Civil Engineering Program

Student Learning Outcomes to Program Learning Outcomes Mapping

Before Reading:

This file includes SLO to PLO mapping for Civil Engineering Program. It should be noted that GE course are "General Courses" taught by other departments. The same for course with codes Math, Phy, Stat (Basic Sciences Department).

In fact we are not satisfied with the maps prepared by the Basic Sciences Department (Math, Phy, Stat) , and we'll work on adjusting them soon.

CE courses are highlighted and all has CE code.

- Some courses were made based on NCAAA outcomes and Others with ABET.
- The reason behind this is the college decided recently to switch from NCAAA to ABET.

Civil Engineering g Courses starts from page 12 with the course:

Engineering Geology (CE 101)

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Student Learning Outcomes to Program Learning Outcomes Mapping

Course Number: GE-101

Course Learning Outcome

c1	Understand meaning of science, engineering, technology and their areas regarding manufacturing industry
c2	Understand industrial planning and safety precautions
c3	Understand metals ,their mechanical properties and practical applications
c4	To understand different measurement system, working principles and uses of measuring tools
c5	Improve the ability to use various machines, tools, machine tools and make them practical hand
c6	Improve the ability of the students to know about machining operations and their use in practical life
c7	Ability to do work in groups or team
c8	
c9	
c10	

Mapping

Map course Los with the program Los. *(place course los in the left column and program Los across the top)*										
Course Los	**Program Learning outcomes** **Use Los codes**									
	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2	d3
1	√			√							
2	√									√	
3	√					√					
4	√			√	√						
5				√					√		
6	√			√							
7								√			
8											

Note: Minimum course Los can be 5 and maximum up to 10

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

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Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: **MATH 105**

Course Learning Outcomes:

C1	An ability to apply knowledge of mathematics, science, and engineering
C2	An ability to identify, formulate, and solve engineering problems
C3	A knowledge of contemporary issues
C4	
C5	
C6	
C7	

Mapping:

Course LOs #	Program Learning Outcomes Use LOs Codes			
	a1	**a2**	**a3**	**b1**
C1	X		X	
C2	X		X	
C3			X	
C4				
C5				
C6				
C7				

Map course LOs with the program LOs. (Place course LO #s in the left column and program LO #s across the top.)

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code
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Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number**: PHY 103**

Course Learning Outcomes:

C1	An ability to apply knowledge of mathematics, science, and engineering
C2	An ability to design and conduct experiments, as well as to analyze and interpret data
C3	An ability to identify, formulate, and solve engineering problems
C4	An ability to communicate effectively
C5	A recognition of the need for, and an ability to engage in life-long learning
C6	A knowledge of contemporary issues
C7	

Mapping:

Map course LOs with the program LOs. (Place course LO #s in the left column and program LO #s across the top.)				
Course LOs #	**Program Learning Outcomes** Use LOs Codes			
	a1	**a2**	**a3**	**b1**
C1	X		X	
C2	X		X	
C3	X		X	
C4			X	
C5		X	X	
C6			X	
C7				

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code
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Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: **MATH 106**

Course Learning Outcomes:

C1	An ability to apply knowledge of mathematics, science, and engineering
C2	An ability to identify, formulate, and solve engineering problems
C3	A knowledge of contemporary issues
C4	
C5	
C6	
C7	

Mapping:

Map course LOs with the program LOs. (Place course LO #s in the left column and program LO #s across the top.)				
Course LOs #	**Program Learning Outcomes** **Use LOs Codes**			
	a1	**a2**	**a3**	**b1**
C1	X		X	
C2	X		X	
C3			X	
C4				
C5				
C6				
C7				

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code
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Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: **MATH 107**

Course Learning Outcomes:

C1	An ability to apply knowledge of mathematics, science, and engineering
C2	An ability to identify, formulate, and solve engineering problems
C3	A knowledge of contemporary issues
C4	
C5	
C6	
C7	

Mapping:

Map course LOs with the program LOs. (Place course LO #s in the left column and program LO #s across the top.)				
Course LOs #	**Program Learning Outcomes** **Use LOs Codes**			
	a1	**a2**	**a3**	**b1**
C1	X		X	
C2	X		X	
C3			X	
C4				
C5				
C6				
C7				

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: **MATH 204**

Course Learning Outcomes:

C1	An ability to apply knowledge of mathematics, science, and engineering
C2	An ability to identify, formulate, and solve engineering problems
C3	A knowledge of contemporary issues
C4	
C5	
C6	
C7	

Mapping:

Map course LOs with the program LOs. (Place course LO #s in the left column and program LO #s across the top.)				
Course LOs #	**Program Learning Outcomes** **Use LOs Codes**			
	a1	**a2**	**a3**	**b1**
C1	X		X	
C2	X		X	
C3			X	
C4				
C5				
C6				
C7				

Majmaah University

Deanship of Quality and

Skills Development

عمادة الجودة وتطوير المهارات
Deanship of quality and skills development

جامعة المجمعة
Majmaah University

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code
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Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: **STAT 201**

Course Learning Outcomes:

C1	An ability to apply knowledge of mathematics, science, and engineering
C2	An ability to identify, formulate, and solve engineering problems
C3	
C4	
C5	
C6	
C7	

Mapping:

Map course LOs with the program LOs. (Place course LO #s in the left column and program LO #s across the top.)				
Course LOs #	**Program Learning Outcomes** Use LOs Codes			
	a1	**a2**	**a3**	**b1**
C1	X		X	
C2	X		X	
C3				
C4				
C5				
C6				
C7				

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code
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Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: **MATH 254**

Course Learning Outcomes:

C1	An ability to apply knowledge of mathematics, science, and engineering
C2	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
C3	
C4	
C5	
C6	
C7	

Mapping:

Map course LOs with the program LOs. (Place course LO #s in the left column and program LO #s across the top.)

