



Republic of the Philippines
BATANGAS STATE UNIVERSITY
The National Engineering University

Alangilan Campus

Golden Country Homes, Alangilan Batangas City, Batangas, Philippines 4200

Tel Nos.: (+63 43) 425-0139 local 2121

E-mail Address: coe.alangilan@g.batstate-u.edu.ph | Website Address: <http://www.batstate-u.edu.ph>

College of Engineering

CURRICULUM

Bachelor of Science in Mechanical Engineering (BSME)

Academic Year 2023-2024

Reference CMOs: CMO No. 97 s. 2017, CMO No. 4 s. 2018 and CMO No. 20, s. 2013,
CMO No. 39, s. 2021, CMO 40, s. 2021

Curriculum Description

Mechanical Engineering is a profession that concerns itself with mechanical design, energy conversion, fuel and combustion technologies, heat transfer, materials, noise control, and acoustics, manufacturing processes, rail transport, automatic control, product safety and reliability, solar energy, and technological impacts to society.

Program Educational Objectives

The mechanical engineering alumni three to five years after graduation shall:

1. Successfully practice in mechanical and thermal systems for the advancement of society.
2. Promote professionalism in mechanical engineering practice.

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.



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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 mechanical 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 mechanical 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 mechanical 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 mechanical 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 engineering knowledge and skills in addressing community problems that contributes to national development.



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CURRICULUM COMPONENTS

Classification/ Field / Course	No. of Hours/Week		Credit Units
	Lec	Lab	
I. TECHNICAL COURSES			
A. Mathematics			
Differential Calculus	3	0	3
Integral Calculus	3	0	3
Engineering Data Analysis	3	0	3
Differential Equations	3	0	3
Numerical Methods	3	0	3
Sub-total	15	0	15
B. Natural/Physical Sciences			
General Chemistry	3	3	4
Modern Biology	2	3	3
Physics 1	3	3	4
Sub-total	8	9	11
C. Basic Engineering Sciences			
Engineering Drawing	0	3	1
Computer-Aided Drafting	0	3	1
Computer Fundamentals and Programming	0	3	1
Statics of Rigid Bodies	3	0	3
Dynamics of Rigid Bodies	2	0	2
Mechanics of Deformable Bodies	3	0	3
Engineering Economics	3	0	3
Engineering Management	2	0	2
Technopreneurship	3	0	3
Introduction to Engineering	0	3	1
Environmental Science and Engineering	3	0	3
Sub-total	19	12	23
D. Allied Courses			
Basic Electrical Engineering	2	3	3
Basic Electronics	2	3	3
DC and AC Machinery	2	3	3
Sub-total	6	9	9
E. Fundamental Mechanical Engineering Courses			
Mechanical Engineering Orientation	1	0	1
Advanced Mathematics for ME	3	0	3
Methods of Research for ME	3	0	3
Fluid Mechanics	3	0	3
Machine Elements	2	3	3
Materials Engineering & Testing	2	3	3
Thermodynamics I	3	0	3



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Thermodynamics 2	3	0	3
Combustion Engineering	3	0	3
Heat Transfer	3	0	3
ME Laboratory 1	0	3	1
ME Laboratory 2	0	6	2
Manufacturing and Industrial Processes with Plant Visits	1	3	2
Basic Occupational Safety and Health	3	0	3
Workshop Theory and Practice	0	3	1
Machine Shop Theory	0	6	2
Control System Engineering	2	3	3
Fluid Machineries	3	0	3
Refrigeration Systems	3	0	3
Airconditioning and Ventilation Systems	3	0	3
Vibration Engineering	2	0	2
Computer Applications for ME	0	3	1
ME Practice with Comprehensive Examination	0	6	2
On the-Job-Training	320		4
Sub-total	43	39	60
F. Professional Mechanical Engineering Course			
Machine Design 1	3	0	3
Machine Design 2	2	3	3
ME Laboratory 3	0	6	2
Industrial Plant Engineering	3	3	4
Power Plant Design with Renewable Energy	4	3	5
ME Laws, Ethics, Codes and Standards	2	0	2
ME Project Study 1	0	3	1
ME Project Study 2	0	3	1
Sub-total	14	21	21
G. Technical Electives			
ME Elective 1	2	0	2
ME Elective 2	2	0	2
Sub-total	4	0	4
Total (Technical Courses)	109	90	143
II. NON-TECHNICAL COURSES			
A. General Education Course			
Purposive Communication	3	0	3
Mathematics in the Modern World	3	0	3
Understanding the Self	3	0	3
Art Appreciation	3	0	3
Ethics	3	0	3
Readings in Philippine History	3	0	3
Contemporary World	3	0	3
Science, Technology and Society	3	0	3
Sub-total	24	0	24



