

Course Syllabi Spring 2020

Course Code	Course Name	Credit Hours	Contact Hours
CE 212	Surveying-i	3	5

Supplemental Materials:

Reference Material	
Title	Surveying with Construction Applications Elementary Surveying
Author/Year	Barry F. Kavanagh, Prentice Hall, 4th Edition, 2011 Charles D. Ghilani , Paul R. Wolf. 13th Edition, Prentice Hall, 2012
Electronic Materials (e.g. Websites, Social Media, Blackboard, etc.)	
Websites	https://lms.ju.edu.sa/webapps/portal/execute/tabs/tabAction?tab_tab_group_id= 212 1

Specific Course Information:

a. Brief Description of the Content of the Course (Catalog Description)
Introduction to different categories of surveying; units of measurements; leveling and contouring; distance measurements; Direction and angular measurements; introduction to control survey (traversing); sources of error in surveying measurements and methods of corrections; electronic distance measurements (EDM); horizontal and vertical curves; and advanced surveying technologies.
b. Pre-requisites or Co-requisites
<ul style="list-style-type: none"> MATH 102 - Calculus 2
c. Course Type (Required or Elective)
Required
d. Specific Outcomes of Instruction

By the end of this course, the student should be able to:

1. **Demonstrate** knowledge of mathematics and engineering, and use techniques and tools, for plane surveying practice
2. Demonstrate ability to **Conduct** surveying experimentation, analyze and interpret surveying data
3. **Perform** the teamwork effectively in field survey and reporting the results professionally

e. Student Outcomes Addressed by the Course

SO1	SO2	SO3	SO4	SO5	SO6	SO7
				CLO 3	CLO 1 CLO 2	

Grading Distribution:

Week	Assessment	Grade %
14	Class Discussions	10%
7	Mid-Term Exam-I	10%
12	Mid-Term Exam-II	10%
13	Lab Report	10%
10	Class assignments	10%
16	Final Exam	50%

Brief List of Topics to be covered:

List of Topics	No. of Weeks	Contact Hours
Categories of surveying, Introduction to plane surveying	2	10
Units of measurements and Conversions	2	10
Leveling, contour mapping and earthwork computations	2	10
Direction and angular measurements	2	10
Electronic distance measurement and Tachometry	2	10

Measurements Accuracy and sources of Errors in distance measurements	2	10
Control surveying (traversing, triangulation, intersection, resection)	2	10
Horizontal and vertical curves	1	5

Course Code	Course Name	Credit Hours	Contact Hours
CE 302	Mechanics of Materials	3	4

Supplemental Materials:

Reference Material	
Title	Mechanics of Materials
Author/Year	Russell C. Hibbeler / 2017
Electronic Materials (e.g. Websites, Social Media, Blackboard, etc.)	
Websites	https://lms.ju.edu.sa/webapps/portal/execute/tabs/tabAction?tab_group_id= 178 1

Specific Course Information:

a. Brief Description of the Content of the Course (Catalog Description)
Calculating the internal forces and drawing the free body diagram, Concept of stress and strain; Mechanical properties of materials, stress-strain relationships and Hooke's law; Axial load; Shearing force and bending moment diagrams; Normal stresses in symmetrical and non-symmetrical sections due to normal forces and bending moment; Shear stresses in symmetrical solid and hollow sections; Torsional shear stresses in circular and non-circular sections; Combined stresses and Principal stresses; Transformation of stress and strain and Mohr's circle.
b. Pre-requisites or Co-requisites
<ul style="list-style-type: none"> • GE201 - Statics • MATH201 - Calculus -iii
c. Course Type (Required or Elective)

Required

d. Specific Outcomes of Instruction

By the end of this course, the student should be able to:

CLO1: Determine the stress-strain problems by understanding the fundamental concepts of stress and strain and their relationship for linear, elastic, homogeneous, isotropic materials.

CLO2: Draw the shearing force and bending moment diagrams of beams subjected to different loading and supporting condition of beams.

CLO3: Determine the deformation and rotations produced by the axial and torsional load respectively.

CLO4: Calculate the shear stress of a beam having a symmetrical/ unsymmetrical solid and hollow sections.

CLO5: Find stresses and strains on arbitrary planes using transformations and Mohr's Circle as well as understanding of the buckling of columns.

e. Student Outcomes Addressed by the Course

SO1	SO2	SO3	SO4	SO5	SO6	SO7
CLO1, CLO2, CLO3, CLO4, CLO5						

Grading Distribution:

Week	Assessment	Grade %
5, 13	Assignments	10%
6, 14	Quizzes	10%
7	Mid-Term Exam-I	10%
13	Mid-Term Exam-II	10%
17	Final Exam	60%

Brief List of Topics to be covered:

List of Topics	No. of Weeks	Contact Hours
Calculating the internal forces and drawing the free body diagram, Concept of stress	2	8
Concept of strain	1	4
Mechanical properties of materials, stress-strain relationships and Hooke's law	1	4
Shearing force and bending moment diagrams	2	8
Axial load	2	8
Torsional shear stresses in circular and non-circular sections	2	8
Normal stresses in symmetrical and non-symmetrical sections due to normal forces and bending moment; Shear stresses in symmetrical solid and hollow sections	2	8
Transformation of stress as well as strain and Mohr's circle, Combined stresses – Principal stresses;	3	12

Course Code	Course Name	Credit Hours	Contact Hours
CE 221	Geology for Civil Engineers	2	3

Supplemental Materials:

Reference Material	
Title	Fundamentals of Rock Mechanics
Author/Year	Jaeger, J.C. and Cook, N.G.W / 2007
Electronic Materials (e.g. Websites, Social Media, Blackboard, etc.)	
Websites	https://lms.ju.edu.sa/webapps/blackboard/execute/modulepage/view?course_id=147873_1&cmp_tab_id=168999_1&editMode=true&mode=cpview

Specific Course Information:

a. Brief Description of the Content of the Course (Catalog Description)
Introduction to engineering geology. Earth surface and physical properties of earth materials. Weathering processes. Types and classification of rocks based on origin and strength. Physical and mineralogical properties of rocks. Basics of structural geology. Rock formation and properties. Identification of rock minerals. Index properties and their measurements in field and laboratory. Deformability. Strength and failure criteria. Mechanical properties of rock. Geological maps.
b. Pre-requisites or Co-requisites
<ul style="list-style-type: none"> PHYS 102
c. Course Type (Required or Elective)
Required
d. Specific Outcomes of Instruction
<p>By the end of this course, the student should be able to:</p> <ol style="list-style-type: none"> Apply knowledge of mathematics, science, and engineering to calculate the physical properties of earth materials. Determine stresses and mechanical properties of rocks and their measurements by applying the principles of rock mechanics. Recognize the social, environmental issues that are associated with mechanical properties of rock and geological maps.

e. Student Outcomes Addressed by the Course						
SO1	SO2	SO3	SO4	SO5	SO6	SO7
					CLO1, CLO2, CLO3	

Grading Distribution:

Week	Assessment	Grade %
2-14	Assignments	10%
14	Report	5%
4,9	Quizzes	5%
7	Mid-Term Exam1	10%
12	Mid-Term Exam2	10%
16	Final exam	60%

Brief List of Topics to be covered:

