



NO.:
DATE:

العدد: ١١٩٨ / ٢٢
التاريخ: ٢٠٢١ / ٤٤

إلى / رئاسة جامعة بغداد

قسم ضمان الجودة والإداء الجامعي

د/ استشاري أوصف البرنامج الأكاديمي

تحية طيبة....

المشارة إلى كتابكم ذي العدد 225 في 2021/1/11 الخالص بوصف البرنامج الأكاديمي للعلمين الدراساتيين (2020/2019)، (2021/2020).

ترفق لكم طياً نسخة من البيانات الخاصة بوصف البرنامج الأكاديمي للعلمين المذكورين اعلاء و على قرص مدمج (CD).

للتفضل بالاطلاع.

مع التقدير.

المرفقات:

• قرص مدمج (CD).

أ.د. منبج جبار نعمة

عميد كلية الهندسة

نسخة منه إلى:

- مكتب العميد/ للتفضل بالاطلاع. مع التقدير.
- شعبة ضمان الجودة وتقويم الأداء/ مع الأوليات.

والعميد عميد كلية الهندسة
م.د. منبج جبار نعمة



NO.:
DATE:

العدد ١٧ / ٥٢١٠
التاريخ ١٧ / ١٠ / ٢٠٢١

الى / شعبة ضمان الجودة والاداء الجامعي
م / استمارة وصف البرنامج الاكاديمي

تحية طيبة

اشارة الى كتابكم ذي العدد ٢٨/١/٣٣ في ٢٨/١/٣٣ في ٢٠٢١/١/١٧ ترفق لكم طيا استمارة وصف البرنامج
الاكاديمي للاعوام (٢٠١٨-٢٠١٩)، (٢٠١٩-٢٠٢٠)، و (٢٠٢٠-٢٠٢١) وعلى ملف الكتروني.

للتفضل بالاطلاع والامر بما ترونه مناسباً.....مع التقدير.

المرفقات

- قرص مدمج عدد "١"



١٧ / ١٠ / ٢٠٢١

أ.م.د. باسم شيع عبد

رئيس قسم هندسة الموارد المائية

نسخة منه الى

- السيد رئيس لجنة الجودة/ م.د. محمد راشد المحترم للاطلاع والعلم رجاء.
- الاضبارة الخاصة.

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

*Academic Program Specifications Form For The
Academic Year 2020-2021*

University: Baghdad

College: Engineering

Number of Department in The College: 07 seven

Dean's Name

Date: / /

Signature



Dean's Assistant For
Scientific Affairs

Date: 20/ 7/ 2023

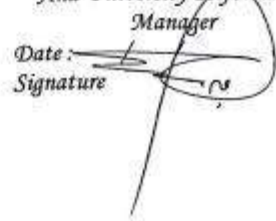
Signature



The College Quality Assurance
And University Performance
Manager

Date:

Signature



Quality Assurance And University Performance Manager

Date:

Signature



TEMPLATE FOR PROGRAM SPECIFICATIONS

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

PROGRAMME SPECIFICATION

This Program Specifications provide a concise summary of the main features of the program and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the provided learning opportunities. It is supported by the specifications for the courses of the program.

1. Teaching Institution	College of Engineering University of Baghdad
2. University Department/Centre	Department of Water Resources
3. Program Title	Water Resources Engineering Program (WRE)
4. Title of Final Awarded degree	B.Sc. in Water Resources Engineering
5. Modes of Attendance offered	Annual System: There is only one mode of delivery, which is a "Day Program". The students are full time students and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. Each graduating student has to successfully complete 147 credits. Each subject credit is one 50-minute lecture per week or 3 hours of laboratory work per week. which may be used as supplementary material for the class room instruction. Starting from academic year 2019-2020 online lectures have been providing to the students.
6. Accreditation body	ABET
7. Other external influences	The Iraqi Engineers Union
8. Date of production/revision of this specification	01-2020

9. Aims of the Program.

1. Graduate water resources engineers to serve in water resources sectors, Agriculture, and other related private sectors.
2. Improving the teaching and administrative activities to meet international accreditations standards and the mission of the department.
3. Improving the academic abilities of the faculty and attracting highly skilled personnel.
4. Improving the abilities of management and technical supporting staff and attracting the highly skilled for employment.
5. Optimizing the use of resources and potentials of the department.
6. Cooperating, exchanging academic programs, and participating with other universities and academic centers in developed countries.
7. Establishing viable applied research that generates knowledge for local and foreign users.

10. Learning Outcomes, Teaching, Learning and Assessment Methods

Following a review of the ABET Criteria and the program objectives, it has been decided by department the Water Resources Engineering that the ABET Criteria (A1 – A4) encompass the spirit of our vision. Therefore, outcomes (A1 – A4) are adopted as the Department POs.

The adopted Department POs are:

A. Cognitive goals

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

A2. An ability to design a system, or components, or process to meet desired needs.

A3. The broad education necessary to understand the impact of engineering solutions in a global and societal context.

A4. Knowledge of contemporary issues (this includes presenting students with issues such as the impact of globalization, the outsourcing of both engineering and other supporting jobs as practiced by modern international users).

B. The special skills goals (B1-B4) for the program of the department the Water Resources are :

B1. An ability to design and conduct experiments as well as to analyze and interpret data.

B2. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

B3. Apply basic mathematical and scientific concepts for the description and solution of engineering problems.

B4. Perform water resources engineering integrated design of systems, components, or processes by means of practical experiences (group projects).

Teaching and Learning Assessment methods (before graduation)

Lectures (in-person and online)

1. Tutorials
2. Homework and assignments
3. Laboratory experiments
4. Tests and examinations
5. In-class questions and discussions
6. Connection between theory and application
7. Field trips
8. Extra-curricular activities
9. Seminars
10. In- and out-class oral conversations
12. Reports, presentations, and posters

Program Assessment methods (after graduation)

- Survey of Alumni
- The related committees in the department such as scientific-, student affairs, social committees
- Employment trends of our graduates will be tracked, e.g., place of employment and job title, every year
- Survey of Employers of Graduates will be given at least every year to determine if the POs are still relevant to the employers of our graduates
- The POs themselves will be re-evaluated every few years first by the faculty and then with the Council Presidency Department. Informal review of the POs will occur in conversations with alumni.

C. Affective and value goals

C1. An ability to identify, formulate, and solve engineering problems.

C2. A recognition of the need for and an ability to engage in life-long learning

(this includes teaching students that the underlying theory is important because the technology changes, coupled with enhancing their self-learning ability).

C3. Ability to function effectively as an individual in a group.

C4. Ability to identify, formulate and provide creative/innovative/effective solution to a problem

Teaching and Learning Methods

1-Observations

2-Lectures

Assessment methods

Presentations

Reports

Assessment Form

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

D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).

D2. An understanding of professional and ethical responsibility.

D3. Ability to demonstrate the characteristics of a leader or a manager

D4. Ability to communicate effectively with engineers, other professionals and community at large

Teaching and Learning Methods

Assessment Methods

11. Program Structure

Level/Year	Course or Module Code	Course or Module Title	Credit rating	12. Awards and Credits
1st year	101WRAL	Arabic Language	2	Bachelor Degree Requires (x) credits
	102WRMA	Mathematics I	6	
	103WRCO	Computer Programming	4	Total Sum 41
	104WREM	Engineering Mechanics	6	
	105WRED	Engineering Drawing	6	
	106WRES	Engineering Statistics	4	
	107WRME	Materials Technology	3	
	108WREG	Engineering Geology	2	
	109WEIR	Introduction to Water Resources	4	
	110 WREN	English Language	2	
	111 WRCO	Computer	2	
2st year	210WRMA	Mathematics II	6	
	211WRCO	Computer Programming	4	
	212WRSM	Strength of Materials	4	
	213WRCS	Components of Hydraulic Structures	2	
	214WRSU	Surveying	6	
	215WRSP	Soil Physics	3	
	216WRLR	Land Reclamation	3	
	217WRWM	Water Quality and Treatment	6	
	218WRDF	Democracy and Freedom	2	
	219 WREN	English Language	2	
	220 WRCO	Computer	2	

3st year	319WRHY	Hydrology	4	Total Sum 38
	320WRSF	Soil Mechanics and Foundation	7	
	321WRIP	Irrigation Principles	4	
	322WRID	Irrigation and Drainage Networks	2	
	323WRFM	Fluid Mechanics	7	
	324WRSA	Structural Analysis	2	
	325WRDS	Design of Concrete Structures	2	
	326WREA	Engineering Analysis	3	
	327WRSC	Soil Conservation	2	
	328WRNM	Numerical Methods	3	
	329WREN	English Language	2	

4st year	429WRDH	Design of Hydraulic Structures	6	Total Sum 38
	430WRDI	Design of On-Farm Irrigation Systems	4	
	431WRGW	Ground Water	2	
	432WRDE	Drainage Engineering	2	
	433WREP	Engineering Project	4	
	434WRPM	Project Management	4	
	435WRAS	Analysis of Water Resources Systems	4	
	436WRDE	Dam Engineering	4	
	437WRAH	Elective Course/ Application in Hydraulics	2	
	438WREE	Engineering Economy	3	
	439WREC	Elective Course/ Water Quality Management	3	

13. Personal Development Planning

Continuous improvement is the goal of the Department of Water Resources Engineering. The curriculum of the department has been continuously updated to meet the needs of the field of work. Meetings and discussion are usually held with employers of the graduates of the department in order to get acquainted with their needs and trying to incorporate those needs in the curriculum of the department. The following specific actions have either been successfully implemented or are in process;

1. Comprehensive changes in curriculum.
2. Continuous improvement of faculty through training programs.
3. Promoting a number of faculty members to higher scientific ranks.
4. Purchasing a number of laboratory equipment and measuring instruments.
5. Purchasing a number of books for the library of the department.
6. Purchasing a number of computers.
7. Establishing computer network access by using LAN network of the Center of the University of Baghdad in the form of Wireless terminals available now in the Department.
8. Employing a number of faculty, engineering, and technical staff.
9. Setting up an increase in extra-curricular activities for students such as scientific conferences and seminars.
10. Reconstructing and rehabilitating class rooms and offices in the Department, as well as services and infrastructure.