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B. General Education Elective and Mandated Courses			
Kontekstwalisadong Komunikasyon sa Filipino	3	0	3
Filipino sa Iba’t Ibang Disiplina	3	0	3
ASEAN Literature	3	0	3
Life and Works of Rizal	3	0	3
Sub-total	12	0	12
C. Physical Activities Towards Health and Fitness			
PATHFit 1 - Movement Competency Training	2	0	2
PATHFit 2 - Exercise-based Fitness Activities	2	0	2
PATHFit 3 – Menu of Dance, Sports, Martial Arts, Group Exercise, Outdoor Adventure Activities Menu Offering: (Traditional and Recreational Games)	2	0	2
PATHFit 4 – Menu of Dance, Sports, Martial Arts, Group Exercise, Outdoor Adventure Activities Menu Offering: (Team Sports, Basketball and Volleyball)	2	0	2
Sub-total	8	0	8
D. National Service Training Program			
NSTP 1	3	0	3
NSTP 2	3	0	3
Sub-total	6	0	6
Total (Non-Technical Courses)	50	0	50
GRAND TOTAL	159	90	193

SUMMARY	
Courses	Number of Units
I. Technical Courses	
A. Mathematics	15
B. Natural/Physical Sciences	11
C. Basic Engineering Sciences	23
D. Allied Courses	9
E. Fundamental Courses	54
F. Professional Mechanical Engineering Courses	27
G. Technical Electives	4
II. Non-Technical Courses	
A. General Education Courses	24
BGeneral Education Elective/Mandated Courses	12
C. PATHFit 1-4	8
D. NSTP	6
GRAND TOTAL	193



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PROGRAM OF STUDY

FIRST YEAR						
First Semester						
Course Code	Course Title	No. of Hour/s		Unit/s	Pre-requisite/s	Co-requisite/s
		Lec	Lab			
MATH 401	Differential Calculus	3	0	3		
SCI 401	General Chemistry	3	3	4		
ENGG 401	Introduction to Engineering	0	3	1		
GEd 102	Mathematics in the Modern World	3	0	3		
GEd 101	Understanding the Self	3	0	3		
GEd 105	Readings in Philippine History	3	0	3		
GEd 106	Purposive Communication	3	0	3		
PATHFit 1	Movement Competency Training	2	0	2		
NSTP 111	National Service Training Program 1	3	0	3		
	Total	23	6	25		

FIRST YEAR						
Second Semester						
Course Code	Course Title	No. of Hour/s		Unit/s	Pre-requisite/s	Co-requisite/s
		Lec	Lab			
MATH 402	Integral Calculus	3	0	3	MATH 401	
SCI 403	Physics 1	3	3	4	MATH 401	MATH 402
ENGG 402	Engineering Drawing	0	3	1		
CpE 401	Computer Programming 1	0	3	1		
GEd 104	The Contemporary World	3	0	3		
GEd 108	Art Appreciation	3	0	3		
GEd 109	Science, Technology and Society	3	0	3		
PATHFit 2	Exercise-based Fitness Activities	2	0	2	PATHFit 1	
NSTP 121	National Service Training Program 2	3	0	3	NSTP 111	
	Total	20	9	23		

FIRST YEAR						
Midterm						
Course Code	Course Title	No. of Hour/s		Unit/s	Pre-requisite/s	Co-requisite/s
		Lec	Lab			
SCI 402	Modern Biology	2	3	3		
GEd 103	Life and Works of Rizal	3	0	3		
GEd 107	Ethics	3	0	3		
	Total	8	3	9		



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SECOND YEAR						
First Semester						
Course Code	Course Title	No. of Hour/s		Unit/s	Pre-requisite/s	Co-requisite/s
		Lec	Lab			
MATH 403	Engineering Data Analysis	3	0	3	MATH 401	
MATH 404	Differential Equations	3	0	3	MATH 402	
ENGG 403	Computer Aided Design	0	3	1	ENGG 402	
ENGG 407	Statics of Rigid Bodies	3	0	3	SCI 403, MATH 402	
ME 401	ME Orientation	1	0	1	ENGG 401	
ME 402	Thermodynamics 1	3	0	3	SCI 403, MATH 402	
ME 403	Workshop Theory and Practice	0	3	1		
EE 419	Basic Electrical Engineering	2	3	3	SCI 403, MATH 402	
PATHFit 3	Menu of Dance, Sports, Martial Arts, Group Exercise, Outdoor Adventure Activities Menu Offering: (Traditional and Recreational Games)	2	0	2	PATHFit 1 and 2	
Fili 101	Kontekstwalisadong Komunikasyon sa Filipino	3	0	3		
Total		20	9	23		

