

# Republic of the Philippines BATANGAS STATE UNIVERSITY

Pablo Borbon Main II, Alangilan, Batangas City



# COLLEGE OF ENGINEERING, ARCHITECTURE & FINE ARTS www.batstate-u.edu.ph Tel. No. (043) 425-0139 loc 118

#### **CURRICULUM**

#### **Bachelor of Science in Mechanical Engineering (BSME)**

Academic Year 2018-2019
Reference CMOs: CMO No. 97 s. 2017, CMO No. 4 s. 2018 and CMO No. 20, s. 2013

#### **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 of Mechanical Engineering**

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.

#### **Student Outcomes**

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

- a. Ability to apply knowledge of mathematics and science to solve engineering problems.
- b. Ability to design and conduct experiments, as well as to analyze and interpret data.
- c. 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, in accordance with standards.
- d. Ability to function on multidisciplinary teams.
- e. Ability to identify, formulate, and solve engineering problems.
- f. Understanding of professional and ethical responsibility.
- g. Ability to communicate effectively.
- h. Broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- i. Recognition of the need for, and an ability to engage in life-long learning.
- j. Knowledge of contemporary issues.
- k. Ability to use techniques, skills, and modern engineering tools necessary for engineering practice.
- 1. Knowledge and understanding of engineering and management principles as a member and leader in a team, to manage projects and in multidisciplinary environments.

# **CURRICULUM COMPONENTS**

CURRICULUM COMPONENTS	umber of Ho	urs Per Wee	Credit
Classification/ Field / Course	Lec	Lab	Units
I. TECHNICAL COURSES			
A. Mathematics			
Differential Calculus	3	0	3
Integral Calculus	3	0	3
Differential Equations	3	0	3
Engineering Data Analysis	3	0	3
Numerical Methods	3	0	3
Sub-Total	15	0	15
B. Natural/Physical Sciences	**************************************		
General Chemistry	3	3	4
Physics I	3	3	4
Modern Biology	2	3	3
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 1	3	0	3
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		2
Computer Applications for ME	0	0	
		3	1
ME Practice with Comprehensive Examination	0 320	6	2
On the-Job-Training		hrs	4
Sub-Total	43	39	60

F. Professional Mechanical Engineering Courses			
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. Elective Courses			
ME Electives (2 units each)	4	0	4
Sub-Total	4	0	4
TOTAL TECHNICAL COURSES	109	90	143
II. NON-TECHNICAL COURSES			
A. General Education Courses			
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
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 Sub-Total	12	0	12
C. Physical Education			
PE 1,2,3,4 (2 units each)	8	0	8
Sub-Total	8	0	8
D. National Service Training Program			
NSTP 1&2 (3 units each)	6	0	6
Sub-Total Sub-Total	6	0	6
TOTAL NON-TECHNICAL COURSES	50	0	50
GRAND TOTAL	159	90	193

SUMMARY					
Courses	Number of Units				
A. Mathematics	15				
B. Natural and 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				
B. General Education Elective/Mandated Courses	12				
C. Physical Education and NSTP	14				
TOTAL	193				

