of established scientific methods;			✓					
EA2	analyse and assess products, processes and methods used in their discipline based on scientific facts;			✓					
EA3	choose suitable methods of analysing, modelling, simulating and optimising and apply them with a high degree of competence.			✓					
Engineering Design (ED)									
ED1	the ability to conceive designs for machinery, devices, EDP programmes or processes correspondent to the status of their knowledge and to develop them according to specified requirements;				✓				
ED2	practically orientated understanding of design methods and the ability to apply them in a competent manner.				✓	✓	✓		
Investigations and Assessment (IA)									
IA1	carry out literature research in accordance with the status of their knowledge and understanding and to use data bases and other sources of information for their work;					✓			
IA2	plan and carry out suitable experiments correspondent to the status of their knowledge and understanding, to interpret the data and draw suitable conclusions.					✓			
Engineering Practice (EP)									
EP1	able to transfer new findings in engineering and natural sciences to industrial and commercial production under consideration of economic, ecologic and safety requirements as well as sustainability and environmental compatibility	✓					✓		✓
EP2	able to plan, control and monitor processes and to develop and operate systems and equipment;	✓					✓		✓
EP3	able to independently consolidate the knowledge gained;	✓					✓		✓
EP4	aware of the non-technical effects of engineering activities.	✓					✓		✓

Transferable Skills (TS)									
TS1	function effectively as an individual and as a member of a team, including where relevant coordination of the team;							✓	✓
TS2	use diverse methods to communicate effectively with the engineering community and with society at large;	✓						✓	✓
TS3	demonstrate awareness of the health, safety and legal issues and responsibilities of engineering practice, the impact of engineering solutions in a societal and environmental context, and commit to professional ethics, responsibilities and norms of engineering practice;	✓						✓	✓
TS4	demonstrate an awareness of project management and business practices, such as risk and change management, and understand their limitations;							✓	✓
TS5	recognise the need for, and have the ability to engage in independent, life-long learning;							✓	✓
TS6	work and communicate in national and international contexts							✓	✓

C. Qualification Profile

Based on the vision and missions of BAEE, there are three groups of the occupational profile of BAEE graduates. The expected scope of occupational competencies can be explained as follows:

1. **Teacher** at a Vocational High School in the field of Automotive Engineering
2. **Training Instructors** at Automotive Vocational Education Institutions or Education and Training centers in the Automotive Industry.
3. **Technopreneur** in the automotive sector or business manager in the automotive sector.

Relation between Occupational Profile with PLO of BAEE Graduates ditampilkan pada table berikut.

Table 2 Relational Occupation Profile with PLO

Occupation Profile	Program Learning Outcomes (PLO)							
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8
Teacher	✓	✓	✓	✓	✓	✓	✓	✓
Training Instructors	✓	✓	✓	✓	✓	✓	✓	✓
Technopreneur	✓	✓					✓	✓

D. The Title of The Degree Program

The name of this study program is Bachelor of Automotive Engineering Education (BAEE) based on the Decree of the Minister of Education and Culture of the Republic of Indonesia c.q. Director General of Higher Education Number 0554/0/1983 dated 3 November 1983 (Appendix 1.1). The name is adapted to the undergraduate program nomenclature issued by the Indonesian Ministry of Education and Culture (Kemendikbud) which has been socialized to all tertiary institutions and the world of work in Indonesia. Therefore, there has never been an understanding regarding the name and field of competence of this program experienced by graduates and stakeholders. The Automotive Engineering Education Study Program has a Bachelor of Education degree (B.Ed. Automotive SP.). The bachelor of education degree is intended to proceed to a professional program to obtain the title of teacher profession. One of the requirements for a professional teacher degree is a Bachelor of Education degree, following a linear professional education program. In accordance with the naming program study, the language of instruction given during the learning process is mainly Indonesian. In addition, some courses are delivered in English. Currently, the Automotive Engineering Education Study Program is accredited "*Unggul*" or Excelent based on the Decree of the National Accreditation Board for Higher Education Number 12803/SK/BAN-PT/AK-ISK/S/XII/2021 (Appendix 1.2). BAEE is designed to have the advantage of producing teachers, instructors, and technopreneurs in the field of Automotive Engineering who are oriented toward the demands of the workforce.