14. Admission criteria.

An applicant for admission to an undergraduate program of WRE in the Department of Water Resources Engineering – College of Engineering – University of Baghdad must satisfy the following minimum requirements:

1. He / she should have an Iraqi secondary school certificate, or its equivalent, and majored in natural or technological sciences. The students must obtain a high rate qualifies for admission to engineering colleges.
2. Acceptance is centrally controlled by the Ministry of Higher Education and Scientific Research (MOHESR).
3. Application to the Department of Water Resources is made directly through the MOHESR and independently from the application to the college of engineering. The number of students accepted is limited to the number of seats available as decided by the College Council based on the capacity of resources of the Department. The capacity plan of the Department of Water Resources in the last three years was 40 - 60 students.
4. Also included a plan to accept the top students from Technical Institutes Foundation and the outstanding employees from state institutions and ministries.
5. The applicant must submit the required documents within a specified period.
6. An applicant who has graduated from a secondary school system outside Iraq must have completed twelve years of combined primary and secondary school studies from a recognized school. He/she is also required to provide an equivalency certificate from the Iraqi Ministry of Education.

Admission to the Department of Water Resources is highly competitive. As explained above, applicants are granted admission in accordance with an overall evaluation on the basis of their rating record, but only to the extent permitted by the maximum number of new admissions established for that academic year.

15. Key sources of information about the program

- a. Department page in the website of the college.
- b. Guide of the Department of Water Resources Engineering.
- c. College of Engineering Catalog.
- d. Minutes of some Committee meetings of the Department of Water Resources Engineering.
- e. Subjects portfolios for Water Resources Engineering subjects.
- f. Documentation Committee in the Department.
- g. Staff and students of the Department.
- h. Examinations Committee in the Department.

Curriculum Skills Map

please tick in the relevant boxes where individual Program Learning Outcomes are being assessed

Program Learning 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	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4
First	102 WRMA	Math.	(C)	X		X				X		X	X	X	X		X	X	X
2019/ 1 st level	103 WRCO	Computer Programming	(C)		X	X		X	X	X		X	X	X	X	X	X	X	X
2019/ 1 st level	104 WREM	Engineering Mechanics	(C)	X					X	X		X		X				X	
2019/ 1 st level	105 WRED	Engineering Drawing	(C)			X		X	X	X	X	X	X	X	X	X	X	X	X
2019/ 1 st level	106 WRES	Engineering Statistics		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2019/ 1 st level	107WREG	Materials Technology	(C)	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
2019/ 1 st level	108 WREG	Engineering Geology	(C)	X		X	X	X	X	X		X	X	X	X	X			

Curriculum Skills Map

please tick in the relevant boxes where individual Program Learning Outcomes are being assessed

Program Learning 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	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4
2019/ 2 nd level	213 WRCS	Components of Hydraulic Structures	(C)	X	X	X			X	X			X	X		X	X	X	X
2019/ 2 nd level	214 WRSU	Surveying	(C)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2019/ 2 th level	215 WRSP	Soil Physics	(C)	X	X	X	X	X	X	X	X	X			X	X	X	X	X
2019/ 2 nd level	216WRLR	Land reclamation	(C)	X	X	X		X	X	X		X	X				X		
2019/ 2 nd level	217 WRWM	Water quality and treatment	(C)	X	X	X		X	X	X		X	X				X		
2019/ 2 nd level	220 WRCO	Computer	(C)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Curriculum Skills Map

please tick in the relevant boxes where individual Program Learning Outcomes are being assessed

Program Learning 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	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4
2019/ 2 nd level	219WREN	English Language II	(C)																X
2019/ 2 nd level	218WRDF	Democracy and Freedom		X	X														
2019/ 3 rd level	319WRHY	Engineering Hydrology	(C)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2019/ 3 th level	320 WRSM	Soil Mechanics and Foundation Design	(C)	X	X	X		X	X	X		X			X	X	X	X	X
2019/ 3 rd level	321 WRIE	Irrigation Principles	(C)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2019/ 3 rd level	322 WRID	Irrigation and Drainage Networks																	

please tick in the relevant boxes where individual Program Learning Outcomes are being assessed

Program Learning 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	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4
2019/ 3 rd level	323 WRFM	Fluid Mechanics	(C)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2019/ 3 rd level	324 WRSA	Structural Analysis	(C)	X	X		X	X	X	X		X	X	X		X	X	X	X
2019/ 3 rd level	325 WRDC	Design of Concrete Structures	(C)	X	X	X	X	X	X	X		X	X	X	X	X		X	X
2019/ 3 rd level	326 WREA	Engineering Analysis	(C)	X		X	X			X		X	X	X	X	X	X	X	X
2019/ 3 rd level	327WRSC	Soil Conservation	(C)	X	X	X		X	X	X		X	X				X		
2019/ 3 rd level	<u>328</u> WRNM	Numerical Analysis	(C)	X		X				X		X	X	X	X	X	X	X	X

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW	
COURSE SPECIFICATION	
<p>This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.</p>	
1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Arabic Language
4. Modes of Attendance offered	Annual system with on campus lectures. The year 2019-2019 is an exception, where online lectures are used due to COVID-19.
5. Semester/Year	1 st and 2 nd semester, 2020-2021
6. Number of hours tuition (total)	2 hours per week, 60 hours per year
7. Date of production/revision of this specification	2020
8. Aims of the Course	
Introducing the Arabic language and its origins	
Highlight the most common linguistic mistakes	
Raising the capability to speak and write properly	
Give a glance on the Arabic literature	
Gain communication skills in proper Arabic language	
9. Learning Outcomes, Teaching ,Learning and Assessment Method	
A. Cognitive goals	
B. The skills goals special to the course.	
10. Teaching and Learning Methods	

- 1- Lectures
- 2- Discussion meetings
- 3- Homework
- 4- Reports

11. Assessment methods

Tests, homework, reports

C. Affective and value goals

C3. Ability to function effectively as an individual in a group.

C4. Ability to identify, formulate and provide creative/innovative/effective solution to a problem

Teaching and Learning Methods

Assessment methods

D. General and rehabilitative transferred skills

(other skills relevant to employability and personal development)

D2. An understanding of professional and ethical responsibility.

D3. Ability to demonstrate the characteristics of a leader or a manager

D4. Ability to communicate effectively with engineers, other professionals and community at large

Teaching and Learning Methods

Assessment methods

13. Course Structure

Week	Hour	LOs (Article	Unit/Module or Topic Title	Teaching Method	Assessment Method
.1	2	C4	تأريخ اللغة العربية	Lecture	Test
.2	2	C4	تأريخ اللغة العربية	Lecture	Test
.3	2	D4	الاغلاط اللغوية	Lecture	Test
.4	2	D4	الاغلاط اللغوية	Lecture	Test
.5	2	C4	همزة القطع والوصل	Lecture, Homework	Test, Homework
.6	2	C4	همزة القطع والوصل	Lecture, Homework	Test, Homework
.7	2	C3	انواع الهمزة، رسم الهمزة	Lecture, Homework	Test, Homework
.8	2	C3	انواع الهمزة، رسم الهمزة	Lecture, Homework	Test, Homework
.9	2	C3+C4	الحروف التي تزداد في الكتابة	Lecture, Homework	Test, Homework
.10	2	C3+C4	الحروف التي تزداد في الكتابة	Lecture, Homework	Test, Homework
.11	2	C3+C4	علامات الترقيم	Lecture, Homework	Test, Homework
.12	2	C3+C4	علامات الترقيم	Lecture, Homework	Test, Homework
.13	2	C3+C4	العدد	Lecture, Homework	Test, Homework
.14	2	C3+C4	العدد	Lecture, Homework	Test, Homework
.15	2	D4	المبتدأ والخبر	Lecture, Report	Report

14. Infrastructure

1. Books Required reading:	<u>Textbook</u> NA
2. Main references (sources)	<u>References</u> الاطفاء اللغوية الشائعة، محمود عبد الرزاق الاملاء الواضح، عبد المجيد النعيمي كتاب النحو الواضح في قواعد اللغة العربية، علي الجارم و مصطفى امين
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	

15. The development of the curriculum plan

University requirement, subject to changes from university and ministry. The lecturer has the authority to adopt different references and change the depth of the subject according to the program requirements.