List of Topics	No. of Weeks	Contact Hours
Introduction to engineering geology	2	6
Physical properties of earth materials	1	3
Types and classification of rocks	1	3
Physical and mineralogical properties of rocks	2	6
Basics of structural geology. Rock formation and properties	2	6
Stresses and their measurements	2	6
Stability of rock masses	2	6
Geological maps : Case study (examples in Saudi Arabia)	3	9

course Code	Course Name	Credit Hours	Contact Hours
CE 303	Properties and Testing of Materials	2	4

Supplemental Materials:

Reference Material	
Title	<u>Engineering Materials 1: An Introduction to Properties, Applications and Design</u>
Author/Year	<u>D.R.H. Jones and Michael F. Ashby / 2018</u>
Electronic Materials (e.g. Websites, Social Media, Blackboard, etc.)	
Websites	<u>https://lms.ju.edu.sa/webapps/blackboard/content/listContentEditable.jsp?content_id=_1294126_1&course_id=_123720_1&mode=reset</u>

Specific Course Information:

a. Brief Description of the Content of the Course (Catalog Description)
This course concerns on engineering materials: properties, tests, specifications, statistical evaluation, bricks, lime and gypsum, wood, metals, plastics, ceramics, glass, test equipment, gauges, and mechanical tests: tensile, pressure, bending, shearing, rigidity, collision, non-destructive tests.
b. Pre-requisites or Co-requisites
CE 302- Mechanics of Materials
c. Course Type (Required or Elective)
Required
d. Specific Outcomes of Instruction
By the end of this course, the student should be able to: CLO1: Perform effectively as a team member during conducting the laboratory experiments in students groups. CLO2: Analyze the results of the experiments that conducted to measure the mechanical properties of engineering materials under the effect of tensile testing, and use engineering judgment to draw conclusions for these results. CLO3: Analyze the results of the experiments that conducted to measure the mechanical properties of engineering materials under the effect of compressive testing, and bending testing.

CLO4: Interpret the experiments results that related to Non-destructive testing of concrete.

e. Student Outcomes Addressed by the Course

SO1	SO2	SO3	SO4	SO5	SO6	SO7
				CLO1	CLO2& CLO3& CLO4	

Grading Distribution:

Week	Assessment	Grade %
7	Mid-Term exam 1	15%
12	Mid-Term exam 2	15%
During semester	Lab Reports	10%
During semester	Lab Performance	10%
16	Final Exam	50%

Brief List of Topics to be covered:

List of Topics	No. of Weeks	Contact Hours
General introduction to the importance of engineering materials and their uses and how to choose them	1	4
Classification of engineering materials	1	4
Properties of engineering materials	2	8
Mechanical tests on engineering materials (tensile testing - compression testing)	4	16
Mechanical tests on engineering materials (bending test)	2	8

Mechanical tests on engineering materials (hardness test)	2	8
Non-destructive testing of concrete	3	12

course Code	Course Name	Credit Hours	Contact Hours
CE 304	Properties and Testing of Concrete	2	4

Supplemental Materials:

Reference Material	
Title	Properties of Concrete
Author/Year	Neville, A. M., 1981
Electronic Materials (e.g. Websites, Social Media, Blackboard, etc.)	
Websites	https://lms.ju.edu.sa/webapps/blackboard/content/listContentEditable.jsp?content_id=1294126_1&course_id=123720_1&mode=reset

Specific Course Information:

a. Brief Description of the Content of the Course (Catalog Description)
This course concerns on: Cement (manufacture, properties, types of cement); Aggregates (types, properties, grading); Mixing water, manufacture of concrete (proportions, mixing, handling, placing), fresh and hardened concrete properties, and their testing and curing.
b. Pre-requisites or Co-requisites
CE 302- Mechanics of Materials
c. Course Type (Required or Elective)
Required
d. Specific Outcomes of Instruction
By the end of this course, the student should be able to: CLO1: Perform effectively as a team member during conducting the laboratory experiments in students groups that require exchange and analysis of data. CLO2: Interpret the experiments results that related to aggregates, and cement. CLO3: Analyze the results of the experiments that conducted to measure the physical properties of fresh and hardened concrete, and use engineering judgment to draw conclusions for these results. CLO4: Clarify the components of the concrete mixture by designing the mix by standard methods
e. Student Outcomes Addressed by the Course

SO1	SO2	SO3	SO4	SO5	SO6	SO7
				CLO1	CLO2& CLO3& CLO4	

Grading Distribution:

Week	Assessment	Grade %
7	Mid-Term exam 1	10%
12	Mid-Term exam 2	10%
During semester	Lab Reports	20%
During semester	Lab Performance	10%
16	Final Exam	50%

Brief List of Topics to be covered:

List of Topics	No. of Weeks	Contact Hours
Introduction to concrete and its components	1	4
Physical, chemical and mechanical properties of aggregate and aggregate tests	3	12
Manufacturing, types, properties and tests of cement.	3	12
Mixing water and admixtures	1	4
Stages of concrete manufacturing, fresh concrete properties and tests	3	12
Hardened concrete and its tests	2	8
Treatment and design of concrete mix	2	8

Course Code	Course Name	Credit Hours	Contact Hours
CE 321	Fluid Mechanics	3	4

Supplemental Materials:

Reference Material	
Title	Fluid Mechanics
Author/Year	Victor Streeter and B, Wylie, 1997, 9 th edition, McGraw-Hill
Electronic Materials (e.g. Websites, Social Media, Blackboard, etc.)	
Websites	https://lms.ju.edu.sa/

Specific Course Information:

a. Brief Description of the Content of the Course (Catalog Description)
Introduction to the basics of fluid mechanics, fluid properties, fluid statics (hydrostatic pressures and forces), fluid kinematics (continuity equation, momentum equations and Bernoulli (Energy) equation), flow resistance and viscosity, flow measurements, pipe flow and systems.
b. Pre-requisites or Co-requisites
<ul style="list-style-type: none"> MATHE 204-Differential Equations
c. Course Type (Required or Elective)
Required
d. Specific Outcomes of Instruction

By the end of this course, the student should be able to:

1. **Formulate** the fundamental principles of mathematics, and sciences related to fluid mechanics.
2. **Solve** hydrostatic pressure problems by applying the fundamentals of fluid mechanics.
3. **Analyze** the behaviour of fluid in dynamics and its relation to pipe flows and systems.

e. Student Outcomes Addressed by the Course

SO1	SO2	SO3	SO4	SO5	SO6	SO7
CLO1, CLO2, CLO3						

Grading Distribution:

Week	Assessment	Grade %
2-15	Assignments	10%
5	Quiz	10%
8	Midterm exam 1	10%
12	Midterm exam 2	10%
16	Final Exam	60%

Brief List of Topics to be covered:

List of Topics	No. of Weeks	Contact Hours
Introduction: outlines of fluid mechanics course; units and dimensions; and fluid properties.	2	8
Fluid Statics: Fluid pressure, Hydrostatic law of pressure, Gauge and absolute pressures, Pressure measurements, Pressure forces on plane surfaces, and Pressure forces on curved surfaces.	4	16
Fluid Kinematics: Fluid-flow definitions, Continuity equation, Bernoulli's (Energy) equation, Hydraulic grade line, Total energy line, Flow through orifices, Flow over weirs, and Flow through venturimeter.	3	12

