جمهورية العراق
وزارة التعليم العالي و البحث العلمي
جهاز الاشراف و التقويم العلمي
الاعتماد الاكاديمي و ضمان الجودة

استمارة وصف البرنامج الاكاديمي لقسم الهندسة المدنية

كلية الهندسة – جامعة الكوفة

الجامعة : الكوفة

الكلية : الهندسة

القسم :

تأريخ ملئ الاستمارة : 2021/6/13

التوقيع:	**التوقيع:**	**التوقيع:**
ا.د. محمد عباس حسن	**أ.د. رغيد فتحي مكي**	**أ.د. حسن مهدي الخطيب**
رئيس القسم المدني	**معاون العميد للشؤون العلمية و الدراسات العليا**	**العميد**
التأريخ : 13 / 6 / 2021	**التأريخ : / / 2021**	**التأريخ : / / 2021**

التوقيع:

مدير قسم ضمان الجودة و تقويم الأداء

التأريخ : / / 2021

Republic of Iraq
Ministry of Higher Education and Scientific Research
Supervision and Scientific Evaluation Directorate
Quality Assurance and Academic Accreditation

Academic Program Specification Form for the Civil Engineering Department-Faculty of Engineering - University of Kufa

University: Kufa
Faculty: Engineering
Department: Civil Engineering Department
Date of Form Completion: 13-6-2021

Signature:

Prof. Dr. Mohammed Abbas Al-Jumaili
Head of Department

Date: 13 / 6 / 2021

Signature :

Prof. Dr. Ragheed Fatehi Makki
Dean's Assistance for Scientific Affairs

Date : / / 2021

Signature:
Dean's Name: Prof Dr. Hasan Mahdi Al-Khateeb
Dean of Faculty of Engineering
Date : / / 2021

Quality Assurance and University Performance Manager

Signature:

Date : / / 2021

Program Specification

The educational program description provides a brief description of the program characteristics and expected program outcomes achieved by the students upon graduation. The program outcomes will be based on course learning outcomes, which will be described also.

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Program Title	B. Sc. in Civil Engineering
4. Title of Final Award	B. Sc. in Civil Engineering
5. Models of Attendance Offered	Annual Educational System
6. Accreditation	ABET
7. Other External Influences	None
8. Date of production/ revision of this specification	2020-2021
9. Aims of the program	
i- Use technical, teamwork, and communication skills, along with leadership principles, to pursue civil engineering careers in areas such as structural, transportation, geotechnical, materials, environmental, construction, and water resources engineering, and/or other fields.	
ii- Pursue graduate degrees in civil engineering and other fields.	
iii- Function ethically in their professional civil engineering roles.	
iv- Pursue professional licensure.	
v- Engage in life-long learning through independent study and by participating in professional conferences, workshops, seminars, or continuing education.	

10. Learning Outcomes, Teaching and Learning and Assessment methods.
(The same as ABET Student Outcomes from a to k)

A-Program Outcomes – Knowledge and Understanding

A1- An ability to apply knowledge of mathematics, science and engineering *(a in ABET Student Outcomes)*.

A2- An ability to design and conduct experiments, as well as to analyze and interpret data *(b in ABET Student Outcomes)*.

A3- 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 *(c in ABET Student Outcomes)*.

A4- An ability to identify, formulate, and solve engineering problems *(e in ABET Student Outcomes)*.

A5- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context *(h in ABET Student Outcomes)*.

A6- A knowledge of contemporary issues *(j in ABET Student Outcomes)*.

B-Subject-specific skills

B1- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice *(k in ABET Student Outcomes)*.

C-Thinking skills

C1- An understanding of professional and ethical responsibility *(f in ABET Student Outcomes)*.

C2- A recognition of the need for, and an ability to engage in life-long learning *(i in ABET Student Outcomes)*.

D- Program Outcomes – General and transferable skills (other skills relevant to employability and Personal development)

D1- An ability to function on multidisciplinary teams *(d in ABET Student Outcomes)*.

D2- An ability to communicate effectively using written, oral and visual methods of communication *(g in ABET Student Outcomes)*.

Teaching and Learning Methods

Mentioned in Course Portfolios

Assessment Methods

Mentioned in Course Portfolios in addition to surveys done to senior students and employers.

1. المؤسسة التعليمية	جامعة الكوفة
2. القسم العلمي - الكلية	قسم الهندسة المدنية
3. اسم البرنامج الأكاديمي	بكالوريوس
4. اسم الشهادة النهائية	بكالوريوس علوم في الهندسة المدنية
5. النظام الدراسي	سنوي
6. برنامج الاعتمادية المعتمد	ABET
7. البرامج المؤثرة الاخرى	لا يوجد
8. تأريخ انجاز و مراجعة المتطلبات	2021-6-14
9. أهداف البرنامج الأكاديمي	
9أ- اعتماد تطوير مهارات التقنية وعمل الفريق و التواصل ومبادئ القيادة لزج الخريجين في حقل العمل و يمتلكون اساسيات العلوم في انشاء الابنية والنقل و الجيوتقنية و المواد الانشائية والبيئة و هندسة الموارد المائية وغيرها من المجالات.	
9ب- السعي لمنح درجة البكالوريوس في اختصاص الهندسة المدنية	
9ج- الاهتمام بترسيخ اخلاقيات المهنه في حقل الهندسة المدنية	
9د-السعي في منح ترخيص ممارسة مهنة الهندسة المدنية	
9هـ – اندماج الخريج في حياه التعليم الطويله الامد بعد انتهاء الدراسة الاكاديمية عن طريق الاشتراك في المؤتمرات و الورش والسمنرات والتعليم المستمر	

10. مخرجات التعلم المطلوبة وطرائق التعليم والتعلم والتقييم

أ-المعرفة والفهم

أ1- قدرة الطالب على تطبيق معارف الرياضيات واساسيات العلوم و الهندسة

أ2- قدرة الطالب على التصميم واجراء التجارب بالاضافة الى تحليل وتفسير البيانات

أ3- القدرة على تصميم العناصر و المنظومة و عمليات الانتاج لتحقيق الاحتياجات ضمن المتطلبات الاقتصادية والبيئية والاجتماعية و السياسية والاخلاقية و الصحية والسلامة الصناعية و الاستدامة

أ4- القدرة على تحديد و فهم وحل المسائل الهندسية .

طرائق التعليم والتعلم : المحاضرات النظرية, مجموعات النقاش الصغيرة, عرض الأفلام العلمية المساعدة, كتابة التقارير.

طرائق التقييم : الاختبارات التحريرية. الاختبارات الشفوية .الواجبات البيتية, الحلقات الدراسية

ب –المهارات الخاصة بالموضوع

ب1 – القدرة على استخدام التقنيات والمهارات الشخصية ووسائل الهندسية الحديثة والمطلوبة في التطبيقات الهندسية

ب2 – القدرة على التواصل الاجتماعي مع الطلبة الاخرين و الاساتذة

ب3 –

طرائق التعليم والتعلم : المحاضرات النظرية, مجموعات النقاش الصغيرة, التدريبات المختبرية.

طرائق التقييم : الاختبارات التحريرية. الاختبارات الشفوية .الواجبات البيتية, الاختبارات العملية في المختبر.

ج- مهارات التفكير

ج1- فهم المسؤولية المهنية والاخلاقيات

ج2- القدرة على الاندامج والحاجة والتميز في التعلم الطويل الامد

ج3-

ج4-

طرائق التعليم والتعلم : أسلوب حل المشكلات, كتابة التقارير, الزيارات الميدانية والسفرات العلمية

طرائق التقييم : الحلقات الدراسية, الاختبارات المفاجئة, التقارير الجماعية, المناقشات خلال المحاضرات.

د - المهارات العامة والمنقولة (المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي).

د1- القدرة على العمل ضمن فريق متعدد الاختصاصات

د2-القدرة على التواصل الفعال باستخدام طرق التواصل المختلفة بالكتابة و الشفوي و المرئية

د3-

طرائق التعليم والتعلم : أسلوب حل المشكلات,مجموعات النقاش الصغيرة, التدريبات المختبرية, كتابة التقارير.

طرائق التقييم : الحلقات الدراسية, التقارير الجماعية, المناقشات خلال المحاضرات. الواجبات البيتية, الاختبارات العملية في المختبر, الاختبارات الشفوية, الحلقات الدراسية.

11.Program Structure

المستوى Level/ year	Course or Module Code	عنوان المقرر Course or Module Title	اسم المقرر او المساق	الوحدات Credit rating	عدد الساعات الدراسية Hours per weeks		
					نظري Th.	مناقشة Tut.	علمي Prac
First	CE132	Engineering Mechanics	ميكانيك هندسي	6	3	1	-
	CE121	Mathematics I	رياضيات I	6	3	1	
	CE134	Engineering Drawing	رسم هندسي	4	1	-	2
	CE123	Principals of Computer Science	مبادئ علم الحاسبات	6	2	-	2
	CE125	Engineering Statistics	احصاء هندسي	2	1	1	
	CE129	Engineering Geology	جيولوجيا الهندسية	3	1	1	1
	CE138	Building Materials	مواد بناء	5	2		1
	CE123	Arabic Language	اللغة العربية	Pass	2		
	CE111	English Language I	اللغة الانكليزيةI	2	1	1	
	CE117	Human Rights and Democracy	حقوق الانسان والديموقراطية	4	2	-	-
	CE126	Workshops	الورش	2	-	-	2
Second	CE232	Strength of Materials	مقاومة المواد	6	3	1	-
	CE221	Mathematics II	الرياضيات II	6	3	1	-
	CE234	Engineering Surveying	المساحة الهندسية	6	2	1	2
	CE236	Fluid Mechanics	ميكانيك الموائع	5	2	1	2
	CE235	Buildings Construction	انشاء المباني	4	1	1	2
	CE223	Computer Programming	برمجة الحاسوب	4	1	-	2
	CE238	Concrete Technology	تكنولوجـــيا الخرسانة	6	2	-	2
	CE219	English Language II	اللغة الانكليزيةII	2	1	1	
Third	CE335	Design of reinforced concrete I	تصاميم الخرسانة المسلحة I-	6	3	1	-
	CE332	Theory of Structures	نظرية الانشاءات	6	3	1	
	CE333	Soil mechanics	ميكانيك التربة	6	2	1	2
	CE336	Engineering Management	الادارة الهندسية	4	2	-	-
	CE321	Engineering Analysis and numerical methods	تحليلات هندسية وطرق عددية	5	2	2	1
	CE338	Traffic Engineering	هندسة المرور	4	1	1	2
	CE334	Drainage and Irrigation Engineering	هندسة الري والبزل	4	2	1	-
	CE319	English Language III	اللغة الانكليزيةIII	2	1	1	-
Fourth	CE431	Design of reinforced concrete II	تصاميم الخرسانة المسلحة -II	4	2	1	-
	CE432	Design of steel structures	تصميم المنشات الحديدية	4	2	1	-
	CE435	Highway Engineering	هندسة الطرق	5	2	-	1
	CE436	Sanitary and environmental Engineering	الهندسة الصحية و البيئية	5	2	-	1
	CE438	Hydrology	هايدرولوجي	4	2	1	-
	CE437	Construction Methods and Estimation	طرق الانشاء والتخمين	4	2	1	-
	CE434	Foundation Engineering	هندسة الاسس	6	3	1	-
	CE433	Hydraulic Structures	المنشات الهيدروليكية	2	1	1	-
	CE439	Engineering Project	المشروع الهندسي	4	1	-	2
	CE411	English Language IV	اللغة الانكليزيةIV	2	1	1	-

Credit units =156

11. Admission

Minimum number of students = 430

Maximum number of students=560

12. Planning for Personal Development

There is training of faculty members in writing of programme learning outcomes. The department made the participating of high expert in organizing the syllabus , learning outcomes and assessment methods.

13. Admission criteria:

The submission to the program and acceptance of students are central from ministry of Higher Education and Scientific Research.

14. Key sources of information about the programme

The program has Industry Advisory Committee IAC which is composed of professional engineers from industry. IAC has two meeting each year discussing different issues related to the program.

- "Introduction to Environmental Engineering" 3rd Edition, P. Aarne Vesilind, Susan M. Morgan, and Lauren G. Heine, Christopher M. Shortt, 2010, (ISBN-13:978-0-495-29585-3).

- "Introduction to Environmental Engineering and Science" 3rd Edition, Masters and Ela, Prentice Hall, 2007, (ISBN 9780131481-930)

Curriculum Skills Map														
Please tick in the relevant boxes where individual Programme Learning Outcomes are being assessed														
Courses				**Program Learning Outcomes (ABET Student Outcomes)**										
Year/ Level	**Course Code**	**Course Title**	**Core (C)Title or Option (O)**	**Knowledge and understanding**						**Subject - specific skills**	**Thinking skills**		General and transferable skills (or)other skills relevant to employability and Personal development	
				A1 (a)	**A2 (b)**	**A3 (c)**	**A4 (e)**	**A5 (h)**	**A6 (j)**	**B1 (k)**	**C1 (f)**	**C2 (i)**	**D1 (d)**	**D2 (g)**
First	CE132	Engineering Mechanics	**Core**	✓										
	CE121	Mathematics	**Core**	✓										
	CE134	Engineering Drawings	**Core**							✓				
	CE123	Principals of Computer Science	**Core**							✓				
	CE125	Engineering Statistics	**Core**	✓										
	CE129	Engineering Geology	**Core**	✓										
	CE138	Building Materials	**Core**	✓	✓									
	CE123	Arabic Language	**Core**											✓
	CE111	English Language	**Core**											✓

	CE117	Human Rights and Democracy	**Core**											
	CE126	Workshops	**Core**		✓									
Second	CE232	Strength of Materials	**Core**	✓			✓							
	CE221	Mathematics II	**Core**	✓										
	CE234	Engineering Surveying	**Core**	✓	✓		✓							
	CE236	Fluid Mechanics	**Core**	✓	✓		✓							
	CE235	Buildings Construction	**Core**	✓						✓	✓			
	CE223	Computer Programming	**Core**							✓				
	CE238	Concrete Technology	**Core**	✓	✓	✓								
	CE219	English Language	**Core**											✓
Third	CE335	Reinforcement concrete I	**Core**	✓		✓	✓							
	CE332	Theory of Structures	**Core**	✓			✓							
	CE333	Soil mechanics	**Core**	✓	✓		✓							
	CE336	Engineering Management	**Core**	✓			✓				✓			
	CE321	Engineering Analysis and numerical methods	**Core**	✓										
	CE338	Traffic Engineering	**Core**	✓	✓	✓	✓							
	CE334	Drainage and Irrigation Eng	**Core**	✓		✓	✓							
	CE319	English Language	**Core**											✓

Fourth	CE431	Design of reinforced concrete	**Core**	✓		✓	✓							
	CE432	Design of steel structures	**Core**	✓		✓	✓							
	CE435	Highway Engineering	**Core**	✓	✓	✓	✓							
	CE436	Sanitary and environment Engineering	**Core**	✓	✓	✓	✓							
	CE438	Hydrology	**Core**	✓			✓							
	CE437	Construction Methods and Estimation	**Core**	✓			✓				✓			
	CE434	Foundation Engineering	**Core**	✓		✓	✓							
	CE433	Hydraulic Structures	**Core**	✓		✓	✓							
	CE439	Engineering Project	**Core**			✓	✓	✓	✓		✓	✓	✓	✓
	CE411	English Language IV	**Core**											✓

Course Specifications
ENGINEERING MECHANICS

COURSE SPECIFICATIONS:
Students learn the fundamentals of engineering mechanics, including an introduction to the basic quantities and idealizations of mechanics, statement of Newton's laws of motion and gravitation, review the principles for applying the SI system of units, the free-body diagram concept for a rigid body, type of forces system and the resultant, the moment of a force concept and calculations in two and three dimensions, define the moment of a couple and determine the resultants of nonconcurrent force systems, reduce a simple distributed loading to a resultant force having a specified location, determine the forces in the members of a truss using the method of joints and the method of sections, analyze the forces acting on the members of frames and machines composed of pin-connected members, introduce the concept of dry friction and show how to analyze the equilibrium of rigid bodies subjected to this force, discuss the concept of the center of gravity, center of mass, and the centroid of lines, area and volumes, develop a method for determining the moment of inertia for an area, introduce the product of inertia and show how to determine the maximum and minimum moments of inertia for an area.

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Course title /code	Engineering Mechanics/ CE132
4. Program to which it contributes	B.Sc. in Civil Engineering
5. Models of Attendance Offered	By manual attendance forms
6. Semester / year	year
7. Number of hours tuition (total)	104
8. Date of production/ revision of this specification	2020-2021
9. Aims of the course Engineering Mechanics teaches civil engineering students to learn the fundamental to the basic quantities and idealizations of mechanics, Newton's laws of motion and gravitation. Also learn types of forces systems and how to determine the resultant of forces. In addition, learn how to calculate the internal forces in the members of a truss using the method of joints and the method of sections, analyzing the forces acting on the members of frames and machines composed of pin-connected members. As well as, learn how to find the centroidal coordinates of bodies or cross section area and moment of inertia. This course is needed for all engineers/structural design courses.	

10. Learning Outcomes, Teaching and Learning and Assessment methods

A-Program Outcomes – Knowledge and Understanding

A1- An ability to apply knowledge of mathematics, science and engineering .

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Ability to work as a team.D1. Critical thinking in choosing the structural system.

D2. Ability to work as a team.

11. Course Structure					
Week	**Hours**	**ILOs**	**Topic title**	**Teaching Methods**	**Assessment Methods**
1	**4**	Apply Newton's Law of motion and gravitation problems.	**General Principals, Newton's laws of motion and gravitation**	Teach the engineering mechanics principals and study the units of mechanical terms such as forces, stresses, moments, resultant of forces, etc. Illustrate the Newton's law and explain these laws. Workout examples demonstrating the Newton's law of motion and different conversion of mechanical units. Student teams are asked to help solve sample problems in class.	Homework; quiz;
2	**4**	Perform of rigid-body equilibrium problems using the equations of equilibrium.	**Units of measurement, examples of conversion of units**	Explain the importance of equations of equilibrium in civil engineering applications. Present method by take resultant of moments about point to evaluate the reactions at supports. Workout examples involving the types of reactions and supports are discussed. Student teams are asked to help solve sample problems in class.	Homework; quiz; Mid - year , exam; final exam
3	**4**	Calculate the moment of a force, the resultant of a force in two and three dimensions.	**Scalars and vectors, vector operations**	Introduce the concept of the moment of a force and the resultant of a force in two and three dimensions. Compare this concept of the moment and the resultant of a force through a series of examples in two and three dimensions. Student teams are asked to help solve sample problems in class.	quiz; Mid - year , exam; final exam
4 and 5	**6**	Reduce a simple distributed loading to a resultant force having a specified location.	**Force system, resultant of force system, examples**	Explain the method to reduce a different types of simple distribution loading such as rectangular, triangular, curve, --- etc. to a resultant force having a specified location. Workout examples involving these ideas of varying shapes of simple distributed loads are discussed. Student teams are asked to help solve sample problems in class.	quiz; Mid - year , exam; final exam

6 and 7	**6**	Determine the resultant of forces in the plane and space.	**Resultant of several coplanar and non-coplanar forces**	Explain the method to find a different types of forces system resultant having a specified location. Workout examples involving these ideas of varying types of forces system are discussed. Student teams are asked to help solve sample problems in class.	quiz; Mid - year , exam; final exam
7 and 8	**6**	Analysis of the forces in space and calculate their components.	**Rectangular component in space (in three dimensions)**	Explain the method to find a components of different types of forces having a specified location in space. Workout examples involving these ideas of varying types of forces system are discussed. Student teams are asked to help solve sample problems in class.	Homework; quiz; Mid - year , exam; final exam
9	**4**	Determine the moment forces and resultant of moments of a body.	**Moment of a force and resultant moment, examples**	Explain the method to calculate the moment of a force and explain how to calculate the resultant of moment for different forces system. Workout examples involving these ideas of varying types of moment of forces system are discussed. Student teams are asked to help solve sample problems in class.	Homework; quiz; Mid - year , exam; final exam
10 and 11	**6**	Determining the moment of couple and resultant of couples in plane.	**Couples, equivalent couples, resultant couples, examples**	Explain the method to calculate the moment of a couple forces and explain how to calculate the resultant of couple moment for different forces system. Workout examples involving these ideas of varying types of moment of forces system are discussed. Student teams are asked to help solve sample problems in class.	Homework; quiz; Mid - year , exam; final exam
12 and 13	**6**	Determining the resultant of some types of distributed load shapes.	**Resultant of distributed normal loads (line loads)**	Explain the method to calculate the resultant of distributed loads for different shapes and how to calculate the resultant of loads for different load shape. Workout examples involving these ideas of varying types of distributed load shape are discussed. Student teams are asked to help solve sample problems in class.	Homework; quiz; Mid - year , exam; final exam

14 and 15	**6**	Definitions of equilibrium and how to recognize the types of supports and draw the FBD.	**Equilibrium, free body diagram, examples**	Teach the concept of equilibrium system of bodies and how to recognize the types of supports and draw the free body diagram and applying the equilibrium equations. Workout problems involving these concepts of many type of supports of bodies are discussed. Student teams are asked to help solve sample problems in class.	Homework; quiz; Mid - year , exam; final exam
16	**4**	Analysis and determination of reaction and internal forces in the structure using equilibrium equations.	**Analysis of plane structures, simple structure**	Teach the concept of structural system and how to determine the value of reaction forces in the supports of structure and the internal forces of members by applying the equilibrium equations. Workout problems involving these concepts of many trusses are discussed. Student teams are asked to help solve sample problems in class.	Homework; quiz; exam; final exam
17 and 18	**6**	Analysis and determination the reactions, internal forces in truss.	**Analysis of plane trusses, simple truss**	Teach the concept of system of trusses and how to determine the value of axial forces in trusses members as tension or compression by applying the equilibrium equations. Explain two methods to determine the axial forces in trusses first by joints method and second by section method. Workout problems involving these concepts of many trusses are discussed. Student teams are asked to help solve sample problems in class.	Homework; quiz; exam; final exam
19 and 20	**6**	Determine the forces in trusses types using joint method.	**Method of joints, examples**	Teach how to determine the value of axial forces in trusses members as tension or compression by applying the equilibrium equations using method of joints. Workout problems involving these concepts of many trusses are discussed. Student teams are asked to help solve sample problems in class.	Homework; quiz; exam; final exam

21 and 22	**6**	Determine the forces in trusses types using section method.	**Method of sections, examples**	Teach how to determine the value of axial forces in trusses members as tension or compression by applying the equilibrium equations using method of section. Workout problems involving these concepts of many trusses are discussed. Student teams are asked to help solve sample problems in class.	Homework; quiz; exam; final exam
23	**4**	Determine the location of the center of gravity, center of mass and centroid for a system of discrete particles and a body of arbitrary shape.	**Centroid and center of gravity, center of mass, examples.**	Introduce the concept of center of gravity, determining the location of centroid of various shapes of areas. Developing this idea to evaluate the centroid of composite bodies by solving various types of problems. Student teams are asked to help solve sample problems in class.	Homework; quiz; exam; final exam
24	**4**	Determine the location of the centroid arbitrary line, area or volume.	**Centroid of composite bodies, examples.**	Determining the location of centroid of various shapes of composite areas and evaluate the centroid of composite bodies by solving various types of problems. Student teams are asked to help solve sample problems in class.	Homework; quiz; exam; final exam
25	**4**	Determining the polar moment of inertia for an area, radius of gyration.	**Moment of inertia, polar moment of inertia, radius of gyration, examples**	Introduce the concept of moment of inertia, polar moment of inertia. Define the radius of gyration, explain the product of inertia of areas and how to use Mohr's circle in finding moment and product moment of inertia. Discuss these ideas by solving various types of examples and problems. Student teams are asked to help solve sample problems in class.	Homework; quiz; exam; final exam
26 and 27	**6**	Determining the moment of inertia for a composite area.	**Moment of inertia of composite areas, examples**	Determination of moment of inertia of composite areas. Discuss these ideas by solving various types of examples and problems. Student teams are asked to help solve sample problems in class.	Homework; quiz; exam; final exam

28 and 29	**6**	Determining the product of inertia of areas. Calculations of the maximum and minimum moments of inertia for an area	**Product of inertia of areas, examples. Moment of Inertia for an Area about Inclined Axes, Principal moments of Inertia, examples**	Determination the product of inertia of areas and how to calculate the moment of inertia for an area about inclined axes and principal moments of inertia. Discuss these ideas by solving various types of examples and problems. Student teams are asked to help solve sample problems in class.	Homework; quiz; exam; final exam
30	**6**	Work together in teams to fulfill engineering objectives (analysis, design, and presentation).	**Write project about one subject of Eng. Mech.**	Students will work in teams on selected projects. Teamwork principles (pros and cons) are discussed. Conflict resolution is addresses within each team setting up their own expectations of each member.	Homework

12. Infrastructure	
Required reading: - **CORE TEXTS** - **COURSE MATERIALS** - **OTHER**	**Required Text:** -Higdon, A. and Stiles, W. B. "Engineering Mechanics", 3rd Ed., Prentice-Hall India,1974. - Hibbeler, R. C. and Fan, S. C., "Engineering Mechanics", Prentice Hall, 1997. **Optional Text:** - Meriam, J. L. and Kraige, L. G. "Engineering Mechanics", 5th Ed., John Wiley and Sons Inc., 2002.. **In addition:** -Assist. Prof. Dr. Saad Al-Wazni provided class notes for Engineering Mechanics. Notes for these two courses were provided since the course at the University of Kufa is taught over the full academic year rather than over a semester.
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: http://elearning7.uokufa.edu.iq/eng/course/index.php?categoryid=273
Community-based facilities (include for example, guest lectures, internship, field studies)	**Field visits to various project sites**

13. Admissions	
Pre-requisites	-------
Minimum number of students	130
Maximum number of students	150

Mathematics I

COURSE SPECIFICATIONS:

Mathematics I subject is a two-course sequence that covers the fundamental elements of Mathematics I. Mathematics I provides students prerequisites for calculus, limits and continuity, derivatives, applications of derivatives, integration, applications of definite integrals, Transcendental Functions, methods of integration and conic sections.