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Calculus I , 102 WRMA.
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a “Day program”. The students are full time students, and on campus. They attend full day program in face to face mode. The academic year is composed of 30 weeks regular subjects.
5. Semester/Year	1st and 2nd Semesters, Academic year 2020 –2021
6. Number of hours tuition (total)	120 hours / 4 hours per week
7. Date of production/revision of this specification	2020
8. Aims of the Course	
<ol style="list-style-type: none"> 1. develop their mathematical knowledge and oral, written and practical skills in a way which encourages confidence and provides satisfaction and enjoyment; 2. read mathematics, and write and talk about the subject in a variety of ways; 3. develop a feel for number, carry out calculations and understand the significance of the results obtained; 4. apply mathematics in everyday situations and develop an understanding of the part which mathematics plays in the world around them; 5. solve problems, present the solutions clearly, check and interpret the results; 6. develop an understanding of mathematical principles; 7. recognise when and how a situation may be represented mathematically, identify and interpret relevant factors and, where necessary, select an appropriate mathematical method to solve the problem; 8. use mathematics as a means of communication with emphasis on the use of clear expression; 9. develop an ability to apply mathematics in other subjects, particularly science and technology; 	

10. develop the abilities to reason logically, to classify, to generalise and to prove;
11. appreciate patterns and relationships in mathematics;
12. produce and appreciate imaginative and creative work arising from mathematical ideas;
13. develop their mathematical abilities by considering problems and conducting individual and co-operative enquiry and experiment, including extended pieces of work of a practical and investigative kind;
14. appreciate the interdependence of different branches of mathematics;
15. acquire a foundation appropriate to their further study of mathematics and of other disciplines.

9• Learning Outcomes, Teaching ,Learning and Assessment Method

the student in the field of water resources engineering will be able to:

- a. To define and understand functions and how to graph these functions.
- b. To define and understand the trigonometric functions and how to graph these functions.
- c. To have the ability for dealing with limits and how to check the continuity of the functions.
- d. To determine the slope of a curve at a point and the rate of at which the function is changed.
- e. To know how to find the derivative of the functions and then using this derivative to find the extreme values of the functions.
- f. To be able to use the fundamental theorem of calculus to evaluate definite integral and calculate the areas, volumes, lengths of plane curves.
- g. To learn how to define, understand, graph and derive the transcendental functions.
- h. To be able to specify and apply the integral methods.

A. Cognitive goals

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

A3. The broad education necessary to understand the impact of engineering solutions in a global and societal context.

B. The skills goals special to the course.

B3. To have the ability to Apply basic mathematical and scientific concepts for the description and solution of engineering problems.

Teaching and Learning Methods

1. Lectures
2. Tutorials
3. Home works
4. Test and exams
5. In class questions and discussions
6. Connection between theory and applications

Assessment methods

1. Examinations, Tests and Quizzes
2. Extracurricular activities
3. Student engagement during lectures

C. Affective and value goals

- C1. An ability to identify, formulate, and solve engineering problems.
- C2. A recognition of the need for and an ability to engage in life-long learning
- C3. Enhancing self-learning ability.
- C4. Ability to identify, formulate and provide creative/innovative/effective solution of a problems.

Teaching and Learning Methods

- Lectures
- Tutorials
- Home works
- Test and exams
- In class questions and discussions
- Lectures
- Tutorials
- Home works
- Test and exams
- In class questions and discussions

Assessment methods

- Examinations, Tests and Quizzes
- Extracurricular activities
- Student engagement during lectures

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D2. An understanding of professional and ethical responsibility.
- D3. Ability to demonstrate the characteristics of a team leader or a manager.
- D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Assessment method	Assessment method	Assessment method	Assessment method	Assessment method	Assessment method

(1-4) of article 12	(1-4) of article 12	(1-4) of article 12	(1-4) of article 12	(1-4) of article 12	(1-4) of article 12
(1-4) of article 12	(1-4) of article 12	(1-4) of article 12	(1-4) of article 12	(1-4) of article 12	(1-4) of article 12
(1-4) of article 12	(1-4) of article 12	(1-4) of article 12	(1-4) of article 12	(1-4) of article 12	(1-4) of article 12
(1-4) of article 12	(1-4) of article 12	(1-4) of article 12	(1-4) of article 12	(1-4) of article 12	(1-4) of article 12
(1-4) of article 12	(1-4) of article 12	(1-4) of article 12	(1-4) of article 12	(1-4) of article 12	(1-4) of article 12
(1-4) of article 12	(1-4) of article 12	(1-4) of article 12	(1-4) of article 12	(1-4) of article 12	(1-4) of article 12
(1-4) of article 12	(1-4) of article 12	(1-4) of article 12	(1-4) of article 12	(1-4) of article 12	(1-4) of article 12

11. Infrastructure

	Textbook
1. Books Required reading:	George B. Thomas , Maurice D, Weir and Joil R. Hass (2020). “Thomas’ Calculus” Twelfth Edition,

2. Main references (sources)	<ul style="list-style-type: none"> - Calculus: (Ross L. Finney and George B. Thomas , 1989) - Thomas' Calculus: (George B. Thomas, Maurice D. Weir and Joel R. Hass , 2011, 12th Edition) - Lectures notes of Prof. Dr. Safa N. Hameed.
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	
12. The development of the curriculum plan	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW	
COURSE SPECIFICATION	
<p>This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.</p>	
1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Computer Programming, 103 WRCO
4. Modes of Attendance offered	Visual Basic is a Microsoft Windows Programming language, and Visual Basic is an example of a graphical-based language. A graphical-based language allows the user to work directly with graphics, Window interfaces concerned with the program, and recent scientific articles from the computer languages related to the students' specialty. Programming skills are developed during this course.
5. Semester/Year	1st and 2nd Semesters, Academic year 2020 –2021
6. Number of hours tuition (total)	60 hr., 2 hr. theoretical per week, 2 theoretical and 2 tutorial
7. Date of production/revision of this specification	2020
8. Aims of the Course	
<p>The aims of this course are to develop skilled Visual Basic and programming users with the technical background, knowledge, and adaptability to develop well-designed, robust, computer-based solutions to a range of problems. The course introduces students to Microsoft visual basic and Programming.</p>	
9. Learning Outcomes, Teaching ,Learning and Assessment Method	
<ul style="list-style-type: none"> • Students list the visual programming concepts. • Explain basic concepts and definitions. • Express constants and arithmetic operations. • Distinguish variable and data types. • Students code visual programs by using Visual Basic work environment. • Distinguish and compose events and methods. • Recognize and arrange control structures. 	

- Design a complete program using visual programming concepts.
- Students prepare various projects by helping visual programming.
- Prepare project in visual programming.
- Manage and analyze prepared project with programs.
- Interpret and report obtaining results.

Goal: At the completion of the Visual Basic Computer Skill training, students will have successfully completed the checklist below.

B. Cognitive goals

A2. To have the ability to make decisions to meet desired needs.

A3. To have the ability to have the broad education necessary to understand the impact of engineering solutions.

A4. Knowledge of contemporary issues (this includes presenting students with issues such as the impact of globalization, the outsourcing of both engineering and other supporting jobs as practiced by modern international users).

B. The skills goals special to the course.

B1. To have the ability to analyze and interpret data.

B2. To have the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

B3. To have the ability to Apply basic mathematical and scientific concepts for the description and solution of engineering problems.

Teaching and Learning Methods

1-Lectures

2-Tutorials

3-Homework and Assignments

4-Tests and Exams

5-In-Class Questions and Discussions

Assessment methods

1. Examinations, Tests, and Quizzes.

2. Student Engagement during Lectures.

3. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor).

C. Affective and value goals

C1. An ability to identify, formulates, and solves engineering problems.

C2. A recognition of the need for and an ability to engage in life-long learning

C3. Enhancing self-learning ability.

C4. Ability to identify, formulate and provide creative/innovative/effective solution of a problems.

Teaching and Learning Methods

Discussion with students

Assessment methods

Respecting deadlines

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D2. An understanding of professional and ethical responsibility.
- D3. Ability to demonstrate the characteristics of a team leader or a manager.
- D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1		4	Introduction to Visual Basic Programming	1 – 5 of Article (11)	1 – 2 of Article (12)
2		4	Basic Concepts and Definitions	1 – 5 of Article (11)	1 – 2 of Article (12)
3		4	Constants and Arithmetic Operations	1 – 5 of Article (11)	1 – 2 of Article (12)
4		4	Expressions (Expressions): constants (constant), variables (variables), transactions (operators)	1 – 5 of Article (11)	1 – 2 of Article (12)
5		4	Orders of input and output (Input and Output commands)	1 – 5 of Article (11)	1 – 2 of Article (12)
6		4	Use design windows	1 – 5 of Article (11)	1 – 2 of Article (12)
7		4	Events and event procedures	1 – 5 of Article (11)	1 – 2 of Article (12)
8		4	Use methods and events	1 – 5 of Article (11)	1 – 2 of Article (12)

9		4	Use the design window to calculations	1 – 5 of Article (11)	1 – 2 of Article (12)
10		4	Use the design window to calculations	1 – 5 of Article (11)	1 – 2 of Article (12)
11		4	Properties	1 – 5 of Article (11)	1 – 2 of Article (12)
12		4	Control sturctures	1 – 5 of Article (11)	1 – 2 of Article (12)
13		4	Loops	1 – 5 of Article (11)	1 – 2 of Article (12)
14		4	Use Statement for...next	1 – 5 of Article (11)	1 – 2 of Article (12)
15		4	Use Statement for...next	1 – 5 of Article (11)	1 – 2 of Article (12)
16		4	Use Statement Select case	1 – 5 of Article (11)	1 – 2 of Article (12)
17		4	Use Statement Do...While	1 – 5 of Article (11)	1 – 2 of Article (12)
18		4	Use Statement Do...While	1 – 5 of Article (11)	1 – 2 of Article (12)
19		4	Sub procedures	1 – 5 of Article (11)	1 – 2 of Article (12)
20		4	Sub routines	1 – 5 of Article (11)	1 – 2 of Article (12)
21		4	Function (function)	1 – 5 of	1 – 2 of