Fluid Dynamics: Momentum and forces in fluid flow, Linear momentum equation, and Forces acting on curved pipes (bends).	2	8
Flow Resistance and Viscosity: Fluid friction, Types of flow, Reynold's experiment, Darcy Weisbach equation, Laminar flow, Turbulent flow, Friction factors, and Minor losses.	1	4
Flow Measurements: flow rate, velocity, depth, fluid viscosities.	1	4
Pipe Flow and Systems: Fluid friction, Types of flow, Reynold's experiment, Darcy Weisbach equation, Laminar flow, Turbulent flow, Friction factors, and Minor losses.	2	8

Course Code	Course Name	Credit Hours	Contact Hours
CE 360	Structural Analysis I	4	6

Supplemental Materials:

Reference Material	
Title	Structural Analysis in SI Units
Author/ Year	Russell C. Hibbeler, 9th edition, Prentice Hall / 2017
Electronic Materials (e.g. Websites, Social Media, Blackboard, etc.)	
Websites	https://lms.ju.edu.sa/webapps/blackboard/execute/modulepage/view?course_id= 140522_1&cmp_tab_id= 160614_1&editMode=true &mode=cpview

Specific Course Information:

a. Brief Description of the Content of the Course (Catalog Description)
The course will provide students with the foundation and knowledge necessary to be able to analyze different types of statically determinate structural systems subjected to different types of loading. This includes the analysis of determinate trusses, beams, plane frames and arches; reaction computation; normal force, shearing force, bending moment diagrams and deformations. Finally, the analysis of beams subjected to moving loads is provided.
b. Pre-requisites or Co-requisites
<ul style="list-style-type: none"> CE 302- Mechanics of Materials
c. Course Type (Required or Elective)
Required
d. Specific Outcomes of Instruction
<p>By the end of this course, the student should be able to:</p> <ol style="list-style-type: none"> Analyze compound and complex beams using principles of engineering statics to calculate and hence draw different kinds of internal forces diagrams.

2. **Solve** different types of statically determinate structures using principles of engineering statics to **determine** and hence **draw** the internal forces diagrams which are required to check the strength requirements for subsequent design courses.
3. **Evaluate** different kinds of deformations for statically determinate structures which are required to **check** the serviceability requirements for subsequent design courses by applying principles of mathematics and mechanics of materials.

e. Student Outcomes Addressed by the Course

SO1	SO2	SO3	SO4	SO5	SO6	SO7
CLO1, CLO2, CLO3						

Grading Distribution:

Week	Assessment	Grade %
4-14	Quizzes	15%
4-15	Assignments	10%
7	Mid-Term Exam	15%
16	Final Exam	60%

Brief List of Topics to be covered:

List of Topics	No. of Weeks	Contact Hours
Types of structures, supports and loads. Idealization of structures and loads.	1.3	8
Reaction computation for different structures and Geometric stability and determinacy	2	12
Analysis of determinate beams; axial force, shear force and bending moment diagrams. Load-shear-moment relationship	2.3	14
Analysis of determinate compound beams, trussed beams, and inclined beams.	2.4	14

Analysis of determinate plane frames and arches; axial force, shear force and bending moment diagrams.	2	12
Differential equation of elastic curve and deflections by double integration.	1	6
Deformations using moment-area, conjugate-beam and virtual work methods.	3	18
Influence lines of determinate structures	1	6

Course Code	Course Name	Credit Hours	Contact Hours
CE 381	Engineering Properties of Soil and their Measurements	2	4

Supplemental Materials:

Reference Material	
Title	Principles of Geotechnical Engineering
Author/Year	Braja M. Das / 2017
Electronic Materials (e.g. Websites, Social Media, Blackboard, etc.)	
Websites	www.lms.ju.edu.sa

Specific Course Information:

a. Brief Description of the Content of the Course (Catalog Description)
This course includes soil formation, weight-volume relationships, Soil plasticity , classification and identification of soils, Soil Compaction, Permeability and Seepage, total and effective stresses in soils, Stress analysis in soils using the elastic theory.
b. Pre-requisites or Co-requisites
<ul style="list-style-type: none"> CE 303- Properties and Testing of Materials
c. Course Type (Required or Elective)
Required
d. Specific Outcomes of Instruction

By the end of this course, the student should be able to:

1. **Analyze** experimental results (moisture content test, sieve analysis test, Atterberg limits test) in order to identify and classify soils.
2. **Analyze** results of experiments (Proctor test, Sand Cone Test, Permeameter test) in order to examine factors affecting soil compaction and interpret hydraulic behaviour of soil.
3. **Determine** stresses in a soil mass taking into account the characteristics of soil.
4. **Perform** effectively as a team member during conducting laboratory experiments and elaborating lab. reports

e. Student Outcomes Addressed by the Course

SO1	SO2	SO3	SO4	SO5	SO6	SO7
				CLO4	CLO1, CLO2, CLO3	

Grading Distribution:

Week	Assessment	Grade %
4	Quiz-1	5%
5	Assignment-1	2%
7	Mid-Term Exam-I	10%
10	Quiz-2	5%
11	Assignment-2	3%
12	Mid-Term Exam-II	10%
14	Lab report and lab performance	15%
15	Final Exam	50%

Brief List of Topics to be covered:

List of Topics	No. of Weeks	Contact Hours
Soil formation	1	4
Weight-volume relationships	2	8
Soil plasticity	2	8
Classifications and identification of soils	2	8
Soil Compaction and soil Permeability	3	12
Total and effective stresses in soils	2	8
Stress analysis in soils using the elastic theory.	3	12

Course Code	Course Name	Credit Hours	Contact Hours
CE 420	Hydraulics	3	5

Supplemental Materials:

Reference Material	
Title	Fluid mechanics" Fundamental and applications"
Author/Year	Yunus A. Cengel, and John M. Cimbala/ Fourth edition/2019
Title	Fundamentals of Hydraulic Engineering Systems
Author/Year	Houghtalen, R.J., Akan, A.O.H., and Hwang, N.H.C. / 2011
Electronic Materials (e.g. Websites, Social Media, Blackboard, etc.)	
Websites	www.lms.ju.edu.sa

Specific Course Information:

a. Brief Description of the Content of the Course (Catalog Description)
This course includes basic concepts of fluid flow as types, classifications, states and properties in closed conducts and in open channels, Dimensional analysis and similarity, Steady flow in closed conduct, Hydraulics of open channel, Pumps and turbines, and Laboratory measurements and data analysis.
b. Pre-requisites or Co-requisites
<ul style="list-style-type: none"> Pre-requisite: CE 321 Fluid Mechanics
c. Course Type (Required or Elective)

Required

d. Specific Outcomes of Instruction

By the end of this course, the student should be able to:

1. **Apply** knowledge of mathematics and basic sciences as well fundamentals of hydraulics to solve hydraulics problems related to different types, states of flow and computing dimensions of best hydraulic section in closed and open conduits
2. **Apply** knowledge of mathematics and basic sciences as well fundamentals of hydraulics to solve hydraulics problems related to energy and momentum principles, manning-shear stress, dimensional analysis, networks and pumps in open channel in open channel.
3. **Perform** lab experiments to analyse hydraulic engineering problems, as well as analyse the collected data.

e. Student Outcomes Addressed by the Course

SO1	SO2	SO3	SO4	SO5	SO6	SO7
CLO1,CLO2					CLO3	

Grading Distribution:

Week	Assessment	Grade %
5,11	Quizz1,2	10%
5,10	Assignments1,2	10%
7	Mid-Term Exam-I	10%
12	Mid-Term Exam-II	10%
14	Lab report	10%
16	Final Exam	50%

