



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](mailto:coe.alangilan@g.batstate-u.edu.ph) | Website Address: <http://www.batstate-u.edu.ph>

---

**College of Engineering**

**CURRICULUM**

**Bachelor of Science in Transportation Systems Engineering (BSTE)**

Academic Year 2023-2024

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

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

**Curriculum Description**

The increasing transportation demand for systematized mobility of people, goods and services as part of rural development and urbanization all over the country indicates the need to increase specialists for transportation sector. The offering of Bachelor of Science in Transportation Engineering program in the university will provide skilled professionals that will take the lead in solving various transportation challenges. Bachelor of Science in Transportation Engineering program provides strong foundation in traffic engineering systems, transportation planning/management and design of transportation infrastructures. The program will adopt outcome-based education (OBE) framework with flipped classroom and other blended learning pedagogies.

**Program Educational Objectives**

The Transportation Systems Engineering alumni three to five years after graduation shall:

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



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](mailto:coe.alangilan@g.batstate-u.edu.ph) | Website Address: <http://www.batstate-u.edu.ph>

---

## College of Engineering

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 transportation 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;



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](mailto:coe.alangilan@g.batstate-u.edu.ph) | Website Address: <http://www.batstate-u.edu.ph>

---

## College of Engineering

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 transportation 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 transportation 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 transportation engineering knowledge and skills in addressing community problems that contributes to national development.



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](mailto:coe.alangilan@g.batstate-u.edu.ph) | Website Address: <http://www.batstate-u.edu.ph>

**College of Engineering**

**Curriculum Components**

Classification/ Field / Course	No. of Hours/Week		Credit Units
	Lec	Lab	
<b>I. TECHNICAL COURSES</b>			
<b>A. Mathematics</b>			
Differential Calculus	3	0	3
Integral Calculus	3	0	3
Differential Equations	3	0	3
Engineering Data Analysis	3	0	3
Numerical Solutions to Transportation Engineering	3	0	3
<b>Sub-total</b>	<b>15</b>	<b>0</b>	<b>15</b>
<b>B. Natural/Physical Sciences</b>			
General Chemistry	3	3	4
Physics 1	3	3	4
Modern Biology	2	3	3
<b>Sub-total</b>	<b>8</b>	<b>9</b>	<b>11</b>
<b>C. Basic Engineering Sciences</b>			
Introduction to Engineering	0	3	1
Computer Programming 1	0	3	1
Engineering Drawing	0	3	1
Computer - Aided Design	0	3	1
Statics of Rigid Bodies	3	0	3
Dynamics of Rigid Bodies	2	0	2
Engineering Economics	3	0	3
Engineering Management	3	0	3
Technopreneurship	3	0	3
Research Methods	3	0	3
<b>Sub-total</b>	<b>17</b>	<b>12</b>	<b>21</b>
<b>D. Allied Courses</b>			
Engineering Utilities 1	3	0	3
Strength of Materials	4	0	4
Hydraulics	2	3	3
Geotechnical Engineering 1: (Soil Mechanics)	3	3	4
Structural Theory	2	3	3
<b>Sub-total</b>	<b>14</b>	<b>9</b>	<b>17</b>
<b>E. Professional Courses</b>			
General Surveying I	2	3	3
General Surveying II	2	3	3
Transportation Engineering Orientation	2	0	2
Fundamentals of Traffic Engineering	3	0	3
Geometric Design of Highways	3	3	4
Railway Engineering	3	0	3
Traffic Engineering Laboratory	3	3	4



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](mailto:coe.alangilan@g.batstate-u.edu.ph) | Website Address: <http://www.batstate-u.edu.ph>

