



Republic of the Philippines
BATANGAS STATE UNIVERSITY
The National Engineering University

Alangilan Campus

Golden Country Homes, Alangilan, Batangas City, 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 Sanitary Engineering (BSSE)

Academic Year 2023-2024

Reference CMOs: CMO No. 98 s. 2017, CMO No. 4 s. 2018 and CMO No. 20 s. 2013

CMO No. 39, S.2021, CMO No. 40, S.2021

Curriculum Description

The BSSE program recognizes the importance of Sanitary Engineering in the protection and preservation of the environment as well as the promotion of health and well-being of the general public.

Program Educational Objectives

The graduates of Bachelor of Science in Sanitary Engineering within three to five years after graduation shall:

1. Successfully practice as sanitary engineers; and
2. Adhere to professional, moral and ethical standards in the practice of sanitary engineering.

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.



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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 student as they progress through the program:

1. **Discipline Knowledge.** Ability to apply mathematics, sciences and principles of engineering to solve complex sanitary 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 sanitary 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 sanitary 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; and
13. **Social and National Responsibility.** Apply acquired sanitary 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 Solutions to SE Problems (Advanced Mathematics	2	3	3
Sub-total	14	3	15
B. Natural/Physical Sciences			
General Chemistry	3	3	4
Physics	3	3	4
Geology	2	0	2
Modern Biology	2	3	3
Sub-total	10	9	13
C. Basic Engineering Sciences			
Sanitary Engineering Orientation	1	0	1
Introduction to Engineering	0	3	1
Engineering Drawing	0	3	1
Computer Programming 1	0	3	1
Computer Programming 2	0	3	1
Computer-Aided Design	0	3	1
Statics of Rigid Bodies	3	0	3
Dynamics of Rigid Bodies	2	0	2
Strength of Materials	4	0	4
Engineering Economics	3	0	3
Engineering Management	2	0	2
Technopreneurship	3	0	3
Sub-total	18	15	23
D. Allied Courses			
Engineering Utilities 1	3	0	3
Engineering Utilities 2	3	0	3
Environmental Science and Engineering	3	0	3
Sub-total	9	0	9
E. Professional Courses			
Fundamentals of Surveying	3	6	5
Construction Materials and Testing	2	3	3
Structural Theory	3	3	4
Principles of Reinforced/Prestressed Concrete Design	3	3	4
Hydraulics	4	3	5
Hydrology	3	0	3



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Sanitary Engineering Laws, Ethics and Contracts	2	0	3
Geotechnical Engineering 1 (Soil Mechanics)	3	3	4
Construction Methods and Project Management	3	3	4
Environmental and Sanitary Chemistry	2	3	3
Microbiology and Parasitology for Environmental Engineers	2	3	3
Public Health Engineering	2	0	2
Basic Occupational Safety and Health	3	0	3
Solid and Hazardous Waste Engineering	3	0	3
Environmental Planning, Laws and Impact Assessment	3	0	3
Water Supply Planning and Development	3	0	3
Sewerage and Urban Drainage	3	0	3
Sanitary Science, Plumbing and Fire Protection as Applied to Buildings	2	3	3
Environmental Engineering Laboratory	0	3	1
Water Purification Process Design	3	0	3
Sewage and Industrial Wastewater Treatment	3	0	3
SE Design Project 1	1	3	2
SE Design Project 2	0	6	2
SE Practice with Comprehensive Examinations	0	6	2
Research Methods	3	0	3
Sub-total	60	51	77
F. On-the Job Training	320 hrs		4
Total (Technical Courses)	111	78	141
II. NON-TECHNICAL COURSES			
A. General Education Course			
Mathematics in the Modern World	3	0	3
Readings in Philippine History	3	0	3
Understanding the Self	3	0	3
The Contemporary World	3	0	3
Science, Technology and Society	3	0	3
Purposive Communication	3	0	3
Art Appreciation	3	0	3
Ethics	3	0	3
Sub-total	24	0	24
B. Filipino/Literature/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 Activity 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 and Adventure Activities	2	0	2



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Menu offering: Traditional and Recreational Games			
PATHFit 4 – Menu of Dance, Sports, Martial Arts, Group Exercise, Outdoor and Adventure Activities	2	0	2
Menu Offering: Team Sports, (Basketball and Volleyball)			
Sub-total	8	0	8
D. National Service Training Program			
NSTP 111	3	0	3
NSTP 121	3	0	3
Sub-total	6	0	6
Total (Non-Technical Courses)	50	0	50
GRAND TOTAL	161	78	191

SUMMARY	
Courses	Number of Units
I. Technical Courses	
A. Mathematics	15
B. Natural/Physical Sciences	13
C. Basic Engineering Sciences	23
D. Allied Courses	9
E. Professional Courses	77
F. OJT	4
II. Non-Technical Courses	
A. General Education Courses	24
B. Filipino/Literature/Mandated Courses	12
C. PATHFit 1 – 4	8
D. NSTP	6
GRAND TOTAL	191



