



Republic of the Philippines
BATANGAS STATE UNIVERSITY
BatStateU Alangilan
Alangilan, Batangas City



College of Engineering, Architecture and Fine Arts
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CURRICULUM

Bachelor of Science in Automotive Engineering (BSAE)

Academic Year: 2021-2022

Reference CMOs: CMO No. 97 s. 2017 (Allied), CMO No. 4 s. 2018 and CMO No. 20 s. 2013

Curriculum Description

Bachelor of Science in Automotive Engineering responds to the automotive industry's demand for automotive engineers who have specific skills and a mastery of both the product, that is, automobiles and their components, and the process of manufacturing them and managing the manufacturing process. The aim is to produce specialized engineers who have a comprehensive view of the automotive industry and its entire value chain.

The program will give a solid scientific grounding that will be complemented with subjects as diverse as design; materials science; mechanical, electrical, and electronic engineering; and the use of ICTs, all of which are applied to the automotive industry. A large proportion of the degree is devoted to innovative technologies such as electric and hybrid propulsion or autonomous vehicles. These allow engineers to integrate functionality, safety, and aesthetic in order to create perfect driving machines.

Program Educational Objectives of Automotive Engineering

The Automotive Engineering alumni three to five years after graduation shall:

1. **Specialist.** Practiced as specialist in solving complex automotive engineering problems leading to improvements and innovations, while taking into consideration the environmental, social, and economical requirements.
2. **Professionalism and Leadership.** Assumed leadership position in industry, academe, government, or private sector with consideration to social and ethical responsibility.
3. **Lifelong Learning.** Engaged in lifelong learning through further studies, research, certifications, promotions, and other personal and professional development activities.

Institutional Graduate Attributes

The student should achieve at least 75% for each IGA upon graduation.

1. **Knowledge Competence.** Demonstrate a mastery of the fundamental knowledge and skills required for functioning effectively as a professional in the discipline, and an ability to integrate and apply them effectively to practice in the workplace.
2. **Creativity and Innovation.** Experiment with new approaches, challenge existing knowledge boundaries and design novel solutions to solve problems.
3. **Critical and Systems Thinking.** Identify, define, and deal with complex problems pertinent to the future professional practice or daily life through logical, analytical and critical thinking.

4. **Communication.** Communicate effectively (both orally and in writing) with a wide range of audiences, across a range of professional and personal contexts, in English and Pilipino.
5. **Lifelong Learning.** Identify own learning needs for professional or personal development; demonstrate an eagerness to take up opportunities for learning new things as well as the ability to learn effectively on their own.
6. **Leadership, teamwork, and Interpersonal Skills.** Function effectively both as a leader and as a member of a team; motivate and lead a team to work towards goal; work collaboratively with other team members; as well as connect and interact socially and effectively with diverse culture.
7. **Global Outlook.** Demonstrate an awareness and understanding of global issues and willingness to work, interact effectively and show sensitivity to cultural diversity.
8. **Social and National Responsibility.** Demonstrate an awareness of their social and national responsibility; engage in activities that contribute to the betterment of the society; and behave ethically and responsibly in social, professional, and work environments.

Student Outcomes

The following skills, knowledge, and behaviors are expected to be attained by students as they progress through the program:

1. **Discipline Knowledge.** Ability to apply mathematics, sciences and principles of engineering to solve complex automotive engineering problems;
2. **Investigation.** Ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions;
3. **Design/Development of Solutions.** Design solution, system, components, processes, exhibiting improvements/innovations, that meet specified needs with appropriate consideration for public health and safety, cultural, societal, economical, ethical, environmental and sustainability issues.
4. **Leadership and Teamwork.** Function effectively as a member of a leader on a diverse team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
5. **Problem Analysis.** Identify, formulate, and solve complex automotive engineering problems by applying principles of engineering, science, and mathematics;
6. **Ethics and Professionalism.** Apply ethical principles and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, environmental, and societal contexts.
7. **Communication.** Communicate effectively on complex engineering activities with the community, and the society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions;
8. **Environment and Sustainability.** Recognize the impact of professional engineering solutions in societal, global, and environmental contexts and demonstrate knowledge of and need for sustainable development;