				Article (11)	Article (12)
22		4	Data structures	1 – 5 of Article (11)	1 – 2 of Article (12)
23		4	Graphics with Visual Basic	1 – 5 of Article (11)	1 – 2 of Article (12)
23		4	Graphics with Visual Basic	1 – 5 of Article (11)	1 – 2 of Article (12)
24		4	Graphics with Visual Basic	1 – 5 of Article (11)	1 – 2 of Article (12)
25		4	Drawing commands (plotting)	1 – 5 of Article (11)	1 – 2 of Article (12)
26		4	Drawing commands (plotting)	1 – 5 of Article (11)	1 – 2 of Article (12)
27		4	Drawing commands (plotting)	1 – 5 of Article (11)	1 – 2 of Article (12)
28		4	Drawing functions (plotting function) and (drawing tools figure tools)	1 – 5 of Article (11)	1 – 2 of Article (12)
29		4	Drawing functions (plotting function) and (drawing tools figure tools)	1 – 5 of Article (11)	1 – 2 of Article (12)
30		4	Drawing functions (plotting function) and (drawing tools figure tools)	1 – 5 of Article (11)	1 – 2 of Article (12)

11. Infrastructure

1. Books Required reading:	<p>There is no required textbook to purchase. Readings will be assigned via various sources, such as internet articles, and freely available downloadable textbooks</p> <p>1- Course Notes for: Learn Visual Basic 6.0 2- Visual Basic 6.0 Dr. Nisreen S. Mohammed 3- WWW.Youtube.com</p>
2. Main references (sources)	
A- Recommended books and references scientific journals, reports...).	Programming in Visual Basic 6.0
B-Electronic references, Internet sites...	
12. The development of the curriculum plan	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Engineering Mechanics / 104 WREM
4. Modes of Attendance offered	Annual System: There is only one mode of delivery, which is a “Day Program”. The students are full-time students and on campus. They attend full-day program in face-to-face mode. The academic year is composed of 30-week regular subjects. Online lectures are provided to the students using Google Classroom Application.
5. Semester/Year	1st and 2nd Semesters, Academic year 2019 –2020
6. Number of hours tuition (total)	120 hr., 4 hr. theoretical per week
7. Date of production/revision of this specification	2020

8. Aims of the Course

- 1- Develop the capacity to predict the effects of force and motion while carrying out the creative design functions of engineering. This capacity requires more than a mere knowledge of the physical and mathematical principles of mechanics.
- 2-Increase the ability to visualize configurations in terms of real materials, actual constraints and the practical limitations which govern the behavior of mechanics and structures.
- 3- Help the student to develop his ability to visualize which is so vital to problem formulation.
- 4- Achieve maximum progress when the principles and their limitations are learned together within the context of engineering applications.
- 5-To build up a strong background knowledge for the next engineering courses such as fluid mechanics, strength of materials, structural analysis etc...

9• Learning Outcomes, Teaching ,Learning and Assessment Method

the student in the field of water resources engineering will be able to:

- 1- Determine the resultant of the system of forces exerted on the rigid body in the form of vector or scalar and transform them into equivalent force couple system.

2. Use equilibrium equations to determine the external reactions of statically determinate structures.
3. Find the internal forces and their types in the members of statically determinate truss by both joint method and section method.
4. Determine the centroids of line, area, and volume.
5. Calculate the moment of inertia of area of any shape and can transfer it to any axis.
6. Describe the motion of particle at any moment (displacement, velocity and acceleration) that is moving on linear or curvilinear path. The motion of projectiles can also be solved.
7. Resolve the motion of particle by rectangular, tangential-transverse and polar coordinates, respectively.
8. Analyze the relative motion of bodies (displacement, velocity, and acceleration).
9. Calculate centroid, area moment of inertia of various figures.
10. Calculate various types of forces (external, internal, and friction force) which are exerted on the moving bodies by using second Newton's law.
11. Use work and equations to determine velocity, displacement, and applied force.

C. Cognitive goals

- A1. To have the ability to apply knowledge of mathematics, science, and engineering.

B. The skills goals special to the course.

- B2. To have the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- B3. To have the ability to Apply basic mathematical and scientific concepts for the description and solution of engineering problems.

Teaching and Learning Methods

- 1- Lectures
- 2- Tutorials
- 3- Homework and Assignments
- 4- Tests and Exams
- 5- In-Class Questions and Discussions
- 6- Connection between Theory and Application
- 7- Extracurricular Activities
- 8- Seminars
- 9- In- and Out-Class oral conservations

Assessment methods

1. Examinations, Tests, and Quizzes
2. Extracurricular Activities
3. Student Engagement during Lectures
 4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor)

C. Affective and value goals

- C1. An ability to identify, formulates, and solves engineering problems.
 C3. Enhancing self-learning ability.

Teaching and Learning Methods

Discussion with students

Assessment methods

Respecting deadlines

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D3. Ability to demonstrate the characteristics of a team leader or a manager.

10 .Course Structure

Weeks	Hours	LOs (Article 10)	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4 3 the. 1 tut.	1	Introduction to statics , basic concepts , scalar and vectors , units	1-9 of article (11)	1 – 4 of article (12)
2	4 3 the. 1 tut	2	Force system and components (2-D)	1-9 of article (11)	1 – 4 of article (12)
3	4 3 the. 1 tut	3	Rectangular components of a force	1-9 of article (11)	1 – 4 of article (12)
4	4 3 the. 1 tut	4	Moment and couple (2-D)	1-9 of article (11)	1 – 4 of article (12)
5	4 3 the. 1 tut	5	Resultants (2-D)	1-9 of article (11)	1 – 4 of article (12)
6	4 3 the. 1 tut	6	Types of supports	1-9 of article (11)	1 – 4 of article (12)
7	4 3 the. 1 tut	7	System isolation and the free body diagram	1-9 of article (11)	1 – 4 of article (12)
8	4 3 the. 1 tut	8	Types of loads and beams	1-9 of article (11)	1 – 4 of article (12)
9	4 3 the. 1 tut	9	Equilibrium , conditions and equations of equilibrium	1-9 of article (11)	1 – 4 of article (12)

10	4 3 the. 1 tut	10	Equilibrium of collinear , concurrent , parallel , and non-concurrent force system	1-9 of article (11)	1 – 4 of article (12)
11	4 3 the. 1 tut	11	Analysis of simple trusses: Method of Joints	1-9 of article (11)	1 – 4 of article (12)
12	4 3 the. 1 tut	12	Analysis of simple trusses: Method of Sections	1-9 of article (11)	1 – 4 of article (12)
13	4 3 the. 1 tut	13	Centroid and moment of areas	1-9 of article (11)	1 – 4 of article (12)
14	4 3 the. 1 tut	14	Centroids of areas by integration	1-9 of article (11)	1 – 4 of article (12)
15	4 3 the. 1 tut	15	Centroids of Composite areas	1-9 of article (11)	1 – 4 of article (12)
16	4 3 the. 1 tut	16	Moment of Inertia by integration	1-9 of article (11)	1 – 4 of article (12)
17	4 3 the. 1 tut	17	Radius of Gyration	1-9 of article (11)	1 – 4 of article (12)
18	4 3 the. 1 tut	18	Moment of Inertia for Composite areas	1-9 of article (11)	1 – 4 of article (12)
19	4 3 the. 1 tut	19	Friction, Types of Friction	1-9 of article (11)	1 – 4 of article (12)
20	4 3 the. 1 tut	20	Dry friction	11-9 of article (11)	1 – 4 of article (12)
21	4 3 the. 1 tut	21	Static Friction and Kinetic Friction	1-9 of article (11)	1 – 4 of article (12)
22	4 3 the. 1 tut	22	Introduction to Dynamics, Newton's Laws, Units, Gravitation	1-9 of article (11)	1 – 4 of article (12)
23	4 3 the. 1 tut	23	Kinematics: Rectilinear Motion with constant acceleration	1-9 of article (11)	1 – 4 of article (12)
24	4 3 the. 1 tut	24	Kinematics: Rectilinear Motion with variable acceleration	1-9 of article (11)	1 – 4 of article (12)

25	4 3 the. 1 tut	25	Kinematics: Curvilinear Motion	1-9 of article (11)	1 – 4 of article (12)
26	4 3 the. 1 tut	26	Kinematics: Projectiles Motion	1-9 of article (11)	1 – 4 of article (12)
27	4 3 the. 1 tut	27	Kinetic: Newton's 2nd Law of Motion	1-9 of article (11)	1 – 4 of article (12)
28	4 3 the. 1 tut	28	Kinetic: Rectilinear Motion	1-9 of article (11)	1 – 4 of article (12)
29	4 3 the. 1 tut	29	Introduction to Work and Energy	1-9 of article (11)	1 – 4 of article (12)
30	4 3 the. 1 tut	30	Work and Energy of Rectilinear Motion	1-9 of article (11)	1 – 4 of article (12)

11. Infrastructure

1. Books Required reading:	1- " Engineering Mechanics " Statics and Dynamics, R. C. Hibbeler, 11 th edition, 2006.
2. Main references (sources)	<p>References</p> <p>1."Engineering Mechanics" Statics, Meriam, J.L. & Kraig, L.G, V1, 5th edition, SI, 2009.</p> <p>2."Engineering Mechanics" Dynamics, Meriam, J.L. & Kraig, L.G, V1, 5th edition, SI, 2009.</p> <p>3-"A Textbook of Engineering Mechanics", R. S. Khurmi, 20th edition, 2000.</p> <p>Others</p> <p>Notebook prepared by the instructor of the course</p> <p>Collection of sheets of solved and unsolved problems and Exams questions</p>
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	

12. The development of the curriculum plan

Review the coarse syllabus after two years

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW	
COURSE SPECIFICATION	
<p>This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.</p>	
1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Engineering Drawing , 105 WRED
4. Modes of Attendance offered	Annual System ; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects.
5. Semester/Year	1st and 2nd Semesters, Academic year 2020 –2021
6. Number of hours tuition (total)	90 hr., 3 hr. per week
7. Date of production/revision of this specification	2020
8. Aims of the Course	
9. Learning Outcomes, Teaching ,Learning and Assessment Method	
D. Cognitive goals	
A3. To have the ability to have the broad education necessary to understand the impact of engineering solutions.	