## PROGRAM OF STUDY

GEd 105 Rea GEd 101 Und SCI 401 Gen GEd 106 Pury MATH 401 Diff ENGG 401 Intre PE 101 Phy NSTP 111 Nat  Course Code  MATH 402 Inte SCI 403 Phy GEd 104 The GEd 109 Scie GEd 108 Art CpE 401 Cor ENGG 402 Eng PE 102 Rhy NSTP 121 Nat  Course Code  GEd 107 Eth GEd 103 Life SCI 402 Mo  Course Code  ME 401 ME MATH 404 Diff ENGG 407 Sta ME 402 The	Course Title  athematics in the Modern World eadings in Philippine History inderstanding the Self eneral Chemistry arposive Communication differential Calculus troduction to Engineering aysical Fitness, Gymnastics and Aerobics ational Service Training Program 1  Total  FIRST YEA  Second Seme  Course Title  tegral Calculus anysics 1 ane Contemporary World beience, Technology and Society art Appreciation computer Programming 1 angineering Drawing anythmic Activities ational Service Training Program 2  Total  FIRST YEA  Midterm  Course Title  thics after and Works of Rizal fodern Biology  Total	No. of   Lec   3   3   3   3   3   3   3   3   4   23   4   4   4   4   4   4   4   4   4	Hour/s  Lab  0 0 0 3 0 0 3 0 0 6  Hour/s  Lab 0 0 3 0 0 4 Hour/s  Lab 0 0 3 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1	Unit/s  3 3 4 3 3 1 2 3 25  Unit/s  3 4 3 25  Unit/s  4 3 3 2 3 1 1 2 2 3 23	Pre-requisite/s  Pre-requisite/s  MATH 401  MATH 401  PE 101  NSTP 1	Co-requisite/s  MATH 402  Co-requisite/s
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CpE 401 Cor ENGG 402 Eng PE 102 Rhy NSTP 121 Nat  Course Code  GEd 107 Eth GEd 103 Life SCI 402 Mo  Course Code  ME 401 ME MATH 404 Diff ENGG 407 Sta ME 402 The	omputer Programming I ngineering Drawing hythmic Activities ational Service Training Program 2  Total FIRST YE Midterm  Course Title thics ife and Works of Rizal lodern Biology	0 2 3 20 AR No. of Lec 3	3 0 0 9 Hour/s	1 2 3 23	NSTP 1	Co-requisite/
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Course Code  GEd 107 Eth GEd 103 Life SCI 402 Mo  Course Code  ME 401 ME MATH 404 Diff ENGG 407 Sta ME 402 The	Total  Total  FIRST YE.  Midterm  Course Title  thics ife and Works of Rizal  lodern Biology	3 20 AR 1 No. of Lec 3 3	0 9 Hour/s Lab	3 23	NSTP 1	Co-requisite/
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GEd 107 Eth GEd 103 Life SCI 402 Mo  Course Code  ME 401 ME MATH 404 Dif ENGG 407 Sta ME 402 The	Course Title thics ife and Works of Rizal lodern Biology	No. of Lec 3	Lab	Unit/s	Pre-requisite/s	Co-requisite/s
GEd 107 Eth GEd 103 Life SCI 402 Mo  Course Code  ME 401 ME MATH 404 Dif ENGG 407 Sta ME 402 The	thics ife and Works of Rizal lodern Biology	Lec 3	Lab	Unit/s	Pre-requisite/s	Co-requisite/s
GEd 103 Life SCI 402 Mo  Course Code  ME 401 ME MATH 404 Diff ENGG 407 Sta ME 402 The	ife and Works of Rizal lodern Biology	3	0			20 requisite/s
SCI 402   Mo	lodern Biology			3		
Course Code  ME 401 ME  MATH 404 Dif  ENGG 407 Sta  ME 402 The		2	0	3		
ME 401 ME MATH 404 Diff ENGG 407 Sta ME 402 The	Total		3	3		
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ME 401 ME MATH 404 Diff ENGG 407 Sta ME 402 The	Course Title		Hour/s	Unit/s	Pre-requisite/s	Co-requisite/
MATH 404 Dif ENGG 407 Sta ME 402 The		Lec	Lab			
ENGG 407 Sta ME 402 The	IE Orientation	1	0	1	ENGG 401	
ME 402 The	ifferential Equations	3	0	3	MATH 402	
	tatics of Rigid Bodies	3	. 0	3	SCI 403, MATH 402	
EE 419 Bas	hermodynamics 1	3	0	3	SCI 403, MATH 402	
	asic Electrical Engineering	2	3	3	SCI 403, MATH 402	
	ngineering Data Analysis	3	0	3	MATH 401	
	omputer Aided Design	0	3	1	ENGG 402	
	/orkshop Theory and Practice	0	3	1		
	dividual and Dual Sports	2	0	2	PE 101	
Fili 101 Ko	ontekstwalisadong Komunikasyon sa Filipino	3	0	3		
	Total		9	23		
	SECOND Y					
	Second Sem		TT /	<del></del>		T
Course Code	Course Title		Hour/s	Unit/s	Pre-requisite/s	Co-requisite/
ME 404 Ad	dvanced Mathematics for ME	Lec 3	Lab 0	3	MATH 404	
	ynamics of Rigid Bodies	2	0	2	ENGG 407	
	hermodynamics 2	3	0	3		
	nermouynamies z		l U	3	ME 402 EE 419	<b></b>
		1 2			FF 419	I
	C and AC Machinery	2	3			
	C and AC Machinery luid Mechanics	3	3 0	3	ME 402	ENGC 400
	C and AC Machinery luid Mechanics lechanics of Deformable Bodies	3	3 0 0	3	ME 402 ENGG 407	ENGG 408
	C and AC Machinery luid Mechanics lechanics of Deformable Bodies omputer Applications for ME	3 3 0	3 0 0 3	3 3	ME 402 ENGG 407 ENGG 403	ENGG 408
DE 104 Pr	C and AC Machinery luid Mechanics dechanics of Deformable Bodies omputer Applications for ME fachine Shop Theory and Practice	3 3 0 0	3 0 0 3 6	3 3 1 2	ME 402 ENGG 407 ENGG 403 ME 403	ENGG 408
	C and AC Machinery luid Mechanics lechanics of Deformable Bodies omputer Applications for ME	3 3 0	3 0 0 3	3 3	ME 402 ENGG 407 ENGG 403	ENGG 408