9. **Lifelong Learning.** Recognize the need for, and ability to engage in independent and life-long learning in the broadest context of technological change.
10. **The Engineer and Society.** Apply reasoning based on contextual knowledge to assess societal, health, safety, legal, cultural, contemporary issues, and the consequent responsibilities relevant to professional engineering practices.
11. **Modern Tool Usage.** Apply appropriate techniques, skills, and modern engineering and IT tools to complex automotive engineering activities;
12. **Project Management and Finance.** Demonstrate knowledge and understanding of engineering management and financial principles as member or a leader of a team to manage projects in multidisciplinary settings and identify opportunities of entrepreneurship.
13. **Social and National Responsibility.** Apply acquired automotive engineering knowledge and skills in addressing community problems that contributes to national development.

CURRICULUM COMPONENTS

Classification/Field/Course	Credit Units	Number of Hours/Week	
		Lec	Lab
TECHNICAL COURSES			
A. Mathematics			
Differential Calculus	3	3	0
Integral Calculus	3	3	0
Differential Equations	3	3	0
Engineering Data Analysis	3	3	0
Sub Total	12	12	0
B. Natural/Physical Sciences			
General Chemistry	4	3	3
Modern Biology	3	2	3
Physics 1	4	3	3
Sub Total	11	8	9
C. Basic Engineering Sciences			
Introduction to Engineering	1	0	3
Computer Programming 1	1	0	3
Engineering Drawing	1	0	3
Statics of Rigid Bodies	3	3	0
Computer Aided Design	1	0	3
Dynamics of Rigid Bodies	2	2	0
Mechanics of Deformable Bodies	3	3	0
Research Methods	3	3	0
Numerical Methods	3	3	0
Engineering Economics	3	3	0
Technopreneurship	3	3	0
Sub Total	24	20	12
D. Allied Courses			
DC and AC Machinery	3	2	3
Control System Engineering	3	3	0
Basic Occupational Safety and Health	3	3	0
Sub Total	9	8	3
E. Professional Courses			
AE Orientation	1	1	0
Thermodynamics 1	3	3	0
Automotive Electrical Systems and Electronics	3	2	3
Materials Science and Technology	3	2	3
Advanced Mathematics for AE	3	3	0
Thermodynamics 2	3	3	0
Fluid Mechanics	3	3	0
Computer Applications for AE	1	0	3
Theory of Machines	3	2	3
Heat Transfer	3	3	0
Fuels and Lubricants	3	3	0
Automotive Engines	3	3	0
Manufacturing Process	3	3	0
AE Laboratory 1 - Engine and Chasis Components	2	0	6
Vehicle Vibration and Acoustics	2	2	0
Vehicle Body Engineering and Aerodynamics	3	2	3

Automotive Design Engines 1	3	3	0
Automotive Pollution and Control	3	3	0
AE Laboratory 2 - Vehicle Maintenance Laboratory	2	0	6
Power Units and Transmission	3	3	0
AE Project Study 1	1	0	3
Quality Control and Reliability Engineering	3	3	0
Automotive Design Engines 2	3	3	0
AE Laboratory 3 - Auto Scanning and Vehicle Testing Laboratory	2	0	6
Automotive Air Conditioning	3	3	0
Transport Management	3	3	0
AE Project Study 2	1	0	3
Production Technology with Plant Visits	2	0	6
Power Train Dynamics	3	2	3
On-the-Job Training	4	240 hours	
Sub Total	78	58	48
F. Elective Courses			
AE Elective 1	3	3	0
AE Elective 2	3	3	0
AE Elective 3	3	3	0
Sub Total	9	9	0
NON-TECHNICAL COURSES			
A. General Education Courses			
Understanding the Self	3	3	0
Mathematics in the Modern World	3	3	0
Readings in Philippine History	3	3	0
Purposive Communication	3	3	0
The Contemporary World	3	3	0
Art Appreciation	3	3	0
Science, Technology and Society	3	3	0
Ethics	3	3	0
People and the Earth's Ecosystem	3	3	0
Sub Total	27	27	0
B. Mandated Courses			
Life and Works of Rizal	3	3	0
Kontekstwalisadong Komunikasyon sa Filipino	3	3	0
ASEAN Literature	3	3	0
Sub Total	9	9	0
C. Physical Education			
Physical Fitness, Gymnastics and Aerobics	2	2	0
Rhythmic Activities	2	2	0
Individual and Dual Sports	2	2	0
Team Sports	2	2	0
Sub Total	8	8	0
D. National Service Training Program			
National Service Training Program 1	3	3	0
National Service Training Program 2	3	3	0
Sub Total	6	6	0
Grand Total	193	165	72