B. The skills goals special to the course.

- B1. To have the ability to analyze and interpret data.
- B2. To have the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- B3. To have the ability to Apply basic mathematical and scientific concepts for the description and solution of engineering problems.
- B4. To have an ability to perform water resources engineering integrated design of systems, components, or processes.

Teaching and Learning Methods

- 1- Lectures.
- 2- Sketching engineering objects in the freehand mode.
- 3- Homework and Assignments.
- 4- Tests and Exams.
- 5- In-Class Questions and Discussions

Assessment methods

- 1- Examination, tests, and quizzes
- 2- Student engagement during lectures

C. Affective and value goals

- C1. An ability to identify, formulates, and solves engineering problems.
- C2. A recognition of the need for and an ability to engage in life-long learning
- C3. Enhancing self-learning ability.
- C4. Ability to identify, formulate and provide creative/innovative/effective solution of a problems.

Teaching and Learning Methods

Drawing and Discussion with students

Assessment methods

Presenting the portrait of drawing in assigned appointment

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D2. An understanding of professional and ethical responsibility.
- D3. Ability to demonstrate the characteristics of a team leader or a manager.
- D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Week	Hours	LOs (Article 10)	Unit/Module or Topic Title	Teaching Method	Assessment Method
1			For 1 st Year ; The 1 st semester starts in November	/	/
2					
3	/	/			
4					
5					
6	3	1	General Introduction about Engineering Drawing and Lines.	1 – 5 of Article (11)	1 – 2 of Article (12)
7	3	2	Lettering	1 – 5 of Article (11)	1 – 2 of Article (12)
8	3	3	Graphic instruments and their use.	1 – 5 of Article (11)	1 – 2 of Article (12)
9	3	4	The alphabet of lines	1 – 5 of Article (11)	1 – 2 of Article (12)
10	3	3 & 4	Exercises for the T-square, triangles and scale. Circles and Tangents	1 – 5 of Article (11)	1 – 2 of Article (12)
11	3	5	Combinations (arcs and circles)	1 – 5 of Article (11)	1 – 2 of Article (12)
12	3				
13	3	6	Dimensions, notes, limits and precision.	1 – 5 of Article (11)	1 – 2 of Article (12)
14	3	7	The Ellipse	1 – 5 of Article (11)	1 – 2 of Article (12)
15	3	8		1 – 5 of Article (11)	1 – 2 of Article (12)
16	3				

17	3		Orthographic Drawing and Sketching (Projection)		
18	3				
19	3				
20	3				
21	3	9	Pictorial Drawing and sketching (isometric)	1 – 5 of Article (11)	1 – 2 of Article (12)
22	3				
23	3				
24	3				
25	5				
26	3				
27	3	10	Sectional views and Conventions	1 – 5 of Article (11)	1 – 2 of Article (12)
28	3				
29	3				
30	3				

11. Infrastructure

1. Books Required reading:	Engineering Drawing and Graphic Technology “By Thomas E. French &
2. Main references (sources)	<ul style="list-style-type: none"> - / the Fundamentals of Engineering Drawing and Graphic Technology: (Thomas E. French and Charles J. vierck) - Technical Graphics Communication :(Gary R. Bertoline and Eric N. Wiebe) - Engineering Graphics “Text and Workbook”: (Jerry W. Craig and Orval B. Craig) - (عبد الرسول الخفاف:الرسم الهندسي)
A- Recommended books and references scientific journals, reports...).	محاضرات باللغة العربية إعداد المدرس : ولاء رفعت – قسم هندسة الموارد المائية
B-Electronic references, Internet sites...	

12. The development of the curriculum plan

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Engineering Statistics, 106WRES
4. Modes of Attendance offered	Annual System: They attendance in electronic mode is 2 hours a week.
5. Semester/Year	Annual
6. Number of hours tuition (total)	90 hr., 2 hr per week
7. Date of production/revision of this specification	2020

8. Aims of the Course

The main objectives of the course are:

1. To understand statistics fundamentals,
2. To understand the principles, data variation and analysis.
3. To perform analysis and calculations with ease.

9. Learning Outcomes, Teaching ,Learning and Assessment Method

E. Cognitive goals

A1. Essential analytical techniques and skills in calculation of statistical problems, and data analysis results.

A2. Studying the extent of data homogeneity.

A3. Measuring the coefficient of variations of several number of sub grouped data.

A4. Learning different statistical measures.

A5. Learning different statistical distributions for the society.

A6. Attract and welcome undergraduate students to our Bachelor of Science program in Water Resources Engineering, and to graduate B.S. students who are innovative problem solvers, who become leaders in their organizations, and who possess the knowledge and skills required for a wide range of careers and career changes.

B. The skills goals special to the course.

B1. Essential analytical techniques and skills in calculation of statistical parameters to yield convenient results.

B2. Concentrating on scientific research and its leading role in helping to serve the society and solving its problems through conducting application researches

Teaching and Learning Methods

1- Lectures.

2- Homework and Assignments.

3- Tests and Exams.

4- In-Class Questions and Discussions.

5- Connection between Theory and Application.

6- In- and Out-Class oral conservations.

Assessment methods

1. Examinations, Tests, and Quizzes.

2. Student Engagement during Lectures.

3. Responses Obtained from Students, Questionnaire about curriculum and faculty member (Instructor).

4. Home work related to problem solving.

C. Affective and value goals

C1. Applicable skills to learn calculation of statistical data analysis.

C2. Mean and variance calculations.

C3. Research and analytical techniques.

C4. Prepare students for successful careers in Water Resources Engineering.

Teaching and Learning Methods

Intensive studies of regulations

Assessment methods

Case studies

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D1. Become more effective, independent and confident self-directed learners

D2. Improve their general skills for study and career management

D3. Articulate personal goals and evaluate progress towards their achievement

D4. An ability to identify, formulate, and solve engineering problems.

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2 (Theo.)	1&2	Review of fundamental concepts	Electronic	Questions during the lectures ,quiz, exam, present in the class
2	2 (Theo.)	1 &2	Data Representation	Electronic	Questions during the lectures ,quiz, exam, present in the class
3	2 (Theo.)	1 &2	Measures of central tendency calculations	Electronic	Questions during the lectures ,quiz, exam, present in the class

4	2 (Theo.)	1 &2	Measures of dispersion calculations	Electronic	Questions during the lectures ,quiz, exam, present in the class
5	2 (Theo.)	1 &2	Construction of histogram and % OGIVE	Electronic	Questions during the lectures ,quiz, exam, present in the class
6	2 (Theo.)	1,2,&3	Binomial Distribution	Electronic	Questions during the lectures ,quiz, exam, present in the class
7	2 (Theo.)	1,2,&3	Poisson Distribution With solved problems	Electronic	Questions during the lectures ,quiz, exam, present in the class
8	2 (Theo.)	2,3 &4	Binomial Distribution With solved problems	Electronic	Questions during the lectures ,quiz, exam, present in the class
9	2 (Theo.)	2,3 &4	Normal Distribution With solved problems	Electronic	Questions during the lectures ,quiz, exam, present in the class
10	2 (Theo.)	-----	t- Distribution	Electronic	-----
11	2 (Theo.)	2,3 &4	Hypotheses Tests	Electronic	Questions during the lectures ,quiz, exam, present in the class

12	2 (Theo.)	2,3 &4	Null Hypothesis	Electronic	Questions during the lectures ,quiz, exam, present in the class
13	2 (Theo.)	2,3 &4	F- Distribution	Electronic	Questions during the lectures ,quiz, exam, present in the class
14	2 (Theo.)	2,3 &4	Estimation of Mean and Variance limits	Electronic	Questions during the lectures ,quiz, exam, present in the class
15	2 (Theo.)	2,3 &4	Correlation Coefficients	Electronic	Questions during the lectures ,quiz, exam, present in the class
16	2 (Theo.)	2,3 &4	The chi- square Test	Electronic	Questions during the lectures ,quiz, exam, present in the class
17	2 (Theo.)	2,3 &4	Simple Regression	Electronic	Questions during the lectures ,quiz, exam, present in the class

11. Infrastructure	
1. Books Required reading:	1. Murray Spiegel , “Statistics”, eighth edition, 2001, Raensellor Polytechnique Institute, Shaumes outline series, USA. Adam and Bashforth, “ Engineering Statistics”, N.Y, 2003
2. Main references (sources)	- Murray D. Spiegel (2014) “Statistics”, 7th ed.
A- Recommended books and references scientific journals, reports...).	Any textbooks regarding Engineering Statistics particularly the ones that deal with applied statistics
B-Electronic references, Internet sites...	https://www.wiley.com/en-gu/Statistics+for+Engineers:+An+Introduction-p-9780470745564 http://www.fulviofrisone.com/attachments/article/447/Schaum's%20Outline%20of%20Statistic.pdf
12. The development of the curriculum plan	
Not to relay on traditional examinations but the creation of reports following the reading of textbooks. These reports are validated and transformed into academic credits for graduation purposes.	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Materials technology, 107 WRME
4. Modes of Attendance offered	One Semester System; There is only one mode of delivery, which is a “Day program”. The students are full time students, and on campus. They attend full day program in face to face mode. The academic semester is composed of 15 weeks regular subjects. Online lectures have been providing to the students using Google Classroom Application.
5. Semester/Year	2 nd semester, 2020-2021
6. Number of hours tuition (total)	60 hours / 4 hours per week, 2 hr. theoretical and 2 hrs. laboratory work per week
7. Date of production/revision of this specification	2020
8. Aims of the Course	
<ol style="list-style-type: none"> 1. This course appraises the characteristics, properties, applications and behavior (including strengthening mechanisms) during processing, fabrication, and service of a wide range of engineering materials. 2. Evaluate the effects of stress, fatigue, creep, corrosion, and wear on material. 3. Examine forms and effects of corrosion in metals and review the main methods of corrosion prevention. 4. Systematically apply and justify procedures used in the failure analysis of a Component. 5. Systematically specify and justify suitable material(s) for a given application, and including the use of relevant material selection methodologies. 	