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Course title /code	Mathematics I / CE121
4. Programme to which it contributes	B.Sc. in Civil Engineering
5. Models of Attendance Offered	By manual attendance forms
6. Semester / year	year
7. Number of hours tuition (total)	120
8. Date of production/ revision of this specification	2020-2021

9. Aims of the course

The aim of this course is for students to learn to draw basic functions and how to derive them and to benefit from derivation in solving engineering applications, as well as to benefit from integration in solving many engineering applications such as Area Between Curves, Volume of Solids of Revolution, Length of Plane Curves, Area of Surface of Revolution. In addition, learn to calculate conic sections.

10. Learning Outcomes, Teaching and Learning and Assessment methods

A-Program Outcomes – Knowledge and Understanding

A1- An ability to apply knowledge of mathematics, science and engineering .

D.General and Transferable Skills (other skills relevant to employability and personal development)

D1. Ability to learn to graph basic functions.

D2. Ability to use calculus, in solving engineering applications.

D3. Ability to work as a team.

11. Course Structure					
Week	**Hours**	**ILOs**	**Topic title**	**Teaching Methods**	**Assessment Methods**
1	**4**	Intervals and Analytical Geometry.	prerequisites for calculus	Introduce the students how to find intervals , calculate the slope and equations of lines , and distance between points.	Exam #1& HW#1
2	**8**	Functions and Their Graphs.	prerequisites for calculus	Train the students how to find domain and range of Functions and Their Graphs.	Exam #2& HW#2
1	**4**	Combining Functions.	prerequisites for calculus	Train the students how to divide the building into plane frames. Show the students how to use the ACI tables to find moments. Describe the details of rebar and ask the students to design the slab working as groups.	Exam #3& HW#3
1	**4**	Trigonometric Functions.	prerequisites for calculus	Train the students how to graph Trigonometric Functions.	
2	**8**	Limits and continuous functions.	limits and continuity	Train the students how to solve limits and continuity	Exam #4& HW#4
1	**4**	Differentiation Rules and Derivatives of Trigonometric Functions.	Derivatives	Teaching the students on how to derivative of functions.	Exam #5& HW#5
1	**4**	The Chain Rule and Implicit Differentiation	Derivatives	Teaching the students on how to derivative of the implicit differentiation.	HW & Exam #6
2	**8**	Derivatives of Transcendental Functions	Derivatives	Teaching the students on how to derivative of transcendental functions.	
2	**8**	Related rates changes, Extreme Values of Functions	applications of derivatives	Explain for the students on how to the applications of derivatives.	HW & Exam #7
2	**8**	Concavity and Curve Sketching, Applied Optimization.	applications of derivatives		

2	**8**	Indefinite Integrals and Definite Integrals.	Integration	Teaching the students on how to integral the basic functions and Integral of Transcendental Functions.	HW & Exam #8
2	**8**	Integral of Transcendental Functions.	Integration		HW & Exam #9
2	**8**	Area Between Curves and Volume of Solids of Revolution.	Applications of Definite Integrals	Explain for the students on how to the applications of Definite Integrals.	HW & Exam #10
1	**4**	Length of Plane Curves and Area of Surface of Revolution.	Applications of Definite Integrals		HW & Exam #11
2	**8**	Integration by Parts and Integration by Trigonometric Substitutions.	Methods of Integrations	Teaching the students on how to integration by parts and integration by trigonometric substitutions.	HW & Exam #12

11. Course Structure, continued

Week	Hours	ILOs	Topic title	Teaching Methods	Assessment Methods
2	**8**	Integration of Rational Function by Partial Fractions and Integrating of the Roots.	Methods of Integrations	Teaching the students on how to integration of rational function by partial Fractions and integrating of the roots.	HW & Exam #13
4	**16**	Calculate Conic Sections.	Conic Sections	Explain for the students on how to Calculation of Conic Sections.	HW & Exam #14

12. Infrastructure	
Required reading: - **CORE TEXTS** - **COURSE MATERIALS** - **OTHER**	- Finney, Weir, C.W. and Giordano, "Tomas Calculus", eleven teen Edition, 2000. - Finney, Weir, C.W. and Giordano, "Tomas Calculus", fourteenth Edition, 2017 - Haward, Bivens and Davis., "Calculus ", Pearson Education, Seven Edition, 2002**.** - James Stewart, "Calculus ", fifth Edition, 2020.
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: https://www.youtube.com/channel/UC0lr_IZ8oULpPdCO7ROEQNA
Community-based facilities (include for example, guest lectures, internship, field studies)	

13. Admissions	
Pre-requisites	-------
Minimum number of students	130
Maximum number of students	150

Course Specifications

ENGINEERING DRAWING

COURSE SPECIFICATIONS:

This course provides a basic engineering drawing instrument, method of writing in Kufic letters, engineering operations to draw a parallel line to other line, bisecting the straight lines, moving the angles, bisect the angles, drawing an arc touches two intersecting lines, drawing an arc touches the straight line and circle, drawing a tangent to two circles, dividing the straight lines to a number of equal parts, dividing circumference of a circle to a number of equal parts, drawing the ellipse, projection method, drawing the vertical, front and side view of three-dimensional shapes, drawing a three-dimensional shape from its projections, sections, hatch, dimensions.

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Course title /code	Engineering Drawing / CE134
4. Programme to which it contributes	BSc in Civil Engineering
5. Models of Attendance Offered	By manual attendance forms
6. Semester / year	year
7. Number of hours tuition (total)	128
8. Date of production/ revision of this specification	2020-2021

9. Aims of the course

The aims of the syllabus are to further the ability to communicate information by graphical means, using also CAD software packages. This will be achieved through the ability to visualize and understand spatial relationships, and the competence to select and use appropriate graphical methods for representing design concepts.

10.Learning Outcomes, Teaching and Learning and Assessment methods.

A- Subject-specific skills

B1- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Ability to draw and read engineering drawing sheets with different specialist manually and by AutoCAD.

D2. Ability to work as a team.

11.a Course Structure (Manual Drawing)

Week	Hours	ILOs	Topic title	Teaching Methods	Assessment Methods
1	**2**	underline the importance and significance of engineering drawing	Introduction and Background	Spend one lecture periods discussing and defining engineering drawing tools	Sheet #1
2	**2**	Draw and write a Kufic letters,	Method of writing in Kufic letters	Drawing two sheets, one under supervision team and Homework.	Sheet #2
3,4 and 5	**6**	Draw a parallel line to other line, bisecting the straight lines, bisect the angles, drawing an arc touches two intersecting lines, bisect the angles; an arc touches two lines.	Engineering operations	Drawing two sheets, one under supervision team and Homework.	Sheet #3,4,5
6 and 7	**4**	Draw different types of shapes gradient from simple to complicated shapes of decoration	Decoration Shapes	Drawing two sheets, one under supervision team and Homework.	Sheet #6,7
8and 9	**4**	Draw projection of three dimension shape with inclined surfaces.	Projections	Drawing two sheets, one under supervision team and Homework.	Sheet #8,9 Quiz #1
10and 11	**4**	Draw projection of three dimension shape with cylindrical surfaces.	Projections	Drawing two sheets, one under supervision team and Homework.	Sheet #10,11 Quiz #2
12and13	**4**	Drawing the dimensions of projection views using specifications of dimensions.	Dimensions	Drawing two sheets, one under supervision team and Homework.	Sheet #13,14
15 and16	**4**	Drawing complete projections of complicated three dimensions shape.	Projections	Drawing two sheets, one under supervision team and Homework.	Sheet #15,16 EXAM #1

11.a Course Structure (Manual Drawing), continued					
Week	**Hours**	**ILOs**	**Topic title**	**Teaching Methods**	**Assessment Methods**
17and18	**4**	Drawing Isometric of three dimension shape with planed and inclined surfaces using three projections only.	Isometric	Drawing two sheets, one under supervision team and Homework.	Sheet #17,18
19,20 and21	**6**	Draw Isometric of three dimension shapes with cylindrical surfaces using three projections only.	Assembling Isometric	Drawing two sheets, one under supervision team and Homework.	Sheet #19, 20,21 Quiz#3
22 and 23	**4**	Draw Isometric of three dimension shapes with dimensions.	Assembling Isometric	Drawing two sheets, one under supervision team and Homework.	Sheet #22,23
24	**2**	Draw Isometric with different scale.	Scaling	Drawing two sheets, one under supervision team and Homework.	Sheet #24 Quiz#4
25,26,27and 28	**8**	Draw section with different views and locations.	Sections	Drawing two sheets, one under supervision team and Homework.	Sheet #25, 26,27,28
29,30,31and 32	**8**	Draw Isometric using two projections only.	Assembling Isometric	Drawing two sheets, one under supervision team and Homework.	Sheet #29, 30,31,32 Exam#2

11.b Course Structure (Computer Aided Drawing (using AutoCAD Program))					
Week	**Hours**	**ILOs**	**Topic title**	**Teaching Methods**	**Assessment Methods**
1	**2**	General introduction to the course outline and the AutoCAD Program	Introduction	Presenting, discussing and defining the course outline and the AutoCAD Program	Oral questions during the lecture
2	**2**	Identifying the AutoCAD's interface, working environment, how to save and open files ,drop-down menus and toolbars	AutoCAD's interface and working environment	Presenting, discussing and defining the lecture items by aid of AutoCAD program	Class works, home works, quizzes, oral questions during the lectures, mid-year, second semester, and final exams
3	**2**	Specifying measurement units, drawing scale, drawing limits and grid style	Preparing the AutoCAD's file to drawing	Presenting, discussing and defining the lecture items by aid of AutoCAD program and drawing examples. In addition to encouraging and prompting students to contribute positively in the lecture through presenting some information and share their drawing experiences	
4	**2**	Presenting and defining the commands; Line, pline, erase, copy, and move with examples	Commands; Line, pline, erase, copy, and move		
5&6	**4**	Selection methods, views, zoom (in, out, window, all, extents, and object) snap setting, and orthogonal setting, with examples	Selection, zoom, snap, and orthogonal settings		
7&8	**4**	Presenting the commands; construction line, rectangular, polygon, arc, mirror, offset, and rotate with examples	Commands;construction line, rectangular, polygon, arc, mirror, offset, and rotate		
9&10	**4**	Presenting the commands; circle , boundary, hatch, gradient, trim, and extend, with examples	Commands; circle , boundary, hatch, gradient, trim, and extend		

11.b Course Structure (Computer Aided Drawing (using AutoCAD Program))					
11&12	**4**	Presenting the commands; rectangular array, polar array, align, and Express-draw-break line with examples	Commands; rectangular array, polar array, align, and Express-draw-break line		
13&14	**4**	Presenting the commands; point, point-divide, point-measure, block, insert block, explode, chamfer, and fillet, with examples	Commands; point, point-divide, point-measure, block, insert block, explode, chamfer, and fillet		
15	**2**	Presenting the commands; break and join and layers properties manager with examples	Commands; break, and join and layers properties manager		
16&17	**4**	Presenting the commands; text, table, multi-leader, and multi-leader style with examples	Commands; text, table, multi-leader, and multi-leader style		
18&19	4	Presenting the commands; dimension; linear, aligned, radius, diameter, angular, and center line by different methods with examples	commands; dimension; linear, aligned, radius, diameter, angular, and centerline		
20&21	4	Presenting the commands; scale, stretch, types and properties of lines and objects with examples	Commands; scale, stretch, types and properties of lines and objects		
22,23&24	6	Application examples (mapping (plan) of non-structural buildings (buildings with bricks or blocks)) with details of doors, windows, and stairs	Drawing of of non-structural buildings		
25&26	4	Application examples (mapping (structural plan) of structural buildings	Drawing of of non-structural buildings		
27&28	4	Presenting the commands; output,	Commands; output, page setup manager,		

11.b Course Structure (Computer Aided Drawing (using AutoCAD Program))					
		page setup manager, layout and printing (plot), with examples	layout and printing (plot)		
29&30	4	Introduction to three-dimensional drawing (extrude, prsspull, union, subtract, slice, coordinates and view)	Introduction to three-dimensional drawing		

12. Infrastructure	
Required reading: - **CORE TEXTS** - **COURSE MATERIALS** - **OTHER**	- Fundamentals of 2017 AutoCAD by Ali Mahdi - AutoCAD Tutorials by Fangfang - Lectures of manual engineering drawing by Ass. Prof. Dr. Hayder H. Alkhudery from http://eng.uokufa.edu.iq/staff/hayderh/index.html - Engineering Mechanics STATICS", R. C Hibbeler, 12th Edition, SI Edition, Prentice-Hall, Pearson Education, 2010 - Lectures of computer aided drawing (AutoCAD) by Ass. Prof. Dr. Haider Ali Al-Tameemi from http://staff.uokufa.edu.iq/lectures.php?hayder.altameemi
Special requirements (include for example, workshops, periodicals, IT software, websites)	presenting and discussing constituents of the topics via direct lectures on Google meet and other supplementary materials involved pdf, pictures, and video files published on Moodle application Website: http://elearning7.uokufa.edu.iq/eng/course/view.php?id=1443&lang=en **http://elearning7.uokufa.edu.iq/eng/course/view.php?id=1573**
Community-based facilities (include for example, guest lectures, internship, field studies)	

13. Admissions	
Pre-requisites	-
Minimum number of students	15
Maximum number of students	40 in one Group

Engineering Statistic

COURSE SPECIFICATIONS:

Engineering Statistic is a two semesters sequence that covers the fundamental elements of statistic methods for engineering applications and problems. Statistics is one of the most important sciences on which political, economic and cultural development depends, etc. Statistics has a key role in the work of academic institutions and the research organizations. In these semesters, students will study statistic with respect to engineering applications and problems in order to obtain knowledge and proficiency for predicting the solutions and the logical explanation of these problems.

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Course title /code	Engineering Statistics / CE125
4. Programme to which it contributes	BSc in Civil Engineering
5. Models of Attendance Offered	By manual attendance forms
6. Semester / year	year
7. Number of hours tuition (total)	60
8. Date of production/ revision of this specification	2020-2021
9. Aims of the course The objectives of these courses are to introduce Engineering Statistic to civil engineering undergraduate students and to familiarize the students with statistic terminology and concepts commonly encountered in engineering practices and applications.	

10. General and Transferable Skills (other skills relevant to employability and personal development)

D1. The ability to use of probability theory and probability distributions in predicting the results of engineering tests.

D2. Ability to use a software, such as MS Excel, in the calculations.

11. Course Structure					
Week	**Hours**	**ILOs**	**Topic title**	**Teaching Methods**	**Assessment Methods**
1	**2**	Introduction and definitions of statistical terms	Introduction , definitions and Background	Spend the lecture period discussing and defining statistic terms and statistical problems and applications	Exam #1
2	**2**	Methods for collecting and classifying statistical data	Collecting and classifying data	Lecture in class to discuss ways to represent and display data using tables, histograms, curves, and figures.	Exam #1
3 and 4	**4**	Presentation of data using frequency tables	Simple Frequency Tables and Class Frequency Tables	Lecture in class to describe the methods for tabulating and displaying data in simple and categorized frequency tables	HW & Exam #2
5 and 6	**4**	Presentation of data using bar charts , bie chart and the frequency curves	Bar charts , Bie chart and the frequency curves	Lecture in class to describe the graphical methods for describing and displaying statistical data	
7, 8 and 9	**6**	Measures of Central Tendency	Arithmetic mean, geometric mean, weighted mean, median, mode, quartiles, percentiles, and decimals	Lecture in class to describe The mean values at which the data are collected and the tendency of these data relative to these mean values	Exam #3
10 , 11 and 12	**6**	measures of dispersion	Range, mean deviation, variance, standard deviation and coefficient of variation	Studying the measures that determine the concentration of statistical data around their means, the direction of concentration, and whether the data is homogeneous or not.	Exam #4
13, 14 and 15	**6**	Measures of skewness and kurtosis	Pearson's skew coefficient, momentary skew coefficient, percentile skew coefficient, momentary kurtosis coefficient and percentile kurtosis coefficient and the relationship between the three means	A study of the skewness of the frequency distribution curve due to the different values of the means among them and the determination of the kurtosis of the vertex of the frequency distribution curve	Exam #5

11. Course Structure, continued					
Week	**Hours**	**ILOs**	**Topic title**	**Teaching Methods**	**Assessment Methods**
16, 17, 18 and 19	**8**	Theory of Probability	Random experiment, events, algebraic operations on events, principles of probability, conditional probability, probability tree, counting principle, permutations and combinations	The study of mathematical methods for converting verbal guesses and probabilities into quantitative measures	HW & Exam #6
20, 21, 22 and 23	**8**	Probability distributions and the Discrete probability distributions	Binomial distribution and Poisson distribution	Definition of random variables, their types, probability density functions, the use of discrete probability distributions and their applications	Exams #7 & #8
24, 25, 26 and 27	**8**	Continuous probability distribution	Normal probability distribution, standard normal probability distribution, t probability distribution and chi-squared probability distribution	Study of continuous probability distributions and their applications problems, probability density functions, distribution curves and their properties, the method of calculating probability from areas under the curve or by using tables of probability distributions.	Exam #9
28, 29 and 30	**6**	Correlation and regression	Definitions of correlation and regression, linear correlation, coefficients of linear correlation, Pearson	A study of transforming data into two-dimensional random variables, representing random variables on a scatter diagram, studying linear correlation and calculating linear correlation coefficients, study the finding of the linear relationship between two	Exam #10

			coefficient of correlation, Spearman's correlation coefficient and the linear regression	variables through linear regression	

12. Infrastructure	
Required reading: - **CORE TEXTS** - **COURSE MATERIALS** - **OTHER**	**Jim Morrison, 2001 , Statistics for Engineers: An Introduction, Wily and sons** مباديء االحصاء واالحتماالت للعلوم االدارّة والتطبّقّة)د .محمد محمد المزاح– جامعة العلوم والتكنولوجّا–صنعاء -الطبعة الثالثة– 2013.
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: http://elearning7.uokufa.edu.iq/eng/course/view.php?id=1442

Course Specifications

Engineering Geology

COURSE SPECIFICATIONS:

Engineering Geology teaches civil engineering students to learn the fundamental of soil formations, minerals of the different layer. The source syllabus includes: Introduction, Minerals, Rocks, Physical and Mechanical Properties of Rock, Soil Engineering, Underground Water Geology, Geological Maps, Tunnel Geology, Types and Location of Tank and Dams, Geological Investigation Quarry.

1.Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Course title /code	Engineering Geology/ CE129
4. Program to which it contributes	
5. Models of Attendance Offered	By manual attendance forms
6. Semester / year	year
7. Number of hours tuition (total)	48
8. Date of production/ revision of this specification	2020-2021

9. Aims of the course

Engineering Geology teaches civil engineering students to learn the fundamental of soil formations, minerals of the different layer. The source syllabus includes: Introduction, Minerals, Rocks, Physical and Mechanical Properties of Rock, Soil Engineering, Underground Water Geology, Geological Maps, Tunnel Geology, Types and Location of Tank and Dams, Geological Investigation Quarry.

10. Learning Outcomes, Teaching and Learning and Assessment methods

A-Program Outcomes – Knowledge and Understanding

A1- An ability to apply knowledge of mathematics, science and engineering .

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Critical thinking in describing the soil's formation and the various factors affecting it.

D2. Ability to work as a team.

11. Course Structure					
Week	**Hours**	**ILOs**	**Topic title**	**Teaching Methods**	**Assessment Methods**
1	2	Learning the students the basic of geology	Introduction	Allow the students to engage and participate in the class to enhance their capabilities of understanding and confidence	Homework; quiz; Mid -year , exam; final exam
2	2	Understanding the minerals , Igneous Rocks , Sedimentary Rocks And etamorphic Rocks.	Minerals	Four lectures by using the textbook and videos to show the students the rock types	Homework; quiz; Mid -year , exam; final exam
3	2		Igneous Rocks		
4	2		Sedimentary Rocks		
5	2		Metamorphic Rocks		
6	2	Physical Properties of Rock	Physical Properties of Rock	---	Homework; quiz; Mid -year , exam; final exam
7	2	Mechanical Properties of Rock	Mechanical Properties of Rock	---	Homework; quiz; Mid -year , exam; final exam
8	2	Joints & Folds	Joints & Folds	---	Homework; quiz; Mid -year , exam; final exam
9	2	Faults	Faults	---	Homework; quiz; Mid -year , exam; final exam
10	2	Earthquakes	Earthquakes	---	Homework; quiz; Mid -year

11	2	Denudation	Denudation	---	Homework; quiz; Mid -year , exam; final exam
12	2	Weathering	Weathering	---	Homework; quiz; Mid -year , exam; final exam
		Mid-year Examination	Mid-year Examination		
13	2	Soil Engineering	Soil Engineering	---	Homework; quiz; Mid -year , exam; final exam
14	2	Properties of Soil	Properties of Soil	---	Homework; quiz; Mid -year , exam; final exam
15	2	Underground Water	Underground Water	---	Homework; quiz; Mid -year , exam; final exam
16	2	Water Geology	Water Geology	---	Homework; quiz; Mid -year , exam; final exam
17	2	Tunnel Geology	Tunnel Geology	---	Homework; quiz; Mid -year , exam; final exam
18	2	Forces around Tunnel	Forces around Tunnel	---	Homework; quiz; Mid -year , exam; final exam
19	2	Types of Tank and Dams	Types of Tank and Dams	---	Homework; quiz; Mid -year , exam; final exam

20	2	Location of Tank and Dams	Location of Tank and Dams	---	Homework; quiz; Mid -year , exam; final exam
21	2	Geophysical Method	Geophysical Method	---	Homework; quiz; Mid -year , exam; final exam
22	2	Seismic Method	Seismic Method	---	Homework; quiz; Mid -year ,
23	2	Geological Maps	Geological Maps	Using the drawing operations to draw geological maps	Homework; quiz; Mid -year , exam; final exam
24	2	Geological Investigation Quarry	Geological Investigation Quarry	---	

12. Infrastructure	
Required reading: - **CORE TEXTS** - **COURSE MATERIALS** - **OTHER**	**Required Text:** ***Engineering Geology by Basim Rassady, Baghdad University, 1991.** **Optional Text:** ***Engineering Geology, by F. G. Bell, USA, 2007.** ***A Geology for Engineers, by F.G.H. Blyth and M. H. de Freitas, 2005**
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: http://elearning7.uokufa.edu.iq/eng/course/index.php?categoryid=272
Community-based facilities (include for example, guest lectures, internship, field studies)	**Field visits to various project sites**

13. Admissions	
Pre-requisites	-------
Minimum number of students	130
Maximum number of students	150

Course Specifications

Building Materials

COURSE SPECIFICATIONS:

The student will understand the basic properties of various types of construction materials and the tests used to characterize those materials' properties. The course specify materials, and material combinations suitable for civil engineering structures.Discuss origins and/or manufacturing process associated with construction materials such as gypsum, lime and portland cement, concrete, steel, polymers and clay bricks. Also , in which the course determines the physical and chemical properties of construction materials and its constituents.

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Course title /code	**Construction Materials/ CE138**
4. Programme to which it contributes	BSc in Civil Engineering
5. Models of Attendance Offered	By manual attendance forms
6. Semester / year	year
7. Number of hours tuition (total)	104
8. Date of production/ revision of this specification	2020-2021
9. Aims of the course The objective of the course is to learn the students how to deal with reinforced concrete structural systems and design them according to design codes. Moreover, the course introduces the prestressed concrete structures for simple structures.	