PROGRAM OF STUDY

FIRST YEAR						
FIRST SEMESTER						
Course Code	Course Title	Units	No. Hour/s		Pre-requisite(s)	Co-Requisite(s)
			Hrs Lec	Hrs Lab		
GEd 101	Understanding the Self	3	3	0		
GEd 102	Mathematics in the Modern World	3	3	0		
GEd 105	Readings in Philippine History	3	3	0		
GEd 106	Purposive Communication	3	3	0		
SCI 401	General Chemistry	4	3	3		
MATH 401	Differential Calculus	3	3	0		
ENGG 401	Introduction to Engineering	1	0	3		
PE 101	Physical Fitness, Gymnastics and Aerobics	2	2	0		
NSTP 111	National Service Training Program 1	3	3	0		
Total		25	23	6		

FIRST YEAR						
SECOND SEMESTER						
Course Code	Course Title	Units	No. Hour/s		Pre-requisite(s)	Co-Requisite(s)
			Hrs Lec	Hrs Lab		
GEd 104	The Contemporary World	3	3	0		
GEd 108	Art Appreciation	3	3	0		
GEd 109	Science, Technology and Society	3	3	0		
CpE 401	Computer Programming 1	1	0	3		
MATH 402	Integral Calculus	3	3	0	MATH 401	
ENGG 402	Engineering Drawing	1	0	3		
SCI 403	Physics 1	4	3	3	MATH 401	MATH 402
PE 102	Rhythmic Activities	2	2	0	PE 101	
NSTP 121	National Service Training Program 2	3	3	0	NSTP 111	
Total		23	20	9		

FIRST YEAR						
MIDTERM SEMESTER						
Course Code	Course Title	Units	No. Hour/s		Pre-requisite(s)	Co-Requisite(s)
			Hrs Lec	Hrs Lab		
GEd 103	Life and Works of Rizal	3	3	0		
GEd 107	Ethics	3	3	0		
SCI 402	Modern Biology	3	2	3		
Total		9	8	3		

SECOND YEAR						
FIRST SEMESTER						
Course Code	Course Title	Units	No. Hour/s		Pre-requisite(s)	Co-Requisite(s)
			Hrs Lec	Hrs Lab		
AE 401	AE Orientation	1	1	0	ENGG 401	
MATH 404	Differential Equations	3	3	0	MATH 402	
ENGG 407	Statics of Rigid Bodies	3	3	0	SCI 403, MATH 402	
ME 402	Thermodynamics 1	3	3	0	SCI 403, MATH 402	
AE 402	Automotive Electrical Systems and Electronics	3	2	3	SCI 403, MATH 402	
MATH 403	Engineering Data Analysis	3	3	0	MATH 401	
ENGG 403	Computer Aided Design	1	0	3	ENGG 402	
AE 403	Materials Science and Technology	3	2	3	SCI 401	
PE 103	Individual and Dual Sports	2	2	0	PE 101	
Fili 101	Kontekstwalisadong Komunikasyon sa Filipino	3	3	0		
Total		25	22	9		

SECOND YEAR						
SECOND SEMESTER						
Course Code	Course Title	Units	No. Hour/s		Pre-requisite(s)	Co-Requisite(s)
			Hrs Lec	Hrs Lab		
AE 404	Advanced Mathematics for AE	3	3	0	MATH 404	
ENGG 408	Dynamics of Rigid Bodies	2	2	0	ENGG 407	
ME 405	Thermodynamics 2	3	3	0	ME 402	
EE 422	DC and AC Machinery	3	2	3	AE 402	
ME 406	Fluid Mechanics	3	3	0	ME 402	
ENGG 418	Mechanics of Deformable Bodies	3	3	0	ENGG 407	ENGG 408
AE 405	Computer Applications for AE	1	0	3	ENGG 403	
AE 406	Theory of Machines	3	2	3	ENGG 403	ENGG 408
PE 104	Team Sports	2	2	0	PE 101	
Total		23	20	9		