6. Connection between theory and applications

9. Learning Outcomes, Teaching ,Learning and Assessment Method

- i. Introduction to Materials Technology.
- j. The engineering properties of Aggregate and types of aggregate.
- k. Types and engineering properties of Bricks including internet sources.
- l. The mechanics of Construction with brick and types of bond.
- m.
- n. The engineering aspects of the Mortar and its types such as cement and Lime.
- o. Introduces the description of Concrete tests and properties of concrete, and their field and laboratory test such as compressive strength and modulus of elasticity.
- p. Develop a successful theoretical reasoning and critical thinking from the output of Materials Technology.
- q. Introduce the definition, name of Additive and admixtures and their usage.

F. Cognitive goals

- A1. To have the ability to apply knowledge of mathematics, science, and engineering.
- A2. To have the ability to make decisions to meet desired needs.
- A3. To have the ability to have the broad education necessary to understand the impact of engineering solutions.
- A4. Knowledge of contemporary issues (this includes presenting students with issues such as the impact of globalization, the outsourcing of both engineering and other supporting jobs as practiced by modern international users).

B. The skills goals special to the course.

- B1. To have the ability to analyze and interpret data.
- B2. To have the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- B3. To have the ability to Apply basic mathematical and scientific concepts for the description and solution of engineering problems.
- B4. To have an ability to perform water resources engineering integrated design of systems, components, or processes.

Teaching and Learning Methods

1. Lectures notes
2. Tutorials
3. Homework and Assignments
4. Laboratory Experiments
5. Test and Exams, Reports and Presentations.
6. In class questions and discussions
7. Online lectures have been providing to the students using Google Classroom Application.
8. Discussion with students

Assessment methods

1. In-class and online tests, and quizzes.
2. Student engagement during lectures
3. Two Monthly written exams and one Laboratory Exam.

C. Affective and value goals

- C1. An ability to identify, formulate, and solve engineering problems.
- C2. A recognition of the need for and an ability to engage in life-long learning
- C3. Enhancing self-learning ability.
- C4. Ability to identify, formulate and provide creative/innovative/effective solution of a problems.

Teaching and Learning Methods

Lectures notes

Tutorials

Online lectures have been providing to the students using Google Classroom Application.

Discussion with students

Assessment methods

Respecting deadlines

D. General and rehabilitative transferred skills (other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D2. An understanding of professional and ethical responsibility.
- D3. Ability to demonstrate the characteristics of a team leader or a manager.
- D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Week	Hours	LO's Article 10	Unit model or Topic title	Teaching Method	Assessment Method
16	2 theo 2 Lab.	1 and 2	Introduction in Material Technology	1 to 8 of article 11	1 to 3 of article 12
17	2 theo 2 Lab.	1 and 2	Introduction in Material Technology		
18	2 theo 2 Lab.	3	Bricks		
19	2 theo 2 Lab.	3	Types of Brick		
20	2 theo 2 Lab.	4	Brick works		
21	2 theo 2 Lab.	4	Types of bond		
22	2 theo 2 Lab.	4	Mortar and its types		
23	2 theo 2 Lab.	5	Concrete		
24	2 theo 2 Lab.	5	Concrete works		
25	2 theo 2 Lab.	5	Cement		
26	2 theo	5	Aggregates		

	2 Lab.				
27	2 theo 2 Lab.	8	Admixtures		
28	2 theo 2 Lab.	5	Lime		
29	2 theo 2 Lab.	6	Properties of concrete		
30	2 theo 2 Lab.	6	Properties of concrete		

11. Infrastructure

1. Books Required reading:	<u>Artin Livon and Zuhair Saako, 1977. "Building Construction" University of Mousul-Iraq. (Arabic Reference)</u>
2. Main references (sources)	- <u>Artin Livon and Zuhair Saako, 1977. "Building Construction" University of Mousul-Iraq. (Arabic Reference)</u> Internet sites. - Internet sites
A- Recommended books and references scientific journals, reports...).	1- Lectures and solved illustrative problems 2-On-line resources
B-Electronic references, Internet sites...	On-line resources

12. The development of the curriculum plan

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Engineering Geology, 108 WREG
4. Modes of Attendance offered	Semester System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The semester is composed of 15-week regular subjects. One hour theoretical and 2 hours of laboratory work per week. Online lectures have been providing to the students using Google Classroom Application.
5. Semester/Year	1st Semesters, Academic year 2020 –2021
6. Number of hours tuition (total)	45 hours, 1 hr. theoretical and 2 hrs. laboratory work per week
7. Date of production/revision of this specification	2020
8. Aims of the Course	
<ol style="list-style-type: none"> 1. Teaching Principles of Engineering Geology. 2. The course introduces basic definitions of minerals, rocks, materials, rock mechanics, and surface erosion control, Soil, ground water and mass movement dams and reservoirs and their geotechnical considerations. 	

3. Introduces the description of rocks, and their field and laboratory test such as compressive strength and modulus of elasticity.
4. Develop a successful theoretical reasoning and critical thinking from the output of Engineering Geology.
5. Provides and encourages students to understand that practically impossible to have a successful design of hydraulic structures without the use of engineering mechanics, engineering geology and strength of materials etc.
6. Introduce Rivers and Stream Geology.
7. Taught the student the Water Bearing Qualities of Rocks and Types of Aquifers.

9• Learning Outcomes, Teaching ,Learning and Assessment Method

- r. Introduction to Engineering Geology and Geological Engineering.
- s. The engineering properties of rocks including lab tests.
- t. Types of aquifers and the motion of groundwater through different aquifers including internet sources.
- u. The engineering properties of soils including internet sources.
- v. The mechanics of Mass Movement including internet sources.
- w. The geo-engineering aspects of the reservoirs and dam construction including internet sources.
- x. Introduces the description of rocks, and their field and laboratory test such as compressive strength and modulus of elasticity.
- y. Develop a successful theoretical reasoning and critical thinking from the output of Engineering Geology.
- z. Provides and encourages students to understand that practically impossible to have a successful design of hydraulic structures without the use of engineering mechanics, engineering geology and strength of materials etc.
- aa. Introduce Rivers and Stream Geology.
- bb. Taught the student the Water Bearing Qualities of Rocks and Types of Aquifers.
- cc. Taught the student the Mass movements, Faults, Folds and Sliding.
- dd. Introduce the Dams and reservoirs and their geotechnical considerations in site selection.

G. Cognitive goals

- A1. To have the ability to apply knowledge of mathematics, science, and engineering.
- A3. To have the ability to have the broad education necessary to understand the impact of engineering solutions.
- A4. Knowledge of contemporary issues (this includes presenting students with issues such as the impact of globalization, the outsourcing of both engineering and other supporting jobs as practiced by modern international users).

B. The skills goals special to the course.

- B1. To have the ability to analyze and interpret data.
- B2. To have the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- B3. To have the ability to Apply basic mathematical and scientific concepts for the description and solution of engineering problems.

Teaching and Learning Methods

- 1- Lecture notes
- 2- Tutorials
- 3- Homework and Assignments
- 4- Tests and Exams
- 5- In-Class Questions and Discussions
- 6- Wooden samples of rocks planes.
- 7- Online lectures have been providing to the students using Google Classroom Application.

Assessment methods

- 1-In-clss and online tests, and quizzes.
- 2-Student engagement during lectures
- 3-Two Monthly written exams.

C. Affective and value goals

- C1. An ability to identify, formulates, and solves engineering problems.
- C2. A recognition of the need for and an ability to engage in life-long learning
- C3.Enhancing self-learning ability.
- C4. Ability to identify, formulate and provide creative/innovative/effective solution of a problems.

Teaching and Learning Methods

- lectures,
- tutorials, and
- supervised team work.

Assessment methods

Discussion with students

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D2. An understanding of professional and ethical responsibility.