10. Learning Outcomes, Teaching and Learning and Assessment methods

Program Outcomes – Knowledge and Understanding

A1- An ability to apply knowledge of mathematics, science and engineering .

A2- An ability to design and conduct experiments, as well as to analyze and interpret data .

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Critical thinking in choosing the structural system.

D2. Ability to work as a team.

11.Course Structure

Week	Hours	ILOs	Topic title	Teaching Methods	Assessment Methods
1	**2**	Classification and properties of construction materials	Properties of construction materials	Introduce the behavior of Material and mechanical properties of construction materials	HW #1
1	**2**	Mechanical properties of materials	Mechanical properties of materials	Review basic materials engineering concepts	Exam #1
1	**2**	Exercise of mechanical properties	Mechanical properties of materials	Exercise of mechanical properties of materials	HW & Exam #2
4	**8**	An understanding of Clayey brick and brick products used in civil engineering construction and the manufacturing stage	Bricks	Clayey brick Manufacturing stage Types of clayey brick Types of brick other than clayey	Exam #3

11. Course Structure, continued

Week	Hours	ILOs	Topic title	Teaching Methods	Assessment Methods
3	**6**	An understanding of gypsum and gypsum products used in civil engineering construction and the common acceptance tests on gypsum.	Gypsum	Chemical composition of Gypsum. Gypsum manufacturing and classes according to Iraqi and British standards Gypsum products and admixtures of gypsum (gypsum uses)	Exam #4

2	**4**	An understanding of lime used in civil engineering construction and the common acceptance tests on lime	Lime	Discuss sources of lime, properties of lime, uses of lime. Classification of lime, manufacture of lime.	Exam #5
3	**6**	An understanding of Cement used in civil engineering construction and the common acceptance tests on Cement	Cement	Manufacture of cement Chemical composition and physical properties of Portland cement. Types of Portland and non-Portland cement	Exam #6
2	**4**	An understanding of types, properties, and test of wood used in civil engineering construction	Wood	Classification of trees, structure and growth of tree, Defects in timbers, seasoning of timbers, decay of timber	Exam #7
3	**6**	An understanding of the various types of tiles used in civil engineering construction and the common acceptance tests on tile.	Tiles	Raw materials and manufacture of tiles. Types and uses of tiles.	Exam #8

11. Course Structure, continued

Week	**Hours**	**ILOs**	**Topic title**	**Teaching Methods**	**Assessment Methods**
3	**6**	An understanding of types, properties, and performance of bonding material used in civil engineering construction	Bonding materials	Cement mortar, Preparing and properties Lime mortar Preparing and properties Gypsum mortar Preparing and properties	Exam #9
3	**6**	An understanding of Asphalt used in	Asphalt	Types and properties of Asphalt	Exam #10

		civil engineering for buildings and road construction		Mix proportion and additives for road pavement Repairing defects in roads and recycling Asphalt pavement	
3	**6**	An understanding of properties of stone used in civil engineering construction and	Stone	Classification of stone, Mechanical properties of stone used in building, Characteristics of good building stones.	Exam #11

12. Schedule of Topics for the Laboratory of Construction Materials

Week	Hours	ILOs	Topic title	Teaching Methods	Assessment Methods
1		How can save yourself and your colleges and how can write Report	Lab. Safety and Reports	Wearing suitable dresses, gloves and masques Writing a scientific report containing the aim, tools, method, results, discussion and conclusion	
4	**8**	Conduct tests on Bricks	Brick Test	Dimensions of brick Efflorescence Absorption and density Compressive strength	3 Reports
3	**6**	Conduct tests on Gypsum	Gypsum	Fineness Setting time Compressive strength	3 Reports
3	**6**	Conduct tests on Lime	Lime	Fineness Setting time Compressive strength	3Reports
3	**6**	Conduct tests on Wood	Wood	Density Moisture content Compressive strength	3Reports
4	**8**	Conduct tests on Tile	Tiles	Dimensions Absorption Flexural strength Abrasion	4 Reports
4	**8**	Conduct tests on Cement	Cement	Cement mortar preparation Cement mortar strength	3Reports

				Slump test for fresh concrete mixture	
				Compressive strength	
2	**4**	Conduct tests on Aggregate	Aggregate	Sieve analysis for fine and coarse aggregate	1 Report

13. Infrastructure	
Required reading: - **CORE TEXTS** - **COURSE MATERIALS** - **OTHER**	**References.** ➢ Building Materials in Civil Engineering: H. Zhang, Second Edition, Woodheed Publishing, 2010. ➢ Tests in Building Materials, Talib, A. &, Abdul- Muni, S. 2011. ➢ IQS- Iraqi Specifications. ➢ BS Specifications.
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: http://elearning7.uokufa.edu.iq/eng/course/view.php?id=1445
Community-based facilities (include for example, guest lectures, internship, field studies)	**Field visits to various project sites**

14. Course Grade Distribution:

Activity	Grade	Remarks
First Semester Exam.	10%	Quiz and homework's of first semester
First Semester Lab.	5%	10 reports
Mid-Year Exam	15%	Central exam
Second Semester Exam	10%	Quiz and homework's of second semester
Second Semester Lab.	5%	10 reports
Attendance, Quizzes and Home works	5%	Attendance of lectures and laboratory

اللغة العربية

وصف المقرر

يوفر وصف المقرر هذا إيجازاً مقتضياً لأهم خصائص المقرر ومخرجات التعلم المتوقعة من الطالب تحقيقها مبرهناً عما إذا كان قد حقق الاستفادة القصوى من فرص التعلم المتاحة. ولابد من الربط بينها وبين وصف البرنامج.

1. المؤسسة التعليمية	كلية الهندسة
2. القسم الجامعي / المركز	قسم المدني
3. اسم / رمز المقرر	لغة عربية / CE123
4. البرامج التي يدخل فيها	برامج البكالوريس ليساهم في تحسين المعرفة
5. أشكال الحضور المتاحة	دوام رسمي والكتروني
6. الفصل / السنة	الفصل الاول /السنة الدراسية الاولى
7. عدد الساعات الدراسية (الكلي)	60
8. تاريخ إعداد هذا الوصف	2021-2020
9-أهداف المقرر تعليم الطلبة مهارات الكتابة على مستوى الأملاء والنحو والصرف فضلا عن تعليم الطلبة اسلوب تحليل النص الادبي بالرجوع الى نصوص ادبية معتبرة. فضلا عن تحليل النص القرآني وتعلم قواعد الاملاء	

9. مخرجات التعلم وطرائق التعليم والتعلم والتقييم

أ- المعرفة والفهم
- اكتساب ما تم توضيحه من المفردات في حقل "المواضيع المطلوب بحثها و شمولها "
- اكتساب مهارات الكتابة الادبية الصحيحة
-التأكد من ان الطالب قادر علي الكتابة الموافقة لقواعد اللغة وعلامات الترقيم

ب - المهارات الخاصة بالموضوع
ب1 – تقارير علمية
ب2
ب3
ب4-

طرائق التعليم والتعلم

- قراءات ، تعلم ذاتي ، حلقات نقاش.
- التدريبات والأنشطة في قاعة الدرس .
- إرشاد الطلاب إلى بعض المواقع الالكترونية للإفادة منها .
- عقد حلقات بحثية يتم من خلالها شرح وتحليل النصوص الادبية

طرائق التقييم

المشاركة في قاعة الدرس.
تقديم الأنشطة
اختبارات فصلية ونهائية وأنشطة .

ج- مهارات التفكير
ج1- تطوير قدرة الطالب للعمل على أداء الواجبات وتسليمها في الموعد المقرر.
ج2- التفكير الادبي التحليلي القادر على تحليل النصوص الادبية.
ج3- تطوير قدرة الطالب على الحوار والمناقشة.

طرائق التعليم والتعلم

- إدارة المحاضرة على نحو يشعر بأهمية الوقت.
- تكليف الطالب ببعض الأنشطة والواجبات الجماعية.

• تخصيص نسبة من الدرجة للأنشطة الجماعية.
طرائق التقييم
• المشاركة الفاعلة في قاعة الدرس دليل التزام الطالب وتحمله المسؤولية. • الالتزام بالموعد المحدد في تقديم الواجبات والبحوث. • تعبر الاختبارات الفصلية والنهائية عن الالتزام والتحصيل المعرفي والمهاري.
د - المهارات العامة والمنقولة (المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي). د1- تنمية قدرة الطالب على التعامل مع وسائل التقنية. د2- تنمية قدرة الطالب على التعامل مع النصوص الادبية. د3- تنمية قدرة الطالب على التعامل مع الوسائل المتعددة. د4- تطوير قدرة الطالب على الحوار والمناقشة.

10. بنية المقرر					
الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة / المساق أو الموضوع	طريقة التعليم	طريقة التقييم
الاول	2	تعليم الطلبة كيفية رسم الهمزة	قواعد رسم الهمزة	نظري	اسئلة عامة ومناقشة
الثاني	2	تعليم الطلبة كيفية رسم الهمزة	قواعد رسم الهمزة	نظري	اسئلة عامة ومناقشة او امتحان اني
الثالث	2	تعليم الطلبة كيفية رسم الهمزة	قواعد رسم الهمزة	نظري	أسئلة عامة ومناقشة
الرابع	2	تعليم الطلبة كيفية وضع علامات الترقيم	علامات التنقيط	نظري	امتحان اني
الخامس	2	تعليم الطلبة كيفية وضع علامات الترقيم	علامات التنقيط	نظري	أسئلة عامة ومناقشة او امتحان اني
السادس	2	تعليم الطلبة كيفية تحليل نص شعري قديم	تحليل نص شعري قديم	نظري	اسئلة عامة و مناقشة
السابع	2	تعليم الطلبة كيفية تحليل نص شعري قديم	تحليل نص شعري قديم	نظري	اسئلة عامة
الثامن	2	تعليم الطلبة كيفية تحليل نص شعري حديث	تحليل نص شعري حديث	نظري	الواجبات الجماعية
التاسع	2	تعليم الطلبة بقواعد الابتداء ونواسخة	الابتداء ونواسخة	نظري	اسئلة عامة
العاشر	2	تعليم الطلبة بقواعد الابتداء ونواسخة	الابتداء ونواسخة	نظري	امتحان شهري
الحادي عشر	2	تعليم الطلبة بقواعد العدد واحكامة	العدد واحكامة	نظري	اسئلة عامة
الثاني عشر	2	تعليم الطلبة بقواعد العدد واحكامة	العدد واحكامة	نظري	مناقشة و امتحان اني
الثالث عشر	2	تعليم الطلبة بقواعد الفاعل ونائبة	الجملة الفعلية	نظري	اسئلة عامة
الرابع عشر	2	تعليم الطلبة بقواعد علامات الاعراب الاصلية والفرعية	علامات الاعراب الاصلية والفرعية	نظري	الواجبات الجماعية
الخامس عشر	2	تعليم الطلبة بقواعد علامات الاعراب الاصلية والفرعية	علامات الاعراب الاصلية والفرعية	نظري	مناقشة

11. البنية التحتية	
القراءات المطلوبة : ▪ النصوص الأساسية ▪ كتب المقرر ▪ أخرى	كتاب اللغة العربية لغير الاختصاص تأليف الدكتور رشيد العبيدي وأخرين كتاب الأملاء الواضح تاليف علي الجارم و احمد امين النحو الوافي عباس حسن النحو الوافي : عباس حسن الادب العربي شوقي ضيف
متطلبات خاصة (وتشمل على سبيل المثال ورش العمل والدوريات والبرمجيات والمواقع الالكترونية)	حلقات نقاشية ، مهرجانات شعرية ، مسرحية قصيرة، مجلة جدارية ، فرقة إنشاد، تلاوة قرآن
الخدمات الاجتماعية (وتشمل على سبيل المثال محاضرات الضيوف والتدريب المهني والدراسات الميدانية)	دورات تنمية بشرية للطلبة ، محاضرات ثقافية عامة ، سمنارات للقسم

12. القبول	
المتطلبات السابقة	لا توجد
أقل عدد من الطلبة	10
أكبر عدد من الطلبة	70
13. خطة تطوير المقرر الدراسي	
زيادة الاهتمام في اجراء مسابقة بالشعر بين الطلبة . الطلب من طلبة المرحلة الاولى كتابة مقالات في مواضيع الهندسة المدنية المختلفة.	

English Language (1)

COURSE DESCRIPTION:

Technical English is a two-semester sequence that covers a general introduction about the importance of studying and learning the English language, reading paragraphs and vocabularies for different engineering topics such as mathematics and physics in addition to multi-exercises for writing numbers, fractions, units, and mathematical equations in correct English language. Primary rules for grammar and other topics of daily English such parts of speech, tenses, conjunctions, greetings, and telling the time in English.

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Course title /code	English Language (1)/ CE111
4. Programme to which it contributes	To improve the English language
5. Models of Attendance Offered	By manual attendance forms
6. Semester / year	year
7. Number of hours tuition (total)	58
8. Date of production/ revision of this specification	2020-2021
9. Aims of the course	Learning varying technical English vocabulary for different topics in the scope of civil engineering, in addition to tenses, affixes, and English abbreviations.
10.General and Transfer Skills	Dealing with technical vocabularies in other courses materials

11.Course Structure					
Week	**Hours**	**ILOs**	**Topic title**	**Teaching Method**	**Assessment Method**
1	**2**	Indicate the importance and significance of studying English language	Introduction about the importance of learning English language	presenting and discussing constituents of the topics via direct lectures on Google meet and other supplementary materials involved pdf, pictures, and video files published on Moodle application	home works, quizzes, oral questions during the lectures, mid-year, second semester, and final exams
2	**2**	Knowing and using every day English greetings and short conversations	Parts of speech		
3	**2**		Greetings, short conversations, pronunciation.		
4	**2**	Understanding the time expressions in English	Telling the time in English.		
5 and 6	**4**	Knowing the primary rules for grammar and other topics of every day English such parts of speech, tenses, conjunctions in English.	Grammar: Present simple tense, Negation.		
7 and 8	**4**		Grammar: Present simple tense, Making a question.		
9	**2**		Grammar :Question words in English		
10 and 11	**4**		Reading passage		
12 and 13	**4**	Learning the use of numbers and mathematical equations in correct English language.	Writing of numbers and simple calculations	presenting and discussing constituents of the topics via direct lectures on Google meet and other supplementary materials involved pdf, pictures, and video files published on Moodle application	home works, quizzes, oral questions during the lectures, mid-year, second semester, and final exams
14 and 15	**4**		Writing of cardinal and ordinal numbers.		
16	**2**		Writing fractions, powers and roots		
17 and 18	**4**		Writing of equations and mathematical expressions.		
19 and 20	**4**		Grammar :Conjunctions		
21	**2**		Vocabulary in		

			geometry (angles and triangles) shapes		
22	**2**		Vocabulary in geometry polygons and quadrilaterals.		
23	**2**		Vocabulary in geometry (2D and 3D) shapes		
24	**2**		Vocabulary in geometry parts of circle.		
25 and26	**4**	Speak and write some technical English engineering vocabularies in the scope of civil engineering	Grammar: Comparative and Superlative of adjectives.		
27 and 28	**4**	Derivate or convert nouns, verbs, adjectives and adverbs by using appropriate suffixes or prefixes.	Affixes: Suffixes & Prefixes		
29	**2**	Using abbreviations in English.	Abbreviations.		

12. Infrastructure	
Required reading: - **CORE TEXTS** - **COURSE MATERIALS** - **OTHER**	- New headway plus student's book (By John and Liz Soars) - Technical English-Civil Engineering (By Markner Gager, 1st edition 2013.) - English in a simplified way (By Tahir Al-Bayaty, 3rd edition 1984).
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: http://elearning7.uokufa.edu.iq/eng/course/view.php?id=1437
Community-based facilities (include for example, guest lectures, internship, field studies)	

13. Admissions

Pre-requisites	---
Minimum number of students	194
Maximum number of students	228

14. Course Grade Distribution		
Activity	Grade	Remarks
Mid-Year Exam	20%	Central exam
Second Semester Exam	15%	At second semester
Attendance, Quizzes and Home works	15%	Attendance of lectures, Exam at the end of each subject and homework

حقوق الانسان والديمقراطية

وصف المقرر

يوفر وصف المقرر هذا إيجازاً مقتضياً لأهم خصائص المقرر ومخرجات التعلم المتوقعة من الطالب تحقيقها مبرهناً عما إذا كان قد حقق الاستفادة القصوى من فرص التعلم المتاحة. ولابد من الربط بينها وبين وصف البرنامج.

1. المؤسسة التعليمية	كلية الهندسة
2. القسم الجامعي / المركز	قسم المدني
3. اسم / رمز المقرر	الديمقراطية وحقوق الإنسان/ C117
4. البرامج التي يدخل فيها	بكالوريوس هندسة مدنية
5. أشكال الحضور المتاحة	دوام رسمي والكتروني
6. الفصل / السنة	الفصل الأول والثاني /السنة الدراسية الأولى
7. عدد الساعات الدراسية (الكلي)	ساعتان في الأسبوع (المجموع 30 ساعة)
8. تاريخ إعداد هذا الوصف	2021-2020
9-أهداف المقرر تعليم الطلبة المبادئ الأساسية في الديمقراطية وحقوق الإنسان وتوفير رؤية للأطر القانونية المتعلقة بها ووسائل التعبير عن الرأي، والأسس الأيديولوجية للديمقراطية ومبادئ حقوق الإنسان.	

10. مخرجات التعلم وطرائق التعليم والتعلم والتقييم
أ- المعرفة والفهم - شرح مفردات المنهج وتوضيحها للطلبة. - إسقاط النظريات والأفكار المتعلقة بالمادة على الواقع الاجتماعي
ب- المهارات الخاصة بالموضوع 1- كتابة تقارير متعلقة بالمادة
طرائق التعليم والتعلم: - قراءات ، تعلم ذاتي ، حلقات نقاش. - التدريبات والأنشطة في قاعة الدرس . - إرشاد الطلاب إلى بعض المواقع الالكترونية والمصادر للإفادة منها . - عقد حلقات بحثية يتم من خلالها التعمق في مواضيع حقوق الإنسان والديمقراطية
طرائق التقييم المشاركة في قاعة الدرس. تقديم الأنشطة اختبارات فصلية ونهائية وأنشطة .
ج- مهارات التفكير 1- تطوير قدرة الطالب للعمل على أداءالواجبات وتسليمها في الموعد المقرر. 2- تطبيق الأفكار النظرية عملياً وقراءة الواقع الاجتماعي بحسب ما تم طرحه في الدرس 3- تطوير قدرة الطالب على الحوار والمناقشة.
طرائق التقييم
• المشاركة الفاعلة في قاعة الدرس دليل التزام الطالب وتحمله المسؤولية. • الالتزام بالموعد المحدد في تقديم الواجبات والبحوث. • تعبر الاختبارات الفصلية والنهائية عن الالتزام والتحصيل المعرفي والمهاري.
د - المهارات العامة والمنقولة (المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي). 1- تنمية قدرة الطالب على التعامل مع وسائل التقنية. 2- تنمية قدرة الطالب على التعامل مع الأخبار المتعلقة بحقوق الإنسان. 3- تنمية قدرة الطالب على التعامل مع الوسائل المتعددة. 4- تطوير قدرة الطالب على الحوار والمناقشة.

11.بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة / المساق أو الموضوع	طريقة التعليم	طريقة التقييم
الأول	2	سرد تأريخي لتعليم الطلبة التطور التاريخي لحقوق الإنسان	التطور التاريخي لحقوق الإنسان	نظري	أسئلة عامة ومناقشة
الثاني	2	تعليم الطلبة معنى الحقوق والحريات العامة	الحقوق والحريات العامة	نظري	أسئلة عامة ومناقشة أو امتحان آني
الثالث	2	تعليم الطلبة معنى الحقوق والحريات الفكرية	الحقوق والحريات الفكرية	نظري	أسئلة عامة ومناقشة
الرابع	2	تعليم الطلبة معنى حق المشاركة في إدارة	حق المشاركة في إدارة	نظري	امتحان آني
الخامس	2	الاقتصادية والاجتماعية	والاجتماعية	نظري	امتحان آني
السادس	2	تعليم الطلبة مفردات حقوق الإنسان في القانون الدولي	حقوق الإنسان في القانون الدولي	نظري	أسئلة عامة و مناقشة
السابع	2	تعليم الطلبة ما اتفق عليه من حقوق الإنسان زمن الحرب	حقوق الإنسان زمن الحرب	نظري	أسئلة عامة
الثامن	2	تعليم تعريف الديمقراطية	تعريف الديمقراطية	نظري	الواجبات الجماعية
التاسع	2	تعليم الطلبة معنى نظام حكم الأقلية	نظام حكم الأقلية	نظري	أسئلة عامة
العاشر	2	تعليم الطلبة صور الديمقراطية	صور الديمقراطية	نظري	أسئلة عامة
الحادي عشر	2	تعليم الطلبة الديمقراطية غير المباشرة (النيابية أو التمثيلية)	الديمقراطية غير المباشرة	نظري	أسئلة عامة
الثاني عشر	2	تعليم الطلبة الديمقراطية شبه المباشرة (نصف المباشرة)	الديمقراطية شبه المباشرة	نظري	مناقشة و امتحان آني
الثالث عشر	2	تعليم الطلبة الحكومة بين حرية الإنسان وضرورة الدولة	الحكومة بين حرية الإنسان وضرورة الدولة	نظري	أسئلة عامة
الرابع عشر	2	تعليم المرأة حقوق المرأة والمشكلات التي تعترض ذلك	حقوق المرأة	نظري	مناقشة وأسئلة عامة
الخامس عشر	2	تعليم الطلبة الوصاية والوعي في تأسيس الدولة	الوصاية والوعي في تأسيس الدولة	نظري	مناقشة

12. البنية التحتية

القراءات المطلوبة : ▪ النصوص الأساسية ▪ كتب المقرر ▪ أخرى	الدستور العراقي الصادر عام 2005 مجموعة مؤلفات متفرقة حول الديمقراطية وحقوق الإنسان
متطلبات خاصة (وتشمل على سبيل المثال ورش العمل والدوريات والبرمجيات والمواقع الالكترونية)	حلقات نقاشية ، والاستماع لآراء الطلبة
الخدمات الاجتماعية (وتشمل على سبيل المثال محاضرات الضيوف والتدريب المهني والدراسات الميدانية)	دورات تنمية بشرية للطلبة ، محاضرات ثقافية عامة

13. القبول	
المتطلبات السابقة	لا توجد
أقل عدد من الطلبة	10
أكبر عدد من الطلبة	70

Course Specifications

STRENGTH OF MATERIALS

COURSE DESCRIPTION:

The course starts with an introduction and definition for the strength of material including analysis of forces. The concept of simple stresses is introduced in which the direct (normal) and shearing stresses are explained according to each type of these stresses which includes also the behavior of the generated stresses in the pressure vessels. Simple strain represented by axial deformations for the determinate or indeterminate models are given for the case of indeterminate and indeterminate systems. The torsional stress which is the stress that usually subjected on the shafts is considered also. Plotting methods of shear and bending moment diagrams are studied according to two methods, equations and graphical methods. The behavior of the generated flexural stresses in beams are studied including the composite type of beams. Similarly, the behavior of shearing stresses in beams is given taking into account the vertical shear and the shear flow subjected upon the cross section. The combination between axial and flexural stresses will be studied accordingly. Plane stress and strain are given later using the equations and Mohr's circle of transformation of the plane stress. Methods that used to determine the deflection in beams is given at the end of the second semester.

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Course title /code	Strength of material / CE232
4. Programme to which it contributes	BSc in Civil Engineering
5. Models of Attendance Offered	By manual attendance forms
6. Semester / year	year
7. Number of hours tuition (total)	120
8. Date of production/ revision of this specification	2020-2021
9. Aims of the course	The mechanics of materials teaches civil engineering students the basics for calculating the different types of internal stresses (normal and shear) and related deformation occurred in the body due to external effects. This course is needed for all subsequent structural design courses. In general ,students get knowledge about all the subjected mentioned within the description of the two courses. The adopted syllabus is the base for the related subjects that the students will get during the third study stage.

10.Learning Outcomes, Teaching and Learning and Assessment methods.