Course LOs #	Program Learning Outcomes Use LOs Codes			
	a1	**a2**	**a3**	**b1**
C1	X		X	
C2	X		X	
C3				
C4				
C5				
C6				
C7				

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code
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Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: **CEN 209**

Course Learning Outcomes:

C1	An ability to apply knowledge of mathematics, science, and engineering
C2	An ability to design and conduct experiments, as well as to analyze and interpret data
C3	An ability to identify, formulate, and solve engineering problems
C4	A recognition of the need for and an ability to engage in life-long learning.
C5	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
C6	
C7	

Mapping:

Map course LOs with the program LOs. (Place course LO #s in the left column and program LO #s across the top.)				
Course LOs #	**Program Learning Outcomes** **Use LOs Codes**			
	a1	**a2**	**a3**	**b1**
C1	X		X	
C2	X		X	
C3	X		X	
C4		X	X	
C5		X	X	
C6				
C7				

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

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Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: **GE 407**

Course Learning Outcomes:

C1	An ability to apply knowledge of mathematics, science, and engineering
C2	An ability to design and conduct experiments, as well as to analyze and interpret data
C3	An ability to identify, formulate, and solve engineering problems
C4	An ability to communicate effectively
C5	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
C6	
C7	

Mapping:

Map course LOs with the program LOs. (Place course LO #s in the left column and program LO #s across the top.)				
Course LOs #	**Program Learning Outcomes** Use LOs Codes			
	a1	**a2**	**a3**	**b1**
C1	X		X	
C2	X		X	
C3	X		X	
C4			X	
C5		X	X	
C6				
C7				

College: Engineering

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Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: *Engineering Geology (CE 101)*

Course Learning Outcomes:

C1	Identify physical and chemical properties of rock minerals.
C2	Recognize the main types of rocks in nature with their properties.
C3	Provide students with different applications of Engineering Geology in the field of Civil Engineering.
C4	Understand the main geologic structures: faults, folds and joints.
C5	Learn desired natural materials for the construction purposes according to the geotechnical properties of rocks.

Mapping:

Map course Los with the program Los. (place course loss in the left column and program Los across the top)											
Course Los	**Program Learning outcomes** **Use Los codes**										
	a	b	c	d	e	f	g	h	i	j	k
C1	√								√		
C2	√	√			√						√
C3	√	√			√			√			
C4	√	√		√		√					
C5	√	√									

Note: Minimum course Los can be 5 and maximum up to 10.

ABET

a	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
b	An ability to conduct experiments and interpret the results.
c	An ability to design engineering system to meet specific needs.
d	An ability to take roles in collaborative teams.
e	An ability to model engineering problems.
f	An ability to take professional and ethical responsibility.
g	An ability to present technical & communication skills effectively.
h	An ability to account for environmental, economic and safety factors in solving engineering problems.
i	An ability to engage in life-long learning.
j	An ability to demonstrate **knowledge of** contemporary engineering **issues**
k	An ability to use engineering skills, tools and techniques necessary for engineering practices

Note: Civil and Environmental Engineering Department is following the ABET.

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code MUP 16

Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: Civil *Engineering Drawing (CE 102)*

Course Learning Outcomes:

C1	Ability to draw different types of civil construction elements
C2	Ability to deal with any type of civil construction.
C3	Ability to solve earth works problems.
C4	Ability to draw the different elements of structures and connections.
C5	Understand relation between earth works with different types of wing, closing walls in underground structures
C6	Ability to draw the different views of the civil construction and how to represent details

Mapping:

Map course Los with the program Los. (place course loss in the left column and program Los across the top)											
Course Los	**Program Learning outcomes** **Use Los codes**										
	a	b	c	d	e	f	g	h	i	j	k
C1			√								
C2		√									
C3	√		√		√						√
C4			√		√				√		√
C5		√								√	√
C6			√							√	

Note: Minimum course Los can be 5 and maximum up to 10.

ABET

a	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
b	An ability to conduct experiments and interpret the results.
c	An ability to design engineering system to meet specific needs.
d	An ability to take roles in collaborative teams.
e	An ability to model engineering problems.
f	An ability to take professional and ethical responsibility.
g	An ability to present technical & communication skills effectively.
h	An ability to account for environmental, economic and safety factors in solving engineering problems.
i	An ability to engage in life-long learning.
j	An ability to demonstrate **knowledge of** contemporary engineering **issues**
k	An ability to use engineering skills, tools and techniques necessary for engineering practices

Note: Civil and Environmental Engineering Department is following the ABET.

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code MUP 16

Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: *Soil Mechanics and Foundation Engineering I (CE 210)*

Course Learning Outcomes:

C1	To determine the types of soil by different laboratory tests.
C2	Classify the soil according to origin and properties
C3	Evaluate the shear strength under different condition of drainage and apply the results to problems of slope stability, cuts, etc.
C4	Find the specific weights of soils under various conditions
C5	Understand the concept of total stress, neutral stress and effective stress

Mapping:

Course Los	Program Learning outcomes Use Los codes										
	a	b	c	d	e	f	g	h	i	j	k
C1	√						√				
C2	√	√			√						
C3	√		√		√						
C4	√				√						√
C5	√				√						√

Note: Minimum course Los can be 5 and maximum up to 10.