E. Curriculum Structure

The curriculum structure is designed and aligned with the SKKNI (Indonesian National Work Competency Standards) in the field of automotive engineering and with the PLO. Its profile is also in line with ASIIN SSC. The BAEE Study Program has 8 PLOs which are equivalent to 6 SSC-01 standards, including Knowledge and Understanding (KU), Engineering Analysis (EA), Engineering Design (ED), Investigations and Assessment (IA), Engineering Practice (EP), and Transferable Skills (TS). The relationship between courses and PLO in the curriculum structure is explained in the following table:

Table 3 Curriculum Structure

Subjec Codes	Mata Kuliah	Number of Credit Systems			PLO							
		Number	Theory	Practice	1	2	3	4	5	6	7	8
Semester 1 (22 Credit)												
MKU6201	Islamic Education*	2	2		✓							
MKU6202	Catholic Education *											
MKU6203	Christian Education *											

Subjec Codes	Mata Kuliah	Number of Credit Systems			PLO							
		Number	Theory	Practice	1	2	3	4	5	6	7	8
MKU6204	Buddhist Education *											
MKU6205	Hindu Education *											
MKU6206	Konghuchu Education *											
OTO6205	Engineering Mathematics	2	2			✓					✓	
OTO6206	Engineering Physics	2	2			✓					✓	
MDK6201	Education	2	2		✓			✓	✓			
OTO 6201	Engineering Drawing Practice	2		2		✓		✓			✓	
OTO 6302	Automotive Technical Tools and Measurements	3	2	1		✓		✓			✓	
OTO 6303	Basic Formation Technology	3	1	2		✓					✓	
OTO 6404	Electricity and Basic Electronics	4	2	2		✓					✓	
MKU6216	Social And Humanitarian Literacy	2	2		✓						✓	
Semester 2 (24 Credit)												
MKU6212	Digital Transformation	2		2	✓						✓	
OTO6413	Analog and Digital Electronics	4	2	2		✓		✓			✓	
OTO6322	Pneumatic and Hydraulic	3	1	2		✓					✓	
OTO6208	Advanced Mathematics	2	2			✓					✓	
OTO6310	Materials Engineering	3	2	1		✓					✓	
OTO6432	Motorcycle Technology	4	2	2		✓		✓	✓		✓	✓
FTE6208	Technology and Vocational Education	2	2		✓		✓	✓	✓	✓		✓
MKU6209	Indonesian	2	2		✓						✓	
OTO6209	Fluid Mechanics	2	2			✓					✓	
Semester 3 (22 Credit)												
MKU6207	Civic Education	2	2		✓							
MKU6208	Pancasila	2	2		✓							
OTO6212	Thermodynamics	2	2			✓					✓	
OTO6221	Statics and Material Strength	2	2			✓					✓	
OTO6420	Steering, Brake and Suspension	4	2	2		✓		✓	✓			
OTO6216	Automotive Design	2		2		✓					✓	✓
MDK6202	Educational Psychology	2	2		✓							
OTO6411	Gasoline Motor Technology	4	2	2		✓		✓	✓			
OTO6418	Electricity and Automotive Electronics	4	2	2		✓		✓	✓		✓	✓
Semester 4 (24 Credit)												
FTE6204	Vocational Learning Media	2	2				✓	✓			✓	✓
OTO6419	Power Transfer System	4	2	2		✓		✓	✓			
OTO6214	Automotive Mechanical Elements	2	2			✓					✓	
FTE6203	Vocational Learning	2	2		✓		✓					
OTO6226	Vehicle Movement Mechanics	2	2			✓					✓	
FTE6202	Vocational Education Curriculum	2	2				✓	✓	✓			✓
FTE6210	Statistics	2	2					✓			✓	

Subjec Codes	Mata Kuliah	Number of Credit Systems			PLO							
		Number	Theory	Practice	1	2	3	4	5	6	7	8
OTO6424	Body Technology and Painting	4	2	2		✓		✓	✓		✓	✓
OTO6417	Diesel Motor Technology	4	2	2		✓		✓	✓		✓	✓
Semester 5 (23 Credit)												
MKP6301	Educational Research Methodology	3	3						✓		✓	
MKU6211	English	2	2								✓	
MDK6204	Socio -Educational Anthropology	2	2		✓							
MDK6203	Vocational Education Management	2	2				✓		✓		✓	
PEN6201	Micro Teaching	2		2	✓			✓		✓		
OTO6200	Transportation Management Regulation	2	2		✓						✓	
FTE6207	Safety, Occupational Health and Environment	2	2		✓			✓				
FTE6205	Vocational Learning Assessment	2	2		✓		✓	✓				
MKU6213	Creativity, Innovation and Entrepreneurship	2	2								✓	✓
OTO6423	Engine Management System	4	2	2		✓		✓			✓	
Semester 6 (12 Credit)												
OTO6252	Vehicle Management System**	2	2			✓		✓			✓	✓
OTO6253	Electric and Hybrid Vehicle**					✓		✓	✓		✓	
OTO6254	EMS Heavy Equipment**					✓		✓				
OTO6255	Advance Vehicle Technology**					✓		✓			✓	
OTO6256	Vehicle Diagnosis System**					✓		✓	✓		✓	
OTO6227	Automotive Industry Management	2	2								✓	✓
MKL6853	Industrial Practice	8		8					✓		✓	✓
Semester 7 (12 Credit)												
MKL6604	Community Service Program	6		6							✓	✓
MKL6601	Educational Practice	6		6	✓			✓		✓	✓	✓
Semester 8 (8 Credit)												
TAM6801	Thesis Final Project	8			✓	✓	✓	✓	✓	✓	✓	✓
Total		**149**	**87**	**54**	**17**	**30**	**7**	**26**	**16**	**4**	**40**	**15**