A- Program Outcomes – Knowledge and Understanding

A1- An ability to apply knowledge of mathematics, science and engineering

A4- An ability to identify, formulate, and solve engineering problems

D2. Ability to work as a team

11.Course Structure

Week	Hours	ILOs	Topic title	Teaching Method	Assessment Method
1	**4**	Revising of the major subjects that were already introduced in the first year within the courses of Engineering Mechanics. Also, an introduction and definition for the strength of material are given, containing analysis of forces with all other considerations related with the forces, such as types, units, directions and equilibrium equations. Plotting methods of shear and bending moment diagrams are studied according to two methods, equations and graphical methods.	Introduction to Strength of Material : Concept of Forces	Presenting each lecture via power point show involving live explanation on each step directly online by Google meet application. Students randomly get sudden questions related with the subject and the answers are introduced directly by writing each step with live writing technologies. Recorded lecture are also introduced on Moodle application	Quizzes, oral practice and activities during the lectures, attendance, mid-year, second semester, and final exams
-62	**20**		Forces and Moments: Differential Equilibrium Relationship		
7-9	**12**	The concept of simple stresses is introduced in which the direct (normal) and shearing stresses are explained according to each type of these stresses which includes also the behavior of the generated stresses in the pressure vessels. Hook's low and its considerations are given next where the students get knowledge about the deformation of materials under stresses in perpendicular directions. The role of Poisson's ratio in this case is taken in the account also.	Stresses: Concept of Stresses		
10-13	**16**	Introducing the simple strain represented by axial deformations for the determinate or indeterminate systems.	Strain		
14-15	**8**	Knowing the torsion stress that usually subjected on the shafts. Equations of Torsional stress and couple as well as angle of twist are given as well.	Torsion: the Torsion Formula for Solid Circular Shaft		

16-20	**20**	Learning the behavior of the generated flexural and shearing stresses in beams.. The combination between axial, flexural and shearing stresses will be studied accordingly. Students learn how to find the stresses in inclined planes which have the maximum and minimum stresses that generated due to the normal stresses.	Stresses in Beam: Bending Stresses		
21-23	**12**		Transformation of Stress and Strain: Equation for the Transportation of Plane Stress		
24-28	**20**	Methods that used to determine the deflection in beams is given herein.	Deflection of Beams: Governing Differential Equation for Deflection of Elastic Beam		

12. Infrastructure	
Required reading: - **References**	Egor Popov, "Introduction to Mechanics of Solids". 1968 by Prentice-Hall, Englewood Cliffs, New Jersey. Singer S.,"Strength of Materials" Fourth ed. "Gere"Mechanics of material "Hibbler" Mechanics of material
Special requirements (include for example, workshops, periodicals, IT software, websites)	http://elearning7.uokufa.edu.iq/eng/login/index.php http://elearning7.uokufa.edu.iq/eng/course/view.php?id=1383

13. Admissions	
Pre-requisites	Engineering Mechanics,Mathematics I
Minimum number of students	100
Maximum number of students	120

14. Course Grade Distribution	**Grade**	**Remarks**
Professionalism	5.0%	Attendance of lectures
Homework	5.0%	Homework are training tools inside the class and at home
Quizzes	5.0%	Exam at the end of each subject
Mid-Term Exam	20.0%	Central exam
Second Semester Exam	15.0%	One or more exams at second semester
Final Exam	50.0%	Central exam

Mathematics II

COURSE SPECIFICATIONS:

Mathematics II subject is a two- or three-semester general calculus course, incorporating innovative features to enhance student learning. The course guides students through the core concepts of calculus and helps them understand how those concepts apply to their lives and the world around them. The course covers matrices, sequences and series, parametric equations and polar coordinates, vectors, functions of several variables, multiple integration, complex numbers, and second-order differential equations.

Teaching Institute	University of Kufa – Faculty of Engineering
University Department / Center	Civil Engineering Department
Course title /code	Mathematics II
Program to which it contributes	BSc in Civil Engineering
Models of Attendance Offered	By manual attendance forms
Semester / year	year
Number of hours tuition (total)	120
Date of production/ revision of this specification	2020-2021

Aims of the course

The aim of this course is for students to learn how to solve problems in matrices, sequences and series, parametric equations and polar coordinates, vectors, functions of several variables, multiple integration, complex numbers, and second-order differential equations. The other aim is how to connect the aforementioned materials to real life problems and its actual applications.

10. Learning Outcomes, Teaching and Learning and Assessment methods.

A- Program Outcomes – Knowledge and Understanding

A1- An ability to apply knowledge of mathematics, science and engineering

A2- An ability to design and conduct experiments, as well as to analyze and interpret data

A4- An ability to identify, formulate, and solve engineering problems.

D. General and Transferable Skills (other skills relevant to employability and personal development)

1. An ability to apply knowledge of mathematics, science and engineering.
2. An ability to design and conduct experiments, as well as to analyze and interpret data.
3. An ability to identify, formulate, and solve engineering problems.

11. Course Structure					
weeks	**Hours**	**Topic title**	**Learning Outcomes**	**Teaching Methods**	**Assessment Methods**
3	**12**	Matrices, determinates, and systems of linear equations.	Introduction to matrices, determinates, matrices operations, applications, and matrices use in solving linear equations systems.	• Explaining the concepts. • Discussion with students. • Brain storming and discussion to find the best way to solve the problems • Solving multiple problems and engaging the students in finding the solutions	Homework, quizzes, and exams
1	**4**	Vectors Calculus (Vectors analyses)	Introduction to vectors, vectors operations, and its applications in real life problems	• Explaining the concepts. • Discussion with students. • Brain storming and discussion to find the best way to solve the problems. • Solving multiple problems and engaging the students in finding the solutions	Homework, quizzes, and exams
3	**12**	Vectors and analytical geometry in space.	• Vectors applications in finding areas, volumes, work, torque, and other applications. • Using vectors to study geometry in space. Determining lines and planes equations, angles between them, and other applications	• Explaining the concepts. • Discussion with students. • Brain storming and discussion to find the best way to solve the problems. • Solving multiple problems and engaging the students in finding the solutions	Homework, quizzes, and exams
3	**12**	Infinite sequences.	Introduction to sequences, sequences operations, sequences domain and range, solving sequences, and its applications in real life problems	• Explaining the concepts. • Discussion with students. • Brain storming and discussion to find the best way to solve the problems. • Solving multiple problems and engaging the students in finding the solutions	Homework, quizzes, and exams
3	**12**	Infinite series	Introduction to series, series operations, series domain and range, solving series, and its applications in real life problems	• Explaining the concepts. • Discussion with students. • Brain storming and discussion to find the best way to solve the problems. • Solving multiple problems and engaging the students in finding the solutions	Homework, quizzes, and exams

4	**16**	Multivariable functions, continuity, and partial derivatives	• Introduction. • Operations on multivariable functions • Limits, continuity and derivatives. • Partial derivatives. • Implicit derivatives. • Applications	• Explaining the concepts. • Discussion with students. • Brain storming and discussion to find the best way to solve the problems. • Solving multiple problems and engaging the students in finding the solutions	Homework, quizzes, and exams
2	**8**	Maxima, minima, and Lagrange multiplier	• Finding critical points. • .Maximum, minimum, and suddle points. • Lagrange multiplier concept and application of Lagrange multiplier.	• Explaining the concepts. • Discussion with students. • Brain storming and discussion to find the best way to solve the problems. • Solving multiple problems and engaging the students in finding the solutions	Homework, quizzes, and exams
1	**4**	Polar coordinates	• Introduction to polar coordinates system. • Ways to plot functions using polar coordinates. • Slope, derivatives, and applications in polar coordinates system	• Explaining the concepts. • Discussion with students. • Brain storming and discussion to find the best way to solve the problems. • Solving multiple problems and engaging the students in finding the solutions	Homework, quizzes, and exams
2	**8**	Multiple Integrals (double and triple integrals)	• Introduction. • Concept of multiple integrals. • Double Integration. • Triple integration. • Double integration in polar coordinates.	• Explaining the concepts. • Discussion with students. • Brain storming and discussion to find the best way to solve the problems. • Solving multiple problems and engaging the students in finding the solutions	Homework, quizzes, and exams
2	**8**	Applications of Multiple Integrals	Using multiple integrals in finding areas, volumes, centroid, 1st and 2nd moment of inertia, and other applications.	• Explaining the concepts. • Discussion with students. • Brain storming and discussion to find the best way to solve the problems. • Solving multiple problems and engaging the students in finding the solutions	Homework, quizzes, and exams
2	**8**	1st order differential equations	• Introduction to 1st order differential equations. • Methods to solve 1st	• Explaining the concepts. • Discussion with students. • Brain storming and discussion to find the best way to solve the problems.	Homework, quizzes, and exams

			order differential equations. • Applications	• Solving multiple problems and engaging the students in finding the solutions	
2	**8**	2^{nd} order differential equations.	• Introduction to 2^{nd} order differential equations. • Methods to solve 2^{nd} order differential equations. • Applications	• Explaining the concepts. • Discussion with students. • Brain storming and discussion to find the best way to solve the problems. • Solving multiple problems and engaging the students in finding the solutions	Homework, quizzes, and exams
2	**8**	Complex numbers	• Introduction to complex numbers. • Operations on complex numbers • Power and roots of complex numbers.	• Explaining the concepts. • Discussion with students. • Brain storming and discussion to find the best way to solve the problems.	Homework, quizzes, and exams

12. Infrastructure	
Required reading: - **CORE TEXTS** - **COURSE MATERIALS** - **OTHER**	- Finney, Weir, C.W. and Giordano, "Tomas Calculus", eleven teen Edition, 2000. - Finney, Weir, C.W. and Giordano, "Tomas Calculus", fourteenth Edition, 2017 - Haward, Bivens and Davis., "Calculus ", Pearson Education, Seven Edition, 2002**.** - Herman, Edwin, and Gilbert Strang. "Calculus Volume 1, 2, and 3." (2018) - Kreyszig, Erwin. "Advanced Engineering Mathematics 10th Edition." (2009).
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: https://studio.youtube.com/channel/UCMC8cB1qHshfJIuZWQo9sSQ

13. Admissions	
Pre-requisites	-------
Minimum number of students	60
Maximum number of students	120

Course Specifications

Engineering Surveying

COURSE SPECIFICATIONS:
By the end of the course, students should be familiar with common survey instruments and possess some technical skills such as:

- have a basic understanding of quantity and computation,
- have a basic understanding of the setting out in Civil Engineering; setting out by coordinates; verticality.
- have a basic understanding of the theory of measurement errors and concepts of adjustment.

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Course title /code	Engineering Surveying / CE234
4. Programme to which it contributes	BSc in Civil Engineering
5. Models of Attendance Offered	By manual attendance forms
6. Semester / year	year
7. Number of hours tuition (total)	180
8. Date of production/ revision of this specification	2020-2021

9. Aims of the course
This course aims to introduce and develop the basic understanding of the principles of engineering surveying.

10. Learning Outcomes, Teaching and Learning and Assessment methods.

B- Program Outcomes – Knowledge and Understanding

A1- An ability to apply knowledge of mathematics, science and engineering

A2- An ability to design and conduct experiments, as well as to analyze and interpret data

A4- An ability to identify, formulate, and solve engineering problems.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. An ability to apply knowledge of mathematics, science and engineering.

D2. An ability to design and conduct experiments, as well as to analyze and interpret data.

11. Course Structure (First term)					
Week	**Hours**	**ILOs**	**Topic title**	**Teaching Methods**	**Assessment Methods**
1	3 th+3 lab	Syllabus-References-Scoring scheme	Introduction to course	- Presentation - Review all instruments in lab	- Report
2	3 th+3 lab	Units-rounding off numbers-scale-significant figures-Setting out straight-line using tape only	Introduction to Surveying Principle	- Presentation - Demonstration in Lab - Field Experiment	- H.W - Quiz - Mid-Exam - Field mid-exam
3	3 th+3 lab	Error sources-Precision-Accuracy-Redundant measurements-Setting out angle by tape only	Theory of errors		
4	3 th+3 lab	random errors- probability-normal distribution-mean and weighted mean-weights-balance adjustment-Setting out a map by tape only	Theory of errors		
5	3 th+3 lab	level types-refraction and curvature errors- Measure angle by tape only	Leveling		
6	3 th+3 lab	Leveling methods-adjustment leveling network- Tachometry method	Leveling		
7	3 th+3 lab	Distance measurement methods-taping- Two pegs test	Distance Measurements		
8	3 th+3 lab	EDM- Differential Levelling	Distance Measurements		
9	3 th+3 lab	Angle, Azimuth, and Bearing	Angle and Direction		
10	3 th+3 lab	Angle measurement	Theodolites		
11	3 th+3 lab	Angle measurements and distance measurements	Total Station		
12	3 th+3 lab	Profile cross section-contour map	Topographic surveying		
13	3 th+3 lab	Regular area- irregular area-cross sections	Areas		
14	3 th+3 lab	Volume computation-mass haul diagram	Volume		
15	3 th+3 lab	Revision class	Revision class	Q & A	-

11. Course Structure (Second term)					
Week	**Hours**	**ILOs**	**Topic title**	**Teaching Methods**	**Assessment Methods**
16	3 th+3 lab	Types of Traverse-Reconnaissance-Station Marking-Angle and Distance Measurements-Measure Close-loop traverse	Traversing	- Presentation - Demonstration in Lab - Field Experiment	- H.W - Quiz - Mid-Exam - Field mid-exam
17	3 th+3 lab	Angles (directions) Adjustment-Computation of Preliminary Azimuths-Departures and Latitudes-Linear Misclosure and Relative Precision-Traverse Adjustment-Calculation of Coordinates- Adjust traverse	Traversing		
18	3 th+3 lab	Rectangular and Polar Coordinates Intersection-Resection	Coordinate Geometry		
19	3 th+3 lab	Understanding GNSS system	Introduction to GNSS		
20	3 th+3 lab	General knowledge in photogrammetry and remote sensing	Introduction to photogrammetry and remote measurement		
21	3 th+3 lab	Digital mapping and surface models	Introduction to GIS		
22	3 th+3 lab	Setting out construction map using theodolite and tape	Construction Surveys		
23	3 th+3 lab	Setting out construction map using Total Station	Construction Surveys		
24	3 th+3 lab	Formula for Vertical Curves and computations	Vertical Curves		
25	3 th+3 lab	Types-computations	Horizonal Curves		
26	3 th+3 lab	Setting out	Horizonal Curves		
27	3 th+3 lab	Types and specifications	Transition Curves		
28	3 th+3 lab	Computations and setting out	Transition Curves		
29	3 th+3 lab	Revision class	Revision class	Q & A	-
30	3 th+3 lab	Revision class	Revision class	Q & A	-

12. Infrastructure	
Required reading: - **CORE TEXTS** - **COURSE MATERIALS** - **OTHER**	- Ghilani, C. D. and P. R. WOLF (2014). Elementary Surveying: An Introduction to Geomatics. New Jersey/ The United State of America, PEARSON. - Uren, J. and B. Price (2010). Surveying for Engineers. UK, PALGRAVE MACMILLAN. - Nadolinets, L., et al. (2017). Surveying Instruments and Technology. New York, Taylor & Francis.
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: http://elearning7.uokufa.edu.iq/eng/course/view.php?id=1254
Community-based facilities (include for example, guest lectures, internship, field studies)	

13. Admissions	
Pre-requisites	Mathematics- Statistics
Minimum number of students	15
Maximum number of students	30

FLUID MECHANICS

COURSE SPECIFICATIONS:

The course Fluid Mechanics is designed to introduce students to the fundamental engineering science concepts related to the mechanics of fluids. This includes basic fluid properties, fluid statics, fluid dynamics, fluid viscosity and turbulence, introduction to flow in closed conduits, pumps and pumping.

The aim of this course is to provide students with an understanding of the basic principles of fluid mechanics and of their application to civil engineering problems. There is a strong focus on water in the course as this is one of the most important fluids for Civil Engineering practice.

In fact, this course forms the basis for subsequent courses in next two years such as Irrigation and Drainage Engineering (3^{rd} year), Hydraulic Structures (4^{th} year), Sanitary Engineering (4^{th} year) and Hydrology (4^{th} year).

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Course title /code	Fluid Mechanics / CE236
4. Programme to which it contributes	BSc in Civil Engineering
5. Models of Attendance Offered	By manual attendance forms
6. Semester / year	year
7. Number of hours tuition (total)	90
8. Date of production/ revision of this specification	2020-2021

9. Aims of the course

- The course will introduce fluid mechanics and establish its relevance in civil engineering.
- Recognition of and develop the knowledge about the fundamental hydraulic definitions and the principle fluid properties underlying the subject.
- Establish how these definitions and properties are utilized to solve the elementary hydrostatical and hydro dynamical problems that may face the civil engineer.

10.Learning Outcomes, Teaching and Learning and Assessment methods.

A-Program Outcomes – Knowledge and Understanding

A1- An ability to apply knowledge of mathematics, science and engineering

A2- An ability to design and conduct experiments, as well as to analyze and interpret data

A4- An ability to identify, formulate, and solve engineering problems

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Ability to use a software, such as MS Excel, in the calculations.

D2. Ability to work as a team.

11. Course Structure

Week	Topic	Learning Outcomes	Strategies for Achieving Outcomes	Assessment Methods
1	Unit-1: Introduction	1.1 Support and describe a fine define of the fluid, fluid mechanics, dimensions and units related with its study and comprehend its relevance to civil engineering.	- Lecture session with discussions to support and describe a fine define of the fluid, fluid mechanics and comprehend its relevance to civil engineering.	- Written exam (Conceptual questions)
			- Using fundamental physical laws and evidences to define and describe a certain characteristics of fluids those deals with fluid mechanics.	
2	Unit-2: Fluid Properties	2.1. Know how define density, specific gravity, viscosity, surface tension, capillarity phenomena, and vapor pressure and describe the differences between absolute viscosity and kinematic viscosity and viscosity, density, and vapor pressure vary with temperature and or pressure.	- Look up fluid property values from figures, tables; know when and how to interpolate.	
			- Solve many examples as application in class.	
		2.2. Able to relate among shear stress, viscosity, and the velocity distribution to solve shear translate due to viscous fluids problems.	- Students are asked to solve some sample problem as home work.	- Written exam consist of conceptual questions and solution need problems.
			- Use laboratory demonstration tools.	- Homework.
3	Unit-3: Fluid Hydrostatics: Fluid Pressure and Its Measurements	3.1. Find and calculate pressure values and distributions for applications involving the atmosphere, the ocean, manometers, and hydraulic machines.	- Describe pressure and pressure distribution.	- Quizzes.
4			- Describe gage, absolute, and vacuum pressure.	- Lab. Report.
5	Hydrostatic Forces , Gates	3.2. Find and calculate forces and moments.• For structures and components subjected to hydrostatic loading,	- List the steps used to derive the hydrostatic differential equation.	- Class and outclass activity (additional).
			- Apply the hydrostatic equation and the manometer equations to predict pressure.	

			- Solve many examples as application in class.	- Written exam consist of conceptual questions and solution need problems.
			- Students are asked to solve some sample problem as home work.	- Homework.
			- Apply the panel equations to predict forces and moments.	- Quizzes.
6			- Apply the buoyancy equation to predict forces.	- Class and outclass activity (additional).
			- Solve many examples as application in class.	- Written exam consist of conceptual questions and solution need problems.
7			- Students are asked to solve some sample problem as home work.	- Homework.
			- Use laboratory demonstration tools.	- Quizzes.
8	Linear Accelerated Fluids	describe and calculate pressure varience in linear accelerated fluid masses		- Class and outclass activity (additional).
9	Angular Accelerated Fluids	describe and calculate pressure varience in angular accelerated fluid masses		
10	Unit-4: Fluid Flow Regimes of Flow	describe the mathematical and physical diffonition of deferent flow regims	- Distinguishing between steady, unsteady, uniform, and non-uniform flows.	
11	Fluid Flow	3.3. Relate pressure and velocity distributions in various streams like closed pipes, outlet velocity from draining tank, variable area ducts and measurement of velocity with various devices such as Venturi tube, orifice, stagnation tube or a Pitot-static tube.	- Distinguish between convective and local acceleration.	- Written exam consist of conceptual questions and solution need problems.
12	Bernoulli's equation (conservation of mechanical energy)		- Apply Euler's equation to predict pressure.	- Homework.
13	Continuity Equation (Mass Conservation)	3.4. Calculate and estimate draining time for a tank or reservoir and using venturimeter to determine flow rate and velocity.	- Apply the Bernoulli equation to pressure and velocity variations.	- Quizzes.
14			- Solve many examples as application in class.	- Lab. Report.
15	Momentum equation	3.5. Calculate forces and moments for jets, vanes, nozzles	- Students are asked to solve some sample problem as home work.	- Class and outclass activity

	(force and rate of change of momentum)	and pipe sections.		(additional).
			- Use laboratory demonstration tools.	
			- Explain the meaning of volume flow rate and mass flow rate.	- Written exam consist of conceptual questions and solution need problems.
			- Explain what is meant by a system, control volume and control surface.	- Homework.
			- State the purpose of the Reynolds transport theorem.	- Quizzes.
			- Solve many examples as application in class.	- Lab. Report.
			- Students are asked to solve some sample problem as home work.	- Class and outclass activity (additional).
			- Explain the steps in deriving the momentum equation.	
16			- Identify the accumulation and momentum flux terms in the momentum equation.	
			- Explain the steps in deriving the moment-of-momentum equation.	- Written exam consist of conceptual questions and solution need problems.
			- Apply the component form of the momentum equation to stationary and moving control volumes.	- Homework.
			- Apply the moment-of-momentum equation to stationary and rotating control volumes.	- Quizzes.
			- Use laboratory demonstration tools.	- Class and outclass activity (additional).
			- Explain the meaning of energy, work, and power.	
			- Apply the energy equation to predict variables such as pressure drop and head loss.	- Written exam consist of conceptual questions and solution need problems.
			- •Apply the power equation to find the power required for a pump or power supplied by a turbine.	- Homework.

17	Unit-5: Real Flow Friction Coefficient & Minor losses	3.8. Find the pressure drop or head loss for flow in a pipe, calculate the flow rate for a specified system, determine the size of pipe required for a specified flow rate and pressure drop, find and determine the pump specifications (power, head, flow rate) for a system with a pump, and determine the power that can be produced by a turbine for a specified elevation change and flow rate.	- Sketch an Energy Grade Line (EGL) or a Hydraulic Grade Line (HGL) and explain the trends.	- Quizzes.
			- Solve many examples as application in class.	- Lab. Report.
18			- Students are asked to solve some sample problem as home work.	- Class and outclass activity (additional).
			- Describe laminar flow, turbulent flow, developing flow, and fully developed flow in a conduit.	
19	Pipes in Series		- Describe how to characterize total head loss by using component and pipe head loss.	- Written exam consist of conceptual questions and solution need problems.
			- List the steps used to derive the (a) Darcy-Weisbach equation and (b) Poiseuille flow solution.	- Homework.
20	Pipes in Parallel		- Describe the main features of the Moody diagram.	- Quizzes.
			- Classify flow as (a) laminar or turbulent and (b) developing or fully developed.	- Class and outclass activity (additional).
21	Pipes in Branched Connecting		- Using equations or the Moody diagram, find values of the friction factor f.	
			- Calculate pipe head loss, component head loss, and total head loss.	
22	Pipes Networks		- Solve many examples as application in class.	- Written exam consist of conceptual questions and solution need problems.
			- Students are asked to solve some sample problem as home work.	- Homework.
			- Use laboratory demonstration tools.	- Quizzes.
23	Pumps and Turbine	3.6. Determine the requirements (e.g., energy, head, flow rate) for a centrifugal pump or an axial fan and calculate power output for radial turbines.	- Describe various type of head terms (pressure head, pump head, velocity head, turbine head, etc.).	- Class and outclass activity (additional).

24		3.7. Establish how much power can be produced for a turbine, sketching an HGL for a piping system and identify locations of cavitation, negative and/or positive pressures.	- Explain the meaning of pump, turbine, efficiency, and head loss.	
25	Unit-7: Flow Measurement Devices	3.10. How can measure flow rate by wieres and flumes	- List the steps used to derive the energy equation.	- Written exam consist of conceptual questions and solution need problems.
26			- Solve many examples as application in class.	- Homework.
			- Students are asked to solve some sample problem as home work.	- Quizzes.
27	Unit-8: An Introduction to Open Channel Flow	3.9. Calculate the water depth and head loss and the dimensions necessary to carry a desired flow rate for a pipe that is half full and concrete channel, and design a stilling basin with hydraulic jump.	- Describe differences between uniform flow, gradually varied flow, and rapidly varied flow.	- Lab. Work and Report.
28			- Describe critical depth, specific energy, supercritical flow, and subcritical flow.	- Class and outclass activity (additional).
			- Describe what causes head loss in open-channel flow.	- Written exam consist of conceptual questions and solution need problems.
			- Describe the factors used to classify surface profiles in gradually varied flow.	- Homework.
29			- Explain the conditions leading to a hydraulic jump.	- Quizzes.
			- Apply Darcy-Weisbach and Manning's equations to uniform flow.	- Lab. Work and Report.
			- How find the best hydraulic section.	- Class and outclass activity (additional).
30			- Calculate the depth, velocity, and head loss in a hydraulic jump.	
			- Apply the Froude number to classify flow as critical, subcritical, or supercritical.	

