Republic of the Philippines
BATANGAS STATE UNIVERSITY
BatStateU Alangilan
Alangilan, Batangas City
College of Engineering, Architecture and Fine Arts
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CURRICULUM
Bachelor of Science in Geodetic Engineering (BSGE)

Academic Year: 2021-2022
Reference CMOs: CMO No. 89 s. 2017, CMO No. 4 s. 2018 and CMO No. 20 s. 2013

Curriculum Description

Geodetic Engineering deals with the collection and measurements of spatial data gathered from the above, on or below the earth's surface with the aid of precision instruments and tools, and with the application of advanced technologies and scientific methodologies. This also includes the management of information systems, maps, plans, charts, and other relevant documents. Included also in this course is the establishment of geodetic control network; collection of ground data using various methodologies, techniques, platforms and sensors; processing, evaluation and analysis of collected data to produce information for different applications; quality assurance of outputs in accordance with governing standards and protocols; conduct of research and development activities; development of spatial information systems, and development of business entrepreneurial skills.

Program Educational Objectives of Geodetic Engineering

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

1. **Specialist.** Practiced as specialist in solving complex geodetic 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 analytical 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 geodetic 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 geodetic 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. **Environment and Sustainability.** 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 geodetic 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 geodetic 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
Differential Equations	3	3	0
Engineering Data Analysis	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	2	3
Sub Total	**11**	**8**	**9**
C. Basic Engineering Sciences			
Computer Programming 1	1	0	3
Computer - Aided Design	1	0	3
Engineering Mechanics	3	3	0
Engineering Drawing	1	0	3
Introduction to Engineering	1	0	3
Research Methods	3	3	0
Basic Occupational Safety and Health	3	3	0
Environmental Science and Engineering	3	3	0
Engineering Management	3	3	0
Engineering Economics	3	3	0
Technopreneurship	3	3	0
Sub Total	**25**	**21**	**12**
D. Allied Courses			
Geology	3	3	0
Electrical and Electronics Engineering for Geodetic Engineers	3	2	3
Advanced Information & Communications Technology	3	3	0
Sub Total	**9**	**8**	**3**
E. Professional Courses			
Geodetic Engineering Orientation	1	1	0
General Surveying 1	3	2	3
Cartography	3	2	3
General Surveying 2	4	3	3
Advanced Engineering Mathematics for Geodetic Engineering	3	3	0
Engineering Surveys	4	3	3
Geometric Geodesy	3	3	0
Introduction to the Laws on Public and Private Lands	2	2	0
Theory of Errors and Adjustments	3	3	0
Geodetic Engineering Laws, Obligations and Contracts, Ethics	2	2	0
Physical Geodesy	2	2	0
Satelite Geodesy	3	3	0
Geodetic Surveying	3	3	0
Geodetic Computations & Adjustments	3	2	3

Remote Sensing	4	3	3
Land Registration Laws	3	3	0
Land Valuation	3	3	0
Fundamentals of Geographic Information Systems	3	2	3
Land Use Planning and Development	3	2	3
Property Surveys	5	3	6
Hydrographic Surveying	3	3	0
GE Design Project 1	1	0	3
GE Design Project 2	1	0	3
Photogrammetry	4	3	3
Public Land Laws & Laws on Natural Resources	3	3	0
Geovisualization	3	3	0
Land Administration and Management	3	3	0
On-the-Job Training (320 hrs)	4	320 hours	
Special Studies in Geodetic Engineering	3	3	0
GE Practice with Comprehensive Examination	2	0	6
Sub Total	**87**	**68**	**45**
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
Art Appreciation	3	3	0
Science, Technology and Society	3	3	0
Ethics	3	3	0
The Contemporary World	3	3	0
People and the Earth's Ecosystem	3	3	0
Sub Total	**27**	**27**	**0**
B. Mandated Courses			
Kontekstwalisadong Komunikasyon sa Filipino	3	3	0
Life and Works of Rizal	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**	**167**	**69**

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	2	3		
	Total	**9**	**8**	**3**		

SECOND YEAR						
FIRST SEMESTER						
Course Code	**Course Title**	**Units**	**No. Hour/s**		**Pre-requisite(s)**	**Co-Requisite(s)**
			Hrs Lec	**Hrs Lab**		
MATH 403	Engineering Data Analysis	3	3	0	MATH 402	
MATH 404	Differential Equations	3	3	0	MATH 402	
GE 401	Geodetic Engineering Orientation	1	1	0		
GE 402	General Surveying 1	3	2	3		
GE 403	Cartography	3	2	3		
ENGG 403	Computer - Aided Design	1	0	3		
ENGG 409	Engineering Mechanics	3	3	0	SCI 403	
SCI 405	Geology	3	3	0	SCI 403	
Fili 101	Kontekstwalisadong Komunikasyon sa Filipino	3	3	0		
PE 103	Individual and Dual Sports	2	2	0	PE 102	
	Total	**25**	**22**	**9**		

