



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 Geological Engineering (BSGeoE)

Academic Year 2023-2024

Reference CMOs: CMO No. 35 s. 2008, CMO No. 4 s. 2018 and CMO No. 20 s. 2013

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

Curriculum Description

The Bachelor of Science in Geological Engineering program is designed to prepare students for careers as professional geologists, researchers and/or for admission to graduate school who are expected to be engaged in relevant issues in the society and industry. The program is structured to provide an optimal curriculum that affords graduates with firm foundations on the concepts and theories in the geological sciences through transformative learning strategies. Graduates of this program are in academic, industrial, and government sectors. Job functions include research, teaching, corporate training, higher education administration, outreach, public service, and educational policy. The program consists of Geological Engineering courses divided into two categories of core courses, required geological engineering courses, Electives and non-Geology courses. The program will adopt outcome-based education (OBE) framework with flipped classroom and other blended learning pedagogies.

Program Educational Objectives of Geological Engineering

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

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



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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 the students as they progress through the program:

1. **Discipline Knowledge.** Ability to apply mathematics, sciences and principles of engineering to solve complex geological 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;



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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 geological 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.** Recognize the need for, and ability to engage in independent and life-long learning in the broadest context of technological change;
11. **Modern Tool Usage.** Apply appropriate techniques, skills, and modern engineering and IT tools to complex geological 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 geological 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 and Analysis	3	0	3
Sub-total	15	0	15
B. Natural/Physical Sciences			
General Chemistry	3	3	4
Physics 1	3	3	4
Modern Biology	2	3	3
Sub-total	8	9	11
C. Basic Engineering Sciences			
Engineering Drawing	0	3	1
Computer Programming 1	0	3	1
Engineering Mechanics	3	0	3
Engineering Economics	3	0	3
Introduction to Engineering	0	3	1
Technopreneurship	3	0	3
Engineering Management	3	0	3
Research Methods	3	0	3
Sub-total	15	9	18
D. Allied Courses			
Basic Electrical Engineering	2	3	3
Thermodynamics	3	0	3
Fluid Mechanics	3	0	3
Qualitative & Quantitative Chemistry	2	3	3
Basic Occupational Safety and Health	3	0	3
Sub-total	13	6	15
E. Professional Courses			
Geological Engineering Orientation	1	0	1
Stratigraphy and Historical Geology	3	0	3
Geology	2	0	2
Advanced Engineering Mathematics for GeoEng	3	0	3
Structural Geology and Tectonics	3	0	3
Mineralogy	2	3	3
Geology, Mining and Environmental Laws Energy Policies and Ethics	3	0	3



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Principles of Geophysics	3	0	3
Geomorphology and Terrain Analysis	2	3	3
Geotechnical Engineering 1: (Soil Mechanics)	3	3	4
Fundamentals of Surveying	3	6	5
Environmental Geotechnology	3	0	3
Groundwater and Soil Pollution Remediation	3	0	3
Petroleum Geology	2	3	3
Geothermal Resources	3	0	3
Foundation Engineering	3	0	3
Petroleum Drilling and Production	3	0	3
On-the-Job Training	320 hours		4
Seminar and Fieldtrips in GeoEng	3	3	4
Fundamentals of Geographic Information System	2	3	3
Rock Mechanics	2	3	3
Geochemistry	2	3	3
Volcanology	3	0	3
GeoEng Design Project 1	1	3	2
GeoEng Design Project 2	0	9	3
Mineral Exploration and Geostatistics	3	0	3
Mine Surveying	3	0	3
Geohazards	3	0	3
Sub-total	67	42	85
Total (Technical Courses)	111	78	141
II. NON-TECHNICAL COURSES			
A. General Education Course			
Mathematics in the Modern World	3	0	3
Understanding the Self	3	0	3
Readings in Philippine History	3	0	3
Purposive Communication	3	0	3
The Contemporary World	3	0	3
Art Appreciation	3	0	3
Science, Technology and Society	3	0	3
Ethics	3	0	3
People and the Earth's Ecosystem	3	0	3
Sub-total	27	0	27
B. Mandated Courses			
ASEAN Literature	3	0	3
Life and Works of Rizal	3	0	3
Kontekstwalisadong Komunikasyon sa Filipino	3	0	3
Sub-total	9	0	9
C. Physical Activity Towards Health and Fitness			
PATHFit 1 – Movement Competency Training	2	0	2
PATHFit 2 – Exercise – based Fitness Activities	2	0	2



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PATHFit 3 – Menu of Dance, Sports, Martial Arts, Group Exercise, Outdoor and Adventure Activities Menu offering: Traditional and Recreational Games	2	0	2
PATHFit 4 – Menu of Dance, Sports, Martial Arts, Group Exercise, Outdoor and 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	168	66	194

SUMMARY	
Courses	Number of Units
I. Technical Courses	
A. Mathematics	15
B. Natural/Physical Sciences	11
C. Basic Engineering Sciences	18
D. Allied Courses	15
E. Professional Courses	85
II. Non-Technical Courses	
A. General Education Courses	27
B. Filipino/Literature/Mandated Courses	9
C. PATHFit 1 – 4	8
D. NSTP	6
GRAND TOTAL	194



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PROGRAM OF STUDY

FIRST YEAR						
First Semester						
Course Code	Course Title	Units	No. Hour/s		Pre-requisite(s)	Co-Requisite(s)
			Lec	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		
PATHFit 1	Movement Competency Training	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)
			Lec	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
PATHFit 2	Exercise-based Fitness Activities	2	2	0	PATHFit 1	
NSTP 121	National Service Training Program 2	3	3	0	NSTP 111	
Total		23	20	9		