Brief List of Topics to be covered:

List of Topics	No. of Weeks	Contact Hours
Introduction: course description, review on fluid mechanics	1	5
Basic concepts in flow: Flow in closed conduits; open channel flow; types, states and conditions of flows; geometric properties of flow	1	5
Flow in closed conduits: steady flow	2	10
Open channel flow: introduction to OCF types, conditions and properties, steady and unsteady flow, uniform and varied flow, transitions in open channels	5	25
Dimensional; analysis, similarity and model	2	10
Laboratory measurements: hydraulic experiments for flow characteristics measurements in pipes and open channels	2	10
Pumps: types of pumps and turbines, Roto Dynamic Pump (pressure pump) Centrifugal Pump, Axial-pumps (Propeller and Kaplan pump)	2	10

Course Code	Course Name	Credit Hours	Contact Hours
CE 422	Hydrology	3	4

Supplemental Materials:

Reference Material	
Title	Hydrology for Engineers
Author/Year	Ray K. Linsley, JR./ 1982
Electronic Materials (e.g. Websites, Social Media, Blackboard, etc.)	
Websites	https://lms.ju.edu.sa/

Specific Course Information:

a. Brief Description of the Content of the Course (Catalog Description)
Introduction to the principles of water resources engineering, water budget and balance; principles of meteorology (temperature, humidity, wind, precipitation); the hydrologic cycle phases and mathematical calculations in each phase; the estimations of infiltration, evaporation and transpiration; the relation between rainfall and run-off hydrographs; the catchment areas and stream-flow of drainage basins; principles of ground water science, and hydraulics of wells.
b. Pre-requisites or Co-requisites
<ul style="list-style-type: none"> CE 321-Fluid Mechanics
c. Course Type (Required or Elective)
Required
d. Specific Outcomes of Instruction

By the end of this course, the student should be able to:

1. **Solve** Water budget equation problems by applying principles of hydrology.
2. **Analyze** different analytical / empirical methods for the rainfall and losses processes.
3. **Analyze** different analytical / empirical methods for the runoff, and base flow processes.
4. **Demonstrate** ethical and professional responsibilities; make informed judgements in terms of surface and groundwater resources engineering and managements.

e. Student Outcomes Addressed by the Course

SO1	SO2	SO3	SO4	SO5	SO6	SO7
CLO1, CLO2, CLO3			CLO4			

Grading Distribution:

Week	Assessment	Grade %
3	Assignments	10%
6	Quizzes	5%
7	Mid-Term Exam-I	10%
12	Mid-Term Exam-II	10%
13	Discussions	5%
16	Final Exam	60%

Brief List of Topics to be covered:

List of Topics	No. of Weeks	Contact Hours
Water budget and water balance	1	4
Water supply and water demands	1	4
The hydrologic cycle.	2	8
Principles of meteorology,	2	8
Rainfall data records and analysis / frequency of storms	1	4

Water losses and Infiltration index	2	8
Evaporation and evapotranspiration	2	8
Drainage basins and catchment areas	1	4
Run-off hydrographs	1	4
Ethical issues in water resource engineering and management	1	4
Ground water - Properties of Aquifers	1	4

Course Code	Course Name	Credit Hours	Contact Hours
CE 433	Transportation Systems	3	4

Supplemental Materials:

Reference Material	
Title	Traffic and Highway Engineering
Author/Year	Garber, N. and Hoel, L., 2009
Electronic Materials (e.g. Websites, Social Media, Blackboard, etc.)	
Websites	https://lms.ju.edu.sa/webapps/blackboard/execute/modulepage/view?course_id= 123749 1&cmp tab id= 140580 1&editMode=true&mode=cpview

Specific Course Information:

a. Brief Description of the Content of the Course (Catalog Description)
Transportation systems and their characteristics, transportation and society, transport system components, vehicle traffic, flow and efficiency, continuous flow, parking efficiency, volume of transport demand, traffic system components, traffic flow characteristics, traffic engineering studies, traffic safety, traffic capacity in urban areas and intersections, systems traffic department.
b. Pre-requisites or Co-requisites
<ul style="list-style-type: none"> None
c. Course Type (Required or Elective)
Required
d. Specific Outcomes of Instruction
<p>By the end of this course, the student should be able to:</p> <ol style="list-style-type: none"> Compute the trip distribution between different zones based on the collected data for the transportation planning by applying the principles of urban transportation planning. Determine the suitable trip path through the road network based on the collected data by applying the principles of traffic assignment.

3. **Interpret** effectively in oral presentations as well as in written form by preparing report related to modern topic in transportation systems.

e. Student Outcomes Addressed by the Course

SO1	SO2	SO3	SO4	SO5	SO6	SO7
		CLO3			CLO1, CLO2	

Grading Distribution:

Week	Assessment	Grade %
4	Quiz-1	2.5%
6	Report and Presentation	10%
7	Mid-Term Exam-I	10%
9	Quiz-2	2.5%
12	Mid-Term Exam-II	10%
14	Assignment-1	5%
16	Final Exam	60%

Brief List of Topics to be covered:

List of Topics	No. of Weeks	Contact Hours
The transportation systems and its characteristics	1	4
Transportation and society	1	4
Components of transportation systems	1	4
Vehicle motion	3	12
Flow and performance	3	12
Traffic volume	2	8
transportation demand	2	8
Traffic service flow	2	8

Course Code	Course Name	Credit Hours	Contact Hours
CE 470	Reinforced Concrete - i	4	6

Supplemental Materials:

Reference Material	
Title	Reinforced concrete (Mechanics and Design)
Author/Year	James K.Wight, James G. Macgregor / 2015
Electronic Materials (e.g. Websites, Social Media, Blackboard, etc.)	
Websites	https://lms.ju.edu.sa/webapps/portal/execute/tabs/tabAction?tab_group_id= 178 1

Specific Course Information:

a. Brief Description of the Content of the Course (Catalog Description)
Introduction to properties of concrete and reinforcing steel; Limit-state design of reinforced concrete structures, Building Code requirements and ethical as well as professional responsibilities in engineering solutions; Loads and load combinations acting on reinforced concrete structures; Analysis and design of beams against flexural: rectangular beams, T-beams and doubly-reinforced beams; Design of beams against shear and torsion forces, Bond and development length including splices and cut-off points; Reinforcement details of beams; Analysis, design and reinforcement details of one-way and two way solid slabs; Analysis and design of columns subjected to axial loads : short concentric tied and spiral columns.
b. Pre-requisites or Co-requisites

- CE 360-Structural Analysis-i
- CE 304-Properties and Testing of Concrete

c. Course Type (Required or Elective)

Required

d. Specific Outcomes of Instruction

By the end of this course, the student should be able to:

CLO1: Evaluate the behaviour under load of reinforced concrete beams and its materials properties using different design method which satisfies the strength and serviceability limit state.

CLO2: Analyse and design of the singly reinforced concrete (rectangular) beams subjected to transverse loading.

CLO3: Analyse and design of the reinforced concrete beam under flexural condition of T-beams as well as doubly reinforcement beam and shear for rectangular beam.

CLO4: Evaluate appropriate code/standard for application to the practical analysis and design of concrete short columns and compute tensile as well as compressive bar development lengths.