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3		Lab induction and Eng. geology		
	1 theo	1-2		1-2	1-2
	2 lab				
2	3		Engineering Properties and Classification of Soil		
	1 theo	1-4		1-7	1-3
	2 lab				
3	3		Engineering Properties and Classification of Soil		
	1 theo	1-4		1-7	1-3
	2 lab				
4	3		Engineering Properties and Classification of Soil		
	1 theo	1-4		1-7	1-3
	2 lab				
5	3		Engineering Properties of Rocks		
	1 theo	1-7		1-7	1-3
	2 lab				
6	3		Engineering Properties of Rocks		
	1 theo	1-7		1-7	1-3
	2 lab				
7	3		Engineering Properties of Rocks		
	1 theo	1-7		1-7	1-3
	2 lab				
8	3		Classification of Rocks		
	1 theo	1-9		1-7	1-3

	2 lab				
9	3		Classification of Rocks		
	1 theo 2 lab	1-9		1-7	1-3
10	3		Groundwater and Geology		
	1 theo 2 lab	1-13		1-7	1-3
11	3		Groundwater and Geology		
	1 theo 2 lab	1-13		1-7	1-3
12	3		Zonal Distribution of Ground water, Ground Water Movement.		
	1 theo 2 lab	1-13		1-7	1-3
13	3		Zonal Distribution of Ground water, Ground Water Movement.		
	1 theo 2 lab	1-13		1-7	1-3
14	3		Mechanics of Mass Movement		
	1 theo 2 lab	1-13		1-7	1-3
15	3		Dams and Reservoirs		
	1 theo 2 lab	1-13		1-7	1-3

11. Infrastructure	
1. Books Required reading:	1. Engineering Geology: Principles and Practice, By David George Price (2009)
2. Main references (sources)	<ul style="list-style-type: none"> - Foundations of Engineering Geology, 3rd Edition by Tony Waltham. - Physical Geology, 13th Edition by Charles C. Plummer, Diane H. Carlson and Lisa Hammersley, McGraw-Hill. - Principles of Geology: (Gilluly J. , A. C. Waters and A. O. Woodford, 3rd Edition)
A- Recommended books and references scientific journals, reports...).	Water Resources Systems: modeling techniques and analysis
B-Electronic references, Internet sites...	
12. The development of the curriculum plan	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution

University of Baghdad
College of Engineering

2. University Department/Centre

Department of Water Resources

3. Course title/code

**Introduction to Water Resources Engineering / 109
WRIR**

4. Modes of Attendance offered

Annual System ; There is only one mode of delivery, which is a “Day Program”. The students are full time students and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subject. Online lectures have been providing to the students using Google Classroom Application.

5. Semester/Year

1st and 2nd Semesters, Academic year 2020 –2021

6. Number of hours tuition (total)

60 hr., 2 hr. theoretical per week

7. Date of production/revision of this specification

2020

8. Aims of the Course

The main goal of this course to learn the student that water is one of the most precious and a finite resources that is essential for agriculture, industry and human existence and the life in Iraq since eternity depends on the waters of its two great rivers: The Tigris and the Euphrates but its geographical location being the lower riparian state, is placing it in an embarrassing situation because it is negatively affected by the multi-purpose Turkish project constructed or planned to be constructed without a prior consultation with Iraq. Therefore, this course is designed to alert Students to the problem of water shortage in Iraq and how to save them and to conserve while providing necessary quantities as well as conserve the environment

9• Learning Outcomes, Teaching ,Learning and Assessment Method

A. Cognitive goals

- A1. To have the ability to apply knowledge of mathematics, science, and engineering.
- A3. To have the ability to have the broad education necessary to understand the impact of engineering solutions.

B. The skills goals special to the course.

- B2. To have the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Teaching and Learning Methods

- 1. Lectures
- 2. Tutorials
- 3. Homework and Assignments
- 4. Tests and Exams
- 6. In-Class Questions and Discussions
- 7. Connection between Theory and Application

Assessment methods

- 1. Examinations, Tests, and Quizzes.
- 2. Extracurricular Activities.
- 3. Student Engagement during Lectures.
- 4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor).

C. Affective and value goals

- C3. Ability to function effectively as an individual in a group.

Teaching and Learning Methods

Discussion with students

Assessment methods

Respecting deadlines

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D2. An understanding of professional and ethical responsibility.
- D3. Ability to demonstrate the characteristics of a team leader or a manager.

10. Course Structure

Week	Hours	Los (Article 10)	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2 theo.		Water resources: hydrologic cycle ,Sources	1-7 of article(11)	1-3 of article(12)
2	=		Field of Water Resource	=	=
3	=		Water Resources in Iraq: Sources	=	=
4	=		Water Resources in Iraq: Sources	=	=
5	=		Iraqi water policy to conserve the water resources	=	=
6	=		Irrigation: sources, soil -water relationship	=	=
7	=		Water quality	=	=
8	=		Irrigation methods	=	=
9	=		Drainage: sources of excess water	=	=
10	=		Drainage and Irrigation net work	=	=
11	=		Drainage and Irrigation net work structure	=	=
12	=		Ground water: occurrence, ground water hydraulic	=	=
13	=		Flood control: method of flood control	=	=
14	=		Types of reservoirs	=	=
15	=		Types of dams	=	=
16	=		Types of spillways	=	=
17	=		Water Resources project in Iraq: Dams	=	=
18	=		Reservoirs	=	=

19	=		Barrage	=	=
20	=		Irrigation and Reclamation Projects	=	=
21	=		Outfall Drain	=	=
22	=		Water Consumer Sector: Agriculture sector, Industry sector	=	=
23	=		Hydropower, water supply and municipal	=	=
24	=		Hydropower: introduction	=	=
25	=		Method of electrical generation, hydropower station in Iraq	=	=
26	=		Laws on the use of Shared Water Resources	=	=
27	=		, the apportionment of the Tigris and Euphrates	=	=
28	=		Each student will write a major research paper on some water resources issue and each student will also present his/her research to the class during the last few weeks of the semester	=	=
29	=		Each student will write a major research paper on some water resources issue and each student will also present his/her research to the class during the last few weeks of the semester	=	=
30	=		Each student will write a major research paper on some water resources issue and each student will also present his/her research to the class during the last few weeks of the semester	=	=

11. Infrastructure	
1. Books Required reading:	<p style="text-align: center;">References</p> <p>1- Encyclopedia of Iraq's Irrigation services by Ministry of Water Resources 2- .Irrigation & Drainage by Charle Shukri 3- Study of Laws, international and regional conventions to regulate the use of water resources by AOAD - 4- Irrigation & Drainage in Iraq by Najib Kerofo</p>
2. Main references (sources)	<p style="text-align: center;">Others</p> <p>1-Notebook prepared by the instructor of the course 2-Magazin Tender Rafidain by ministry of Water Resources</p>
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	
12. The development of the curriculum plan	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution

University of Baghdad
College of Engineering

2. University Department/Centre

Department of Water Resources

3. Course title/code

English language, 110WREN

4. Modes of Attendance offered

Annual System: There is only one mode of delivery, which is a “Day Program”. The students are full-time students and on campus. They attend full-day program in face-to-face mode. The academic year is composed of 30-week regular subjects. Online lectures are provided to the students using Google Classroom Application.

5. Semester/Year

1st and 2nd Semesters, Academic year 2020–2021

6. Number of hours tuition (total)

12 hr., 1 hr. per week

7. Date of production/revision of this specification

2020

8. Aims of the Course

The aim of this course is to empower students with the language and life skills they need to carry out their goals. To this end it provides ample opportunities for students to build awareness and practice language in real- life scenarios. The integrated skills approach of the course develops the student's self-confidence to survive and succeed in professional and social encounters within an English-speaking global community.

9• Learning Outcomes, Teaching ,Learning and Assessment Method

By the end of this communication skills course, the students will be able to:

- 1- Find and understand information about vocabulary, pronunciation, usage, and grammar in reference texts, online resources, and English language dictionaries.
- 2- Develop conversational English skills necessary for becoming a contributing participant in small group activities, large group discussions, and oral presentations.
- 3- Understand texts using effective learning strategies for reading and vocabulary building.
- 4- Demonstrate an appropriate level of control of grammatical accuracy and lexical appropriacy in written and oral communication.

A. Cognitive goals

B. The skills goals special to the course.

Teaching and Learning Methods

- 1. Lectures.
- 2. Homework and Assignments.
- 3. Tests and Exams.
- 4. In-Class Questions and Discussions.
- 5. Reports and Presentations.

Assessment methods

- 1. Examinations, Tests, and Quizzes.
- 2. Student Engagement during Lectures.
- 3. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor).

C. Affective and value goals

Teaching and Learning Methods

Assessment methods

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	1 hr	1	Introduction to the course	1-5 of article (11)	1 – 3 of article (12)
2	1 hr	2	Unit 1: Hello	1-5 of article (11)	1 – 3 of article (12)
3	1 hr	3	Unit 1: Hello	1-5 of article (11)	1 – 3 of article (12)
4	1 hr	4	Unit 2: Your world	1-5 of article (11)	1 – 3 of article (12)
5	1 hr	5	Unit 2: Your world	1-5 of article (11)	1 – 3 of article (12)
6	1 hr	6	Unit 3: Personal information	1-5 of article (11)	1 – 3 of article (12)
7	1 hr	7	Unit 3: Personal information	1-5 of article (11)	1 – 3 of article (12)
8	1 hr	8	Unit 4: Family and friend	1-5 of article (11)	1 – 3 of article (12)
9	1 hr	9	Unit 4: Family and friend	1-5 of article (11)	1 – 3 of article (12)
10	1 hr	10	Unit 5: It's my life!	1-5 of article (11)	1 – 3 of article (12)
11	1 hr	11	Unit 5: It's my life!	1-5 of article (11)	1 – 3 of article (12)
12	1 hr	12	Unit 6: Every day	1-5 of article (11)	1 – 3 of article (12)
13	1 hr	13	Unit 6: Every day	1-5 of article (11)	1 – 3 of article (12)
14	1 hr	14	Unit 7: Places I like	1-5 of article (11)	1 – 3 of article (12)
15	1 hr	15	Unit 7: Places I like	1-5 of article (11)	1 – 3 of article (12)
16	1 hr	16	Unit 8: Where I live	1-5 of article (11)	1 – 3 of article (12)
17	1 hr	17	Unit 8: Where I live	1-5 of article (11)	1 – 3 of article (12)
18	1 hr	18	Unit 9: Happy birthday	1-5 of article (11)	1 – 3 of article (12)
19	1 hr	19	Unit 9: Happy birthday	1-5 of article (11)	1 – 3 of article (12)
20	1 hr	20	Unit 10: We had a good time!	11-5 of article (11)	1 – 3 of article (12)
21	1 hr	21	Unit 10: We had a good time!	1-5 of article (11)	1 – 3 of article (12)