ABET

a	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
b	An ability to conduct experiments and interpret the results.
c	An ability to design engineering system to meet specific needs.
d	An ability to take roles in collaborative teams.
e	An ability to model engineering problems.
f	An ability to take professional and ethical responsibility.
g	An ability to present technical & communication skills effectively.
h	An ability to account for environmental, economic and safety factors in solving engineering problems.
i	An ability to engage in life-long learning.
j	An ability to demonstrate **knowledge of** contemporary engineering **issues**
k	An ability to use engineering skills, tools and techniques necessary for engineering practices

Note: Civil and Environmental Engineering Department is following the ABET.

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

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Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: *Properties and Strength of Materials 1 (CE 212)*

Course Learning Outcomes

c1	Apply mathematics, science and engineering principles.
c2	Conduct and analyze various strength tests on engineering materials.
c3	Design quality control materials used in construction taking into consideration the economic, environmental, safety, and sustainability factors.
c4	Identify, formulate and solve construction materials related to test problems.
c5	Use modern engineering tools for safe-use of engineering quality control construction materials.

Mapping:

Map course Los with the program Los. (place course loss in the left column and program Los across the top)											
Course Los	**Program Learning outcomes** **Use Los codes**										
	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2	d3
c1	√	√									
c2	√	√									
c3	√	√			√						
c4			√		√					√	
c5						√	√				

	Learning outcomes for CE
a1	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
a2	An ability to demonstrate **knowledge of** contemporary engineering **issues**
a3	An ability to use engineering skills, tools and techniques necessary for engineering practices
b1	An ability to conduct experiments and interpret the results.
b2	An ability to design engineering system to meet specific needs, within realistic constraints
b2	An ability to model and solve engineering problems.
c1	An ability to take roles in collaborative teams.
c2	An ability to take professional and ethical responsibility.
d1	An ability to present technical & communication skills effectively.
d2	An ability to account for environmental, economic and safety factors in solving engineering problems.
d3	An ability to engage in life-long learning.

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code MUP 16

Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: *Structural Analysis I (CE 214)*

Course Learning Outcomes

c1	Apply mathematics, science and engineering principles.
c2	Analyze and explain the differences between various engineering structures, as well as interprets data.
c3	Design various engineering structures taking into accounts the economic, environmental, safety, and sustainability factors.
c4	Identify, formulate and solve structural design engineering problems.
c5	Use modern engineering methods for civil engineering practice.

Mapping:

Map course Los with the program Los. (place course loss in the left column and program Los across the top)											
Course Los	**Program Learning outcomes** **Use Los codes**										
	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2	d3
c1	√	√									
c2	√	√									
c3	√	√									
c4			√	√	√	√				√	
c5					√		√				

	Learning outcomes for CE
a1	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
a2	An ability to demonstrate **knowledge of** contemporary engineering **issues**
a3	An ability to use engineering skills, tools and techniques necessary for engineering practices
b1	An ability to conduct experiments and interpret the results.
b2	An ability to design engineering system to meet specific needs, within realistic constraints
b2	An ability to model and solve engineering problems.
c1	An ability to take roles in collaborative teams.
c2	An ability to take professional and ethical responsibility.
d1	An ability to present technical & communication skills effectively.
d2	An ability to account for environmental, economic and safety factors in solving engineering problems.
d3	An ability to engage in life-long learning.

College: Engineering

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Code MUP 16

Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: **Structural Analysis 2 (CE 215)**

Course Learning Outcomes

c1	Determine the properties of plane areas.
c2	Determine the straining actions of various structures
c3	Analyze different sections subjected to normal, shear and combined stresses
c4	Construct the normal, shear and combined stress diagrams for various sections of structures.
c5	Solve inderminate structures

Mapping:

Map course Los with the program Los. (place course loss in the left column and program Los across the top)											
Course Los	**Program Learning outcomes** **Use Los codes**										
	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2	d3
c1	√				√	√					√
c2	√				√	√					√
c3	√				√	√					√
c4	√				√	√					√
c5	√				√	√					√

Note: Minimum course Los can be 5 and maximum up to 10. Please check , the above is an example

	Learning outcomes for CE
a1	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
a2	An ability to demonstrate **knowledge of** contemporary engineering **issues**
a3	An ability to use engineering skills, tools and techniques necessary for engineering practices
b1	An ability to conduct experiments and interpret the results.
b2	An ability to design engineering system to meet specific needs, within realistic constraints
b2	An ability to model and solve engineering problems.
c1	An ability to take roles in collaborative teams.
c2	An ability to take professional and ethical responsibility.
d1	An ability to present technical & communication skills effectively.
d2	An ability to account for environmental, economic and safety factors in solving engineering problems.
d3	An ability to engage in life-long learning.

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

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Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: *Hydraulics I (CE 240)*

Course Learning Outcomes

c1	Recognize and define different fluid properties, its dimensions and units of measurements.
c2	Describe the fluids pressure and methods of its measurement.
c3	Understand the concepts of hydrostatic forces on submerged surfaces.
c4	The ability to design and conduct experiments, as well as to analyze and interpret data.
c5	Identify, formulate and solve engineering problems using motion laws of fluid.
c6	Applying hydraulics governing equation in design of actual engineering system.
c7	
c8	
c9	
c10	

Mapping:

Map course Los with the program Los. (place course loss in the left column and program Los across the top)											
Course Los	**Program Learning outcomes** **Use Los codes**										
	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2	d3
c1	√	√			√						
c2	√	√			√						
c3	√		√		√						
c4				√			√		√		
c5		√			√	√					√
c6			√		√			√		√	
c7											
c8											
c9											

Note: Minimum course Los can be 5 and maximum up to 10.