CLO5: Analyse and design one-way and two-way slabs under flexure and shear reinforcement at the ultimate limit state.

e. Student Outcomes Addressed by the Course

SO1	SO2	SO3	SO4	SO5	SO6	SO7
	CLO2, CLO3, CLO5		CLO1, CLO4			

Grading Distribution:

Week	Assessment	Grade %
7, 11	Assignments	10%
6, 10	Quizzes	10%
8	Mid-Term Exam-I	10%
12	Mid-Term Exam-II	10%
17	Final Exam	60%

Brief List of Topics to be covered:

List of Topics	No. of Weeks	Contact Hours
Introduction to properties of concrete and reinforcing steel; Limit-state design of reinforced concrete structures- Types of reinforced concrete structures.	2	12
Building Code requirements and ethical as well as professional responsibilities in engineering solutions; Loads and load combinations acting on reinforced concrete structures	2	12
Analysis and design of beams against flexural: rectangular beams, T-beams, doubly-reinforced beams	3	18
Design of beams against shear forces and torsion.	2	12
Bond and development length including splices and cut-off points; Reinforcement details of beams	2	12
Analysis, design and reinforcement details of one-way and two-way solid slabs.	2	12
Analysis and design of columns subjected to axial loads: short concentric tied and spiral columns.	2	12

Course Code	Course Name	Credit Hours	Contact Hours
CE 480	Soil Mechanics	3	4

Supplemental Materials:

Reference Material	
Title	Principles of Geotechnical Engineering
Author/ Year	Braja M. Das / 2014
Electronic Materials (e.g. Websites, Social Media, Blackboard, etc.)	
Websites	https://lms.ju.edu.sa

Specific Course Information:

a. Brief Description of the Content of the Course (Catalog Description)
Theory of consolidation of soils, determination of settlement of soils : normally consolidated clay and over-consolidated clay, theory of Mohr-Coulomb, experimental study of shear strength of soils : Direct shear test and triaxial test, Determination of lateral earth pressure on soil retaining structures, study of stability of slopes, soil investigation and site exploration.
b. Pre-requisites or Co-requisites
<ul style="list-style-type: none"> • CE 381-Engineering Properties of Soils and their measurements • CE 303-Properties and Testing of Materials
c. Course Type (Required or Elective)
Required
d. Specific Outcomes of Instruction

By the end of this course, the student should be able to:

1. **Evaluate** and Interpret data giving by laboratory tests (odometer test) in order to determine soil consolidation characteristics and settlement.
2. **Analyze** results of experiments (direct shear test, shear tri-axial test) in order to study the shear strength of soil.
3. **Examine** the stability of earth retaining structures, subject to the lateral earth pressure, and stability of slopes taking into account the characteristics of soil.
4. **Interpret** effectively in oral presentations as well as in written form by preparing report related to soil mechanics topics.

e. Student Outcomes Addressed by the Course

SO1	SO2	SO3	SO4	SO5	SO6	SO7
		CLO4			CLO, CLO2, CLO3	

Grading Distribution:

Week	Assessment	Grade %
4	Quiz-1	5%
7	Mid-Term Exam-I	10%
9	Quiz-2	5%
13	Mid-Term Exam-II	10%
5,10,14	Reports & Presentations	10%
16	Final Exam	60%

Brief List of Topics to be covered:

List of Topics	No. of Weeks	Contact Hours
Theory of Consolidation of Soils	2	8
Settlement of soils	2	8
Shear Strength of Soils	3	12
Lateral Earth Pressure	2	8
Stability of retaining walls	2	8
Stability of Slopes	3	12
Soil Investigation and Site exploration	1	4

Course Code	Course Name	Credit Hours	Contact Hours
CE 417	Construction Equipment & Methods	3	4

Supplemental Materials:

Reference Material	
Title	Construction Methods & Management
Author/Year	S.W. Nunnally / 2007
Electronic Materials (e.g. Websites, Social Media, Blackboard, etc.)	
Websites	https://lms.ju.edu.sa/webapps/blackboard/execute/modulepage/view?course_id=96076_1&cmp_tab_id=106899_1&editMode=true&mode=cpview

Specific Course Information:

a. Brief Description of the Content of the Course (Catalog Description)
This course includes overview of the construction industry, earthmoving machinery and operations, excavation and lifting, loading and hauling, compacting & finishing, concrete construction, concrete form design, construction economics, and contract construction.
b. Pre-requisites or Co-requisites
<ul style="list-style-type: none"> None
c. Course Type (Required or Elective)
Required
d. Specific Outcomes of Instruction
<p>By the end of this course, the student should be able to:</p> <ol style="list-style-type: none"> Apply new knowledge in civil engineering as needed, using appropriate new construction strategies. Identify and solve civil engineering problems related to ownership and operating costs. Apply principles of civil engineering concepts for quantities take-off and different types of contracts.
e. Student Outcomes Addressed by the Course

SO1	SO2	SO3	SO4	SO5	SO6	SO7
CLO2, CLO3						CLO1

Grading Distribution:

Week	Assessment	Grade %
2-15	Assignments	6%
14	Reports	8%
4,9	Quizzes	6%
8	Mid-Term Exam1	10%
12	Mid-Term Exam2	10%
16	Final exam	60%

Brief List of Topics to be covered:

List of Topics	No. of Weeks	Contact Hours
Earthmoving machinery and operations.	2	8
Professional ethics.	1	4
Excavation and lifting.	2	8
Loading & hauling. Compacting & finishing.	2	8
Concrete construction	2	8
Concrete form design.	2	8
Construction economics.	2	8
Contract construction.	2	8

Course Code	Course Name	Credit Hours	Contact Hours
CE 436	Highway and Traffic Engineering	3	5

Supplemental Materials:

Reference Material	
Title	Materials for Civil and Construction Engineers
Author/ Year	Mamlouk and Zaniwski/2017
Electronic Materials (e.g. Websites, Social Media, Blackboard, etc.)	
Websites	www.lms.ju.edu.sa/webapps/blackboard/execute/modulepage/view?course_id=_123751_1&cmp_tap_id=_140582_1&editmode

Specific Course Information:

a. Brief Description of the Content of the Course (Catalog Description)
This course includes highway planning and capacity, design control and criteria, cross sectional elements, sight distances, horizontal and vertical alignments, intersections, highway material characterization, bituminous mixtures design, flexible pavement design, highway drainage, pavement evaluation and maintenance, components of traffic system, traffic stream characteristics, traffic studies, parking, pedestrians, traffic safety, traffic signals, signs and markings, capacity of urban streets and intersections, and congestion management.
b. Pre-requisites or Co-requisites
<ul style="list-style-type: none"> CE 433-Transportation Systems
c. Course Type (Required or Elective)
Required
d. Specific Outcomes of Instruction
<p>By the end of this course, the student should be able to:</p> <ol style="list-style-type: none"> Identify, formulate and solve complex problems for the horizontal and vertical alignments of highway by applying the principles of road planning and maintenance. Identify, formulate and solve complex problems for calculating the cycle time of traffic signals by applying the principles traffic. Determine the volumetric of asphalt mix and engineering properties of road materials (binder and aggregates) by applying the principles of engineering criteria.