The structure of the courses in the BAEE SP curriculum for eight semesters can be described based on their weight to the PLO, as shown in Figure 1. PLO 1 weighs 11% of the entire course. PLO 2 makes up 19% of the entire course. PLO 3 weighs 5% of the entire course. PLO 4 weighs 17% of the entire course. PLO 5 weighs 10% of the entire course. PLO 6 weighs 3% of the entire course. PLO 7 weighs 26% of the entire course. Meanwhile, PLO 8 weighs 10% of all courses. The following is a picture of the distribution of courses with PLO.

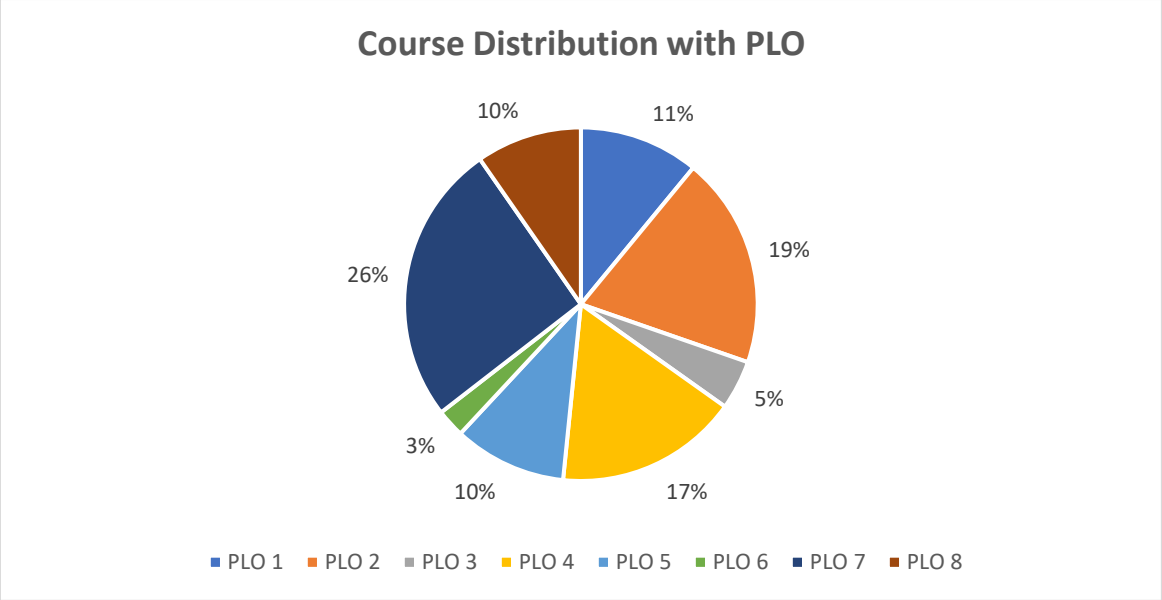

Figure 1 Course Distribution with PLO

The structure of the courses in the BAEE curriculum for eight semesters can be described as underdeveloped to achieve the set graduate qualification standards. The following is an image of course mapping with Graduate Profiles.