In addition to the lecture meetings, the course will occasionally meet for laboratory sessions. The laboratory lessons are intended to parallel the lecture material, and are also listed below.

Laboratory No.	Laboratory Test
1	EXPERIMENT 1. DENSITY AND SPECIFIC GRAVITY
2	EXPERIMENT 2. VISCOSITY
3	EXPERIMENT 3. SURFACE TENSION
4	EXPERIMENT 4. CAPILLARITY
5	EXPERIMENT 5. CENTER OF PRESSURE
6	EXPERIMENT 1. FLOW THROUGH A CIRCULAR ORIFICE
7	EXPERIMENT 2. TRAJECTORY OF A HORIZONTAL JET
8	EXPERIMENT 3. TIME TO EMPTY A VESSEL
9	EXPERIMENT 4. IMPACT OF JETS
10	EXPERIMENT 5. VERIFICATION OF BERNOULLI'S EQUATION
11	EXPERIMENT 6. DEMONSTRATION OF LAMINAR AND TURBULENT FLOW
12	EXPERIMENT 7. PIPE FLOW MEASUREMENT (FLOW THROUGH VENTURI TUBE)
13	EXPERIMENT 8. FRICTION LOSSES IN PIPES.
14	EXPERIMENT 9. MINOR LOSSES IN PIPES

12. Infrastructure	
Required reading: - **CORE TEXTS** - **COURSE MATERIALS** - **OTHER**	***Textbook:*** ***Engineering Fluid Mechanics***, Crowe, C. T., D. F. Elger, B. C. Williams and J. A. Roberson, John Wiley & Sons, New York, 2010. ***References:*** **Elementary Fluid Mechanics**, Vennard, J. K., John Wiley & Sons, New York. **Fluid Mechanics**, Streeter & Wylie, McGraw-Hill, New York. **Fluid Mechanics**, F.M.White, McGraw-Hill, New York. ***In addition to about 120 pages lecture notes provided by instructor***
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: http://elearning7.uokufa.edu.iq/eng/course/view.php?id=1250

13. Admissions	
Pre-requisites	Engineering Mechanics,
Minimum number of students	100
Maximum number of students	120

CONCRETE TECHNOLOGY

COURSE SPECIFICATIONS:

This course provides a comprehensive treatment of the materials and civil engineering principles which results in production and construction of high quality concrete for buildings and infrastructure. During the semester, students will practice and learn to characterize and predict the behavior of aggregates, Portland cement, and concrete products.

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Course title /code	Concrete technology / CE238
4. Programme to which it contributes	BSc in Civil Engineering
5. Models of Attendance Offered	By manual attendance forms
6. Semester / year	year
7. Number of hours tuition (total)	120
8. Date of production/ revision of this specification	2020-2021
9. Aims of the course In-depth study of composition, characteristics and hydration of cements; structure and properties of hardened cement paste; aggregates; workability, production, handling; placing; vibration; and curing of concrete; strength; mix design; volume changes and permeability of concrete; durability to chemical and physical attacks.	

10.Learning Outcomes , Teaching and Learning and Assessment methods

A- Program Outcomes – Knowledge and Understanding

A1- An ability to apply knowledge of mathematics, science and engineering *(a in ABET Student Outcomes)*.

A2- An ability to design and conduct experiments, as well as to analyze and interpret data

A3- 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

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. The ability to make the appropriate engineering decision

D2. Teamwork ability

D3. Contact with laboratories, equipment, building materials and see work sites

D4. Ability to identify and solve civil engineering problems

11. Course Structure

Week	Hours	ILOs	Topic title	Teaching Methods	Assessment Methods*
1	2	An ability to identify, formulate and solve aggregate, water and concrete problems	Introduction	Lecture in class, Discussion Question & Answer	Homework; quiz; exam; final exam
2	2		Manufacture of Cement and Composition	A field visit to the cement plant, case study	quiz; exam; technical report, presentation, final exam
3	2		Hydration of Cement	Presentation, Discussion Question & Answer	Homework; quiz; technical report; final exam
4 and 5	4		Volume of Products of Hydration	Problem Solving, Discussion Question & Answer	
6	2	An ability to understand and use the common measuring (testing) techniques and acceptance tests for assessing the properties of concrete and concrete-making-materials	Tests of Cement	Experiment & Presentation	
7-10	6		Types of cement, Portland Cement (P.C), Special Types of P.C, Natural Cement, High Resistance Sulfate Cement, Expanded Cement, Aluminous Cement,	Lecture , Case Study, Brain Storming, Question & Answer	
11	2	An ability to identify,	Aggregate, Classification of	Lecture in class, Discussion	Homework; quiz; final

		formulate and solve aggregate, water and concrete problems	Aggregate. Properties of Aggregate.	Question & Answer	exam
12	2		Bulking of Sand, Deleterious Substances in Aggregate.	Presentation, Question & Answer, case study	Homework; quiz; final exam
13	2		Soundness of Aggregate, Alkali-Silica Reaction	Presentation, Question & Answer, case study	Homework; quiz; final exam
14-15			Sieve Analysis, Practical Gratings	Experiment ,Presentation, Problem Solving	quiz; exam; technical report, presentation, final exam
16			Fresh Concrete, Consistency of Concrete.	Lecture in class, Discussion Question & Answer	Homework; quiz; final exam
17		Confirm the performance of concrete	Workability, Measurement of Workability	Experiment & Presentation	quiz; exam; technical report, presentation, final exam
18			Factors Effecting Workability	Presentation, Question & Answer, case study	Homework; quiz; final exam
19			Segregation, Bleeding, The Mixing of Concrete.	Presentation, Question & Answer, case study	Homework; quiz; final exam
20			Vibration of Concrete, Concreting in Hot Weather.	Experiment & Presentation	quiz; exam; technical report, presentation, final exam
21		Confirm the performance of concrete	Hardened Concrete, Strength of Concrete, Types of Strength.	Experiment & Presentation	quiz; exam; technical report, presentation, final exam
22			Factors Effecting Strength and Tests Results of Strength.	Presentation, Question & Answer, case study	Homework; quiz; final exam
23			Curing of Concrete	Lecture , case study	Homework; quiz; final exam
24-27		An ability to select and design	Design of Concrete Mixture, ACI	Lecture, Problem Solving, case study	Homework; quiz; exam;

		economic mix proportions for different exposure conditions and intended purposes	Method.		technical report, presentation, final exam
28		An ability to understand and use the common measuring (testing) techniques and acceptance tests for assessing the properties of concrete and concrete-making-materials & Confirm the performance of concrete	Modulus of Elasticity, Poisson's Ratio	Lecture, Discussion Question & Answer	Homework; quiz; final exam
29			Volume Changes, Swelling, Shrinkage, Creep.	Lecture in class, Discussion Question & Answer	Homework; quiz; final exam
30			Durability of Concrete: permeability of Concrete, Sulfate and Acid Attack on Concrete, Effect of See Water, Effloresces, Concreting in Cold Weather.	Lecture , Case Study, Brain Storming, Question & Answer, A field visit	quiz; exam; technical report, presentation, final exam

In addition to the lecture meetings, the course will occasionally meet for laboratory sessions. The laboratory lessons are intended to parallel the lecture material, and are also listed below.

Laboratory No.	Laboratory Test
1	No Lab
2	Lab Safety
	Cement Tests
3	Consistency of Cement Paste
4	Initial and Final Setting Time of Cement Paste
5	Soundness of Cement
6	Compressive Strength of Cement
7	Fineness of Cement
	Aggregate Tests
8	Sampling
9	Specific Gravity and Absorption
10	Density
11	Shape and Surface Texture
12	Sieve Analysis of Fine Aggregate
13	Sieve Analysis of Coarse Aggregate
	Fresh Concrete Tests
14	Slump Test
15	Compacting Factor

16	Ve-Be Test
17	Kelly Ball Test
18	Density
	Hardened Concrete Tests
19-20	Mix Design/ Compressive Strength / Density
21-22	Mix Design/ Splitting Tensile Strength
23-24	Mix Design/ Flexural Strength
	Non- Destructive Tests
25	Schmidt's Hammer
26	Ultrasonic Pulse Velocity

12. Infrastructure	
Required reading: - **CORE TEXTS** - **COURSE MATERIALS** - **OTHER**	**Textbook;** T1- Concrete Technology: A. M. Neville & J J Brooks, Second Edition, Prentice Hall, 2010 T2- Concrete: Microstructure, Properties, and Materials by Mehta and Monteiro, Third Edition, McGraw Hill, 2006 . T3- Tests in Concrete Technology, Muayad K. & Hana Abid Yousif, Baghdad. 1985 **References;** R1 **-.** Concrete Technology; A.M. Neville , Fifth Edition, Prentice Hall**,** 2011 R2- IQS- Iraqi Specifications R3- Concrete Technology, Theory and Practice, M.S. Shetty, 2011
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: http://elearning7.uokufa.edu.iq/eng/course/view.php?id=1245
Community-based facilities (include for example, guest lectures, internship, field studies)	

13. Admissions	
Pre-requisites	
Minimum number of students	16
Maximum number of students	36

Course Specifications

English II

COURSE SPECIFICATIONS:

Technical English is a two-semester sequence that covers a general introduction about the importance of studying and learning the English language, reading paragraphs, vocabularies and the structure and writing expression for different engineering topics such as buildings construction and concrete technology. Primary rules for grammar and other topics of daily English such as parts of speech, tenses, conjunctions, and essay writing. The best way to improve student's English is by doing as much practice as they can. Therefore, to fulfil this aim, each lecture is designed to include plenty of exercises that are short and take very little time to complete. In addition to the essential subjects, the course contains information on writing a composition, setting a letter as well as the use of various of linking words to connect the simple sentences.

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Course title /code	English II / CE219
4. Programme to which it contributes	BSc in Civil Engineering
5. Models of Attendance Offered	By manual attendance forms
6. Semester / year	year
7. Number of hours tuition (total)	58
8. Date of production/ revision of this specification	2020-2021
9. Aims of the course It is a recognized fact that English has been gaining much importance for educational opportunities (at university, in travelling abroad) and for professional opportunities (in daily life). Taking these fields of application into consideration and aiming at making this global language easy to use, this course has been set to meet the need of the learners of English.	

10.Learning Outcomes , Teaching and Learning and Assessment methods

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Ability to use a software, such as MS Excel, in the calculations.

D2. Ability to work as a team..

11. Course Structure					
Week	**Total Hours**	**ILOs**	**Topic title**	**Teaching Method**	**Assessment Method**
1	**2**	Knowing and using every day English greetings and short conversations	Parts of speech	presenting and discussing constituents of the topics via direct lectures on Google meet and other supplementary materials involved pdf, pictures, and video files published on Moodle application	home works, quizzes, oral questions during the lectures, mid-year, second semester, and final exams
2	**2**		Greetings, simple sentences.		
3 and 4	**4**	Knowing the primary rules for grammar and other topics of every day English such parts of speech, tenses, linking words, conjunctions in English. Besides these skills, learning how to speak and write some technical English in the scope of civil engineering is needed.	Grammar: Present, past, future simple tenses, question and question words, reading.		
5, 6 and 7	**6**		Grammar: Present simple tense and present continuous tense and the difference between them, Making a question. Have/got have and how to use them. Reading and writing by using the linking words (but, however, so, because, ...)		
8 and 9	**4**		Grammar: Past simple, Past continuous. Difference between them. Prepositions in time expression. Reading. Writing – Linking words		

10 and 11	**4**		Grammar: Expression of quantity. Articles – a and the. Reading. Writing – Linking words		
12 and 13	**2**		Grammar: Verb patterns I. Future intentions. Vocabulary. Reading		
14 and 15	**2**		Grammar: What ... like? form. Comparatives & Superlatives. Vocabulary. Reading. Writing – Relative clauses		
16 and 17	**4**		Grammar: Present perfect. Present perfect and past simple. Vocabulary Reading. Writing – Relative clauses		
18	**2**		Grammar: Modal auxiliary verbs. Vocabulary. Reading.		
19 and 20			Grammar: Time clauses. Future "Will". First conditional. Vocabulary. Reading. Writing – Essay		
21 and 22			Grammar: Verb pattern II. Used to. The difference between used to and the past simple. Infinitives. Vocabulary. Reading & Speaking		
23			Grammar: The Passive, form, use		

24 and 25			Grammar: Second conditional (if). Might (modal auxiliary verb)		
26 and 27			Grammar: Present perfect continuous, form, use		
28 and 29			Grammar: Past perfect. Reported statements		

12. Infrastructure	
Required reading: - **CORE TEXTS** - **COURSE MATERIALS** - **OTHER**	**Text Book and other Supplemental Materials:** 1- New Headway English Course: Student's Book - Pre-intermediate (Soars and Soars, 2000). 2- http://elearning7.uokufa.edu.iq/eng/course/view. 3- https://en.oxforddictionaries.com/grammar/ (Oxford University Press, 2017).
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: http://elearning7.uokufa.edu.iq/eng/course/view.php?id=1250

Course Grade Distribution:

Activity	Grade	Remarks
Mid-Year Exam	20%	Central exam
Second Semester Exam	15%	At second semester
Attendance, Quizzes and Home works	15%	Attendance of lectures, Exam at the end of each subject and homework

THEORY OF STRUCTURES

COURSE SPECIFICATIONS:

Theory of Structures is a two semesters sequence that covers the fundamental elements of structural analysis of plane (two-dimensional) structures. The first part of this course introduces the types and classifications of structures and structural elements as well as the stability and determinacy of structures. Then, two main parts are:

- Analysis of statically determinate structures which includes computing internal actions, constructing influence lines, studying moving loads, and deformation calculations of the different types of structures (beams, frames, arches, trusses, and composite structures)
- Analysis of statically indeterminate structures which includes approximate methods, force methods, and displacement methods.

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Course title /code	Theory of Structures/ CE332
4. Programme to which it contributes	BSc in Civil Engineering
5. Models of Attendance Offered	By manual attendance forms
6. Semester / year	year
7. Number of hours tuition (total)	90
8. Date of production/ revision of this specification	2020-2021
9. Aims of the course The objective of the course is to learn the students how to deal with the analysis of different types of structural systems. Moreover, this course is needed for all subsequent structural design courses.	

10. Learning Outcomes, Teaching and Learning and Assessment methods.

A-Program Outcomes – Knowledge and Understanding

A1- An ability to apply knowledge of mathematics, science and engineering

A4- An ability to identify, formulate, and solve engineering problems

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Critical thinking in choosing the structural system.

D2. Ability to work as a team.

11. Course Structure

Week	Hours	ILOs	Topic title	Teaching Methods	Assessment Methods
1	**3**	Define Structures and structural elements and quantify the types of structures, loadings, and supports and comprehend their relevance to civil engineering.	**Definitions and Classifications**	Introduce the structural systems and explain the importance of structural analysis in structural design.	Conceptual questions
2 & 3	**6**	Perform of rigid-body equilibrium problems using the equations of equilibrium. Calculate support reactions for structures that include equations of condition. Discuss the stability and determinacy of beams, arches, frames, trusses, and composite structures.	**Stability and Determinacy of Structures**	Explain the importance of equations of equilibrium in structural analysis and review the concept of Free Body Diagram (FBD). Emphasize that the equation of condition through an internal hinge is necessary to solve the support reactions. Instruction is provided on using a two-dimensional frame analysis computer program to validate homework solutions. Student teams are asked to help solve sample problems in class.	Homework; Quiz; Mid -year exam
4 & 5	**6**	Calculate bar forces in statically determinate trusses (simple, compound, and complex trusses).	**Analysis of Determinate Trusses**	Review FBD principles as they relate to calculating bar forces in a truss; review method of joints and emphasize the method of sections. Instruction is provided on using a two-dimensional frame analysis computer program to validate homework solutions. Student teams are asked to help solve sample problems in class.	Homework; Quiz; Monthly exam; Final exam
6 & 7	**6**	Quantify the normal force, shear force and bending moment variation along the segments of a structure.	**Analysis of Determinate Beams, Frames, Arches and Composite Structures**	Review FBD principles as they relate to calculating axial, shear, and bending moments in two-dimensional beam and frame structures; relate bending moment diagram to the qualitative deflected shape of the structure. Instruction has been provided on using a two-dimensional frame analysis computer program to validate homework solutions is provided. Student teams are asked to help solve sample problems in class.	Homework; Quiz; Monthly exam; Final exam
8 - 11	**12**	6 Construct influence line diagrams for statically determinate structures and locate live loads (uniform and point force(s)) to maximize the response function.	**Influence Lines for Statically Determinate Structures**	Cover the equilibrium principles for calculating response function influence line equations (beam, frame, and truss); Muller-Breslau principle to construct qualitative influence line diagrams; discuss placement of dead and live	Homework; Quiz; Monthly exam;

				loadings; live loading includes single point force, uniform, and series of wheel loads to produce maximum response. Student teams are asked to help solve sample problems in class.	Final exam
12-15	**12**	Calculate displacements for planar truss, beam, frame and composite type structures by using unit load method.	**Deflection of Determinate Structures**	Cover the principle of virtual work to calculate two-dimensional structural displacements; emphasize the conservation of energy principle that is used to calculate the change in energy associated with the virtual force. Instruction has been provided on using a two-dimensional frame analysis computer program to validate homework solutions. Student teams are asked to help solve sample problems in class.	Homework; Quiz; Monthly exam; Final exam
16	**3**	Use approximate methods to analyze statically indeterminate continuous beams, statically indeterminate multi-bay and multi-story frames, and statically indeterminate trusses with double diagonals.	**Approximate Analysis of Indeterminate Structures**	Develop engineering principles for equilibrium-based approximate analysis with a focus on selection of inflection points. Use the portal method of approximate analysis to analyze two-dimensional frame structures with multiple bays and stories. Develop engineering principles for equilibrium-based approximate analysis with a focus on tension-compression assumptions in the diagonals of double diagonal trusses.	Homework; Quiz; Monthly exam; Final exam
17 - 21	**15**	Analyze statically indeterminate truss, beam, arch, frame and composite type structures using the method of consistent deformation	**Analysis of Indeterminate Structures by Consistent of Deformation Method**	Develop consistent deformation method of analysis including selection of various redundant forces; equilibrium and displacement calculations after the calculation of the redundant forces. Student teams are asked to help solve sample problems in class	Homework; Quiz; Monthly exam; Final exam
22 - 26	**15**	Analyze statically indeterminate beam and frame structures using the slope deflection method	**Analysis of Indeterminate Structures by Slope Deflection Method**	Develop slope-deflection method of analysis to analyze kinematically indeterminate structures; leads to the calculation of joint displacements. Member-end forces are calculated after calculating the joint displacements. Beam and both non-sway and sway frames are considered. Student teams are asked to help solve sample problems in class.	Homework; Quiz; Monthly exam; Final exam

27 - 30	**12**	Analyze statically indeterminate beam and frame structures using the moment distribution method	**Analysis of Indeterminate Structures by Moment Distribution Method**	Stiffness coefficient and fixed-end moment concept introduced in the slope-deflection method of analysis is used to perform to the iterative analysis of continuous beam as well as non-sway and sway frame structures using the moment distribution method of analysis. Student teams are asked to help solve sample problems in class.	Homework; Quiz; Monthly exam; Final exam

12. Infrastructure	
Required reading: - **CORE TEXTS** - **COURSE MATERIALS** - **OTHER**	**Required Text:** - Hibbeler, R.C. "Structural Analysis", Sixth Edition, Pearson Prentice Hall, 2006. - Aslam Kassimali "Structural Analysis" 1993, PWS KENT Publishing Company **Optional Text:** - Mckenzie W.M.C. Examples in Structural Analysis, Taylor & Francis Publishing Company, 2006. **In addition:** - Notes for this course were provided since the course at the University of Kufa is taught over the full academic year rather than over a semester.
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: http://elearning7.uokufa.edu.iq/eng/course/view.php?id=1247 You-Tube Channel https://www.youtube.com/channel/UC4oHmEDPcD5upQ0-vIpPqJw/featured
Community-based facilities (include for example, guest lectures, internship, field studies)	**Field visits to various project sites**

13. Admissions	
Pre-requisites	Engineering Mechanics and Strength of Materials
Minimum number of students	60
Maximum number of students	80

Course Specifications

SOIL MECHANICS

COURSE SPECIFICATIONS:

Soil Mechanics is a two semesters sequence that covers the fundamental elements of soil mechanics. Soil is treated as an engineered material with physical properties such as strength, compressibility, permeability…etc. It is important to be able to understand, predict, and control these properties to increase the likelihood that structures placed on top of soil will perform satisfactorily. In these semesters, students will study soil with respect to these properties in order to obtain knowledge and proficiency for predicting and controlling soil behavior.

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Course title /code	Soil Mechanics / CE333
4. Programme to which it contributes	BSc in Civil Engineering
5. Models of Attendance Offered	By manual attendance forms
6. Semester / year	year
7. Number of hours tuition (total)	104
8. Date of production/ revision of this specification	2020-2021
9. Aims of the course The objectives of these courses are to introduce soil mechanics to civil engineering undergraduate students and to familiarize the students with soil terminology and concepts commonly encountered in engineering practice.	

10.D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Ability to use a software, such as MS Excel, in the calculations.

D2. Ability to work as a team..

11. Course Structure					
Week	**Hours**	**ILOs**	**Topic title**	**Teaching Methods**	**Assessment Methods**
1	**2**	underline the importance and significance of soil mechanics	Introduction and Background	Spend two lecture periods discussing and defining soil mechanics and soil problems with plates, sketches and discussion	Exam #1
2	**2**	identify the origins and formation of soil	Soil Formation	Lecture in class to discuss the parent rock and soil formation with plates, sketches and discussion	Exam #1
3 and 4	**4**	relate the soil phases (minerals, air, and water)	Weight-Volume Relationships in Soil	Lecture in class to describe the concept the different phases of the soil material, how to calculate their weights and volumes, also to find the relationships among them.	HW & Exam #2
5	**2**	classify soil using Unified Soil Classification System (USCS)	Soil Plasticity	Lecture in class to describe USCS method; do sample problems in class; perform two labs to classify soil in addition to grain size lab and Atterberg limits lab	
6 and 7	**4**		Grain Size Distribution in Soil		
8	**2**		Soil Classification		
9 and 10	**4**	interpret soil compaction and compaction control	Soil Compaction	Lecture in class to describe the concept of soil compaction curve; perform sample problems in class; perform compaction lab	Exam #3
11 and 12	**4**	estimate the coefficient of soil permeability	One-Dimensional Fluid Flow in Soil	Lecture in class to describe the concept of soil hydraulic conductivity; perform sample calculations in class; perform lab on hydraulic conductivity with plates, sketches and discussion	Exam #4
13, 14, 15 and 16	**8**	estimate flow rates using flow net	Two-Dimensional Fluid Flow in Soil	Lecture in class to describe the two dimensional flow; show some examples; discuss flow nets and seepage forces and do examples in class with plates, sketches and discussion	Exam #5

11. Course Structure, continued					
Week	**Hours**	**ILOs**	**Topic title**	**Teaching Methods**	**Assessment Methods**
17, 18, 19 and 20	**8**	calculate stresses within a soil mass	Stresses in Soil	Lecture in class to describe the concept of effective stress and the external stress distribution in the soil mass; perform sample calculations in class;	HW & Exam #6
21, 22, 23 and 24	**8**	estimate the consolidation settlement	Consolidation Settlement	Discuss time rates of settlement discuss consolidation settlement in lecture; perform sample calculations in class; do a lab on consolidation to measure consolidation parameters in lecture; derive consolidation coefficients; with plates, sketches and discussion	Exams #7 & #8
25, 26, 27 and 28	**8**	calculate the soil shear strength parameters	Shear Strength in Soil	Discuss the concept of shear strength in class; perform sample problems using Mohr circles; perform labs on triaxial, direct shear and unconfined compressive strength testing	Exam #9
29 and 30	**4**		Theory of Stress Path		

In addition to the lecture meetings, the course will occasionally meet for laboratory sessions. The laboratory lessons are intended to parallel the lecture material, and are also listed below.

