Republic of the Philippines
BATANGAS STATE UNIVERSITY
BatStateU Alangilan
Alangilan, Batangas City
College of Engineering, Architecture and Fine Arts
https://batstate-u.edu.ph, Tel. No. (043) 425-0139 loc. 0118/2121

CURRICULUM
Bachelor of Science in Aerospace Engineering (BSAeE)

Academic Year: 2021-2022
Reference CMOs: CMO No. 93 s. 2017, CMO No. 4 s. 2018 and CMO No. 20 s. 2013

Curriculum Description

Aerospace Engineering is a profession that applies the basic principles of science and engineering combined with the mathematical and computational tools and equipment that will ensure efficient and safe air transportation while addressing problems associated with sustainability of aerospace industry development. Program delivery is guided by learning theories and active learning principles such as that which the conceive-design-implement-operate initiative advocates. The program adopts blended learning modes and alternative methods of delivery. Authentic assessment is adopted to ensure effective implementation of outcomes-based education.

Program Educational Objectives of Aerospace Engineering

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

1. **Specialist.** Practiced as specialist in solving complex aerospace 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.

Students Outcomes

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

1. **Discipline Knowledge.** Ability to apply mathematics, sciences and principles of engineering to solve complex aerospace 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 or a leader of 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 aerospace 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 aerospace 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 aerospace 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
Engineering Data Analysis	3	3	0
Differential Equations	3	3	0
Sub Total	**12**	**12**	**0**
B. Natural/Physical Sciences			
General Chemistry	4	3	3
Physics 1	4	3	3
Modern Biology	3	3	0
Sub Total	**11**	**9**	**6**
C. Basic Engineering Sciences			
Introduction to Engineering	1	0	3
Computer Programming 1	1	0	3
Engineering Drawing	1	0	3
Computer-Aided Drafting and Design 1	1	0	3
Statics of Rigid Bodies	3	3	0
Dynamics of Rigid Bodies	2	2	0
Mechanics of Deformable Bodies	3	3	0
Computer-Aided Drafting and Design 2	1	0	3
Research Methods	3	2	3
Technopreneurship	3	3	0
Fluid Mechanics	3	3	0
Numerical Methods	3	3	0
Sub Total	**25**	**19**	**18**
D. Allied Courses			
Basic Electrical Engineering	3	2	3
Basic Electronics	3	2	3
Thermodynamics	3	3	0
Sub Total	**9**	**7**	**6**
E. Professional Courses			
Aerospace Vehicle Performance	3	3	0
Computational Fluid Dynamics	3	2	3
Finite Element Analysis	3	2	3
System Dynamics and Vibration	3	3	0
Aerospace Flight Mechanics	3	3	0
Spacecraft and Aircraft Sensors and Instrumentation	3	2	3
Human Systems Engineering	2	2	0
Introduction to Avionics Integration	3	3	0
Aerodynamics	3	3	0
Design of Aerospace Structures	3	3	0
Jet and Rocket Propulsion	3	3	0
Civil Air Laws, Regulations and Professional Ethics	2	2	0
Aerospace Materials Analysis	3	2	3
Flight and Aviation Management	3	3	0
Structural Dynamics and Aeroelasticity	3	2	3
Aerospace Vehicle Stability and Control	3	2	3

Engineering Acoustics and Noise Control	3	3	0
Aerospace Vehicle Design 1	4	3	3
Aerospace Vehicle Design 2	4	3	3
Unmanned Aerospace Vehicle Design	3	3	0
Aerodome Engineering	2	2	0
On-The-Job-Training	4	320 hours	
Wind Engineering	3	3	0
Rocket Design	3	2	3
Global Value Chain	3	3	0
Special Topics in Aerospace Engineering	1	0	3
Integrative Studies	2	0	6
Sub Total	**78**	**62**	**36**
F. Elective Courses			
AeE Elective 1	3	2	3
AeE Elective 2	3	2	3
AeE Elective 3	3	2	3
Sub Total	**9**	**6**	**9**
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	**194**	**165**	**75**

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	3	0		
	Total	**9**	**9**	**0**		

SECOND YEAR						
FIRST SEMESTER						
Course Code	**Course Title**	**Units**	**No. Hour/s**		**Pre-requisite(s)**	**Co-Requisite(s)**
			Hrs Lec	**Hrs Lab**		
AeE 401	Aerospace Vehicle Performance	3	3	0		MATH 404
ECE 422	Basic Electronics	3	2	3		EE 419
EE 419	Basic Electrical Engineering	3	2	3	SCI 403	
MATH 403	Engineering Data Analysis	3	3	0	MATH 402	
MATH 404	Differential Equations	3	3	0	MATH 402	
ENGG 421	Computer-Aided Drafting and Design 1	1	0	3	ENGG 402	
ENGG 407	Statics of Rigid Bodies	3	3	0		
ME 406	Fluid Mechanics	3	3	0		
PE 103	Individual and Dual Sports	2	2	0	PE 101	
	Total	**24**	**21**	**9**		