**College of Engineering**

Transport, Energy and the Environment	3	0	3
Traffic Operations and Management	3	0	3
Transportation Networks and Optimization	2	3	3
Traffic Safety Management	3	0	3
Pavement Design and Testing	2	3	3
Railways Management	3	0	3
Principles of Structural Analysis and Design	2	3	3
Design of Transportation Infrastructures	3	0	3
Transportation Laws and Policy Development	3	0	3
Mass Transportation System	3	0	3
Transportation Planning and Design	3	3	4
On-the-Job Training	320 hours		4
Transportation Engineering Economics and Finance	3	0	3
Pavement Maintenance and Management	3	0	3
Transportation Project Management	3	0	3
Transportation Engineering Design Project 1	1	3	2
Transportation Engineering Design Project 2	0	6	2
Fundamentals of Ports and Harbor Engineering	3	0	3
Construction Materials and Testing	3	2	3
<b>Sub-total</b>	<b>63</b>	<b>36</b>	<b>79</b>
<b>Total (Technical Courses)</b>	<b>111</b>	<b>78</b>	<b>141</b>
<b>II. NON-TECHNICAL COURSES</b>			
<b>A. General Education Course</b>			
Mathematics in the Modern World	3	0	3
Readings in Philippine History	3	0	3
Understanding the Self	3	0	3
Purposive Communication	3	0	3
The Contemporary World	3	0	3
Science, Technology and Society	3	0	3
Art Appreciation	3	0	3
Ethics	3	0	3
People and the Earth's Ecosystem	3	0	3
<b>Sub-total</b>	<b>27</b>	<b>0</b>	<b>27</b>
<b>B. Mandated Courses</b>			
Life and Works of Rizal	3	0	3
Kontekstwalisadong Komunikasyon sa Filipino	3	0	3
ASEAN Literature	3	0	3
<b>Sub-total</b>	<b>9</b>	<b>0</b>	<b>9</b>
<b>C. Physical Activity Towards Health and Fitness</b>			
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



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](mailto:coe.alangilan@g.batstate-u.edu.ph) | Website Address: <http://www.batstate-u.edu.ph>

**College of Engineering**

PATHFit 4 – Menu of Dance, Sports, Martial Arts, Group Exercise, Outdoor and Adventure Activities Menu Offering: Team Sports, (Basketball and Volleyball)	2	0	2
<b>Sub-total</b>	<b>8</b>	<b>0</b>	<b>8</b>
<b>D. National Service Training Program</b>			
NSTP 1	3	0	3
NSTP 2	3	0	3
<b>Sub-total</b>	<b>6</b>	<b>0</b>	<b>6</b>
<b>Total (Non-Technical Courses)</b>	<b>50</b>	<b>0</b>	<b>50</b>
<b>GRAND TOTAL</b>	<b>167</b>	<b>66</b>	<b>193</b>

<b>SUMMARY</b>	
<b>Courses</b>	<b>Number of Units</b>
<b>I. Technical Courses</b>	
A. Mathematics	15
B. Natural/Physical Sciences	11
C. Basic Engineering Sciences	21
D. Allied Courses	17
E. Professional Courses	79
<b>II. Non-Technical Courses</b>	
A. General Education Courses	27
B. Filipino/Literature/Mandated Courses	9
C. PATHFit 1 – 4	8
D. NSTP	6
<b>GRAND TOTAL</b>	<b>193</b>



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](mailto:coe.alangilan@g.batstate-u.edu.ph) | Website Address: <http://www.batstate-u.edu.ph>

**College of Engineering**

**PROGRAM OF STUDY**

FIRST YEAR						
First Semester						
Course Code	Course Title	Units	No. Hour/s		Pre-requisite(s)	Co-requisite(s)
			Lec	Lab		
GEEd 101	Understanding the Self	3	3	0		
GEEd 102	Mathematics in the Modern World	3	3	0		
GEEd 105	Readings in Philippine History	3	3	0		
GEEd 106	Purposive Communication	3	3	0		
MATH 401	Differential Calculus	3	3	0		
ENGG 401	Introduction to Engineering	1	0	3		
SCI 401	General Chemistry	4	3	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		
MATH 402	Integral Calculus	3	3	0	MATH 401	
SCI 403	Physics 1	4	3	3	MATH 401	MATH 402
GEEd 104	The Contemporary World	3	3	0		
GEEd 109	Science, Technology and Society	3	3	0		
GEEd 108	Art Appreciation	3	3	0		
CpE 401	Computer Programming 1	1	0	3		
PATHFit 2	Exercise-based Fitness Activities	2	2	0	PATHFit 1	
NSTP 121	National Service Training Program 2	3	3	0	NSTP 111	
ENGG 402	Engineering Drawing	1	0	3		
Total		23	20	9		

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





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](mailto:coe.alangilan@g.batstate-u.edu.ph) | Website Address: <http://www.batstate-u.edu.ph>

**College of Engineering**

SECOND YEAR						
First Semester						
Course Code	Course Title	Units	No. Hour/s		Pre-requisite(s)	Co-requisite(s)
			Lec	Lab		
TE 401	Transportation Engineering Orientation	2	2	0	ENGG 401	
GE 101	General Surveying I	3	2	3	ENGG 402	
MATH 404	Differential Equations	3	3	0	MATH 402	
MATH 403	Engineering Data Analysis	3	3	0	MATH 402	
ENGG 403	Computer-Aided Design	1	0	3	ENGG 402	
ENGG 407	Statics of Rigid Bodies	3	3	0	SCI 403	
ENGG 408	Dynamics of Rigid Bodies	2	2	0	MATH 402	
EE 421	Engineering Utilities 1	3	3	0	SCI 403, MATH 402	
Fili 101	Kontekswalisadong 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		25	23	6		