	Learning outcomes for CE
a1	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
a2	An ability to demonstrate **knowledge of** contemporary engineering **issues**
a3	An ability to use engineering skills, tools and techniques necessary for engineering practices
b1	An ability to conduct experiments and interpret the results.
b2	An ability to design engineering system to meet specific needs, within realistic constraints
b2	An ability to model and solve engineering problems.
c1	An ability to take roles in collaborative teams.
c2	An ability to take professional and ethical responsibility.
d1	An ability to present technical & communication skills effectively.
d2	An ability to account for environmental, economic and safety factors in solving engineering problems.
d3	An ability to engage in life-long learning.

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code MUP 16

Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: *Hydraulics II (CE 241)*

Course Learning Outcomes:

C1	Ability to apply knowledge of fluid mechanics, hydraulics, and engineering to design of pipes and open channels.
C2	Understanding of professional and ethical responsibility.
C3	Ability to use the techniques, skills, and modern engineering tools necessary for hydraulic engineering practice.
C4	Ability to design a system, component, or process.
C5	Ability to design and conduct experiments, as well as to analyze and interpret data.
C6	Prepare and deliver an oral presentation about a topic of current interests in the field of water resources.

Mapping:

Map course Los with the program Los. (place course loss in the left column and program Los across the top)											
Course Los	**Program Learning outcomes** **Use Los codes**										
	a	b	c	d	e	f	g	h	i	j	k
C1	√										
C2	√				√						
C3	√				√						√
C4	√				√						√
C5	√	√		√							
C6				√	√	√					

Note: Minimum course Los can be 5 and maximum up to 10.

ABET

a	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
b	An ability to conduct experiments and interpret the results.
c	An ability to design engineering system to meet specific needs.
d	An ability to take roles in collaborative teams.
e	An ability to model engineering problems.
f	An ability to take professional and ethical responsibility.
g	An ability to present technical & communication skills effectively.
h	An ability to account for environmental, economic and safety factors in solving engineering problems.
i	An ability to engage in life-long learning.
j	An ability to demonstrate **knowledge of** contemporary engineering **issues**
k	An ability to use engineering skills, tools and techniques necessary for engineering practices

Note: Civil and Environmental Engineering Department is following the ABET.

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code MUP 16

Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: *Properties and Strength of Materials 2 (CE 313)*

Course Learning Outcomes

c1	Learn experimental techniques for determining aggregate properties like finess modulus and grading, abrasion and impact, setting times of cement and grain size distribution of aggregates
c2	Solve problems and understand finess modulus, shrinkage and creep.
c3	Study the equipment used for all the tests above
c4	Study mix design of concrete by different methods like laboratory trial method and absolute volume method.
c5	
c6	
c7	

Mapping:

Map course Los with the program Los. (place course loss in the left column and program Los across the top)											
Course Los	**Program Learning outcomes** **Use Los codes**										
	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2	d3
c1	√	√	√	√	√	√					
c2	√		√	√		√	√				
c3		√	√	√	√						
c4	√		√	√	√	√				√	
c5											
c6											
c7											
c8											
c9											

Note: Minimum course Los can be 5 and maximum up to 10.

	Learning outcomes for CE
a1	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
a2	An ability to demonstrate **knowledge of** contemporary engineering **issues**
a3	An ability to use engineering skills, tools and techniques necessary for engineering practices
b1	An ability to conduct experiments and interpret the results.
b2	An ability to design engineering system to meet specific needs, within realistic constraints
b3	An ability to model and solve engineering problems.
c1	An ability to take roles in collaborative teams.
c2	An ability to take professional and ethical responsibility.
d1	An ability to present technical & communication skills effectively.
d2	An ability to account for environmental, economic and safety factors in solving engineering problems.
d3	An ability to engage in life-long learning.

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code MUP 16

Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: *Structural Analysis 3 (CE 316)*

Course Learning Outcomes

c1	Determination of indeterminate structures deflections.
c2	Analysis of indeterminate structures by force and displacement methods.
c3	Analysis of beams and plane frames having non-prismatic members.
c4	
c5	
c6	
c7	
c8	
c9	
c10	

Mapping:

Map course Los with the program Los. (place course loss in the left column and program Los across the top)											
Course Los	**Program Learning outcomes** **Use Los codes**										
	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2	d3
c1	√	√	√		√	√					
c2	√		√		√	√					
c3	√	√	√		√	√					
c4											
c5											
c6											
c7											
c8											
c9											

Note: Minimum course Los can be 5 and maximum up to 10.

	Learning outcomes for CE
a1	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
a2	An ability to demonstrate **knowledge of** contemporary engineering **issues**
a3	An ability to use engineering skills, tools and techniques necessary for engineering practices
b1	An ability to conduct experiments and interpret the results.
b2	An ability to design engineering system to meet specific needs, within realistic constraints
b3	An ability to model and solve engineering problems.
c1	An ability to take roles in collaborative teams.
c2	An ability to take professional and ethical responsibility.
d1	An ability to present technical & communication skills effectively.
d2	An ability to account for environmental, economic and safety factors in solving engineering problems.
d3	An ability to engage in life-long learning.