<p>4. Determine the structural thickness of pavement based on the required traffic characterization (ESAL).</p> <p>5. Outline the principles of conducting highway laboratory experiments with appropriate method through sufficient practicing.</p>						
e. Student Outcomes Addressed by the Course						
SO1	SO2	SO3	SO4	SO5	SO6	SO7
CLO1- CLO4					CLO5	

Grading Distribution:

Week	Assessment	Grade %
5	Quiz-1	2.5%
6	Report and Presentation	10%
7	Mid-Term Exam-I	10%
10	Quiz-2	2.5%
11	Assignment-1	5%
12	Mid-Term Exam-II	10%
14	Lab report and lab performance	10%
16	Final Exam	50%

Brief List of Topics to be covered:

List of Topics	No. of Weeks	Contact Hours
Highway planning and capacity& Design controls and criteria	1	5
Cross Sectional Elements	1	5
Sight Distance	1	5
Horizontal Alignment	1	5
Vertical Alignment	1	5
Intersections Design	1	5
Subgrade, Base and Subbase Material Characterization	1	5
Bituminous Materials Characterization	1	5

Bituminous Mix Design	1	5
Flexible Pavement design	1	5
Pavement Evaluation and Maintenance	1	5
Components of Traffic System	1	5
Traffic-Stream Studies and Characteristics	1	5
Parking, Signs and Markings	1	5
Traffic Signals	1	5
Highway planning and capacity& Design controls and criteria	1	5

Course Code	Course Name	Credit Hours	Contact Hours
CE 442	Water and Wastewater Treatment	3	4

Supplemental Materials:

Reference Material	
Title	Wastewater Engineering Water and Wastewater Technology Water Supply and Sewerage Water Supply and Sewerage
Author/Year	Hammer, M.J, 7 th Edition, Pearson Mackenzie, 2nd edition, McGraw Hill Mectlaf and Eddy Inc. / 2015 Terence J and McGhee 6th edition, McGraw Hill
Electronic Materials (e.g. Websites, Social Media, Blackboard, etc.)	
Websites	www.lms.ju.edu.sa

Specific Course Information:

a. Brief Description of the Content of the Course (Catalog Description)
<p>This course includes water quality and standards. Characteristics of raw water, collection works in water treatment plant, purification works in water treatment plant (sedimentation, filtration and disinfection), characteristics of wastewater, sewage treatment, primary treatment of wastewater and secondary clarification during wastewater treatment.</p>
b. Pre-requisites or Co-requisites
CE 321- Fluid Mechanics
c. Course Type (Required or Elective)
Required

d. Specific Outcomes of Instruction

By the end of this course, the student should be able to:

- CLO 1. Explain** the characteristics and environmental issues associated with water and wastewater treatment.
- CLO 2. Describe** fundamentals and basic concepts for design of water and wastewater treatment.
- CLO 3. Design** water and wastewater treatment facilities.
- CLO 4. Demonstrate** the concepts of performing experiments to evaluate the properties of water and waste water.

e. Student Outcomes Addressed by the Course

SO1	SO2	SO3	SO4	SO5	SO6	SO7
	CLO 2, CLO3				CLO1, CLO4	

Grading Distribution

Quizzes	5%
Assignment (CEP)*	5%
Midterm Exam-1	10%
Midterm Exam-11	10%
Group Presentations & Discussion Forum	5%
Lab Reports	5%
Lab work	10%
Final Exam	50%

*Complex Engineering Problem

Brief List of Topics to be covered:

List of Topics	No. of Weeks	Contact Hours
Water quality and standards	1	2
Characteristics of raw water and wastewater; Population forecasting and Water demand; Collection works (Intake, intake pipe)	2	4
Collection works (Function and Design of Sump, LLP)	1	2
Process of coagulation, flash mixing, design of coagulation tank and calculating amount of coagulants (Purification works in WTP)	1	2
Process of flocculation and design of flocculation tank (Purification works in WTP)	1	2
Process and Design of sedimentation (Clarifiers)	2	4
Process involved in filtration and design of filters (Purification works in WTP)	1	2
Disinfection, Filtered water storage tank and distribution networks	2	4
Primary treatment of wastewater	1	2
Secondary treatment of wastewater	2	4
Wastewater treatment (Examples and exercises)	1	2

Detail of Lab work to be covered:

List of Topics	No. of Weeks	Contact Hours
Introduction to Environmental Engineering Lab, Water and wastewater quality standards	1	2
Experiment #1 Determination of Color in Different Liquid Samples Experiment #2 Determination of pH of Different Liquid Samples	1	2
Experiment # 3 Determination of Turbidity	1	2
Experiment # 4 Determination of Conductivity	1	2
Experiment # 5 Determination of Total Dissolved and Suspended Solids	1	2
Experiment # 6 Determination of Acidity	1	2

Experiment # 7 Determination of Alkalinity	1	2
Experiment#8 Determination of Total Solids in Waste Water (TS)	1	2
Experiment# 9 Jar Test	1	2
Experiment#10 Determination of Volatile Solids in Waste Water Sample (VS)	1	2
Experiment#11 Determination Of Settleable Solid in a Given Wastewater Sample	1	2
Experiment#12 Determination of Dissolved Oxygen Present In Water (DO)	1	2
Experiment# 13 Determination of Biochemical Oxygen Demand (BOD)	1	2
Group Presentations	1	2

Course Code	Course Name	Credit Hours	Contact Hours
CE 482	Foundation Engineering	3	4

Supplemental Materials:

Reference Material	
Title	Principles of Foundation Engineering
Author/Year	Braja M. Das. / 2014
Electronic Materials (e.g. Websites, Social Media, Blackboard, etc.)	
Websites	https://www.amazon.com/Foundation-Analysis-Design-Bowles/dp/1259061035

Specific Course Information:

a. Brief Description of the Content of the Course (Catalog Description)
This course includes types of foundations, bearing capacity of shallow foundation, design of shallow foundation, types of deep foundations, bearing capacity of single piles and pile groups, design of pile foundations, types, stability and design of retaining walls, and analysis the stability of the sheet piles.
b. Pre-requisites or Co-requisites
<ul style="list-style-type: none"> • CE 470-Reinforced Concrete i • CE 480-Soil Mechanics
c. Course Type (Required or Elective)
Required
d. Specific Outcomes of Instruction
<p>By the end of this course, the student should be able to:</p> <ol style="list-style-type: none"> 1. Design various types of shallow foundations (isolated, wall, strip, strap, and raft foundation) to make a complete design and typical drawings. Taking into account safety and economic factors. 2. Design deep foundations (piles) and retaining walls to meet desired needs within realistic constraints. Taking into account safety and economic factors. 3. Perform effective communication as a team member/leader through a group project with a range of audiences.

e. Student Outcomes Addressed by the Course						
SO1	SO2	SO3	SO4	SO5	SO6	SO7
	CLO1, CLO2	CLO3				

Grading Distribution:

Week	Assessment	Grade %
2-15	Assignments	10%
4, 9	Quizzes	5%
8	Mid-Term Exam-I	10%
12	Mid-Term Exam-II	10%
14	Group project	5%
16	Final Exam	60%

Brief List of Topics to be covered:

List of Topics	No. of Weeks	Contact Hours
Types of foundation Bearing capacity of shallow foundation	1	4
Bearing capacity of shallow foundation Exercises on Bearing capacity of shallow foundation	1	4
Shallow foundation: introduction, types	2	8
Shallow foundation (design)	4	16
Deep foundation (introduction and types) Deep foundation (piles)	1	4
Deep foundation (BC of piles) Deep foundation (pile group)	1	4
Deep foundation (design of pile cap)	2	8
Ethics in design and construction.	1	4
Retaining walls (types and stability) Sheet piling (types and stability)	1	4
Site Investigation	1	4