SECOND YEAR						
SECOND SEMESTER						
Course Code	**Course Title**	**Units**	**No. Hour/s**		**Pre-requisite(s)**	**Co-Requisite(s)**
			Hrs Lec	**Hrs Lab**		
AeE 402	System Dynamics and Vibration	3	3	0	MATH 404	
AeE 403	Aerospace Flight Mechanics	3	3	0		ENGG 408
ENGG 414	Numerical Methods	3	3	0	MATH 404	
ENGG 408	Dynamics of Rigid Bodies	2	2	0		
ENGG 418	Mechanics of Deformable Bodies	3	3	0	ENGG 407	ENGG 408
ENGG 422	Computer-Aided Drafting and Design 2	1	0	3	ENGG 421	
ME 431	Thermodynamics	3	3	0	SCI 403	
Fili 101	Kontekstwalisadong Komunikasyon sa Filipino	3	3	0		
PE 104	Team Sports	2	2	0	PE 101	
	Total	**23**	**22**	**3**		

THIRD YEAR						
FIRST SEMESTER						
Course Code	**Course Title**	**Units**	**No. Hour/s**		**Pre-requisite(s)**	**Co-Requisite(s)**
			Hrs Lec	**Hrs Lab**		
AeE 404	Introduction to Avionics Integration	3	3	0	AeE 402	
AeE 405	Jet and Rocket Propulsion	3	3	0	ME 431, ME 406	
AeE 406	Finite Element Analysis	3	2	3	ENGG 418	
AeE 407	Spacecraft and Aircraft Sensors and Instrumentation	3	2	3	ECE 422	
AeE 408	Aerodynamics	3	3	0	ME 431, ME 406	
AeE 409	Design of Aerospace Structures	3	3	0	ENGG 418	
AeEE 401	AeE Elective 1	3	2	3		
Litr 102	ASEAN Literature	3	3	0		
	Total	**24**	**21**	**9**		

THIRD YEAR						
SECOND SEMESTER						
Course Code	**Course Title**	**Units**	**No. Hour/s**		**Pre-requisite(s)**	**Co-Requisite(s)**
			Hrs Lec	**Hrs Lab**		
AeE 410	Civil Air Laws, Regulations and Professional Ethics	2	2	0	3rd year standing	
AeE 411	Aerospace Materials Analysis	3	2	3	AeE 406	
AeE 412	Computational Fluid Dynamics	3	2	3	AeE 406	
AeE 413	Structural Dynamics and Aeroelasticity	3	2	3	AeE 409	
AeE 414	Aerospace Vehicle Design 1	4	3	3	AeE 401, ENGG 414	
AeE 415	Aerospace Vehicle Stability and Control	3	2	3	AeE 408, MATH 404	
ENGG 416	Research Methods	3	2	3		
AeEE 402	AeE Elective 2	3	2	3	MATH 403	
	Total	**24**	**17**	**21**		

THIRD YEAR						
MIDTERM SEMESTER						
Course Code	**Course Title**	**Units**	**No. Hour/s**		**Pre-requisite(s)**	**Co-Requisite(s)**
			Hrs Lec	**Hrs Lab**		
AeE 416	Wind Engineering	3	3	0	MATH 401	
AeE 417	Flight and Aviation Management	3	3	0	3rd year standing	
GEd 110	People and the Earth's Ecosystems	3	3	0		
	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 405	Technopreneurship	3	3	0	4th year standing	
AeE 418	Human Systems Engineering	2	2	0	AeE 415	
ENGG 417	On-the-Job Training	4	320 hours		4th year standing	
	Total	**9**	**5**	**0**		

FOURTH YEAR						
SECOND SEMESTER						
Course Code	**Course Title**	**Units**	**No. Hour/s**		**Pre-requisite(s)**	**Co-Requisite(s)**
			Hrs Lec	**Hrs Lab**		
AeE 419	Unmanned Aerospace Vehicle Design	3	3	0	AeE 414	
AeE 420	Aerospace Vehicle Design 2	4	3	3	AeE 414	
AeE 421	Engineering Acoustics and Noise Control	3	3	0	MATH 404	
AeE 422	Rocket Design	3	2	3	AeE 408, AeE 416	
AeE 423	Global Value Chain	3	3	0	4th year standing	
AeE 424	Aerodome Engineering	2	2	0	4th year standing	
AeE 425	Integrative Studies	2	0	6	Graduating Standing	
AeE 426	Special Topics in Aerospace Engineering	1	0	3	Graduating Standing	
AeEE 403	AeE Elective 3	3	2	3	Graduating Standing	
Total		**24**	**18**	**18**		
TOTAL CREDIT UNITS		**194**	**165**	**75**		