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code MUP 16

Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: *Reinforced Concrete Design 2 (CE 318)*

Course Learning Outcomes

c1	Recognize and define reinforced concrete structures.
c2	Understand the basic principles to properly apply the SBC provisions.
c3	Establish a clear understanding of the mechanical behaviors of reinforcing steel, concrete and reinforced concrete members.
c4	Determine the immediate and long term deflections in reinforced concrete members; apply SBC provisions for cracking and deflection control.
c5	Understand the flexural and shear behaviors of reinforced concrete members, analysis and design for bending and shear.
c6	
c7	
c8	
c9	
c10	

Mapping:

Map course Los with the program Los. (place course loss in the left column and program Los across the top)											
Course Los	Program Learning outcomes Use LOS Codes										
	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2	d3
c1		√		√							
c2	√		√		√						
c3				√							
c4	√	√	√								
c5			√	√	√						
c6											
c7											
c8											

Note: The course LOS should be between 5 and 10.

	Learning outcomes for CE
a1	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
a2	An ability to demonstrate **knowledge of** contemporary engineering **issues**
a3	An ability to use engineering skills, tools and techniques necessary for engineering practices
b1	An ability to conduct experiments and interpret the results.
b2	An ability to design engineering system to meet specific needs, within realistic constraints
b2	An ability to model and solve engineering problems.
c1	An ability to take roles in collaborative teams.
c2	An ability to take professional and ethical responsibility.
d1	An ability to present technical & communication skills effectively.
d2	An ability to account for environmental, economic and safety factors in solving engineering problems.
d3	An ability to engage in life-long learning.

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code MUP 16

Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: *Structural Steel Design 1 (CE 320)*

Course Learning Outcomes

c1	Understand advantages and disadvantages of using steel structures.
c2	Determine factored strength of different steel members, beams, columns and connections.
c3	Understand concept of LRFD approach, and related factors that affect design of steel structures.
c4	Understand and analyze the behavior of steel structures subjected to flexure, shear and axial loading.
c5	Understand design of steel structures at serviceability and ultimate limit states.
c6	
c7	
c8	
c9	
c10	

Mapping:

Map course Los with the program Los. (place course loss in the left column and program Los across the top)											
Course Los	**Program Learning outcomes Use LOS Codes**										
	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2	d3
c1	√	√			√						
c2	√	√	√		√						
c3	√			√							
c4											
c5	√		√	√							
c6											
c7											
c8											
c9											

Note: The course LOS should be between 5 and 10.

	Learning outcomes for CE
a1	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
a2	An ability to demonstrate **knowledge of** contemporary engineering **issues**
a3	An ability to use engineering skills, tools and techniques necessary for engineering practices
b1	An ability to conduct experiments and interpret the results.
b2	An ability to design engineering system to meet specific needs, within realistic constraints
b2	An ability to model and solve engineering problems.
c1	An ability to take roles in collaborative teams.
c2	An ability to take professional and ethical responsibility.
d1	An ability to present technical & communication skills effectively.
d2	An ability to account for environmental, economic and safety factors in solving engineering problems.
d3	An ability to engage in life-long learning.

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code MUP 16

Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: *Environmental Engineering I (CE 360)*

Course Learning Outcomes

c1	Apply science and engineering principles.
c2	Analyze and explain the differences of environmental pollution effects on environment.
c3	Identify engineering pollution problems in terms of air, liquid and solid.
c4	Demonstrate real examples of waste problems and mitigation
c5	Use modern engineering methods for pollution mitigation for civil engineering practice.

Mapping:

Map course Los with the program Los. (place course loss in the left column and program Los across the top)										
Course Los	**Program Learning outcomes** **Use Los codes**									
	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2	d3
c1	√	√									
c2	√	√									
c3	√	√			√						
c4			√		√					√	
c5						√	√				

	Learning outcomes for CE
a1	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
a2	An ability to demonstrate **knowledge of** contemporary engineering **issues**
a3	An ability to use engineering skills, tools and techniques necessary for engineering practices
b1	An ability to conduct experiments and interpret the results.
b2	An ability to design engineering system to meet specific needs, within realistic constraints
b2	An ability to model and solve engineering problems.
c1	An ability to take roles in collaborative teams.
c2	An ability to take professional and ethical responsibility.
d1	An ability to present technical & communication skills effectively.
d2	An ability to account for environmental, economic and safety factors in solving engineering problems.
d3	An ability to engage in life-long learning.

Majmaah University

Deanship of Quality and

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Majmaah University

عمادة الجودة وتطوير المهارات
Deanship of quality and skills development

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code MUP 16

Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: **Surveying I (CE 370)**

Course Learning Outcomes

c1	Get accurate measurements using the recent surveying instruments and operating surveying software program.
c2	Be able to read and construct cadastral maps for different engineering projects.
c3	Compute cut & fill or materials volumes for any project.
c4	Ability to conduct land settlement using levelling methods and draw longitudinal and cross sections.
c5	Conduct accurate measurements and function in a team work
c6	Ability to measure and calculate accurate: lengths, areas, volumes, earthworks using different surveying methods
c7	
c8	

Mapping:

Map course Los with the program Los. (place course loss in the left column and program Los across the top)											
Course Los	**Program Learning outcomes** **Use Los codes**										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
c1	√							√			√
c2	√	√		√	√						√
c3	√	√			√	√					
c4	√	√									√
c5				√	√	√					
c6	√									√	
c7											
c8											

Note: Minimum course Los can be 5 and maximum up to 10.