Course Code	Course Name	Credit Hours	Contact Hours
CE 496	Graduation Project-I	2	3

Supplemental Materials:

Reference Material	
Title	Journals, Conference paper and Books related to the field of title
Author/ Year	-
Electronic Materials (e.g. Websites, Social Media, Blackboard, etc.)	
Websites	https://lms.ju.edu.sa/webapps/portal/execute/tabs/tabAction?tab_tab_group_id= 178 1

Specific Course Information:

a. Brief Description of the Content of the Course (Catalog Description)
The graduation project I (CE496) consists of choosing the topic of the project, establishing the project, reviewing the literature, preparing or carrying out the preliminary experiments if the project includes an experimental part, collecting the field data and developing the mathematical / computer model, if necessary and also write the first two chapters with the preliminary results.
b. Pre-requisites or Co-requisites
<ul style="list-style-type: none"> Minimum 80 credit hours is required to complete
c. Course Type (Required or Elective)
Required

d. Specific Outcomes of Instruction

By the end of this course, the student should be able to:

CLO1: Identify the research gap through detail/in depth research and literature review based on the assigned project topic.

CLO2: Outline the project and includes project objectives, an indicative summary of methodology, and potential outcomes.

CLO3: Collect the required field data, combine it, and analysis using appropriate statistical techniques and resolution of complex issues of Civil Engineering field.

CLO4: Perform necessary tasks required in the completion of research/project work as an individual or a team member.

CLO5: Present his research/project work in logical and well-planned way by appropriate communication and presentation skills.

CLO6: Present in the form of a project report (draft, edit, format, check for errors) of research/project work.

e. Student Outcomes Addressed by the Course

SO1	SO2	SO3	SO4	SO5	SO6	SO7
		CLO5, CLO6		CLO4	CLO1, CLO2, CLO3	

Grading Distribution:

Week	Assessment	Grade %
4	Find the research gap	15%
5	Method and Objective	15%
7	Data collection and analysis	15%
2-15	Team Works	5%
14	Presentation the project and Poster	20%
16	Submit the project Report	30%

Brief List of Topics to be covered:

List of Topics	No. of Weeks	Contact Hours
Collecting study materials	2	6
Summarize the journals	2	6
Find methodology	2	6
Analysis and Design the model	2	6
Write the objective of the project	1	3
Write the application of the project	1	3
Write the project specification	1	3
Write the report, poster and presentation	4	12

Course Code	Course Name	Credit Hours	Contact Hours
CE 402	Management of Engineering Projects	3	4

Supplemental Materials:

Reference Material	
Title	Project Management Body of Knowledge Project Management with CPM, PERT and Precedence Diagramming
Author/Year	Project Management Institute, 2013 , ISBN: 978-1-935589-67-9 Moder J., Phillips C., and Davis E. Van Nostrand Reinhold, 1983, ISBN-13: 978-0442254155
Electronic Materials (e.g. Websites, Social Media, Blackboard, etc.)	
Websites	https://lms.ju.edu.sa/webapps/portal/execute/tabs/tabAction?tab_tab_group_id= 178 1

Specific Course Information:

a. Brief Description of the Content of the Course (Catalog Description)
Introduction to the knowledge, principles, tools and techniques of project management in the engineering projects; management processes and decision making; planning, scheduling and time management; PERT and critical path method; cost and earned value analysis; risk management, quality management, resource management, ethics and leadership; procurement and contracting, computer applications and professional licensing in Project Management.
b. Pre-requisites or Co-requisites
<ul style="list-style-type: none"> None
c. Course Type (Required or Elective)
Required

d. Specific Outcomes of Instruction

By the end of this course, the student should be able to:

1. **Identify**, formulate and solve management problems related to planning, scheduling, cost estimation, quality, and risk assessment
2. **Apply** planning, organizing and control techniques to produce solutions for engineering projects that meet specific engineering requirements
3. **Communicate** the project deliverables and results in effective reporting and presentation
4. **Identify** the ethical and professional responsibilities of project manager.
5. **Perform** effectively in teamwork and discussions to lead the project activities.

e. Student Outcomes Addressed by the Course

SO1	SO2	SO3	SO4	SO5	SO6	SO7
CLO1	CLO2	CLO3	CLO4	CLO5		

Grading Distribution:

Week	Assessment	Grade %
7	Mid-Term Exam-I	10%
9	Class Discussions	5%
15	Project Report	20%
15	Presentation	5%
16	Final Exam	60%

Brief List of Topics to be covered:

List of Topics	No. of Weeks	Contact Hours
Fundamentals and knowledge areas in engineering projects management, business and public policy.	1	4
Scope management in engineering projects.	2	8
Time management and Resource estimations.	2	8
Network diagram and Scheduling	2	8
PERT and critical path methods	2	8
Cost Management, Cost control and Earned value methods	2	8
Contracting, Risk management and Quality management	2	8
Organizational charts, leadership and Resource Management	1	4
Professional ethics and PM licensing	1	4

Course Code	Course Name	Credit Hours	Contact Hours
CE 423	Hydraulic Structures	3	4

Supplemental Materials:

Reference Material	
Title	Hydraulic Structures
Author/Year	P. Novak et al/2007
Title	Fundamentals of Hydraulic Engineering Systems
Author/Year	Houghtalen, R.J., Akan, A.O.H., and Hwang, N.H.C. / 2011
Electronic Materials (e.g. Websites, Social Media, Blackboard, etc.)	
Websites	www.lms.ju.edu.sa

Specific Course Information:

a. Brief Description of the Content of the Course (Catalog Description)
This course introduces the fundamental of planning hydraulic structures and water canals including classifications, functions, design. Moreover , designing crossing structures, spillways and escapes, energy dissipation downstream hydraulic structures, control structures and dams.
b. Pre-requisites or Co-requisites
<ul style="list-style-type: none"> Pre-requisite: CE 420 Hydraulics
c. Course Type (Required or Elective)
Required
d. Specific Outcomes of Instruction

By the end of this course, the student should be able to:

1. **Design** a system, component, or project of crossing hydraulic structures to meet desired needs within realistic constraints such as economic, environmental, safety, manufacturability, and sustainability.
2. **Design** heading up structures including the ability to evaluate and synthesize information and develop appropriate economic and safe alternative solutions.
3. **Present and perform** effectively in oral presentations as well as in written form by preparing report related to topics in Hydraulic structures engineering.

e. Student Outcomes Addressed by the Course

SO1	SO2	SO3	SO4	SO5	SO6	SO7
	CLO1, CLO2	CLO3				

Grading Distribution:

5,9	Assignments1,2	10%
5	Quiz1	5%
7	Mid-Term Exam-I	10%
12	Mid-Term Exam-II	10%
14	Report and Presentation	5%
16	Final Exam	60%

Brief List of Topics to be covered:

List of Topics	No. of Weeks	Contact Hours
Introduction: hydraulic structures usage, types and design.	0.5	2
Retaining walls: types of RWs, design of Gravity and R.C. retaining walls	1.5	6
Design of crossing structures: Introduction, Culverts, Bridges, Syphons and Aqueducts	6	24
Design of spillways: types and usage, design of tail escapes	2	8
Energy dissipation downstream hydraulic structures taking into account ethics considerations	1	4
Heading up structures: Introduction, Floor Design, Dams, Weirs	4	16