SECOND YEAR						
Second Semester						
Course Code	Course Title	Units	No. Hour/s		Pre-requisite(s)	Co-requisite(s)
			Lec	Lab		
CE 406	Construction Materials and Testing	3	2	3		
TE 402	Numerical Solutions to Transportation Engineering	3	3	0	MATH 404	
GE 201	General Surveying II	3	2	3	GE 101	
TE 403	Fundamentals of Traffic Engineering	3	3	0	TE 401, ENGG 408	
CE 402	Strength of Materials	4	4	0	ENGG 407	
CE 410	Hydraulics	3	2	3	ENGG 407	
ENGG 404	Engineering Economics	3	3	0	MATH 402	
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		24	21	9		





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](mailto:coe.alangilan@g.batstate-u.edu.ph) | Website Address: <http://www.batstate-u.edu.ph>

**College of Engineering**

THIRD YEAR						
First Semester						
Course Code	Course Title	Units	No. Hours		Pre-requisite(s)	Co-requisite(s)
			Lec	Lab		
TE 404	Geometric Design of Highway	4	3	3	GE 201	
TE 405	Railway Engineering	3	3	0	GE 201	
TE 406	Traffic Engineering Laboratory	4	3	3	TE 403	
TE 407	Transport, Energy and the Environment	3	3	0	3rd year standing	
CE 407	Structural Theory	3	2	3	CE 402	
CE 411	Geotechnical Engineering I: Soil Mechanics	4	3	3	CE 410	
ENGG 406	Engineering Management	3	3	0	ENGG 404	
Total		24	20	12		

THIRD YEAR						
Second Semester						
Course Code	Course Title	Units	No. Hours		Pre-requisite(s)	Co-requisite(s)
			Lec	Lab		
TE 408	Traffic Operations and Management	3	3	0	TE 406	
TE 409	Transportation Networks and Optimization	3	2	3	TE 406	
TE 410	Traffic Safety Management	3	3	0	TE 406	
TE 411	Pavement Design and Testing	3	2	3	TE 404, CE 406	
TE 412	Railways Management	3	3	0	TE 405	
CE 427	Principles of Structural Analysis and Design	3	2	3	CE 402	
ENGG 405	Technopreneurship	3	3	0	ENGG 406	
CET 404	Fundamentals of Ports and Harbor Engineering	3	3	0	CE 411	
Total		24	21	9		

THIRD YEAR						
MIDTERM						
Course Code	Course Title	Units	No. Hours		Pre-requisite(s)	Co-requisite(s)
			Lec	Lab		
ENGG 416	Research Methods	3	3	0	MATH 403	
Litr 102	ASEAN Literature	3	3	0		
GED 110	People and the Earth's Ecosystems	3	3	0		
Total		9	9	0		



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](mailto:coe.alangilan@g.batstate-u.edu.ph) | Website Address: <http://www.batstate-u.edu.ph>

**College of Engineering**

FOURTH YEAR						
First Semester						
Course Code	Course Title	Units	No. Hours		Pre-requisite(s)	Co-requisite(s)
			Lec	Lab		
TE 413	Design of Transportation Infrastructures	3	3	0	CE 427, TE 404	
TE 414	Transportation Laws and Policy Development	3	3	0	TE 408	
TE 415	Mass Transportation System	3	3	0	TE 409	
TE 416	Transportation Planning and Design	3	4	3	TE 403	
TE 417	Transportation Engineering Economics and Finance	3	3	0	ENGG 406	
TE 418	Pavement Maintenance and Management	3	3	0	TE 411	
TE 419	Transportation Project Management	3	3	0	ENGG 406	
TE 420	Transportation Engineering Design Project 1	1	2	3	ENGG 416	
Total		24	22	6		

FOURTH YEAR						
Second Semester						
Course Code	Course Title	Units	No. Hours		Pre-requisite(s)	Co-requisite(s)
			Lec	Lab		
TE 421	Transportation Engineering Design Project 2	2	0	6	TE 420	
ENGG 417	On-the-Job Training	4	320 hours		4th year standing	
Total		6	0	6		
GRAND TOTAL UNITS		193	167	66		