ABET

a	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
b	An ability to conduct experiments and interpret the results.
c	An ability to design engineering system to meet specific needs.
d	An ability to take roles in collaborative teams.
e	An ability to model engineering problems.
f	An ability to take professional and ethical responsibility.
g	An ability to present technical & communication skills effectively.
h	An ability to account for environmental, economic and safety factors in solving engineering problems.
i	An ability to engage in life-long learning.
j	An ability to demonstrate **knowledge of** contemporary engineering **issues**
k	An ability to use engineering skills, tools and techniques necessary for engineering practices

Note: Civil and Environmental Engineering Department is following the ABET.

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code MUP 16

Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: *Highway and Traffic Engineering (CE 380)*

Course Learning Outcomes

c1	plan and design highway geometrics .
c2	Study pavement materials characteristics and methods of pavement design.
c3	Study different methods of pavement construction for roads and airports.
c4	Design elements of roads to satisfy their intended function and sustain traffic loads.
c5	
c6	
c7	
c8	
c9	
c10	

Mapping:

Map course Los with the program Los. (place course loss in the left column and program Los across the top)										
Course Los	**Program Learning outcomes** **Use Los codes**									
	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2	d3
c1	√			√	√			√		√	
c2		√				√			√			
c3		√				√					√	
c4	√			√	√			√			
c5											
c6											
c7											
c8											
c9											

Note: Minimum course Los can be 5 and maximum up to 10.

	Learning outcomes for CEE
a1	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
a2	An ability to demonstrate **knowledge of** contemporary engineering **issues**
a3	An ability to use engineering skills, tools and techniques necessary for engineering practices
b1	An ability to conduct experiments and interpret the results.
b2	An ability to design engineering system to meet specific needs, within realistic constraints
b2	An ability to model and solve engineering problems.
c1	An ability to take roles in collaborative teams.
c2	An ability to take professional and ethical responsibility.
d1	An ability to present technical & communication skills effectively.
d2	An ability to account for environmental, economic and safety factors in solving engineering problems.
d3	An ability to engage in life-long learning.

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code MUP 16

Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: *Highway Construction and Materials (CE 381)*

Course Learning Outcomes

c1	Ability to apply mathematics, science and engineering principles.
c2	Ability to conduct and analyze highway materials experiments, as well as interprets data.
c3	Ability to design highway pavement components taking into consideration the economic, environmental, safety, and sustainability factors.
c4	Ability to identify, formulate and solve highway construction materials related problems.
c5	Ability to use modern engineering tools and methods for long-life and safe-use of engineering highway designed pavements.

Mapping:

Map course Los with the program Los. (place course loss in the left column and program Los across the top)											
Course Los	**Program Learning outcomes** **Use Los codes**										
	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2	d3
c1	√	√									
c2	√	√									
c3	√	√	√	√		√				√	
c4			√		√	√					
c5											

	Learning outcomes for CE
a1	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
a2	An ability to demonstrate **knowledge of** contemporary engineering **issues**
a3	An ability to use engineering skills, tools and techniques necessary for engineering practices
b1	An ability to conduct experiments and interpret the results.
b2	An ability to design engineering system to meet specific needs, within realistic constraints
b2	An ability to model and solve engineering problems.
c1	An ability to take roles in collaborative teams.
c2	An ability to take professional and ethical responsibility.
d1	An ability to present technical & communication skills effectively.
d2	An ability to account for environmental, economic and safety factors in solving engineering problems.
d3	An ability to engage in life-long learning.

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code MUP 16

Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: *Engineering Project Management (CE 408)*

Course Learning Outcomes

c1	Development of an engineering project plan.
c2	Preparing and applying project schedules using AON, AOA, PERT and Bar chart methods.
c3	Determine project schedule for purpose of resource levelling and allocation and time-cost trade-off.
c4	Time and cost monitoring and controlling for an engineering project.
c5	Assessment and management of project risks.
c6	Use computer software for preparing project schedules.

Mapping:

Map course Los with the program Los. (place course loss in the left column and program Los across the top)											
Course Los	**Program Learning outcomes** **Use Los codes**										
	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2	d3
c1		√					√				
c2					√						
c3			√		√						
c4					√						
c5		√	√								
c6	√		√								
c7											
c8											
c9											

	Learning outcomes for CE
a1	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
a2	An ability to demonstrate **knowledge of** contemporary engineering **issues**
a3	An ability to use engineering skills, tools and techniques necessary for engineering practices
b1	An ability to conduct experiments and interpret the results.
b2	An ability to design engineering system to meet specific needs, within realistic constraints
b2	An ability to model and solve engineering problems.
c1	An ability to take roles in collaborative teams.
c2	An ability to take professional and ethical responsibility.
d1	An ability to present technical & communication skills effectively.
d2	An ability to account for environmental, economic and safety factors in solving engineering problems.
d3	An ability to engage in life-long learning.

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code MUP 16

Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: *Reinforced Concrete Design 3 (CE 419)*

Course Learning Outcomes

c1	Understand nominal and design strength of column sections using equilibrium and compatibility requirements.
c2	Recognize the adequacy of column strength considering both uni-axial and biaxial moments.
c3	Carryout flexural design and detailing in single footing dimensions.
c4	Understand the role and types of retaining walls.
c5	Understand cracking control concepts.
c6	
c7	
c8	
c9	
c10	

Mapping:

Map course Los with the program Los. (place course loss in the left column and program Los across the top)											
Course Los	**Program Learning outcomes Use LOS Codes**										
	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2	d3
c1	√	√		√							
c2			√		√						
c3			√								
c4	√	√									
c5		√	√	√	√						
c6											
c7											
c8											
c9											

Note: The course LOS should be between 5 and 10.

