Republic of the Philippines
BATANGAS STATE UNIVERSITY
The National Engineering University
Alangilan Campus
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CURRICULUM

Bachelor of Science in Civil Engineering (BSCE)
Academic Year 2023 – 2024

Reference CMOs: CMO No. 92 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

Civil Engineering is a profession that applies the basic principles of science in conjunction with mathematical and computational tools to solve problems associated with developing and sustaining civilized life on our planet.

The Civil Engineering curriculum is designed to prepare graduates to apply knowledge of mathematics, calculus-based physics, chemistry, and at least one additional area of basic science, consistent with the Program Educational Objectives; apply knowledge of technical areas appropriate to civil engineering; conduct civil engineering experiments and analyze and interpret the resulting data; design a system component, or process in more than one civil engineering context; explain basic concepts in management, business, public policy, and leadership; and explain the importance of professional licensure.

Program Educational Objectives

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

1. successfully participate as partners in nation-building in engineering projects involving structural, geotechnical, water resources, transportation and construction management; and
2. adhere to professional, moral and ethical standards in the practice of civil 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.

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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 students as they progress through the program:

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

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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 civil 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 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 CE Problems	2	3	3
Sub-total	**14**	**3**	**15**
B. Natural/Physical Sciences			
General Chemistry	3	3	4
Physics 1	3	3	4
Geology	2	0	2
Modern Biology	2	3	3
Sub-total	**10**	**9**	**13**
C. Basic Engineering Sciences			
Civil Engineering Orientation	2	0	2
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	**19**	**15**	**24**
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
CE Laws, Ethics and Contracts	2	0	2
Highway and Railroad Engineering	3	0	3
Building System Design	2	3	3
Geotechnical Engineering 1 (Soil Mechanics)	3	3	4
Principles of Transportation Engineering	3	0	3
Quantity Surveying	1	3	2

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Construction Methods and Project Management	3	3	4
Principles of Steel Design	2	3	3
CE Design Project 1	1	3	2
CE Design Project 2	0	9	3
CE Practice with Comprehensive Examinations	0	6	2
Research Methods	3	0	3
Sub-total	**41**	**51**	**58**
2. Professional Courses Specialized			
Professional Course – specialized 1	3	0	3
Professional Course – specialized 2	3	0	3
Professional Course – specialized 3	3	0	3
Professional Course – specialized 4	3	0	3
Professional Course – specialized 5	3	0	3
Sub-total	**15**	**0**	**15**
F. On-the Job Training	320 hrs.		4
Total (Technical Courses)	**108**	**78**	**138**
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 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 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 111	3	0	3
NSTP 121	3	0	3
Sub-total	**6**	**0**	**6**
Total (Non-Technical Courses)	**50**	**0**	**50**
GRAND TOTAL	**158**	**78**	**188**

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SUMMARY	
Courses	**Number of Units**
I. Technical Courses	
A. Mathematics	15
B. Natural/Physical Sciences	13
C. Basic Engineering Sciences	24
D. Allied Courses	9
E. Professional Courses	58
F. Professional Courses – Specialized	15
G. 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	**188**

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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		
MATH 401	Differential Calculus	3	0	3		
ENGG 401	Introduction to Engineering	0	3	1		
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		
GEd 108	Art Appreciation	3	0	3		
CpE 401	Computer Programming 1	0	3	1		
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	
MATH 403	Engineering Data Analysis	3	0	3	MATH 402	
CpE 402	Computer Programming 2	0	3	1		
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 403	Computer-Aided Design	0	3	1	ENGG 402	
CE 401	Civil Engineering Orientation	2	0	2		
ENGG 407	Statics of Rigid Bodies	3	0	3	SCI 403, MATH 402	
EE 421	Engineering Utilities 1	3	0	3		
ME 432	Engineering Utilities 2	3	0	3		
Fili 101	Kontekstwalisadong Komunikasyon sa Filipino	3	0	3		
	Total	**22**	**6**	**24**		

SECOND YEAR						
Second 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		
ENGG 408	Dynamics of Rigid Bodies	2	0	2	ENGG 407	
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	
SCI 405	Geology	2	0	2		
CE 404	Fundamentals of Surveying	3	6	5	ENGG 402	
CE 402	Strength of Materials	4	0	4	ENGG 407	
CE 406	Construction Materials and Testing	2	3	3		CE 402
CE 403	Numerical Solutions to CE Problems	2	3	3	MATH 404	
	Total	**20**	**12**	**24**		

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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 407	Structural Theory	3	3	4	CE 402	
CE 408	Highway and Railroad Engineering	3	0	3	CE 404	
CE 409	Building System Design	2	3	3	ENGG 402	
CE 410	Hydraulics	4	3	5	ENGG 408, CE 402	
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		
	Total	**20**	**12**	**24**		