Laboratory No.	Laboratory Test
1	Moisture Content
2	Organic Content
3	Specific Gravity
4	Atterberg Limits
5	Mechanical Analysis
6	Soil Compaction (Standard and Modified Proctor Test)
7	Field Measurement of Dry Unit Weight and Moisture Content
8	One-Dimensional Permeability Test
9	Consolidation Test

10	Direct Shear Test
11	Unconfined Compressive Strength Test
12	Triaxial Strength Test

12. Infrastructure	
Required reading: - **CORE TEXTS** - **COURSE MATERIALS** - **OTHER**	- Das, B. M., 2009, Principles of Geotechnical Engineering, 7th Edition, Brooks-Cole, Pacific Grove, California, ISBN 0-495-41130-2 - Lectures of Soil Mechanics by Prof. Dr. Mohammed Shaker Al Shakerchy from http://eng.uokufa.edu.iq/staff/mohammedsh/index.html - The laboratory textbook for this course is: booklet of soil laboratory prepared by laboratory staff
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: http://elearning7.uokufa.edu.iq/eng/course/view.php?id=1245
Community-based facilities (include for example, guest lectures, internship, field studies)	

13. Admissions	
Pre-requisites	Engineering geology, engineering mechanics and fluid mechanics
Minimum number of students	15
Maximum number of students	25

Course Specifications

Irrigation and Drainage Engineering

COURSE SPECIFICATIONS:

Irrigation and drainage engineering is a two semesters sequence that covers the fundamentals of Irrigation and drainage engineering and open channel hydraulics. The study of Irrigation and Drainage engineering is very critical to civil engineers who are planning to practice in this field after graduation. For civil engineers, the material provided in this course will provide fundamental knowledge for future practicing in Irrigation and drainage systems designs especially in this region where the economy id greatly enhanced by agricultural produces exports. This course introduces the fundamental of Irrigation and drainage design to students including, surface irrigation systems, sprinkler irrigation system, Trickle irrigation system, open channel hydraulics, and drainage systems. In irrigation engineering, students will learn the designation of surface irrigation systems, sprinkler irrigation systems, and trickle irrigation systems given land physical properties and climate conditions dominated in the region. In drainage irrigation, the students will be introduced to the methods used for land draining and the equations governing the flow in a porous media and their derivatives.

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Course title /code	Irrigation and Drainage Engineering / CE3221
4. Programme to which it contributes	BSc in Civil Engineering
5. Models of Attendance Offered	By manual attendance forms
6. Semester / year	year
7. Number of hours tuition (total)	60
8. Date of production/ revision of this specification	2020-2021
9. Aims of the course The objectives of these courses are to introduce irrigation and drainage engineering to students in order to build a new civil engineers generations that are capable of comprehend the science of Irrigation and drainage engineering.	

10 .Learning Outcomes, Teaching and Learning and Assessment methods.

A-Program Outcomes – Knowledge and Understanding

A1- An ability to apply knowledge of mathematics, science and engineering

A3- 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 .

A4- An ability to identify, formulate, and solve engineering problems

D-Program Outcomes – General and transferable skills (other skills relevant to employability and Personal development)

D1- An ability to function on multidisciplinary teams .

11. Course Structure

Week	Hours	ILOs	Topic title	Teaching Methods	Assessment Methods
1	**2**	underline the importance and significance of open channels	Introduction to open channels and its types	discussing and defining open channels and its types with sketches and discussion. - Video presentation. Online meeting using White board sketching and presentation.	Exam #1
		identify and classify the types of flow in open channels	Types of flow	Discuss and compare the flow types with plates, sketches and discussion. - Video presentation. Online meeting using White board sketching and presentation.	Exam #1
3 and 4	**4**	Derive the Chezy and Mannings equations for uniform flow	Computation of velocity in open channels	introduce the concept the velocity, how to calculate their values using the derived equations with solved examples.	HW & Exam #1
5	**2**	Estimate the roughness coefficient for composite section	Weighted roughness	describe the concept of composite roughness; perform sample problems.	HW
6	**2**	identify and derive the best hydraulic section	Optimum hydraulic section	Discuss the concept of best hydraulic section; derive the best section for different cross section using solved examples. - Video presentation. Online meeting using White board	HW

				sketching and presentation.	
7 and 8	**4**	identify and derive the specific energy in open channels	Specific energy	Discuss the concept of specific energy; perform sample calculations; perform with plates, sketches and discussion. - Video presentation. Online meeting using White board sketching and presentation.	Exam #2
		Identify the locations of occurrence of critical depth	Occurrence of Critical depth	describe the locations of occurrence of critical depth with some examples and plates, sketches and discussion. - Video presentation. Online meeting using White board sketching and presentation.	Exam #2
		calculate the critical depth for different cross sections	Computation of critical depth	Do some solved examples to calculate the critical depth in open channels	HW & Exam #2
9	**2**	identify and classify the hydraulic jump in open channels Calculate the depths of hydraulic jump and the energy losses through it	Hydraulic jump	Discuss the phenomenon of hydraulic jump, perform sample calculations; with plates, sketches and discussion. - Video presentation. Online meeting using White board sketching and presentation.	Exams #3
10	**2**	identify the lining of open channels and advantages of lining	Lining	Discuss the lining of open channels with plates, sketches and discussion	Exam #4
11	**4**				
12 and 13	**4**	identify and derive the equation relate the flow movement in soils and estimate the permeability in field	Flow of water through soils	Discuss the concept of flow of water through porous media and the permeability with plates, sketches and discussion	Exam #4
14	**2**	Identify the process of land drainage	Introduction to drainage engineering	Discuss the concept of drainage engineering and its types with plates, sketches and discussion. Do some	Exam #5 & Exam #6

15	**2**	Identify the methods of land drainage Estimate the variables that are related the drainage design	Types of drainage engineering Design the drainage	solved examples to calculate the variables that relate the drainage design. Video presentation. - Online meeting using White board sketching and presentation.	
16	**2**	Define the Irrigation and state its types, aims, scope, phases, and studies. In addition, hydrologic cycle is presented	Introduction to the Irrigation Engineering	- Video presentation. - Online meeting using White board sketching and presentation.	Homework
17	**2**	Present the sources for irrigation water as well as the water quality requirements and specifications	Introduction to the Irrigation Engineering	- Video presentation. - Online meeting using White board sketching and presentation.	Homework
18	**2**	Present the common methods used in irrigation and surface irrigation mechanism	Methods of Irrigation and surface irrigation	-Video presentation. -Online meeting using White board sketching and presentation.	Homework
19	**2**	Present the water balance concept and derive its equation	Surface irrigation	-Video presentation. -Online meeting using White board sketching and presentation.	Homework
20	**2**	Solve Examples	Surface irrigation	-Video presentation. -Online meeting using White board sketching and presentation.	Homework
21	**2**	Present governor equations and methodology of design	Surface irrigation: Border Irrigation	-Video presentation. -Online meeting using White board sketching and presentation.	Homework

22	**2**	Solve Examples-I	Surface irrigation: Border Irrigation	-Video presentation. -Online meeting using White board sketching and presentation.	Homework
23	**2**	Solve Examples-II	Surface irrigation: Border Irrigation	-Video presentation. -Online meeting using White board sketching and presentation.	Homework
24	**2**	Present basic concepts, pros and cons.	Sprinkler irrigation	-Video presentation. -Online meeting using White board sketching and presentation.	Homework
25	**2**	Present basic components of the system	Sprinkler irrigation	-Video presentation. -Online meeting using White board sketching and presentation.	Homework
26	**2**	Present the hydraulics of Sprinkler Nozzle	Sprinkler irrigation	-Video presentation. -Online meeting using White board sketching and presentation.	Homework
27	**2**	Present flow in pipe principles	Sprinkler irrigation	-Video presentation. -Online meeting using White board sketching and presentation.	Homework
28	**2**	Present flow in multi outlet pipes	Sprinkler irrigation	-Video presentation. -Online meeting using White board sketching and presentation.	Homework
29 and 30	**2**	Solve examples-I	Sprinkler irrigation	-Video presentation. -Online meeting using White board sketching and presentation.	Homework

12. Infrastructure	
Required reading: - **CORE TEXTS** - **COURSE MATERIALS** - **OTHER**	***1_Irrigation and Drainage (Dr.Liath K. Ismaeel)*** ***2- Irrigation (Dr. Mohammed A. Al-najem)*** ***3- Water Resources systems and Management(R. Gupta)*** ***4- Open Channel Hydraulic (V. T. Chow)***
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: http://elearning7.uokufa.edu.iq/eng/user/profile.php?id=598

13. Admissions	
Pre-requisites	fluid mechanics
Minimum number of students	15
Maximum number of students	25

Course Specifications

Traffic Engineering

COURSE SPECIFICATIONS:

This course introduces basic concepts of transportation and traffic engineering. It is a two semesters sequence that covers the fundamental elements of traffic engineering. It focuses on procedures used in traffic road transportation system design, operations management, and planning. Issues affecting modes other than the automobile are discussed. Students become familiar with transportation and traffic engineering topics though an analysis of transportation infrastructure problems.

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Course title /code	Traffic Engineering / CE338
4. Programme to which it contributes	BSc in Civil Engineering
5. Models of Attendance Offered	By manual attendance forms
6. Semester / year	year
7. Number of hours tuition (total)	104
8. Date of production/ revision of this specification	2020-2021

9. Aims of the course

The objective of this course is to introduce students to key topics, issues, and design procedures in the field of traffic engineering. Students are exposed to current design guidelines and are introduced to the basic issues dealing with traffic engineering.

10.Learning Outcomes , Teaching and Learning and Assessment methods

D.General and Transferable Skills (other skills relevant to employability and personal development)

D1. Ability to use a software, such as MS Excel, in the calculations.

D2. Ability to work as a team..

11. Course Structure					
Week	**Hours**	**ILOs**	**Topic title**	**Teaching Methods**	**Assessment Methods**
1	2	Informing the students the basic and principle of road network systems	Introduction to traffic engineering; Principles of road network systems	One lecture to be introduction of this course	--------
2	2	Understand traffic flow measurements and field data collection and analysis	Traffic volume studies: Count types, techniques, volume variation, short counts, volume measurement types	Discuss the concepts of flow elements ,methods of volume measurements and predicting current traffic and future traffic demand.	Homework; quiz; exam; final exam; assessment form
3	2	Determining spot speed, 85^{th} speed, median speed and its applications.	Spot speed, speed types, definition, measurements, determination of average spot speed, speed limit, design speed	Two lectures are required to learn student how to estimate spot speed, sample of speed data, draw accumulative speed curve and determine 85^{th} speed.	exam; final exam; assessment form
4-5	4	Understand speed-flow-density relationships	Fundamental relationship between speed-flow-density, relationship derivation, linear and non-linear relationship (speed-density), evaluation of different curves	Discuss the concepts of flow, density and speed; identify their relationships; demonstrate the development of flow models;	Homework; quiz; exam; final exam; assessment form
6	2	Determining Types, signalized intersection delay, route delay	Traffic delay study: Types, signalized intersection delay, route delay	Explain the delay types and measurements Students are required to solve homework problems that apply these principles	Homework; quiz; exam; final exam; assessment form
7	2	Understand types of parking, evaluate parking	Car parking: Surveys, types, measurements, determination of off-street parking location (moment method)	One lecture and lab to present homework and collecting parking data	Lab; quiz; exam; final exam; assessment form
8	2	Understand impacts of human factors on roadway design	Perception procedure intellect in human mind, factors affecting drivers (physical, psychological, modifying)	Explain impacts of human factors on roadway design; discuss reaction and braking times; demonstrate effect of human factors on traffic	Mid-year and final examination

				sign placement Students are required to solve homework problems that apply these principles	
9-11	6	Application of sight distance on horizontal curve	Stopping Sight Distance (SSD): Min required SSD, min passing sight distance, min radius of horizontal curve for SSD, min vertical curve length for SSD	Three lectures explain min required SSD, min passing sight distance, min radius of horizontal curve for SSD, min vertical curve length for SSD	quiz; exam; final exam; assessment form
12	2	Determine appropriate phasing plan for a signalized intersection	Analysis of basic freeway section (uninterrupted flow, factors affecting capacity, service flow rates, level of service)	Students are required to solve homework problems that apply these principles and use them in completing a group project	Lab; quiz; exam; final exam; assessment form
13	2	Determine Level of service (LOS) for basic freeway segment (Planning, designing and analysis).	Analysis of multi-lane rural highway section (uninterrupted flow, factors affecting capacity, service flow rates, level of service)		
14	2	Determining the time and space headway on roadway	Headway and gap distribution (double exponential distribution), statistical testing		
15	2	Identify the interchange types	Interchanges: Types, design principles	One lecture to draw the interchange types with applications	Quiz
16-17	4	Evaluate alternative designs and phasing plans for a signalized intersection And Compute optimum cycle length for a signalized intersection	At-grade Intersections: Shapes, principles of design, warrants for signals for at-grade intersections	Present Critical Movement Analysis for traffic lane allocation; demonstrate use of Webster=s formula for cycle computation; review computations for clearance interval and green times. Students are required to solve homework problems that apply these principles and use them in completing a group project	Lab; quiz; exam; final exam; assessment form
18-19	6		Design of traffic signals (Webster method), example of traffic signals		
20	2		Method of coordination (specifically the flexible progressive method), time-space diagram		
21	2	Understand the impacts of various modes of transportation and	Traffic signs: Type, shapes, colors; road markings types and applications;	One lectures to show the students the traffic signs and specifications	Quiz

		of future technologies on transportation			
22-25	6	Learning the accident causes, rates and modeling	Traffic accident types, reporting, surveys, analysis objectives, accident rates, safety precautions and countermeasures	Three theoretical lectures in determining the collecting of accident data	quiz; exam; final exam; assessment form
26-28	4	Understand the goals and objectives of transportation planning	Transportation planning	Demonstrate models used in traffic generation, trip distribution and assignment, and route choice; discuss computer software used in transportation planning Students are required to solve homework problems that apply these principles	Homework; quiz; exam; final exam; assessment form

In addition to the lecture meetings, the course will occasionally meet for laboratory sessions. The laboratory lessons are intended to parallel the lecture material, and are also listed below.

Laboratory No.	Laboratory Test
1	Videos of data collected from field
2	Collecting flow data from field
3	Collecting speed data from field
4	Collecting headway data
5	Analysis and determining flow relationship from field data- PHF
6	Understanding how to use the HCS for different facilities such as basic freeway, multi-lane, two-lane, weaving, merging and intersections
7	Collecting data for urban transportation planning
8	Videos of data collected from field
9	Collecting flow data from field
10	Collecting speed data from field
11	Collecting headway data
12	Analysis and determining flow relationship from field data- PHF

12. Infrastructure	
Required reading: - **CORE TEXTS** - **COURSE MATERIALS**	- Garber, N. and Hoel L. *Traffic and Highway Engineering*, 4th Edition, Cengage Learning, Toronto ON - HCM (2000). *Highway Capacity Manual.* Transportation Research Board, TRB Special Report 209, USA.

- **OTHER**	- HCM (2010). *Highway Capacity Manual*. Transportation Research Board, TRB Special Report 616, USA. - Institute of Transportation Engineering, ITE. (2010). *Traffic Engineering Handbook.* 6th Edition, USA: Washington. - Mannering, F., Kilareski,W., and Washburn, S. (2005). *Principles of Highway Engineering and Traffic Analysis*. 3rd edition, USA. - Pignataro ,L. J. "Traffic Engineering theory and practice" ,Prentice-Hall , Inc., New Jersey, USA, 1973. - Lectures of Traffic Engineering by Prof. Dr. Hamid Athab Eedan Al-Jameel and Asst. Prof Dr Khwala Hasaan Hamoudi http://elearning7.uokufa.edu.iq/eng/course/view.php?id=1240
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: http://elearning7.uokufa.edu.iq/eng/course/view.php?id=1240
Community-based facilities (include for example, guest lectures, internship, field studies)	In addition to the lecture meetings, the course will occasionally meet for laboratory sessions. The laboratory lessons are intended to parallel the lecture material, and are also listed below.

Course Name: Engineering Analysis and Numerical Methods

Course Description:

This class is an introductory level on applying some numerical methods in civil/structural engineering. The class will cover several topics include a solution of non-linear equations, solution of simultaneous equations, numerical interpolation, numerical integration, Fourier series for the function of one variable, solution of initial and boundary value problems in ordinary differential equations, method of least squares, and solution of high-order equation finite differences.

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Course title /code	Engineering and Numerical Analysis / CE321
4. Program to which it contributes	Learning the students modeling and development of numerical techniques to solve different types of models
5. Models of Attendance Offered	In classrooms and lab
6. Semester / year	year
7. Number of hours tuition (total)	120
8. Date of production/ revision of this specification	2020-2021

9. Aims of the course

The aim of this course is for all engineering students to introduce them to mathematical modeling and the development of numerical techniques to solve different types of models. A course that develops students to transform real-life problems into mathematical equations and provide the appropriate numerical schemes to approximate solutions of such models. and development of numerical algorithms to provide solutions to common problems formulated in science and engineering. The primary objective of the course is to develop a basic understanding of the construction of numerical algorithms, and perhaps more importantly, the applicability and limits of their appropriate use.

10. Learning Outcomes , Teaching and Learning and Assessment methods

D.General and Transferable Skills (other skills relevant to employability and personal development)

D1. Ability to use a software, such as MS Excel, in the calculations.

D2. Ability to work as a team..

11.COURSE STRUCTURE					
Week	Total Hours	ILOs	Topic title	Teaching Method	Assessment Method
1 and 2	4	Find the solution for non-linear equations using several methods.	Solution of non-Linear Equations	Present different examples with a step-by-step solution for each method of finding equation roots.	Quizzes, Exams, Homework, and Classwork
3, 4 and 5	12	Compute the solution of simultaneous linear equations	System of Simultaneous Linear Ordinary D.Es	Show examples of how to solve several linear ordinary equations.	Quizzes, Exams, Homework, and Classwork
6, 7 and 8	12	Calculate the unknowns in a set of equations using different methods	Advanced Matrices	Cover some exercises of matrices with their solution of unknowns.	Quizzes, Exams, Homework, and Classwork
9 and 10	8	Solve a set of simultaneous equations with various approaches.	Solution of simultaneous Linear Equations	Explain the history of each equation such as an engineering or a physical problem then solve them with different kinds of methods.	Quizzes, Exams, Homework, and Classwork
11	4	Estimate a missing value or interpolate an intermediate value.	Interpolation	Explain the importance of finding a missing value in a field and how to estimate it with several interpolating methods.	Quizzes, Exams, Homework, and Classwork
12 and 13	8	Compute the errors in solving non-linear equations.	Method of Least Squares of Errors	Show the errors due to calculating the values in non-linear equations and how to avoid or reduce that error in the solution.	Quizzes, Exams, Homework, and Classwork
14, 15 and 16	12	Differentiate equations numerically.	Numerical Differentiation	Find the differentiation of some equations using different methods and illustrate the solution graphically to make students understand it well.	Quizzes, Exams, Homework, and Classwork
17 and 18	8	Compute the approximate integration of the area under the curve for complex functions.	Numerical Integration and Computer Application	Calculate the integration for some complex equations which don't have an exact solution by representing the function graphically and solve it numerically with an approximate result.	Quizzes, Exams, Homework, and Classwork
19, 20, 21 and 22	16	Calculate integration of periodic functions by applying Fourier series	Fourier Series	Draw the periodic functions such as triangular functions, then explain how to apply the Fourier	Quizzes, Exams, Homework, and

		conception.		series to find the integration for some cycles.	Classwork
23, 24, and 25	12	Solve structural problems with ordinary differential equations.	Partial Differential Equations and Boundary Value Problems	Apply the finite differences approach to solve problems with some known boundary conditions at the ends of the structural element to find the structural analysis results.	Quizzes, Exams, Homework, and Classwork
26, and 27	8	Calculate the initial and boundary value problems and their application.	Numerical Solution Partial Differential Equations	Show several engineering examples and represent them graphically then solve them using an initial value or known information.	Quizzes, Exams, Homework, and Classwork
28, 29, and 30	12	Understand the finite difference method and applying the concepts to find the deformations and forces in structural elements.	Finite differences Method	Derive and show the concept of the finite differences method to the students and apply the concept to solving several structural beams to find the deflection, rotation, shear forces, and bending moments.	Quizzes, Exams, Homework, and Classwork

12. Infrastructure	
Required reading: - **CORE TEXTS** - **COURSE MATERIALS** - **OTHER**	**Text Book:** Applied Numerical Analysis." Gerald, third edition" **Other Supplemental Materials:** **1.** Numerical Analysis. " Burdeu, seventh edition" **2.** "مقدمة في التحليلات العددية." د. احمد الالوسي. د. عادل البياتي
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: http://elearning7.uokufa.edu.iq/eng/course/view.php?id=1240
Community-based facilities (include for example, guest lectures, internship, field studies)	In addition to the lecture meetings, the course will occasionally meet for laboratory sessions. The computer laboratory lessons are intended to parallel the lecture material, and are also listed below.

Project Management

COURSE DESCRIPTION

Course Catalog Description: Project construction management, realizing project management, and clarifying project success and/or failure. Construction of buildings, dams, airports, highways, and bridges with considering safety and reliability in construction.

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Department of Civil Engineering
3. Course title /code	Project Management / CE 101
4. Programme to which it contributes	BSc in Civil Engineering
5. Models of Attendance Offered	By manual attendance forms
6. Semester / year	year
7. Number of hours tuition (total)	60
8. Date of production/ revision of this specification	2020-2021
9. GOALS/OBJECTIVES	In this course, the basics of project management, cost estimates, and scheduling techniques will be introduced to the students. In addition, the course will cover a variety of topics, such as contract types, project budget control, and bidding strategy. The main purpose of this class is to let students aware of the managerial basics, which are estimating techniques, material, labor, equipment, and progress payment reports.

10.Learning Outcomes , Teaching and Learning and Assessment methods

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Ability to use a software, such as MS Excel, in the calculations.

D2. Ability to work as a team..

11. COURSE STRUCTURES					
Week	Total Hours	ILOs	Topic title	Teaching Method	Assessment Method
1 and 2	6	Learning the basics of this course	Syllabus, Introduction	Explain the way of teaching this class, the method of contacting students with their instructor, the method of solving homework and submitting, etc. In addition to giving a general information about construction project management.	All exams
3 to 8	12	Construction Schedule	Construction Schedule	Discussing and teaching a number of adopted methods to develop a schedule for construction projects.	Midterm Exam
9	3	Contract Management	Contract Management	Teaching the most used types of contractual agreements among the involved parties in projects execution.	Midterm Exam
10	3	Estimating Activity Duration	Estimating Activity Duration	Discussing the affecting factors on labor productivity in case to calculate the required time to complete each activity of project activities.	Midterm Exam
11	6	Project Bidding	Project Bidding	Teaching and explaining the put rules and procedures to specify the winning contractor among a number of willing contractors.	Midterm Exam
12 to 16	12	Economic Project Selection Criteria	Economic Project Selection Criteria	Teaching a number of topics referred to Engineering Economics, and then explaining the procedure of calculating cost and profit of projects and defining the way of selecting the project with the most promising profits.	Final Exam
17 to 20	6	Project Cost and Schedule Control	Project Cost and Schedule Control	Explaining the methods of analyzing projects progression by comparing the planned and actual costs with suggesting the most suitable methods of fixing any late progression or over-cost execution.	Final Exam
21 to 23	6	Resident Project Representative Office	Resident Project Representative Office	Teaching the responsibilities and duties of resident project representative office	Final Exam
24 to 26	6	Change Order	Change Order	Teaching the purpose and need of changer order with explaining the rules and methods of issuing change orders.	Final Exam
27 to 30	8		Project		

12. Infrastructure	
Required reading: - **CORE TEXTS** - **COURSE MATERIALS** - **OTHER**	**Required Textbook** "Project Management in Practice" Fourth Edition, Mantel S. J., Meredith J R., Shafer S. M., Sutton M. M., USA. "Project Management" Tenth Edition, Kerzner H., Hoboken, New Jersey.
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: http://elearning7.uokufa.edu.iq/eng/course/view.php?id=1240
Community-based facilities (include for example, guest lectures, internship, field studies)	

Design of Reinforced Concrete II

COURSE SPECIFICATIONS:

The frames are analyzed to resist bending moments using Direct Design Method DDM. The slab thickness will be calculated to control deflection. The slab will be designed to resist one way shear and punching shear, and the shear resistance will be increased by stirrups. Analysis of frames will be done using Equivalent Frame Method EFM to have results that are more accurate. Slabs of irregular shape will be analyzed using yield line method. The design of Pre-stressed concrete beams to resist flexure will be introduced.

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Course title /code	**Design of Reinforced Concrete II** / CE431
4. Programme to which it contributes	BSc in Civil Engineering
5. Models of Attendance Offered	By manual attendance forms
6. Semester / year	year
7. Number of hours tuition (total)	90
8. Date of production/ revision of this specification	2020-2021

9. Aims of the course

The objective of the course is to learn the students how to deal with reinforced concrete structural systems and design them according to design codes. Moreover, the course introduces the prestressed concrete structures for simple structures.