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



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SECOND YEAR						
First Semester						
Course Code	Course Title	Units	No. Hour/s		Pre-requisite(s)	Co-Requisite(s)
			Lec	Lab		
GeoE 401	Geological Engineering Orientation	1	1	0		
GeoE 403	Stratigraphy and Historical Geology	3	3	0		
GeoE 402	Geology	2	2	0		
ME 431	Thermodynamics	3	3	0	MATH 402, SCI 403	
EE 419	Basic Electrical Engineering	3	2	3	MATH 402, SCI 403	
ENGG 409	Engineering Mechanics	3	3	0	SCI 403	
MATH 404	Differential Equations	3	3	0	MATH 402	
Fili 101	Kontekstwalisadong Komunikasyon sa Filipino	3	3	0		
PATHFit 3	Menu of Dance, Sports, Martial Arts, Group Exercise, Outdoor and Adventure Activities Menu offering: Traditional and Recreational Games	2	2	0	PATHFit 1 & 2	
Total		23	22	3		

SECOND YEAR						
Second Semester						
Course Code	Course Title	Units	No. Hour/s		Pre-requisite(s)	Co-Requisite(s)
			Lec	Lab		
GeoE 404	Structural Geology and Tectonics	3	3	0	GeoE 403	
GeoE 405	Advanced Engineering Mathematics for GeoEng	3	3	0	MATH 404	
GeoE 406	Mineralogy	3	2	3	SCI 401, GeoE 402	
GeoE 407	Principles of Geophysics	3	3	0	SCI 403, GeoE 402	
ChE 420	Qualitative & Quantitative Chemistry	3	2	3	SCI 401	
MATH 403	Engineering Data Analysis	3	3	0	MATH 402	
CE 421	Fluid Mechanics	3	3	0	ENGG 409	
PATHFit 4	Menu of Dance, Sports, Martial Arts, Group Exercise, Outdoor and Adventure Activities Menu Offering: Team Sports, (Basketball and Volleyball)	2	2	0	PATHFit 1 & 2	
Total		23	21	6		



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THIRD YEAR						
First Semester						
Course Code	Course Title	Units	No. Hour/s		Pre-requisite(s)	Co-Requisite(s)
			Lec	Lab		
GeoE 408	Geology, Mining and Environmental Laws Energy Policies and Ethics	3	3	0	3rd year standing	
GeoE 409	Fundamentals of Surveying	5	3	6	ENGG 402	
GeoE 410	Geotechnical Engineering 1: (Soil Mechanics)	4	3	3	ENGG 409, GeoE 402	
GeoE 411	Geomorphology and Terrain Analysis	3	2	3	GeoE 403, GeoE 406	
GeoE 412	Seminar and Fieldtrips in GeoEng	4	3	3	3rd year standing	
GeoE 413	Numerical Methods and Analysis	3	3	0	GeoE 405	
ENGG 404	Engineering Economics	3	3	0	MATH 402	
Total		25	20	15		

THIRD YEAR						
Second Semester						
Course Code	Course Title	Units	No. Hour/s		Pre-requisite(s)	Co-Requisite(s)
			Lec	Lab		
GeoE 414	Fundamentals of Geographic Information System	3	2	3	GeoE 409, GeoE 411	
GeoE 415	Environmental Geotechnology	3	3	0	3rd year standing	
GeoE 416	Petroleum Geology	3	2	3	3rd year standing	
GeoE 417	Rock Mechanics	3	2	3	GeoE 402, ENGG 409	
GeoE 418	Geochemistry	3	2	3	SCI 401, GeoE 402, GeoE 407	
GeoE 419	Volcanology	3	3	0	3rd year standing	
ENGG 406	Engineering Management	3	3	0	GeoE 408	
ENGG 416	Research Methods	3	3	0	MATH 403	
Total		24	20	12		

THIRD YEAR						
MIDTERM						
Course Code	Course Title	Units	No. Hour/s		Pre-requisite(s)	Co-Requisite(s)
			Lec	Lab		
ENGG 411	Basic Occupational Safety and Health	3	3	0	3 rd year Standing	
GeoEE 401	Groundwater and Soil Pollution Remediation	3	3	0	GeoE 410, GeoE 415	
Litr 102	ASEAN Literature	3	3	0		
Total		9	9	0		



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FOURTH YEAR						
First Semester						
Course Code	Course Title	Units	No. Hour/s		Pre-requisite(s)	Co-Requisite(s)
			Lec	Lab		
ENGG 417	On-the-Job Training	4	320 hours		4 th year standing	
GeoE 422	GeoEng Design Project 1	2	1	3	ENGG 416	
GeoE 421	Mine Surveying	3	3	0	GeoE 406, GeoE 409	
Total		9	4	3		

FOURTH YEAR						
Second Semester						
Course Code	Course Title	Units	No. Hour/s		Pre-requisite(s)	Co-Requisite(s)
			Lec	Lab		
GEEd 110	People and the Earth's Ecosystems	3	3	0		
ENGG 405	Technopreneurship	3	3	0	4 th year Standing	
GeoEE 402	Geothermal Resources	3	3	0	4 th year Standing	
GeoE 423	GeoEng Design Project 2	3	0	9	GeoE 421	
GeoEE 403	Foundation Engineering	3	3	0	GeoE 409, GeoE 417	
GeoE 424	Mineral Exploration and Geostatistics	3	3	0	MATH 403, GeoE 406	
GeoEE 404	Petroleum Drilling and Production	3	3	0	GeoE 416	
GeoE 425	Geohazards	3	3	0	GeoE 411, GeoE 414, GeoE 415	
Total		24	21	9		
GRAND TOTAL UNITS		194	168	66		