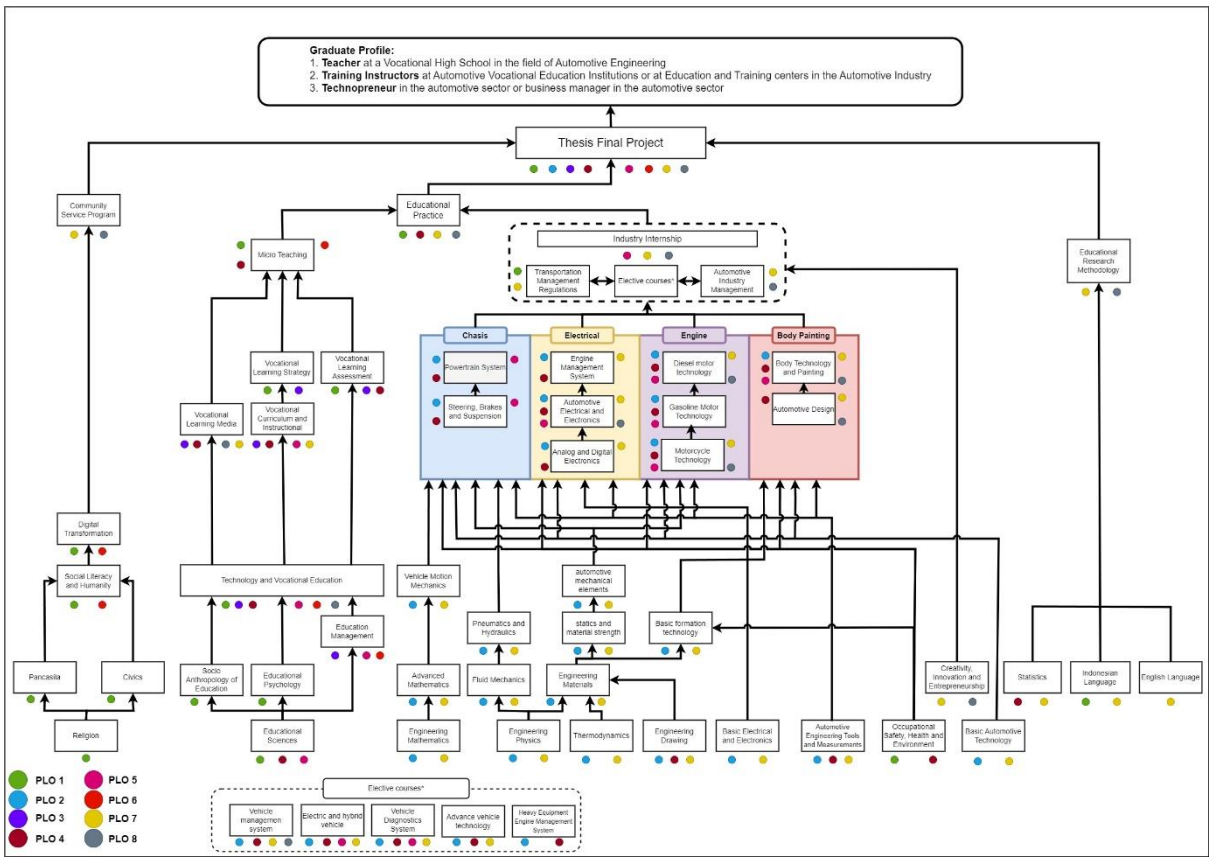

Figure 2 Curriculum Mapping

F. Assessment

There are several type of assessment that used by BAEE SP as is shown in the following table.

Table 4 Assessment

No	Type of Assessment	Explanation
1	Short Form and Multiple Choice Test	Short form tests are also known as objective tests. They include multiple choice, completion (or close), true-false and matching types, of which multiple choice is the most commonly used.
2	Short Answer Test	Short answer questions require a brief answer consisting of a phrase, sentence or short paragraph. For example, 'briefly explain the purpose of formative assessment'.
3	Essay	Essays require students to select, organise and integrate material on a given topic. They also test writing skills and the ability to develop an argument and use evidence to support it.
4	Performance Test	Performance tests involve either a hands-on activity, such as using a particular analytical laboratory technique or taking a patient history, or the development of products, such as a building design or computer software.
5	Written Report	The report is a common way of presenting information and recommendations or conclusions related to a specific purpose. Reports are written based on gathering and analysing information using a discipline specific methodology and format.
6	Fieldwork / Practicum-Test	Fieldwork experiences and practicums provide opportunities for assessments to be performed on site or subsequent to the experience. Fieldwork practical tests may involve performance tests in the workplace on specific cases or tasks, or may involve the assessment of skills and abilities.
7	Project	Projects are an extended piece of work involving inquiry based activities. Projects may be small or large, undertaken by individuals or in groups and have outcomes such as a report, design, art work, wiki, a poster or working product.

G. Grading and Scoring

The final score is presented in the letter grading, which the conversion is defined in UNY Academic Regulation (https://s.id/AcademicRegulation), Article 21 paragraph 4. The scoring category is detailed in the following tabel:

Table 5 Grading and Scoring

Final Mark	Conversion	
Scale	Letter	Weight
86 – 100	A	4.00
81 – 85	A-	3.67
76 – 80	B+	3.33
71 – 75	B	3.00
66 – 70	B-	2.67
61 – 65	C+	2.33
56 – 60	C	2.00
41 – 55	D	1.00
0 – 40	E	0.00