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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			
GEd 102	Mathematics in the Modern World	3	0	3		
GEd 105	Readings in Philippine History	3	0	3		
GEd 101	Understanding the Self	3	0	3		
SCI 401	General Chemistry	3	3	4		
GEd 106	Purposive Communication	3	0	3		
ENGG 401	Introduction to Engineering	0	3	1		
MATH 401	Differential Calculus	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
GEd 104	The Contemporary World	3	0	3		
GEd 109	Science, Technology and Society	3	0	3		
CpE 401	Computer Programming 1	0	3	1		
GEd 108	Art Appreciation	3	0	3		
ENGG 402	Engineering Drawing	0	3	1		
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			
GEd 107	Ethics	3	0	3		
GEd 103	Life and Works of Rizal	3	0	3		
SCI 402	Modern Biology	2	3	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 404	Differential Equations	3	0	3	MATH 402	
CE 404	Fundamentals of Surveying	3	6	5	ENGG 402	
SCI 405	Geology	2	0	2		
PATHFit 3	Menu of Dance, Sports, Martial Arts, Group Exercise, Outdoor and Adventure Activities Menu offering: Traditional and Recreational Games	2	0	2	PATHFit 1 and 2	
ENGG 407	Statics of Rigid Bodies	3	0	3	SCI 403, MATH 402	
ENGG 403	Computer Aided Design	0	3	1	ENGG 402	
SE 401	Sanitary Engineering Orientation	1	0	1		
SE 402	Environmental and Sanitary Chemistry	2	3	3	SCI 401	
ENGG 408	Dynamics of Rigid Bodies	2	0	2	ENGG 407	
Total		18	12	22		

SECOND YEAR						
Second Semester						
Course Code	Course Title	No. of Hour/s		Unit/s	Pre-requisite/s	Co-requisite/s
		Lec	Lab			
SE 403	Numerical Solutions to SE Problems (Advanced Mathematics)	2	3	3	MATH 404	
PATHFit 4	Menu of Dance, Sports, Martial Arts, Group Exercise, Outdoor and Adventure Activities Menu Offering: Team Sports, (Basketball and Volleyball)	2	0	2	PATHFit 1 and 2	
ENGG 413	Environmental Science and Engineering	3	0	3	SCI 401	
MATH 403	Engineering Data Analysis	3	0	3	MATH 402	
CE 402	Strength of Materials	4	0	4	ENGG 407	
SE 404	Microbiology and Parasitology for Environmental Engineers	2	3	3	SE 402	
Fili 101	Kontekstwalisadong Komunikasyon sa Filipino	3	0	3		
EE 421	Engineering Utilities 1	3	0	3		
ME 432	Engineering Utilities 2	3	0	3		
Total		25	6	27		



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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			
CE 405	Hydrology	3	0	3		
CE 407	Structural Theory	3	3	4	CE 402	
CE 410	Hydraulics	4	3	5	CE 402, ENGG 408	
CE 411	Geotechnical Engineering 1 (Soil Mechanics)	3	3	4	CE 402, SCI 405	
ENGG 404	Engineering Economics	3	0	3	MATH 402	
ENGG 406	Engineering Management	2	0	2		
SE 405	Public Health Engineering	2	0	2	SE 404	
ENGG 416	Research Methods	3	0	3	MATH 403	
Total		23	9	26		

THIRD YEAR						
Second Semester						
Course Code	Course Title	No. of Hour/s		Unit/s	Pre-requisite/s	Co-requisite/s
		Lec	Lab			
SE 406	Water Supply Planning and Development	3	0	3	CE 410	
SE 407	Sewerage and Urban Drainage	3	0	3	CE 405	
SE 408	Sewage and Industrial Wastewater Treatment	3	0	3	ENGG 413	
CE 406	Construction Materials and Testing	2	3	3	CE 402	
SE 409	Environmental Planning, Laws and Impact Assessment	3	0	3		
ENGG 411	Basic Occupational Safety and Health	3	0	3		
CE 415	Principles of Reinforced/Prestressed Concrete Design	3	3	4	CE 407	
SE 410	Solid and Hazardous Waste Engineering	3	0	3	SE 405	
Total		23	6	25		

THIRD YEAR						
MIDTERM						
Course Code	Course Title	No. of Hour/s		Unit/s	Pre-requisite/s	Co-requisite/s
		Lec	Lab			
Litr 102	ASEAN Literature	3	0	3		
CpE 402	Computer Programming 2	0	3	1		
Fili 102	Filipino sa Iba't Ibang Disiplina	3	0	3		
Total		6	3	7		



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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 hrs		4	4th yr standing	
SE 411	SE Project Design 1	1	3	2	SE 405, SE 407, SE 408, SE 409, CE 415, ENGG 416	
SE 412	SE Laws, Contracts and Ethics	3	0	3		
Total		4	3	9		

FOURTH YEAR						
Second Semester						
Course Code	Course Title	No. of Hour/s		Unit/s	Pre-requisite/s	Co-requisite/s
		Lec	Lab			
CE 417	Construction Methods and Project Management	3	3	4	ENGG 406	
ENGG 405	Technopreneurship	3	0	3	4th yr standing	
SE 413	Environmental Engineering Laboratory	0	3	1	4th yr standing	
SE 414	SE Project Design 2	0	6	2	SE 411	
SE 415	SE Practice with Comprehensive Examinations	0	6	2	Graduating	
SE 416	Sanitary Science, Plumbing and Fire Protection as Applied to Buildings	2	3	3	CE 410	
SE 417	Water Purification Process Design	3	0	3	SE 406	
Total		11	21	18		
GRAND TOTAL UNITS		161	78	191		