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	First Sen					
Course Code	Course Title	No. of Lec	Hour/s Lab	Unit/s	Pre-requisite/s	Co-requisite/
ENGG 416	Research Methods	3	0	3	MATH 403	
ME 409	Heat Transfer	3	0	3	ME 405	
ME 410	Combustion Engineering	3	0	3	ME 405	
ME 411	Fluid Machinery	3	0	3	ME 406	
ME 412	Machine Elements	2	3	3	ENGG 408	
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	ME 405	
ENGG 414	Numerical Methods	3	0	3	ME 404	
Litr 102	ASEAN Literature	3	0	3	10112 404	-
	Tot		9	27		
	THIRD Y	STREET, SQUARE, SQUARE	9	Z/		1
	Second Se		***************************************			
C C :			Hour/s			T
Course Code	Course Title	Lec	Lab	Unit/s	Pre-requisite/s	Co-requisite
ME 416	Vibration Engineering	2	0	2	MATTITAGA	-
ME 417	Refrigeration Systems	3		2	MATH 404	
ME 418	Machine Design 1		0	3	ME 409	
ME 419	ME Elective 2	3	0	3	ME 412, ME 413	ME 421
ECE 422	Basic Electronics	2	0	2		
ME 420	<u> </u>	2	3	3	EE 419	
	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	ENGG 416	
	Tot		12	21		
	THIRD Y	EAR				
	Midter	m				
Course Code	Commo Tido	No. of	Hour/s	** ***		
Course Code	Course Title	Lec	Lab	Unit/s	Pre-requisite/s	Co-requisite
ME 423	Airconditioning and Ventilation Systems	3	0	3	ME 417	
ENGG 411	Basic Occupational Safety and Health	3	0	3	11117 117	<del>                                     </del>
ME 424	Machine Design 2	2	3	3	ME 418	1
		al 8	3	9	WIL 410	
	FOURTH	THE RESERVE AND ADDRESS OF THE PARTY OF THE	<u> </u>	) 9		
	First Sen	_		<del></del>		
		The state of the s	Hour/s			T
Course Code	Course Title	Lec	Lab	Unit/s	Pre-requisite/s	Co-requisite
ENGG 417	On-the-Job Training	_	20	1	4.1. 37 Ct 1'	
ENGG 417	Environmental Science and Engineering			4	4th Year Standing	
ME 425		3	0	3	SCI 401	<b>_</b>
IVIE 423	Power Plant Design with Renewable Energy	4	3	5	ME 410, ME 411	
	Tot		3	12		
***************************************	FOURTH					
	Second Se					
<b>Course Code</b>	Course Title		Hour/s	Unit/s	Pre-requisite/s	Co-requisite
ENICO 405		Lec	Lab			- Toquisite
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	
2020 1200			_	4		
	Tot	al 11	24	19		

## **ME Electives:**

- 1. Introduction to Robotics
- 2. Industrial Robots
- 3. Engine Friction and Lubrication
- 4. Solar Energy and Wind Energy Utilization5. Design of Thermal Systems