SECOND YEAR						
Second Semester						
Course Code	Course Title	No. of Hour/s		Unit/s	Pre-requisite/s	Co-requisite/s
		Lec	Lab			
ENGG 408	Dynamics of Rigid Bodies	2	0	2	ENGG 407	
ENGG 418	Mechanics of Deformable Bodies	3	0	3	ENGG 407	ENGG 408
ME 404	Advanced Mathematics for ME	3	0	3	MATH 404	
ME 405	Thermodynamics 2	3	0	3	ME 402	
ME 406	Fluid Mechanics	3	0	3	ME 402	
ME 407	Computer Applications for ME	0	3	1	ENGG 403	
ME 408	Machine Shop Theory and Practice	0	6	2	ME 403	
EE 422	DC and AC Machinery	2	3	3	EE 419	
PATHFit 4	Menu of Dance, Sports, Martial Arts, Group Exercise, Outdoor Adventure Activities Menu Offering: (Team Sports, Basketball and Volleyball)	2	0	2	PATHFit 1 and 2	
Fili 102	Filipino sa Iba't Ibang Disiplina	3	0	3		
Total		21	12	25		



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THIRD YEAR						
First Semester						
Course Code	Course Title	No. of Hour/s		Unit/s	Pre-requisite/s	Co-requisite/s
		Lec	Lab			
ENGG 416	Research Methods	3	0	3	MATH 403	
ME 409	Heat Transfer	3	0	3	ME405	
ME 410	Combustion Engineering	3	0	3	ME405	
ME 411	Fluid Machinery	3	0	3	ME406	
ME 412	Machine Elements	2	3	3	ENGG408	
ME 413	Materials Engineering and Testing	2	3	3	ENGG 418, SCI 401	
ME 414	ME Elective 1	2	0	2		
ME 415	ME Laboratory 1	0	3	1	ME405	
ENGG 414	Numerical Methods	3	0	3	ME 404	
Litr 102	ASEAN Literature	3	0	3		
Total		24	9	27		

THIRD YEAR						
Second Semester						
Course Code	Course Title	No. of Hour/s		Unit/s	Pre-requisite/s	Co-requisite/s
		Lec	Lab			
ME 416	Vibration Engineering	2	0	2	MATH 404	
ME 417	Refrigeration Systems	3	0	3	ME409	
ME 418	Machine Design 1	3	0	3	ME 412, ME 413	ME 421
ME 419	ME Elective 2	2	0	2		
ECE 422	Basie Electronics	2	3	3	EE419	
ME 420	ME Laboratory 2	0	6	2	ME 411, ME 415	
ENGG 404	Engineering Economics	3	0	3	MATH 402	
ME 421	ME Laws, Ethics, Contracts, Codes and Standards	2	0	2	GEd 107	
ME 422	ME Project Study 1	0	3	1	ENGG416	
Total		17	12	21		

THIRD YEAR						
MIDTERM						
Course Code	Course Title	No. of Hour/s		Unit/s	Pre-requisite/s	Co-requisite/s
		Lec	Lab			
ME 423	Airconditioning and Ventilation Systems	3	0	3	ME 417	
ENGG 411	Basic Occupational Safety and Health	3	0	3		
ME 424	Machine Design 2	2	3	3	ME 418	
Total		8	3	9		



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FOURTH YEAR						
First Semester						
Course Code	Course Title	No. of Hour/s		Unit/s	Pre-requisite/s	Co-requisite/s
		Lec	Lab			
ENGG 417	On-the-Job Training	320		4	4th year standing	
ENGG 413	Environmental Science and Engineering	3	0	3	SCI 401	
ME 425	Power Plant Design with Renewable Energy	4	3	5	ME 410, ME 411	
Total		7	3	12		

FOURTH YEAR						
Second Semester						
Course Code	Course Title	No. of Hour/s		Unit/s	Pre-requisite/s	Co-requisite/s
		Lec	Lab			
ENGG 405	Technopreneurship	3	0	3	4th year standing	
ME 426	Industrial Plant Engineering	3	3	4	ME 423, ME 411	ME 428
ME 427	ME Project Study 2	0	3	1	ME 422	
ME 428	Manufacturing and Industrial Processes with Plant Visits	1	3	2	ENGG 411	ME 426
ME 429	ME Laboratory 3	0	6	2	ME 425	
ENGG 406	Engineering Management	2	0	2		
ME 430	ME Practice with Comprehensive Examination	0	6	2	Graduating	
ECE 425	Control System Engineering	2	3	3	ECE 422	
Total		11	24	19		
GRAND TOTAL UNITS		159	90	193		

- ME Electives:
1. Introduction to Robotics
 2. Industrial Robots
 3. Engine Friction and Lubrication
 4. Solar Energy and Wind Energy Utilization
 5. Design of Thermal Systems