10. Learning Outcomes, Teaching and Learning and Assessment methods.

A1- An ability to apply knowledge of mathematics, science and engineering

A3- 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 .

A4- An ability to identify, formulate, and solve engineering problems

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Critical thinking in choosing the structural system.

D2. Ability to work as a team.

11. Course Structure					
Week	**Hours**	**ILOs**	**Topic title**	**Teaching Methods**	**Assessment Methods**
2	**6**	Calculate the minimum slab thickness to control deflection for slab with beams.	Control of deflection for slab with beams	Introduce the building systems and the students will learn how to use ACI 318 to calculate minimum thickness to control deflection.	Exam #1
1	**3**	Calculate the minimum slab thickness to control deflection for slab without beams.	Control deflection for slab without beams	Introduce flat slab and flat plate and train the students how to use ACI tables to calculate minimum thickness to control deflection.	Exam #1
2	**6**	Calculate the moment per meter for slab with beams using DDM.	Direct Design method DDM for slab with beams	Train the students how to divide the building into plane frames. Show the students how to use the ACI tables to find moments. Describe the details of rebar and ask the students to design the slab working as groups.	HW & Exam #2
2	**6**	Calculate the moment per meter for slab without beams using DDM.	Direct Design method DDM for slab without beams	Train the students how to divide the building into plane frames. Show the students how to use the ACI tables to find moments.	
1	**3**	Design the slab to resist flexure.	Reinforcement detailing	Train the students how to use the ACI detailing requitements.	Exam #3
1	**3**	Design the slab without beam to resist one-way shear	One-way shear design for slab without beam	Explain the effect of shear on slabs. Teach the students on how to design the slab to resist shear.	Exam #4

11. Course Structure, continued

Week	Hours	ILOs	Topic title	Teaching Methods	Assessment Methods
2	**6**	Design the slab without beam to resist two-way shear	Two-way shear design for slab without beam	Explain the effect of shear on slabs and show the students a short movie about Sampoong Mall failure. Teach the students on how to design the slab to resist shear.	Exam #5
2	**6**	Design the slab for moment transfer from slab to column by flexure.	Moment transfer from slab to column by flexure	Show the students drawings of moment transfer, and then explain to them steps of design.	HW & Exam #6
2	**6**	Design the slab for moment transfer from slab to column by shear.	Moment transfer from slab to column by shear	Show the students drawings of moment transfer, and then explain to them steps of design.	Exams #7 & #8
2	**6**	Calculate the stiffness of slab-beam strip using EFM.	Stiffness of slab-beam strip using Equivalent Frame Method EFM	Introduce EFM to students and review briefly moment distribution method. Read the provision of ACI 318 on this topic. Solve example and ask students to do homework.	HW & Exam #9
3	**9**	Calculate the stiffness of equivalent column using EFM.	Stiffness of column using Equivalent Frame Method EFM	Show the students some drawings to clarify the concept of torsional member. Solve example on calculation of equivalent column stiffness.	Exam #10
2	**6**	Calculate the moment from moment distribution using EFM.	Analysis of frames using Equivalent Frame Method EFM	Solve an example using moment distribution method and EFM tables. Ask the students to do homework.	HW & Exam #11
4	**12**	Calculate the ultimate moment using yield line theory.	Analysis of slabs using yield line theory	Explain the main concept of yield line method and solve example. Ask the student to solve class problem in groups.	Exam #12
4	**12**	Analyze pre-stressed concrete beam to resist flexure.	Introduction to pre-stressed concrete	Explain the main concept of prestressed concrete and show the students short film on the topic, and then read the ACI provisions and solve example. Ask the student to solve class	HW & Exam #13

				problem in groups.	

12. Infrastructure	
Required reading: - **CORE TEXTS** - **COURSE MATERIALS** - **OTHER**	- Darwin D., Dolan, C.W. and Nilson, A.H., "Design of Concrete Structures", McGraw-Hill, Fifteenth Edition, 2016. - American Concrete Institute, "Building Code Requirements for Structural Concrete (ACI 318-19)", Farmington Hills, Michigan, 2019 . - Wight, J.K., "Reinforced Concrete, Mechanics and Design", Pearson Education, Inc., Seventh Edition, 2016. - Hassoun, M.N. and Al-Manaseer, A., "Structural Concrete, Theory and Design", John Wiley & Sons, Inc., Seventh Edition, 2020.
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: http://elearning7.uokufa.edu.iq/eng/course/view.php?id=1234 Youtube: https://www.youtube.com/channel/UCL0MFlLiLRx4NkSPuM0zpfQ
Community-based facilities (include for example, guest lectures, internship, field studies)	**Field visits to various project sites**

13. Admissions	
Pre-requisites	Engineering Mechanics, Strength of Materials, Theory of Structures, Reinforced Concrete Design I
Minimum number of students	58
Maximum number of students	69

HIGHWAY ENGINEERING

Course Description:

Highway engineering subject is a two-course sequence that covers the fundamental elements of highway engineering. Highway engineering is the application of technological and scientific principles to the planning, functional design, operation and management of highway network in order to provide for the safe, rapid, comfortable, convenient, economical, and environmentally compatible movement of people and goods. Also, the course includes the geometric design, cross section elements, earthwork, paving material properties, structural design of flexible and rigid pavements and maintenance program that can be adopted on highway system.

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Course title /code	Highway Engineering / CE435
4. Programme to which it contributes	Learning the students the highway engineering principles
5. Models of Attendance Offered	In classrooms and lab
6. Semester / year	year
7. Number of hours tuition (total)	60
8. Date of production/ revision of this specification	2020-2021
9. Aims of the course	
The aims of these courses are to introduce highway engineering principles to civil engineering undergraduate students and to familiarize the students with highway engineering subject and concepts commonly encountered in engineering practice.	

10.Learning Outcomes, Teaching and Learning and Assessment methods.

A- Program Outcomes – Knowledge and Understanding

A1- An ability to apply knowledge of mathematics, science and engineering

A2- An ability to design and conduct experiments, as well as to analyze and interpret data

A3- 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 .

A4- An ability to identify, formulate, and solve engineering problems

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Ability to use a software, such as MS Excel, in the calculations.

D2. Ability to work as a team.

D3. Critical thinking in choosing the structural system.

11. Course Structure

Week	Total Hours	ILOs	Topic title	Teaching Method	Assessment Method
1	2	Knowing the students the important of studying the highway engineering	Introduction to Highway Engineering Course	One lecture to calculate the earthwork areas and volume , and draw the mass haul diagram Spend one lecture discussing and defining the cross section element and how to determine the right of way Three lectures in class to study horizontal curves and design of highway super elevation	home works, quizzes, oral questions during the lectures, mid-year, second semester, and final exams
2	2	Determine the best location and route of a highway	Highways History; Highway Location and economic; Highway surveying		
3	2	Understand the cross section elements of various highway classes	Cross Section Elements		
4	2	Calculate the earthwork volumes of cut and fill along the highway profile.	Mass Haul Diagram and Earthworks		
5 and 6	4	Understand and design the horizontal and vertical alignment of highway	Highway Alignment: Horizontal Alignment		
7 and 8	4		Super elevation and		

			Widening	sections Three lectures are required to learn student how to design vertical curve length and determine pavement elevation along vertical curve.	
9	2		Vertical Alignment		
10 and 11	4	Explaining the flexible and rigid pavements structure as well as classify soil using standard classification schemes	Pavement layers and Material Characterization		
12 and 13	4	Understand subgrade and subbase course properties	Roadbed and soil stabilization	Using the google meet to give the students lectures on properties of both soil and subbase and drainage of the pavement	home works, quizzes, oral questions during the lectures, mid-year, second semester, and final exams
14 and 15	4		Subbase course material properties		
16	2	Understand the concept of surface and subsurface drainage	Surface and subsurface pavement drainage		
17 and 18	4	Identify asphalt cement and aggregate properties	Asphalt Concrete Technology	Spending lectures on how to measure the physical properties of asphalt , also rheological behavior of asphalt cement	
19 and 20	4		Aggregate Properties and combination		
21	2		Asphalt Cement Properties		
22	2		Rheological properties of asphaltic Materials		
23	2	Design hot asphalt mixture by various methods	Asphalt Concrete Mix Design: Marshall Mix Design	Giving the various technologies and design methods in determining the proportions of asphalt and aggregates in the hot mix asphalt	
24	2		Super pave Mix Design		
25 and26	4		Asphalt Mixture Types and Applications		
27 and 28	4	Design the structural layers of	Flexible Pavement	Discussing and	

		flexible pavement	Design	giving manual to students in calculating the thicknesses of flexible and rigid pavements	
29 and 30	4	Design rigid pavement thickness and joint types	Rigid Pavement Design and Reinforcement and Joints for Rigid Pavement		

In addition to the lecture meetings, the course will occasionally meet for laboratory sessions. The laboratory lessons are intended to parallel the lecture material, and are also listed below.

Laboratory No.	Topics
1	Grain Size Distribution of Granular Materials
2	Determination of Optimum Moisture Content of Granular Materials
3	California Bearing Ratio (CBR) of Soil
4	Crashing Ratio of Aggregate
5	Abrasion Test for Aggregate
6	Penetration Test for Asphalt Cement
7	Softening Point of Asphalt Cement
8	Ductility of Asphalt Cement
9	Viscosity of Asphalt Cement
10	Marshall Mix Design

12. Infrastructure

Required reading:

-CORE TEXTS

-COURSE MATERIALS

-OTHER

1. Garber, N. and Heol, L., (2010), ***"Traffic and Highway engineering"***, 5th edition, Canada: Cengage Learning.
2. O'Flaherty C.A., (2002), ***"Highways"***, 4th Edition, Oxford: Butterworth Heinemann.
3. Rogers M., (2008), ***"Highway Engineering"***, 2nd Edition, Blackwell Publishing Ltd.
4. Yoder, E. and Witczak. M., 1975, ***"Principles of pavement design"***, 2nd edition, New York :John Wiley and Sons ,Inc.

Other Supplemental Materials:

1. AASHTO, (1993), "AASHTO Guide for Design of Pavement Structures", American Association of State Highway and Transportation Officials, Washington, D.C., USA.
2. AASHTO, (2007), "Standard Specifications for Transportation Materials and Methods of Sampling and Testing". 5 th edition, American Association of State Highway and Transportation Officials, Washington, D.C., USA.
3. AASHTO, (2011) ,"A Policy on Geometric Design of Highways and Streets", American Association of State Highway and Transportation Officials, Washington, D.C., USA.
4. ASTM Standards, (2005), Roads and Paving Materials. Annual Book of the American Society for Testing and Materials Standards, Section 4, Vol. 04-03.

	5. State Commission of Roads and Bridges (SCRB), (2005), "Highway Design Manual", Republic of Iraq, Ministry of Housing and Construction, Department of Planning and Studies, Baghdad, 6- State Commission of Roads and Bridges (SCRB), (2003), "General Specification for Roads and Bridges", Republic of Iraq, Ministry of Housing and Construction, Department of Planning and Studies, Baghdad, Revised Edition, Addendum No.3.
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: http://elearning7.uokufa.edu.iq/eng/course/view.php?id=1230 presenting and discussing constituents of the topics via direct lectures on Google meet and other supplementary materials involved pdf, pictures, and video files published on Moodle application
Community-based facilities (include for example, guest lectures, internship, field studies)	**Guest lectures from foreign universities**

13. Admissions	
Pre-requisites	Traffic Engineering
Minimum number of students	56
Maximum number of students	66

SANITARY AND ENVIRONMENTAL ENGINEERING

Course Description:

Introduce topics of environmental and sanitary engineering including; material balance, risk assessment, population growth, solid waste management, air pollution control as well as fundamentals of water and wastewater treatment. Water treatment will begin with water demand, followed by conventional treatment processes, and water distribution network analysis with associated pumps and pump stations. Wastewater includes analysis of sewerage networks, sewage flow variation, wastewater characteristics, conventional wastewater treatment processes, storm water and run-off estimation by means of the Rational method. Sludge treatment is overviewed. Self-purification of receiving streams and the Streeter Phillips eq. is introduced.

2. Teaching Institute	University of Kufa – Faculty of Engineering
3. University Department / Center	Civil Engineering Department
4. Course title /code	Sanitary and Environmental engineering / CE433
5. Program to which it contributes	Learning the students the Sanitary and Environmental engineering principles
6. Models of Attendance Offered	In classrooms and lab with field visits.
7. Semester / year	year
8. Number of hours tuition (total)	150
9. Date of production/ revision of this specification	2020-2021

10. Aims of the course

The aims of this course are to introduce the basic concepts of sanitary and environmental engineering to civil engineering undergraduate students, especially the fundamentals of conventional water and wastewater treatment processes, and to familiarize the students with sanitary and environmental engineering subject and concepts commonly encountered in engineering practice.

10. Learning Outcomes, Teaching and Learning and Assessment methods.

C- Program Outcomes – Knowledge and Understanding

A1- An ability to apply knowledge of mathematics, science and engineering

A2- An ability to design and conduct experiments, as well as to analyze and interpret data .

A3- 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

A4- An ability to identify, formulate, and solve engineering problems.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Ability to use a software, such as MS Excel and Pipe++ in the calculations.

D2. Ability to work as a team.

D3. Critical thinking in choosing the appropriate system to the facility needed.

11.COURSE STRUCTURE

Week	Total Hours	ILOs	Topic title	Teaching Method	Assessment Method
1 &2	6	Knowing the students the important of studying the environmental and sanitary engineering. Students learn some basic terms.	Fundamental concepts: units, material balance, risk analysis	Two lectures with home works	home works, quizzes, oral questions during the lectures, mid-year, second semester, and final exams
3	3	Apply population growth models to estimate future population as related to water demand for various consumptions.	Population prediction: growth models	Lecture with several solved examples	
4 & 5	6	Understand types of water demand in urban areas, with demand variation and fluctuation.	Water demand: domestic, fire demands, industrial, commercial, and losses	Two lectures with solved examples.	
6	3	Identify water intake structure and associated locations and pump type	Water intake: location, water intake structures, and pumps	Lectures with site visits for water purification plant.	
7	3	Introduce coagulation and flocculation theory and process design	Coagulation process: theory, and coagulation basin design		
8	3	Explain flocculation process as complementary to coagulation process with associated mixing for both of them.	Flocculation process: theory and design		
9	3	Relate Stoke's law to settling basin functional design.	Sedimentation process: theory and design		
10 & 11	6	Describe filtration theory and application and related to functional design and operation.	Filtration process: Filtration process		
12	3	Describe disinfection theory as related to chlorination.	Disinfection process: Disinfectant type,	Using the google meet to give the	home works, quizzes, oral questions

			chlorination, contact basin Design	students lectures on disinfection of potable water.	during the lectures, mid-year, second semester, and final exams
13,14&15	9	Apply hydraulic concept including Hardy cross method to design and analyze water pipe distribution network.	Systems of water distribution: types of pipes, valves, and fittings, Hardy cross method for closed water distribution networks	Three lecture with site visit.	
16	3	Quantify runoff flow and analyze physical, chemical, and biological characteristics of storm water, runoff water, and wastewater.	Review of storm water and runoff water	Lecture with explaining for governing codes.	
17	3	Explain wastewater characteristics: Physical, chemical, and biological as related to treatment.	Wastewater characteristics: Physical, chemical, and biological	Spending lectures on how to measure the physical properties of asphalt , also rheological behavior of asphalt cement	
18	3	Describe wastewater collection regarding kinds, advantages for each type and design criteria.	Wastewater collection systems: type, basic hydraulic design	Lecture with site visit for sewage network.	
19	3	Introduce sewage pretreatment, screen, grit removal.	Wastewater pretreatment: screen, grit chamber	Lecture with site visit for sewage treatment plant.	
20 & 21	6	introduce sewage primary treatment (primary sedimentation basins)	Primary treatment of wastewater: theory of wastewater sedimentation, and settling tank design	Two Lectures with site visit for sewage treatment plant.	
22,23&24	9	Describe and relate process microbiology to biological treatment process design.	Biological treatment of wastewater process microbiology, activated sludge process, trickling filters, rotating	Three lectures including videos for treatment plants.	

			biological contact		
25&26	6	Compute DO profile for 1D streams receiving treated wastewater..	Stream water quality modeling: introduction to river pollution, dissolved oxygen sag curve	Two lectures with site visit for a river receiving treated sewage.	
27 & 28	6	Identify air pollutants and control techniques.	Air pollution: type, source, and characteristics of air pollutants, control techniques type, source, and characteristics of air pollutants, control techniques	Two lectures include designing skills of transfer station.	
29 & 30	6	Apply solid waste management to resource recovery	Solid waste management: storage, collection, transportation, recycling, disposal	Discussing and giving manual to students in designing transfer station	

In addition to the lecture meetings, the course will occasionally meet for laboratory sessions. The laboratory lessons are intended to parallel the lecture material, and are also listed below.

Week	Topic	Total Hours
1	Fundamental Concepts: Safety Measures for Chemical and Biological Laboratories	1
2	Sampling and Solutions and Preparation of Standard Na2CO3 Solution	1
3	pH and Acid – Base Titration	1
4	Total Solids	1
5	Total Dissolved Solids	1
6	Electrical Conductivity	1
7	Total Hardness	1
8	Turbidity	1
9	Fundamental Concepts Of Applied Optimum Coagulant Dosage	1
10	Jar Test	1
11	Settling Column Test	1
12	Residual Chlorine	1
13	Layout Of Typical Pipe System	1
14	Pipe Connections To Pumps	1
15	Line Sketch Of Pipe System For Single And Multi-Storey Building	1
16	Dissolved Oxygen (DO) Test	1
17	Biochemical Oxygen Demand (BOD) Test	1
18	Chemical Oxygen Demand (COD) Test	1
19	Total Organic Carbon (TOC) Test	1
20	Theoretical Demonstration And Classification Of Microbial Tests And Preparing of Diluted Samples.	1

21	Plate Count Method (E-Coli)	1
22	Major Cat ions in Water (Ca, Mg)	1
23	Major Cat ions in Water (Na, K)	1
24	Major Anions in Water (HCO, Cl)	1
25	Theoretical Demonstration and Classification Of Spectrophotometers	1
26	Heavy Metals (Zn)	1
27	Heavy Metals (Cu)	1
28	Heavy Metals (Pb)	1
29	Heavy Metals (Al)	1
30	Heavy Metals (Cd)	1

12. Infrastructure	
Required reading: **-CORE TEXTS** **-COURSE MATERIALS** **-OTHERS**	1. Gilbert M. Master and Wendell P. Ela, Introduction to Environmental Engineering and Science, 3rd ed., Pearson Education, Inc., Upper Saddle River, NJ (2008). ISBN 0-13-148193-2 2. Water Supply and Pollution Control. Viessman and Hammer, 8th ed., 2009, Pearson Prentice Hall, ISBN 0-13-233717-7. 3- Terence J. McGhee & E. W. Steel, edition 6th, 1991, Water Supply and Sewerage, McGraw Hill, ISBN-13: 978-0070609389 **Other Supplemental Materials:** 6. Tchobanoglous, G.; and Kreith, F. (2002). Handbook of solid waste management (2nd ed). McGraw-Hill, USA. 7. Peavy, H.S.; Rowe, D.R.; and Tchobanoglous, G. (1985). Environmental engineering. New York: McGraw-Hill, Inc. 8. APHA-AWWA-WPCF., "Standard Method of Examination of Water and wastewater". 14th edition, American Public Health Association, Washington, DC., USA, 1975. **9.** Building General Directorate, "Iraqi Code of Sewerage Networks, Pump Stations and Treatment Plants in Cities- MBI 603", Engineering Consulting Bureau – Faculty of Engineering – University of Kufa, Iraqi Ministry of Reconstruction and Housing, Baghdad, 2021.
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: http://elearning7.uokufa.edu.iq/eng/course/view.php?id=1231 presenting and discussing constituents of the topics via direct lectures on Google meet and other supplementary materials involved pdf, pictures, and video files published on Moodle application
Community-based facilities (include for example, guest lectures, internship, field studies)	**Guest lectures from foreign universities**

13. Admissions	
Pre-requisites	Fluid mechanics, Irrigation and drainage, Hydrology, statistics.
Minimum number of students	25
Maximum number of students	120

Course Specifications

Hydrology

COURSE SPECIFICATIONS:

Students will perform a hydrological study of the laws governing the occurrence, distribution, and movement of water in watershed systems. Topics include meteorological considerations, precipitation, evaporation, infiltration, streamflow, hydrograph analysis, flood routing, groundwater flow, well hydraulics and frequency analysis.

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Course title /code	Hydrology / CE 438
4. Programme to which it contributes	BSc in Civil Engineering
5. Models of Attendance Offered	By manual attendance forms
6. Semester / year	year
7. Number of hours tuition (total)	90
8. Date of production/ revision of this specification	2020-2021
9. Aims of the course The objectives of these courses are to introduce Hydrology to civil engineering undergraduate students and to familiarize the students with hydrology terminology and concepts commonly encountered in engineering practice.	

10.Learning Outcomes, Teaching and Learning and Assessment methods.

A- Program Outcomes – Knowledge and Understanding

A1- An ability to apply knowledge of mathematics, science and engineering.

A4- An ability to identify, formulate, and solve engineering problems.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Ability to use a software, such as MS Excel, in the calculations.

D2. Ability to work as a team.

11. Course Structure

Week	Hours	ILOs	Topic title	Teaching Methods	Assessment Methods
1	**3**	underline the importance and significance of hydrology	Introduction and Background	Introduce the defining of hydrology and the students will learn what the hydrological cycle.	Discussion through lectures
1	**3**	identify the precipitation	precipitation	Train the students how to discuss the precipitation, prepare the data and estimate missing precipitation data.	Exam #1
1	**3**	Test for consistency of records	The consistency of records	Train the students how to test for consistency of records by drawing double mass curve technique. Show the students how to use the charts.	HW & Exam #2
2	**6**	Calculate average precipitation over area	Average precipitation over area	Train the students to determine the average precipitation over area by various methods. Show the students how to use the charts.	
1	**3**	Calculate Evaporation by Empirical Equations.	Evaporation	Show the students calculating Evaporation by Empirical Equations, and then explain to them steps of calculation.	Exam #3
2	**6**	Calculate Evapotranspiration	Evapotranspiration	Train the students how calculate Evapotranspiration by Penman equation and Blaney-Criddle formula. Show the students how to use H_a, N and ph tables.	Exam #4
1	**3**	Calculate Infiltration	Infiltration	Train the students how to calculate infiltration and	Exam #5

				Indices like Ø and W indices.	
1	**3**	Define Run off	Run off	Introduce the defining of Run off and Run off characteristics of streams to students.	Discussion through lectures
1	**3**	Calculate Run off	Run off	Train the students how to calculate Run off by Empirical Equation.	HW
1	**3**	Draw Flow-Duration Curve	Flow-Duration Curve	Show the students sketches of Flow-Duration Curve, and then explain to them steps of drawing.	Exam # 6

11. Course Structure, continued

Week	Hours	ILOs	Topic title	Teaching Methods	Assessment Methods
1	**3**	Draw Flow-Mass Curve	Flow-Mass Curve	Show the students sketches of Flow-Mass Curve. Explain to them how to use the charts.	HW
2	**6**	Calculate Storage Volume Evaluation	Storage Volume Evaluation	Show the students drawings of Storage Volume Evaluation, Maintainable demand and Variable demand, and then explain to them steps of drawing.	Exam #7
2	**6**	Define hydrograph	Hydrograph	Explain to student the components of Hydrograph. Student teams are asked to help solve sample problems in class.	Discussion through lectures and homework
3	**9**	Derivate Unit Hydrograph	Unit Hydrograph	Explain to students the unit hydrograph theory, including methods to derive, transform, and apply a unit hydrograph for a given rainfall excess pattern. Solve example and ask students to do homework.	HW & Exam #8
4	**12**	Determine Flood Peak	Flood	Explain to student the methods of calculating flood Peak: 1) Rational method 2) Empirical method 3) Flood-Frequency Studies. Solve example and ask students to do homework.	HW & Exam #9
1	**3**	Define flood routing	Flood Routing	Explain to student flood routing	Discussion through lectures
3	**9**	Determine flood routing	Flood Routing	Explain to student the methods of calculating flood routing: 1) Modified Pauls method 2) Goodrichs method 3) Muskingums method. Ask the students to do homework.	Discussion and HW

1	3	Determine ground water budget	Ground Water	Train the student to determine ground water budget. Ask the students to solve class problem in groups.	HW
1	**3**	Determine confined and unconfined flow	Wells	Train the student to determine confined and unconfined flow. Ask the students to solve class problem in groups.	HW

12. Infrastructure	
Required reading: - **CORE TEXTS** - **COURSE MATERIALS** - **OTHER**	1. Engineering Hydrology by Subramanya 2. Advanced Hydrology by V.T. Chow 3. Engineering Hydrology by Linsley
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: http://elearning7.uokufa.edu.iq/eng/course/view.php?id= **1237**
Community-based facilities (include for example, guest lectures, internship, field studies)	

13. Admissions	
Pre-requisites	Engineering statistic, Engineering Analysis and Irrigation and Drainage
Minimum number of students	25
Maximum number of students	50

Course Specifications

Construction Methods and Estimation

COURSE SPECIFICATIONS:

This course is a two semesters sequence that investigates the principles and practices for the selection of methods, budget, and schedule for both vertical and horizontal construction projects. The course Enables students to work as a project engineer or as a resident engineer or consultant engineer in the projects.