THIRD YEAR						
FIRST SEMESTER						
Course Code	Course Title	Units	No. Hour/s		Pre-requisite(s)	Co-Requisite(s)
			Hrs Lec	Hrs Lab		
ENGG 416	Research Methods	3	3	0	MATH 403	
ME 411	Heat Transfer	3	3	0	ME 405, AE 404	
AE 407	Fuels and Lubricants	3	3	0	ME 405	AE 408
AE 408	Automotive Engines	3	3	0	AE 406	
AE 409	Manufacturing Process	3	3	0		
AE 410	AE Elective 1	3	3	0		
AE 411	AE Laboratory 1 - Engine and Chassis Components	2	0	6	AE 403	
ENGG 414	Numerical Methods	3	3	0	AE 404	
Litr 102	ASEAN Literature	3	3	0		
Total		26	24	6		

THIRD YEAR						
SECOND SEMESTER						
Course Code	Course Title	Units	No. Hour/s		Pre-requisite(s)	Co-Requisite(s)
			Hrs Lec	Hrs Lab		
AE 412	Vehicle Vibration and Acoustics	2	2	0	MATH 404, AE 411	
AE 413	Vehicle Body Engineering and Aerodynamics	3	2	3	AE 411, AE 405	
AE 414	Automotive Design Engines 1	3	3	0	ENGG 418, AE 409	
AE 415	AE Elective 2	3	3	0	AE 410	
AE 416	Automotive Pollution and Control	3	3	0		
AE 417	AE Laboratory 2 - Vehicle Maintenance Laboratory	2	0	6	AE 411	
ENGG 404	Engineering Economics	3	3	0	MATH 402	
AE 418	Power Units and Transmission	3	3	0		
AE 419	AE Project Study 1	1	0	3	ENGG 416	
Total		23	19	12		

THIRD YEAR						
MIDTERM SEMESTER						
Course Code	Course Title	Units	No. Hour/s		Pre-requisite(s)	Co-Requisite(s)
			Hrs Lec	Hrs Lab		
AE 420	Quality Control and Reliability Engineering	3	3	0	3rd year standing	
ENGG 411	Basic Occupational Safety and Health	3	3	0	3rd year standing	
AE 421	Automotive Design Engines 2	3	3	0	AE 414	
Total		9	9	0		

FOURTH YEAR						
FIRST SEMESTER						
Course Code	Course Title	Units	No. Hour/s		Pre-requisite(s)	Co-Requisite(s)
			Hrs Lec	Hrs Lab		
ENGG 417	On-the-Job Training	4	240 hours		4th year standing	
AE 422	AE Laboratory 3 - Auto Scanning and Vehicle Testing Laboratory	2	0	6	AE 417	
AE 423	Automotive Air Conditioning	3	3	0	ME 411	
Total		9	3	6		

FOURTH YEAR						
SECOND SEMESTER						
Course Code	Course Title	Units	No. Hour/s		Pre-requisite(s)	Co-Requisite(s)
			Hrs Lec	Hrs Lab		
GEd 110	People and the Earth's Ecosystems	3	3	0		
ENGG 405	Technopreneurship	3	3	0	4th year standing	
AE 424	Transport Management	3	3	0	4th year standing	
AE 425	AE Project Study 2	1	0	3	AE 419	
AE 426	Production Technology with Plant Visits	2	0	6	4th year standing	
AE 427	Power Train Dynamics	3	2	3	AE 418	
ECE 425	Control System Engineering	3	3	0	AE 402	
AE 428	AE Elective 3	3	3	0	AE 415	
Total		21	17	12		
TOTAL CREDIT UNITS		193	165	72		
AE Electives:						
Modern Vehicle Technology		3	3	0		
Robotics and Robot Application		3	3	0		
Off-Road Vehicles		3	3	0		
Alternate Fuels and Energy Systems		3	3	0		