	Learning outcomes for CE
a1	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
a2	An ability to demonstrate **knowledge of** contemporary engineering **issues**
a3	An ability to use engineering skills, tools and techniques necessary for engineering practices
b1	An ability to conduct experiments and interpret the results.
b2	An ability to design engineering system to meet specific needs, within realistic constraints
b2	An ability to model and solve engineering problems.
c1	An ability to take roles in collaborative teams.
c2	An ability to take professional and ethical responsibility.
d1	An ability to present technical & communication skills effectively.
d2	An ability to account for environmental, economic and safety factors in solving engineering problems.
d3	An ability to engage in life-long learning.

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code MUP 16

Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: STRUCTURAL STEEL DESIGN 2 (CE 421)

Course Learning Outcomes

c1	Design compound beams.
c2	Design plate girder or truss steel bridges
c3	Design crane beams.
c4	Design industrial buildings.
c5	
c6	
c7	
c8	
c9	
c10	

Mapping:

Map course Los with the program Los. (place course loss in the left column and program Los across the top)											
Course Los	**Program Learning outcomes** **Use Los codes**										
	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2	d3
c1		√		√	√						
c2		√		√	√						
c3		√		√	√						
c4		√		√	√						
c5											
c6											
c7											
c8											
c9											

Note: Minimum course Los can be 5 and maximum up to 10.

Learning outcomes for CE	
a1	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
a2	An ability to demonstrate **knowledge of** contemporary engineering **issues**
a3	An ability to use engineering skills, tools and techniques necessary for engineering practices
b1	An ability to conduct experiments and interpret the results.
b2	An ability to design engineering system to meet specific needs, within realistic constraints
b2	An ability to model and solve engineering problems.
c1	An ability to take roles in collaborative teams.
c2	An ability to take professional and ethical responsibility.
d1	An ability to present technical & communication skills effectively.
d2	An ability to account for environmental, economic and safety factors in solving engineering problems.
d3	An ability to engage in life-long learning.

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code MUP 16

Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: *Methods and Equipment of Construction (CE 422)*

Course Learning Outcomes

c1	Understand earthmoving material and soil volume change characteristics
c2	Determine earthwork volume and mass diagram.
c3	Understand design principles of concrete formwork.
c4	Design concrete formwork for slab, beam, column, and footings.
c5	Determine equipment operation and maintenance costs.
c6	
c7	
c8	
c9	
c10	

Mapping:

Map course Los with the program Los. (place course loss in the left column and program Los across the top)											
Course Los	**Program Learning outcomes** **Use LOS Codes**										
	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2	d3
c1				√	√						
c2	√		√		√						
c3		√	√	√							
c4	√	√									
c5	√				√						
c6											
c7											
c8											
c9											

Note: The course LOS should be between 5 and 10.

	Learning outcomes for CE
a1	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
a2	An ability to demonstrate **knowledge of** contemporary engineering **issues**
a3	An ability to use engineering skills, tools and techniques necessary for engineering practices
b1	An ability to conduct experiments and interpret the results.
b2	An ability to design engineering system to meet specific needs, within realistic constraints
b2	An ability to model and solve engineering problems.
c1	An ability to take roles in collaborative teams.
c2	An ability to take professional and ethical responsibility.
d1	An ability to present technical & communication skills effectively.
d2	An ability to account for environmental, economic and safety factors in solving engineering problems.
d3	An ability to engage in life-long learning.

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code MUP 16

Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: **Bridges Design (CE 428)**

Course Learning Outcomes

c1	Identify the different types of bridges and the usage of each type under different circumstances.
c2	Evaluate loads on bridges as per codal provisions.
c3	Design different bridge elements as per codal provisions.
c4	Design of substructures elements
c5	
c6	
c7	
c8	
c9	
c10	

Mapping:

Map course Los with the program Los. (place course loss in the left column and program Los across the top)										
Course Los	**Program Learning outcomes Use Los codes**									
	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2	d3
c1	√			√	√			√		√	
c2		√			√			√			
c3		√			√					√	
c4	√			√	√			√			
c5											
c6											
c7											
c8											
c9											

Note: Minimum course Los can be 5 and maximum up to 10.

Learning outcomes for CE	
a1	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
a2	An ability to demonstrate **knowledge of** contemporary engineering **issues**
a3	An ability to use engineering skills, tools and techniques necessary for engineering practices
b1	An ability to conduct experiments and interpret the results.
b2	An ability to design engineering system to meet specific needs, within realistic constraints
b2	An ability to model and solve engineering problems.
c1	An ability to take roles in collaborative teams.
c2	An ability to take professional and ethical responsibility.
d1	An ability to present technical & communication skills effectively.
d2	An ability to account for environmental, economic and safety factors in solving engineering problems.
d3	An ability to engage in life-long learning.

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code MUP 16

Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: *Hydrology (CE 445)*

Course Learning Outcomes:

C1	Students apply algebra, elementary calculus, and principles of physics.
C2	Students are able to identify and formulate an engineering problem and to develop a solution.
C3	Students recognize the importance of analysis in solving hydrological problems.
C4	Students are encouraged to submit accurate analysis in an efficient and professional way.
C5	Students recognize the ethical and professional responsibility in achieving accurate hydrological results to be utilized by hydraulic engineers for safe and economical design of hydraulic structures.
C6	Prepare and deliver an oral presentation about a topic of current interests in the field of water resources.

Mapping:

Map course Los with the program Los. (place course loss in the left column and program Los across the top)											
Course Los	**Program Learning outcomes** **Use Los codes**										
	a	b	c	d	e	f	g	h	i	j	k
C1	√										
C2	√				√						
C3	√				√						√
C4	√				√						√
C5	√	√		√							
C6				√	√	√					

Note: Minimum course Los can be 5 and maximum up to 10.