THIRD YEAR						
Second Semester						
Course Code	**Course Title**	**No. of Hour/s**		**Unit/s**	**Pre-requisite/s**	**Co-requisite/s**
		Lec	**Lab**			
CE 412	Construction Methods and Project Management	3	3	4	ENGG 406	
CE 413	Quantity Surveying	1	3	2	CE 409	
CE 414	Principles of Steel Design	2	3	3	CE 407	
CE 415	Principles of Reinforced/Prestressed Concrete Design	3	3	4	CE 407	
CE 416	Principles of Transportation Engineering	3	0	3	CE 408	
	Professional Course 1	3	0	3		
	Professional Course 2	3	0	3		
ENGG 416	Research Methods	3	0	3	MATH 403	
	Total	**21**	**12**	**25**		

THIRD YEAR						
MIDTERM						
Course Code	**Course Title**	**No. of Hour/s**		**Unit/s**	**Pre-requisite/s**	**Co-requisite/s**
		Lec	**Lab**			
CE 417	CE Laws, Ethics and Contracts	2	0	2		
Fili 102	Filipino sa Iba't Ibang Disiplina	3	0	3		
Litr 102	ASEAN Literature	3	0	3		
	Total	**8**	**0**	**8**		

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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 Year Standing	
ENGG 413	Environmental Science and Engineering	3	0	3	SCI 401	
CE 418	CE Design Project 1	1	3	2	ENGG 416, CE 411, CE 412, CE 413, CE 414, CE 415, CE 416	
	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**			
ENGG 405	Technopreneurship	3	0	3	4th Year Standing	
	Professional Course 3	3	0	3	4th Year Standing	
	Professional Course 4	3	0	3		
	Professional Course 5	3	0	3		
CE 419	CE Design Project 2	0	9	3	CE 418	
CE 420	CE Practice with Comprehensive Examinations	0	6	2	Graduating Status	
	Total	**12**	**15**	**17**		
GRAND TOTAL UNITS		**158**	**78**	**188**		

*Professional Courses

A – Water Resources Engineering Track

CEW 401	Professional Course 1 – Water Resources Engineering	3	0	3	CE 405, CE 410	
CEW 402	Professional Course 2 – Water Supply Planning and Development	3	0	3	CE 405, CE 410	
CEW 403	Professional Course 3 – Irrigation Engineering	3	0	3	4th year Standing	
CEW 404	Professional Course 4 – Flood Control and Drainage Design	3	0	3	CE 405, CEW 401	
CEW 405	Professional Course 5 – River Engineering	3	0	3	CE 403, CE 410	

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B – Transportation Engineering Track

CET 401	Professional Course 1 – Highway Engineering	3	0	3	CE 404	
CET 402	Professional Course 2 – Highway Engineering as Applied in Urban City	3	0	3		CE 416
CET 403	Professional Course 3 – Airport Design	3	0	3	CE 416	
CET 404	Professional Course 4 – Fundamentals of Ports and Harbors	3	0	3	CE 410, CE 416	
CET 405	Professional Course 5 – Transportation System Planning and Design	3	0	3	CE 416	

C – Structural Engineering Track

CES 401	Professional Course 1 – Earthquake Engineering	3	0	3	CE 407	
CES 402	Professional Course 2 – Bridge Engineering	3	0	3	CE 407	
CES 403	Professional Course 3 – Foundation and Retaining Wall Design	3	0	3	CE 411	
CES 404	Professional Course 4 – Design of Steel Structure	3	0	3	CE 407	
CES 405	Professional Course 5 – Computer Softwares in Structural Analysis	3	0	3	CE 407	

D – Construction Engineering and Management Track

CEM 401	Professional Course 1 – Computer Softwares for Construction Management	3	0	3		
CEM 402	Professional Course 2 – Advanced Construction Methods and Equipment	3	0	3		
CEM 403	Professional Course 3 – Construction Cost Engineering	3	0	3		
CEM 404	Professional Course 4 – Database Management in Construction	3	0	3		
CEM 405	Professional Course 5 – Construction Occupational Safety and Health	3	0	3		

E – Geotechnical Engineering Track

CEG 401	Professional Course 1 – Geotechnical Engineering 2 (Rock Mechanics)	3	0	3	CE 411	
CEG 402	Professional Course 2 – Foundation Engineering	3	0	3	CE 411	
CEG 403	Professional Course 3 – Geotechnical Earthquake Engineering	3	0	3	CE 411	
CEG 404	Professional Course 4 – Ground Improvement	3	0	3	CE 411	
CEG 405	Professional Course 5 – Computer Softwares in Geotechnical Engineering	3	0	3	CE 411	