SECOND YEAR						
SECOND SEMESTER						
Course Code	**Course Title**	**Units**	**No. Hour/s**		**Pre-requisite(s)**	**Co-Requisite(s)**
			Hrs Lec	**Hrs Lab**		
GE 404	General Surveying 2	4	3	3	GE 402	
GE 406	Engineering Surveys	4	3	3		GE 404
GE 407	Geometric Geodesy	3	3	0		GE 404
GE 408	Electrical and Electronics Engineering for Geodetic Engineers	3	2	3	SCI 403	
GE 409	Introduction to the Laws on Public and Private Lands	2	2	0		
GE 410	Theory of Errors and Adjustments	3	3	0	MATH 404	
GE 405	Advanced Engineering Mathematics for Geodetic Engineering	3	3	0	MATH 404	
PE 104	Team Sports	2	2	0	PE 103	
	Total	**24**	**21**	**9**		

THIRD YEAR						
FIRST SEMESTER						
Course Code	**Course Title**	**Units**	**No. Hour/s**		**Pre-requisite(s)**	**Co-Requisite(s)**
			Hrs Lec	**Hrs Lab**		
Litr 102	ASEAN Literature	3	3	0		
GE 411	Geodetic Engineering Laws, Obligations and Contracts, Ethics	2	2	0	GE 409	
ENGG 416	Research Methods	3	3	0	MATH 403	
GE 412	Physical Geodesy	2	2	0	GE 407	
GE 413	Satelite Geodesy	3	3	0	GE 407	GE 412
GE 414	Geodetic Surveying	3	3	0	GE 407	GE 412
GE 415	Geodetic Computations & Adjustments	3	2	3	GE 410	
GE 416	Remote Sensing	4	3	3	SCI 403	
	Total	**23**	**21**	**6**		

THIRD YEAR						
SECOND SEMESTER						
Course Code	**Course Title**	**Units**	**No. Hour/s**		**Pre-requisite(s)**	**Co-Requisite(s)**
			Hrs Lec	**Hrs Lab**		
GE 417	Land Registration Laws	3	3	0	GE 409	
GEE 401	Land Valuation	3	3	0	3rd year standing	
GE 418	Fundamentals of Geographic Information Systems	3	2	3	GE 403	
GE 419	Land Use Planning and Development	3	2	3		GE 418
GE 420	Property Surveys	5	3	6	GE 402	
GE 421	Hydrographic Surveying	3	3	0	GE 402	
GE 422	GE Design Project 1	1	0	3	ENGG 416	
GE 423	Photogrammetry	4	3	3	GE 415, GE 403	
	Total	**25**	**19**	**18**		

THIRD YEAR						
MIDTERM SEMESTER						
Course Code	**Course Title**	**Units**	**No. Hour/s**		**Pre-requisite(s)**	**Co-Requisite(s)**
			Hrs Lec	**Hrs Lab**		
ENGG 411	Basic Occupational Safety and Health	3	3	0	3rd year standing	
ENGG 413	Environmental Science and Engineering	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 417	On-the-Job Training	4	320 hours		4th year standing	
ENGG 406	Engineering Management	3	3	0	4th year standing	
ENGG 404	Engineering Economics	3	3	0	MATH 402	
	Total	**10**	**6**	**0**		

FOURTH YEAR						
SECOND SEMESTER						
Course Code	**Course Title**	**Units**	**No. Hour/s**		**Pre-requisite(s)**	**Co-Requisite(s)**
			Hrs Lec	**Hrs Lab**		
GE 424	GE Design Project 2	1	0	3	GE 401	
ENGG 405	Technopreneurship	3	3	0	4th year standing	
GE 425	Public Land Laws & Laws on Natural Resources	3	3	0	GE 409	
GEE 402	Geovisualization	3	3	0	GEE 401	
GE 426	Advanced Information & Communications Technology	3	3	0	4th year standing	
GE 427	Land Administration and Management	3	3	0	4th year standing	
GE 428	Special Studies in Geodetic Engineering	3	3	0	4th year standing	
GE 429	GE Practice with Comprehensive Examination	2	0	6	Graduating standing	
Total		**21**	**18**	**9**		
TOTAL CREDIT UNITS		**194**	**167**	**69**		