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Majmaah University

ABET

a	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
b	An ability to conduct experiments and interpret the results.
c	An ability to design engineering system to meet specific needs.
d	An ability to take roles in collaborative teams.
e	An ability to model engineering problems.
f	An ability to take professional and ethical responsibility.
g	An ability to present technical & communication skills effectively.
h	An ability to account for environmental, economic and safety factors in solving engineering problems.
i	An ability to engage in life-long learning.
j	An ability to demonstrate **knowledge of** contemporary engineering **issues**
k	An ability to use engineering skills, tools and techniques necessary for engineering practices

Note: Civil and Environmental Engineering Department is following the ABET.

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code MUP 16

Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: *Water and Wastewater Treatment CE (463)*

Course Learning Outcomes

c1	Ability to apply science and engineering principles.
c2	Ability to conduct and analyze water and wastewater properties.
c3	Ability to design units of water and wastewater treatment taking into consideration the economic, environmental, safety, and sustainability factors.
c4	Ability to identify, formulate and solve sludge problem after treatment processed.
c5	Ability to use novel chemicals and process to enhance water treatment and eliminate sludge dumping.

Mapping:

Map course Los with the program Los. (place course loss in the left column and program Los across the top)											
Course Los	**Program Learning outcomes** **Use Los codes**										
	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2	d3
c1	√	√			√						
c2	√	√			√						
c3	√	√	√	√	√						
c4			√		√	√				√	
c5											

	Learning outcomes for CE
a1	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
a2	An ability to demonstrate **knowledge of** contemporary engineering **issues**
a3	An ability to use engineering skills, tools and techniques necessary for engineering practices
b1	An ability to conduct experiments and interpret the results.
b2	An ability to design engineering system to meet specific needs, within realistic constraints
b2	An ability to model and solve engineering problems.
c1	An ability to take roles in collaborative teams.
c2	An ability to take professional and ethical responsibility.
d1	An ability to present technical & communication skills effectively.
d2	An ability to account for environmental, economic and safety factors in solving engineering problems.
d3	An ability to engage in life-long learning.

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code MUP 16

Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: **Photogrammetry (CE 474)**

Course Learning Outcomes

c1	Understand the theory and applications of potogrammetry.
c2	Ability to calculate the geometry of aerial photographs.
c3	Understand how data can be measured using aerial photography.
c4	Create maps from aerial photographs using photogrammetric techniques.
c5	Conduct accurate measurements and function in a team work.
c6	Recognize the difference between remote sensing and Photogrammetry w.r.t. techniques and applications.
c7	
c8	
c9	
c10	

Mapping:

Map course Los with the program Los. (place course loss in the left column and program Los across the top)											
Course Los	**Program Learning outcomes** **Use Los codes**										
	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2	d3
c1	√	√									
c2	√	√	√								
c3	√		√								√
c4	√		√	√	√					√	
c5	√			√			√	√	√		
c6		√									
c7											
c8											
c9											

Note: Minimum course Los can be 5 and maximum up to 10.

	Learning outcomes for CE
a1	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
a2	An ability to demonstrate **knowledge of** contemporary engineering **issues**
a3	An ability to use engineering skills, tools and techniques necessary for engineering practices
b1	An ability to conduct experiments and interpret the results.
b2	An ability to design engineering system to meet specific needs, within realistic constraints
b2	An ability to model and solve engineering problems.
c1	An ability to take roles in collaborative teams.
c2	An ability to take professional and ethical responsibility.
d1	An ability to present technical & communication skills effectively.
d2	An ability to account for environmental, economic and safety factors in solving engineering problems.
d3	An ability to engage in life-long learning.

College: Engineering

Department: Civil and Environmental Engineering   Program: Civil Engineering

Code MUP 16

Course Student Learning Outcomes to Program Learning Outcomes Map

Course Number: **Surveying I (CE 499)**

Course Learning Outcomes

c1	Understand and practice the basic concepts and elements of engineering design for a multidisciplinary civil engineering project.
c2	Practice group learning and teamwork by working on a multidisciplinary project.
c3	Prepare and deliver an oral presentation about a topic of current interests in the field of water resources.
c4	Carry out an integrated project planning, scheduling, and cost analysis for a moderately-sized, civil engineering project.
c5	Ability to design and conduct experiments, as well as to analyze and interpret data.
c6	
c7	
c8	

Mapping:

Map course Los with the program Los. (place course loss in the left column and program Los across the top)											
Course Los	**Program Learning outcomes** **Use Los codes**										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
c1	√	√									
c2			√	√		√					
c3	√				√						√
c4						√	√				
c5	√	√		√							
c6											
c7											
c8											
c9											

Note: Minimum course Los can be 5 and maximum up to 10.

ABET

a	An ability to apply principles of engineering, mathematics, and science in application of Engineering & Technology.
b	An ability to conduct experiments and interpret the results.
c	An ability to design engineering system to meet specific needs.
d	An ability to take roles in collaborative teams.
e	An ability to model engineering problems.
f	An ability to take professional and ethical responsibility.
g	An ability to present technical & communication skills effectively.
h	An ability to account for environmental, economic and safety factors in solving engineering problems.
i	An ability to engage in life-long learning.
j	An ability to demonstrate **knowledge of** contemporary engineering **issues**
k	An ability to use engineering skills, tools and techniques necessary for engineering practices

Note: Civil and Environmental Engineering Department is following the ABET.