Course Code	Course Name	Credit Hours	Contact Hours
CE 444	Environmental Engineering	3	4

Supplemental Materials:

Reference Material	
Title	Environmental Engineering
Author/Year	Peavy, H. McGraw-Hill, 2003
Electronic Materials (e.g. Websites, Social Media, Blackboard, etc.)	
Websites	www.lms.ju.edu.sa

Specific Course Information:

a. Brief Description of the Content of the Course (Catalog Description)
This course introduces the definition of environmental engineering, pollution problems and the impact of development on the environment. Solid wastes management, characteristics, storage, collection, disposal, and recycling. Water pollution overland, in streams, lake and sea. Air pollution sources, pollutants, effects and control. Noise, light and visual pollution, and soil degradation sources, effect and control.
b. Pre-requisites or Co-requisites
CE 422- Hydrology
c. Course Type (Required or Elective)
Required

d. Specific Outcomes of Instruction

By the end of this course, the student should be able to:

CLO 1. **Apply** and obtain a new knowledge by using engineering strategies to save the environment from different types of pollution with the ability to demonstrate that by communicating and discussing effectively with a range of audiences.

CLO 2. **Analyze** and assess professional solutions to the impact of environmental issues in a global, economic, environmental and societal context as a part of ethical and engineering responsibilities

e. Student Outcomes Addressed by the Course

SO1	SO2	SO3	SO4	SO5	SO6	SO7
			CLO2			CLO1

Grading Distribution

Assessment	Grade %
Quizzes	10%
Presentation	5%
Report	10%
Mid-Term Exam I	15%
Final Exam	60%

Brief List of Topics to be covered:

List of Topics	No. of Weeks	Contact Hrs
Introduction of Environmental Engineering.	1	4
Profession Ethics in Environmental Engineering	1	4
Environmental Pollution: Types and Causes.	1	4
Solid Wastes Management: Characteristics, storage, and collection	2	8
Water Pollution: Sources and methods of controlling such sources.	2	8
Air Pollution: Sources and pollutants.	2	8
Noise Pollution: Sources, effect and control.	1	4
Light and Visual Pollution: Sources, effect and control.	2	8
Soil Degradation: Sources, effect and control.	2	8
General Review & Final Oral Presentation	1	4

Course Code	Course Name	Credit Hours	Contact Hours
CE-473	Steel Structures	3	4

Supplemental Materials:

Reference Material	
Title	Steel Design
Author/Year	William Segui, , Cengage Learning, 6 th edition, 2017
Electronic Materials (e.g. Websites, Social Media, Blackboard, etc.)	
Websites	https://lms.ju.edu.sa/webapps/blackboard/execute/modulepage/view?course_id= 140551_1&cmp_tab_id= 160643_1&editModule=true&mode=cpview

Specific Course Information:

a. Brief Description of the Content of the Course (Catalog Description)
This course includes properties of steel, types of loads, philosophies of the design according to AISC using ASD method vs. LRFD method, analysis and design of tension and compression members, design of bolted and welded connections, design of beams for flexure and shear strength requirements, serviceability requirements for beams, buckling of beams, beams with biaxial bending moments, design of beams-column, design of column base plate.
b. Pre-requisites or Co-requisites
<ul style="list-style-type: none"> CE 360-Structural Analysis-I
c. Course Type (Required or Elective)
Required
d. Specific Outcomes of Instruction

By the end of this course, the student should be able to:

1. **Design** of tension steel members and compression steel members using LRFD method to meet the specified needs which are required to satisfy the American Institute of Steel Construction (AISC) requirements considering economy and safety.
2. **Design** of bolted and welded truss member shear-connections using LRFD method to satisfy the strength requirements according to AISC considering economy and safety.
3. **Design** of beams using LRFD method to satisfy the strength requirements and the serviceability requirements according to AISC considering economy and safety.
4. **Design** of beam-column and column base-plate according to the AISC requirements and specifications considering economy and safety.

e. Student Outcomes Addressed by the Course

SO1	SO2	SO3	SO4	SO5	SO6	SO7
	CLO1, CLO2, CLO3, CLO4					

Grading Distribution:

Week	Assessment	Grade %
4-14	Quizzes	15%
4-15	Assignments	10%
8	Mid-Term Exam	15%
16	Final Exam	60%

Brief List of Topics to be covered:

List of Topics	No. of Weeks	Contact Hours
Introduction on steel as a construction material Design philosophies according to AISC	1	4
Design of tension members	3	12
Design of compression members	2	8
Welded and bolted connections	2	8
Design of beams	4	16
Columns under eccentric loadings	2	8
Column bases and footings	1	4

Course Code	Course Name	Credit Hours	Contact Hours
CE 497	Graduation Project-II	1	2

Supplemental Materials:

Reference Material	
Title	Journals, Conference paper and Books related to the field of title
Author/Year	-
Electronic Materials (e.g. Websites, Social Media, Blackboard, etc.)	
Websites	https://lms.ju.edu.sa/webapps/portal/execute/tabs/tabAction?tab_group_id= 178 1

Specific Course Information:

a. Brief Description of the Content of the Course (Catalog Description)
The graduation project II (CE497) is the continuity of Part-I of the project including: running and finalizing the experimental program or the mathematical/computer model, analysing the results with respect to code and ethics and findings and validate and drawing the conclusion, writing the complete project report, presenting and defending the project.
b. Pre-requisites or Co-requisites
<ul style="list-style-type: none"> Graduation Project-I
c. Course Type (Required or Elective)
Required

d. Specific Outcomes of Instruction

By the end of this course, the student should be able to:

CLO1: Simulate/develop a computational mathematical model of a Civil Engineering problem using specific IT/engineering tools and techniques.

CLO2: Demonstrate the research/project work as conducting experiments that has passed through design and implementation phases.

CLO3: Perform necessary tasks required in the completion of research/project work as an individual or a team member.

CLO4: Present his research/project work in logical and well-planned way by appropriate communication and presentation skills.

CLO5: Integrate the societal and environmental effects of the project into the proposed engineering solution.

CLO6: Present in the form of a project report (draft, edit, format, check for errors) of research/project work.

CLO7: Complete the project by **practicing** management principles including punctuality, commitment and dedication under the guidance of a supervisor.

CLO8: Identify professional goals that support lifelong learning, productivity and satisfaction in large framework of rapidly evolving technology.

e. Student Outcomes Addressed by the Course

SO1	SO2	SO3	SO4	SO5	SO6	SO7
CLO2	CLO1	CLO4, CLO6	CLO5	CLO3, CLO7		CLO8

Grading Distribution:

Week	Assessment	Grade %
4	Construct/Design	15%
5	Testing and Evaluation	15%
2-15	Team Works	5%
14	Presentation	20%
2-15	Societal and environmental effects	5%
15	Report Writing	30%

2-15	Project Management	5%
4	Life Long Learning	5%

Brief List of Topics to be covered:

List of Topics	No. of Weeks	Contact Hours
Plan an effective design strategy and a project work plan, using standard project planning techniques, to ensure project completion on time and within budget.	2	4
Preparation for Testing and Analysis based on Code/Standard	3	6
Testing and Analysis	3	6
Validate the obtained results with published results	1	2
Parametric Study	1	2
Documentation and Drawing	1	2
Write the report, poster and presentation	4	8