Topics studied include construction industry introduction, construction equipment production, formwork design, construction contracts, quantity surveying estimating construction materials and construction cost. In addition, topics studied include soil stabilization, selection of construction equipment and cost of possessing an equipment beside the requirement of codes and technical specifications. Furthermore, the students after completion of this course will be able to function ethically in their professional civil engineering roles.

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Course title /code	Construction Methods and Estimation / CE437
4. Programme to which it contributes	BSc in Civil Engineering
5. Models of Attendance Offered	manual attendance forms
6. Semester / year	Year
7. Number of hours tuition (total)	90
8. Date of production/ revision of this specification	2020-2021

9. Aims of the course

The objectives of these courses are to introduce Construction Methods and Estimation to civil engineering undergraduate students; in addition to enable, the students to possess the necessary skills to work as residential engineer or executing engineer in construction projects, beside function ethically in their professional civil engineering roles.

10. Learning Outcomes, Teaching and Learning and Assessment methods.

B- Program Outcomes – Knowledge and Understanding

A1- An ability to apply knowledge of mathematics, science and engineering

A4- An ability to identify, formulate, and solve engineering problems

C-Thinking skills

C1- An understanding of professional and ethical responsibility

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Ability of career management

D2. Ability to work as a team.

D3. Ability to solve technical and commercial problems

D4 Critical thinking in choosing the type of construction or equipment

D5 An ability to communicate effectively using written, oral and visual methods of communication.

D6 Ability to use a software, such as MS Excel, in the calculations.

11. Course Structure					
Week	Hours	ILOs	Topic title	Teaching Methods	Assessment Methods
1	3	Having information about construction field, and stages of achieving projects.	Introduction to the construction industry	Lectures beside demonstration tools that give an idea about construction industry. construction stages including planning, financing, design, and contracting	Exams +quizzes
2	3	Understand the types of contracts and construction methods	Methods of projects implementation	Lectures beside demonstration tools that explain the types of construction contracts, and learning students about different construction methods.	Exams +quizzes
3-5	9	Enable student to work as project engineer and as resident engineer	Construction Management	Lectures beside demonstration tools to teach students how to design and follow up construction schedules, besides understanding the basis of	Exams +quizzes +HW

				Supervision. Planning, inspection, and cost control, how to apply technical specification, beside requirements of building codes, Furthermore learning students about shop and as-built drawings.	
6	3	Understand ways to estimate quantities and quantity surveyor tasks, beside preparing bill of quantities	Introduction to the quantitative survey	Lectures that give an introduction about quantity surveying, studying the duties of quantity surveyor at different stages of constructions, prepare a quantity take-off, training Preparing bill of quantities	Exams +quizzes
7	3	Understand the ways to Prepare a preliminary cost estimation for projects.	preliminary cost estimation	Lectures beside solved examples to learn students about the different ways of approximate cost estimate, and how to utilize these ways in checking the accuracy of detailed cost estimation.	Exams +quizzes +HW
8-9	6	Prepare students to estimate quantities of construction materials	Estimation of construction materials	Lectures beside solved examples that give an idea about estimating quantities of different materials in construction, beside estimations of losses in construction materials	Exams +quizzes +HW
10	3	Understand the ways to Prepare quantity estimation of roads, bridges and culverts	Quantity survey of roads, and bridges projects	Lectures beside solved examples that give an idea about estimating quantities of different materials in road, bridges and culverts works.	Exams +quizzes +HW
11	3	Prepare a detailed cost estimate for construction items	Item cost estimation	Lectures beside solved examples that teach students how to estimate accurately quantities and cost of construction items.	Exams +quizzes +HW

12	3	Understand the methodology of conventional, steel, and precast construction.	Selection of building construction methods	Lectures beside demonstration tools that Enable students to understand the characteristics of different kinds of construction (conventional, steel, execution, and precast), beside the factors affecting selection of each type of construction	Exams +quizzes
13-14	6	Prepare a detailed quantity survey and cost estimate for construction project	Building estimation project	learning how to estimate accurately quantities and cost of construction projects via doing annual estimation project.	Project submission
15	3	Understand the methodology of timber and steel formwork construction	Analysis and design of formworks in concrete constructions	Lectures beside solved examples that give an idea about the loads affecting formwork and methods to design each kind of formwork	Exams +quizzes +HW
Half Year break					
16-18	9	Following the Requirements of engineering ethics	job ethics	Lectures beside demonstration tools, videos that learn students the requirements of Iraqi code of engineering ethics that must be followed in practicing the engineering job.	report submission& Exam
19-20	6	Learning about general requirements of executing contracts	standard contracting documents	Lectures beside demonstration tools that give an idea about the rules that regulate the relationship between construction parties and the duties and faculties of each of them.	Exams + submitted reports + quizzes
21	3	Understand the technical specification of construction works	technical specifications	Lectures beside demonstration tools that give the student an idea about technical specification for different construction methods related to	Exams+ submitted reports + quizzes+ HW

				methodology of erection testing, and checking of finished works. Studying local and international specifications of construction materials, test methods and acceptance criteria	
22-23	6	Understand the requirement of Iraqi and Unified Arabian building codes	building codes	Lectures beside demonstration tools that give an idea about the differences between code and specification, and studying the requirements of local, Arabic, and international building codes for different engineering topics.	Exams+ quizzes+ submitted reports
24	3	Understand using Unified standard guideline for Quantity survey	Quantity survey standards	Lectures beside demonstration tools that give an idea about unified guide lines for quantity surveying	Exams+ quizzes+ HW
25-26	6	Understand the different methods for stabilization of soil, beside identifying different construction equipment	Soil stabilization	Lectures beside solved examples that explain the different states of soil (bank , loose, compacted) and the relationship between soil characteristics in each state. Studying the different methods of soil stabilization and their benefits on soil behavior. Also having an idea about testing of soil compaction Studying different types of equipment used for earth work and suitability of each equipment for certain purposes	Exams+ quizzes+ HW
27	3	Communicate professionally in a project environment, beside communication with researchers authors	Improvement of students' communication abilities	Lectures beside demonstration reports, videos that enable students to cooperate with different parties such as, residential engineer, contractor, consultant, and engineer Take benefit of scientific	Exams+ submitted reports + HW

				research and how to contact with researchers, authors, and scientific publishers sites.	
28	3	Understand commercial bases for selection of construction equipment by determining cost of possessing equipment per unit time	Selection of construction equipment	Lectures beside solved examples that enable the students to estimate the cost of possessing equipment including investment, depreciation, maintenance and operation cost	Exams+ quizzes+ HW
29	3	Understand engineering bases for selection of equipment	engineering bases for selection of equipment	Lectures beside solved examples that explain the factors affecting the performance of equipment for certain purpose such as drag force, horse power, type of wheels, temperature and atmospheric pressure	Exams+ quizzes+ HW
30	3	Learning how to estimate the productivity of construction equipment	Productivity of machines	Lectures beside solved examples that give an idea for studying the productivity of different equipment and the factors affecting their productivity	Exams+ quizzes+ HW

12. Infrastructure	
Required reading: - **CORE TEXTS** - **COURSE MATERIALS** - **OTHER**	Equipment and methods of construction / translated by Dr. Mohammad Ayub Al-Izzi / publications of University of Technology, 1985 * Cost analyzing guideline for building and construction / Ministry of Construction and Housing, 2014 * Resident engineer guideline for the construction projects / the Ministry of Construction and Housing, 2015 * Unified Standard Guideline for quantitative survey of works of buildings and civil engineering / Ministry of Planning, 1984

	* Unified Arab codes for building * Iraqi codes 2020
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: **http://elearning7.uokufa.edu.iq/eng/course/view.php?id=1233**
Community-based facilities (include for example, guest lectures, internship, field studies)	**Consultant guest engineers lectures** **Field visits to various project sites**

13. Admissions	
Pre-requisites	Construction materials Buildings Construction Engineering Management
Minimum number of students	80
Maximum number of students	100

Course Specifications

FOUNDATION ENGINEERING

COURSE SPECIFICATIONS:

The students learn the steps of site investigation program, the computation methods of settlement of shallow foundations, the methods used to estimate the bearing capacity of soil under shallow foundations and the design steps of them. Also, they learn the methods of estimating pile capacity, the concept of lateral earth pressure, the stability of different retaining structures and finally the analysis of the stability of unsupported soil slopes.

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Course title /code	Foundation Engineering / CE434
4. Programme to which it contributes	BSc in Civil Engineering
5. Models of Attendance Offered	By manual attendance forms
6. Semester / year	year
7. Number of hours tuition (total)	104
8. Date of production/ revision of this specification	2020-2021
9. Aims of the course Foundation engineering course gets the students the ability to describe the in-situ problems and how to use the all necessary engineering concepts to overcome these problems safely and economically.	

11. Learning Outcomes, Teaching and Learning and Assessment methods.

A- Program Outcomes – Knowledge and Understanding

A1- An ability to apply knowledge of mathematics, science and engineering

A3- 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 .

A4- An ability to identify, formulate, and solve engineering problems

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Ability to use a software, such as MS Excel, in the calculations.

D2. Ability to work as a team.

11. Course Structure					
Week	**Hours**	**ILOs**	**Topic title**	**Teaching Methods**	**Assessment Methods**
1	**4**	Problems of foundations in the field and the use of foundation engineering in solving them.	Plan the site investigation program.	Explain the concept of site investigation and the necessary information to design a site investigation program.	Exam #1
2 and 3	**8**	Introduction to the site investigation process.	Determine the suitable field tests.	Illustrate the most common field tests and the procedure of conducting of each test. Also, explain the uses of tests data in the foundation engineering and solve some examples about them.	Exam #1
4 and 5	**8**	Compute the settlement of shallow foundations.	Definition of soil settlement and the types of settlement based on the soil type.	Discuss the reasons of soil settlement and explain all its types.	Exam #2
6 and 7	**8**	Review of consolidation settlement and study of some factors affect the degree of consolidation.	Methods of estimating foundation settlement.	Present the methods used to compute the immediate and consolidation settlement and solve some examples. Also, make homework problem to estimate settlement.	Exam #2
8	**4**	Methods of estimating of ultimate bearing capacity for different soils.	Introduction to the definition of bearing capacity.	Demonstrate the types of shear failure and the methods used to estimate the ultimate bearing capacity.	Exam #3
9, 10 and 11	**12**	Effect of some factors on the ultimate bearing capacity.	Types of shear failure occur in soil under shallow foundations.	Solve some examples to show the effect of several factors on the bearing capacity.	Exam #4
12, 13, 14 and 15	**16**	Proportioning and designing of shallow foundations.	Design the shallow foundations.	Explain the procedure used to design the shallow foundation with aids of ACI code and use numerical problem to illustrate that.	Exam #5

11. Course Structure, continued					
Week	**Hours**	**ILOs**	**Topic title**	**Teaching Methods**	**Assessment Methods**
16 and 17	**8**	General introduction to the pile foundation, uses and types.	Estimate the pile capacity.	Demonstrate the reasons of using pile foundation and the different methods used to estimate the pile capacity.	Exam #6
18 and 19	**8**	Methods of estimating pile capacity for different types of soil.	Pile group capacity.	Use the numeric examples to show the design procedure of pile foundation.	Exam #6
20 and 21	**8**	Computation of pile efficiency and group settlement.	Settlement of piles.	Explain the procedure used to calculate the pile group settlement.	Exam #7
22, 23 and 24	**12**	Calculate the lateral earth pressure.	Introduction to the lateral earth pressure concept.	Explain the different types of soil pressure and the importance of the lateral earth pressure.	Exam #8
25, 26 and 27	**12**	Study the stability of retaining structures (retaining walls and sheet piles).	Study the stability of retaining walls.	Illustrate the procedures used to study the stability of retaining structures with aids of examples.	Exam #9
28	**4**	Analyze the unsupported slopes of soils.	Introduction to the unsupported slopes of different soils.	Explain the concept of slopes in soil and demonstrate the types of slopes and the methods used to study the stability of each type.	Exam #10
29 and 30	**8**	Analyze the unsupported slopes of soils.	Study the stability of infinite slopes with and without seepage.	Solve some examples to illustrate the computational methods.	Exam #10

12. Infrastructure	
Required reading: - **CORE TEXTS** - **COURSE MATERIALS** - **OTHER**	- Foundation Analysis and Design, by: J. E. Bowles - Principles of Foundation Engineering, by: B. M. Das - Geotechnical Engineering, by: V. N. S. Murthy
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: http://elearning7.uokufa.edu.iq/eng/course/view.php?id=1229
Community-based facilities (include for example, guest lectures, internship, field studies)	

13. Admissions	
Pre-requisites	Engineering geology, engineering mechanics, fluid mechanics and Soil Mechanics
Minimum number of students	15
Maximum number of students	25

Hydraulic Structures

Course Description:

Teaching hydraulic structures aims to teach students the basics of this subject in terms of introducing them to most water structures and teaching them how to design and analyze these facilities. The fact that the civil engineer must be familiar with these structures such as dams, regulators, arches, and other things that have been listed below in the syllabus. This course is given in two semesters.

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Course title /code	Hydraulic Structures / CE433
4. Programme to which it contributes	BSc in Civil Engineering
5. Models of Attendance Offered	By manual attendance forms
6. Semester / year	year
7. Number of hours tuition (total)	90
8. Date of production/ revision of this specification	2020-2021
9. Aims of the course Introduce students to the most important hydraulic structures and teach them the basics of design and analysis for these facilities.	

10. Learning Outcomes, Teaching and Learning and Assessment methods.

A-Program Outcomes – Knowledge and Understanding

A1- An ability to apply knowledge of mathematics, science and engineering *(a in ABET Student Outcomes)*.

A3- 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.

A4- An ability to identify, formulate, and solve engineering problems *(e in ABET Student Outcomes)*.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Ability to use a software, such as MS Excel, in the calculations.

D2. Ability to work as a team.

11. Course Structure					
Week	**Total Hours**	**ILOs**	**Topic title**	**Teaching Method**	**Assessment Method**
1	**2**	Designing floors and checking the seepage under them by different ways	Introduction about the Hydraulic Structures	presenting and discussing constituents of the topics via direct lectures on Google meet and other supplementary materials involved pdf, pictures, and video files published on Moodle application	home works, quizzes, oral questions during the lectures, mid-year, second semester, and final exams
2	**2**		Design the floor of hydraulic structures by Flow Nets method	presenting and discussing constituents of the topics via direct lectures on Google meet and other supplementary materials involved pdf, pictures, and video files published on Moodle application	home works, quizzes, oral questions during the lectures, mid-year, second semester, and final exams
3	**2**		Design the floor of hydraulic structures by Bligh's method		
4	**2**		Design the floor of hydraulic structures by Lane's method		
5	**2**		Design the floor of hydraulic structures by Khosla's method/ using chart		
6	**2**	Compute the depth of piles at upstream and down stream of the structure	Regime Score Depth	presenting and discussing constituents of the topics via direct lectures on Google meet and other supplementary materials involved pdf, pictures, and video files published on Moodle application	home works, quizzes, oral questions during the lectures, mid-year, second semester, and final exams
7	**2**	Types of this structure, its function, and calculation equations, each according to its type	Weir		
8	**2**				
9	**2**				
10	**2**	Types of gates, how they work, and the equations used in their analysis	Gates	presenting and discussing constituents of the topics via direct lectures on Google meet and other supplementary materials involved pdf, pictures, and video files	home works, quizzes, oral questions during the lectures, mid-year, second semester, and final
11	**2**				
12	**2**	Types of head and cross regulators, the method of	Regulator		

13	**2**	design and analysis of the structure		published on Moodle application	exams
14	**2**	The hydraulic jump and how its energy is dispersed by this basin. Types of basins and how to design and analyze them	Stilling Basin		
15	**2**				
16	**2**				
17	**2**	Design and analysis of flow within the culvert. Types of these structures and the way to classify them. Study the control of flow by the inlet or outlet. Types of entrance and exit losses.	Culverts		home works, quizzes, oral questions during the lectures, mid-year, second semester, and final exams
18	**2**				
19	**2**				
20	**2**	The types and importance of this structure, the method of its design and analysis	Siphon	presenting and discussing constituents of the topics via direct lectures on Google meet and other supplementary materials involved pdf, pictures, and video files published on Moodle application	
21	**2**				
22	**2**	Types of these structures, their importance, design and analysis	Cross drainage work		
23	**2**				
24	**2**				
25	**2**	Types and functions of these structures. Identify the most important forces affecting it. structural analysis in terms of stability and slippage	Dam		home works, quizzes, oral questions during the lectures, mid-year, second semester, and final exams
26	**2**				
27	**2**				
28	**2**				
29	**2**	Types of this structure and its function. The design of the ogee-type spillway and identify its equation	Spillway		
30	**2**				

12. Infrastructure	
Required reading: **-CORE TEXTS** **-COURSE MATERIALS** **-OTHER**	- Open-Channel Hydraulics by Ven Te Chow, 1959 - Irrigation engineering and hydraulic structure by SANTOSH - Hydraulic structures by NOVAK - Water Resource Engineering by KHARAGPUR - Water resources engineering by Chin Irrigation, water power and Water resources engineering by Arora -
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: http://elearning7.uokufa.edu.iq/eng/course/view.php?id=1230 presenting and discussing constituents of the topics via direct lectures on Google meet and other supplementary materials involved pdf, pictures, and video files published on Moodle application
Community-based facilities (include for example, guest lectures, internship, field studies)	**Guest lectures from foreign universities**

Course Grade Distribution:

Activity	Grade	Remarks
Mid-Year Exam	20%	Central exam
Second Semester Exam	15%	At second semester
Attendance, Quizzes and Home works	15%	Attending lectures and exams at the end of each subject, homework, seminars and daily interaction

English Language (IV)

COURSE DESCRIPTION:

Technical English (4) is a two-strand course that bridges the gap between general and academic English. It is aimed at the 4th year civil engineering department students to prepare them as future specialists to communicate effectively in the professional field as well as in real -life situations The over-arching aim is to empower the students to use English language for pursuing their academic as well as their professional progress in different engineering disciplines. The ultimate goal is to make the grandaunts operational in any learning situation. The course designed to features thoughts-provoking topics relevant to students in higher education. It helps to develop skills required for academic study including reading, note-taking, essay-writing, and giving presentations.

1. Teaching Institute	University of Kufa – Faculty of Engineering
2. University Department / Center	Civil Engineering Department
3. Course title /code	English Language (IV)/ CE411
4. Programme to which it contributes	To improve the English language
5. Models of Attendance Offered	By manual attendance forms
6. Semester / year	year
7. Number of hours tuition (total)	58
8. Date of production/ revision of this specification	2020-2021
9. Aims of the course	Bridgeing the gap between general and academic English. It also includes strategies for undertaking research and dealing with unfamiliar academic vocabulary.

10.Learning Outcomes, Teaching and Learning and Assessment methods

Program Outcomes – Knowledge and Understanding

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Critical thinking in choosing the structural system.

11.Course Structure					
Week	**Hours**	**ILOs**	**Topic title**	**Teaching Method**	**Assessment Method**
1	**2**	Indicate the importance and significance of studying English language	Introduction about the importance of learning English language	presenting and discussing constituents of the topics via direct lectures on Google meet and other supplementary materials involved pdf, pictures, and video files published on Moodle application	home works, quizzes, oral questions during the lectures, mid-year, second semester, and final exams
2	**2**	Reading & writing skills Vocabulary Development	Predicting contents, skimming. Handwriting, paragraphs, linking ideas. Collocations, jobs ending in -er, -or, -ist.		
3	**2**	Reading & writing skills Vocabulary Development Research	Scanning using heading, meaning from context. Punctuation, talking about frequency, writing about study habits. Recording vocabulary Sources.		
4	**2**	Reading & writing skills Vocabulary Development Research	Making notes. Linking ideas, words and phrases, writing about a building. Dictionary entries, countable or uncountable names. Focusing on search.		
5	**2**	Reading & writing skills Vocabulary Development Research	Predicting content, linking ideas. Writing formal and informal letters and e-mails. Plurals. Making notes.		
6	**2**	Reading & writing skills Vocabulary Development Research	Websites' information extraction, using visuals in websites. Writing definitions, giving examples, writing a description of a device. Homophones. Reliable resourses.		
7	**2**	Reading & writing skills Vocabulary Development	Topic sentences, writer's opinion. Punctuation, linking ideas, using pronouns, writing about food and drinks.		

			Prefixes.		
8	**2**	Reading & writing skills Research Vocabulary Development	Looking at data, getting facts from a text. Comparatives and superlatives, linking ideas, writing about cities. Finding facts and figures. Word-attack skill.		
9	**2**	Reading & writing skills Research	Using synonyms to avoid repetitions, using a list of points in notes making. Common mistakes, summaries, writing a summary. Reliable sources.	presenting and discussing constituents of the topics via direct lectures on Google meet and other supplementary materials involved pdf, pictures, and video files published on Moodle application	home works, quizzes, oral questions during the lectures, mid-year, second semester, and final exams
10	**2**	Reading & writing skills. Vocabulary Development	Using what you know, using reference to understand a text, focusing on statistics. Contrasting and comparing linking tools, cause and result linking tools, words and phrases, writing about statistics. Words or figures, learning a word synonyms and antonyms.		
11	**2**	Reading & writing skills development. Vocabulary Development	Following instructions in filling forms, eading methods. Writing formal and informal e-mails, checking your writing. A dictionary entry, recording vocabulary.		
12	**2**	Reading & writing skills development. Vocabulary Development.	Skimming and skanning. Brainstorming ideas. Using But, however, and although linking tools in contrasting ideas. Synonyms and antonyms in vocabulary, recording words in groups.		
13	**2**	Reading & writing skills development. Vocabulary	Predicting content, meaning from context. Varying the structure of sentences		

		Development.	and paragraphs in writing articles. Antonyms from prefixes.		
14	**2**	Reading & writing skills development. Vocabulary Development.	Identifying the main message and topic sentences. Organizing and linking ideas in writing, writing a discursive essay. Using vocabulary in avoiding reputation.		
15	**2**	Reading & writing skills development. Vocabulary Development.	Purpose of the written material and the targeted audience. Using formal expressions in writing letters and e-mail. Suffixes and prefixes in vocabulary		
16	**2**	Reading & writing skills development. Vocabulary Development.	Interpreting meaning, using abbreviation in notes making. Paraphrasing and summarizing, writing a summary. Using numbers.		
17	**2**	Reading & writing skills development. Research skill development	Using original resourcse. Adding extra information, organizing ideas, writing from research. Using the internet for research, developing research plan.		
18	**2**	Reading & writing skills Research Vocabulary Development	Rephrasing and explaining, avoiding repetition. Coherent writing, linking ideas, writing from notes. Acknowledgments Abbreviations		
19	**2**	Reading & writing skills Research	Intensive reading, Linking ideas by asking why and what is aimed from reading. Writing a description of a process using passive voice, clarifying a sequence.		

			Using indexes in research.		
20	**2**	Reading & writing skills Vocabulary Development	Interpreting data from reading. Illustrating data and describing a graph or chart in writing. Avoiding reputation.		

12. Infrastructure	
Required reading: - **CORE TEXTS** - **COURSE MATERIALS** - **OTHER**	Philpot S. et al. (2011). Headway academic skills: reading, writing, and study skills. Level 1, Level 2, and Level3. Oxford University press.UK
Special requirements (include for example, workshops, periodicals, IT software, websites)	Website: https://meet.google.com/fto-afdb-iez https://elt.oup.com/catalogue/items/global/adult_courses/headway_academic_skills/?cc=global&selLanguage=en https://elt.oup.com/student/headway/audio?cc=global&selLanguage=en http://elearning7.uokufa.edu.iq/eng/course/view.php?id=1437
Community-based facilities (include for example, guest lectures, internship, field studies)	

13. Admissions	
Pre-requisites	---
Minimum number of students	50
Maximum number of students	60

14. Course Grade Distribution		
Activity	Grade	Remarks
Mid-Year Exam	20%	Central exam
Second Semester Exam	15%	At second semester
Attendance, Quizzes and Home works	15%	Attendance of lectures, Exam at the end of each subject and homework