22	1 hr	22	Unit 11: We can do it	1-5 of article (11)	1 – 3 of article (12)
23	1 hr	23	Unit 11: We can do it	1-5 of article (11)	1 – 3 of article (12)
24	1 hr	24	Unit 11: We can do it	1-5 of article (11)	1 – 3 of article (12)
25	1 hr	25	Unit 12: Thank you very much!	1-5 of article (11)	1 – 3 of article (12)
26	1 hr	26	Unit 12: Thank you very much!	1-5 of article (11)	1 – 3 of article (12)
27	1 hr	27	Unit 13: Here and now	1-5 of article (11)	1 – 3 of article (12)
28	1 hr	28	Unit 13: Here and now	1-5 of article (11)	1 – 3 of article (12)
29	1 hr	29	Unit 14: It's time to go	1-5 of article (11)	1 – 3 of article (12)
30	1 hr	30	Unit 14: It's time to go	1-5 of article (11)	1 – 3 of article (12)

11. Infrastructure

1. Books Required reading:	(1) New Headway Plus [Beginning] by John and Liz Soars, Oxford: Oxford University Press (2006)
2. Main references (sources)	(1) Modern scientific articles from the news related to the students' specialty Others - Notebook prepared by the instructor of the course - Collection of sheets of solved and unsolved problems and Exams questions
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	

12. The development of the curriculum plan

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TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW	
COURSE SPECIFICATION	
<p>This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.</p>	
1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Compter/ 111WRCO
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. Online lectures have been providing to the students using Google Classroom Application.
5. Semester/Year	1st and 2nd Semesters, Academic year 2019 –2020
6. Number of hours tuition (total)	60 hr., 2 hr. per week
7. Date of production/revision of this specification	2020
8. Aims of the Course	
<p>The aims of this course are to develop skilled computer users with the technical background, knowledge, and adaptability to develop well-designed, robust, computer-based solutions to a range of problems. The course introduces students to Windows and Microsoft office word and their applications.</p>	

9• Learning Outcomes, Teaching ,Learning and Assessment Method

1. Key Computer Components

- Internal Components (Motherboard, CPU, Memory)
- Media Storage Devices (Hard Disk Storage, DVD/CD Drives, Disk Drives, Portable/Removable Devices)
- Human Interface (Keyboard, Mouse, Touch Pad, Touch Screen, etc.) Video/Audio Components (Monitors, Video Processor, Speakers) Internet/LAN Devices (Modems, Network Interface Devices, Wireless Cards)
- External Components (Printers, Scanners, Web Cams)

2. The Windows Operating System

- Date and Time
- Task Bar, Start Button
- Advanced Searches
- Shutting down your computer
- Files-Loading/Saving
- Creating a Folder or files
- Saving/Renaming folders and files
- Windows Settings and Control Panel.

3. Microsoft Word Skills

- The Environment and Ribbon Command
- Tabs Hiding and the Ribbon Quick Access
- Toolbar Contextual
- Toolbar View
- Document Basics such as Starting a new Document, Saving a document, Printing a document and Text Formatting
- Inserting Clip Art
- Working with shapes
- Line and Paragraph Spacing
- Text Editing such as , Selecting Text Cut, Copy and Paste
- Format Text Font, Size, Color Bold, Italics, Underline Font Effects
- Auto Format Indenting Paragraphs Paragraph Borders and Shading Paragraph Alignment and Breaking.
- Building Tables Creating a table Editing a table Sizing a table Formatting a table
- Working with Images Inserting pictures Setting picture position and text wrapping Resizing and cropping Using clip art organizer Creating with Word Art
- Modifications Columns and Ordering Headers and Footers Smart Art Applying Styles.

H. Cognitive goals

- A1. To have the ability to apply knowledge of mathematics, science, and engineering.
- A2. To have the ability to make decisions to meet desired needs.
- A3. To have the ability to have the broad education necessary to understand the impact of engineering solutions.
- A4. Understanding the importance of Information Technology for Engineering specialty.

B. The skills goals special to the course.

- B1. The skill of working with different computer components.
- B2. The ability to use the Operating systems such as Windows
And Microsoft Word to prepare, design, manipulates and store different files.
- B3. The Use of Word program to write scientific assays and reports.
- B4. A professional user that can deal with different types of application software.

Teaching and Learning Methods

- 1-Lectures
- 2-Tutorials
- 3-Homework and Assignments
- 4-Tests and Exams
- 5-In-Class Questions and Discussions

Assessment methods

- 1-Examination, tests, and quizzes
- 2-Student engagement during lectures

C. Affective and value goals

- C1. An ability to identify, formulates, and solves Computer problems.
- C2. Gain an understanding of the role of the operating system, computer software and hardware.
- C3. Ability to function effectively as an individual in a group.
- C4. Have the advanced skills developed for the use of office productivity packages.

Teaching and Learning Methods

Discussion with students

Assessment methods

Respecting deadlines

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D2. An understanding of professional and ethical responsibility.
- D3. Ability to demonstrate the characteristics of a leader or a manager
- D4. Understand all the basic concepts of information technology and its related terminologies.

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2	1	Introduction to Computer science	1 – 5 of Article (11)	1 – 2 of Article (12)
2	2	2 , 3	Computer Units	1 – 5 of Article (11)	1 – 2 of Article (12)
3	2	3 , 4	Internal Components (Motherboard, CPU, Memory)	1 – 5 of Article (11)	1 – 2 of Article (12)
4	2	4	Media Storage Devices (Hard Disk Storage, DVD/CD Drives, Disk Drives, Portable/Removable Devices)	1 – 5 of Article (11)	1 – 2 of Article (12)
5	2	5	Human Interface (Keyboard, Mouse, Touch Pad, Touch Screen, etc.)	1 – 5 of Article (11)	1 – 2 of Article (12)
6	2	5	External Components (Printers, Scanners, Web Cams)	1 – 5 of Article (11)	1 – 2 of Article (12)
7	2	6	Software	1 – 5 of Article (11)	1 – 2 of Article (12)
8	2	6	Introduction To Windows	1 – 5 of Article (11)	1 – 2 of Article (12)
9	2	7	Date and Time, Task Bar	1 – 5 of Article (11)	1 – 2 of Article (12)
10	2	7 , 8	Creating a Folder Creating a File Loading a File	1 – 5 of Article (11)	1 – 2 of Article (12)
11	2	5, 6, 7, 8	Advanced Search	1 – 5 of Article (11)	1 – 2 of Article (12)
12	2	9, 10	Making Changes Saving/Renaming	1 – 5 of Article (11)	1 – 2 of Article (12)

13	2	9, 10	Moving Files Renaming Making a Copy Copy Files onto a dis	1 – 5 of Article (11)	1 – 2 of Article (12)
14	2	9,10	Windows Settings	1 – 5 of Article (11)	1 – 2 of Article (12)
15	2	11	Control Panel	1 – 5 of Article (11)	1 – 2 of Article (12)
16	2	11	The Word Ribbon and Command Tabs	1 – 5 of Article (11)	1 – 2 of Article (12)
17	2	11	Starting a new Document	1 – 5 of Article (11)	1 – 2 of Article (12)
18	2	12	Printing a document	1 – 5 of Article (11)	1 – 2 of Article (12)
19	2	12	Formatting text	1 – 5 of Article (11)	1 – 2 of Article (12)
20	2	13	Inserting Clip Art	1 – 5 of Article (11)	1 – 2 of Article (12)
21	2	13	Working with shapes	1 – 5 of Article (11)	1 – 2 of Article (12)
22	2	15	Editing basics	1 – 5 of Article (11)	1 – 2 of Article (12)
23	2	15	Cut, Copy, Paste	1 – 5 of Article (11)	1 – 2 of Article (12)
24	2	15	Font format and Effects	1 – 5 of Article (11)	1 – 2 of Article (12)
25	2	15	Creating a table	1 – 5 of Article (11)	1 – 2 of Article (12)
26	2	15	Formatting a table	1 – 5 of	1 – 2 of

				Article (11)	Article (12)
27	2	16	Inserting pictures	1 – 5 of Article (11)	1 – 2 of Article (12)
28	2	16	Creating with Word Art	1 – 5 of Article (11)	1 – 2 of Article (12)
29	2	17	Columns and Ordering	1 – 5 of Article (11)	1 – 2 of Article (12)
30	2	17, 18	Applying Styles and themes	1 – 5 of Article (11)	1 – 2 of Article (12)

11. Infrastructure

1. Books Required reading:	Textbook Ghassan Hamid Abdul Majed , (2014) "Computer Fundamentals" Book store for printing publishing and translating .
2. Main references (sources)	IC3 Test Guide (2019) . Certiport. MOS study guide 2016 Exam (77-725)
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	
12. The development of the curriculum plan	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW	
COURSE SPECIFICATION	
<p>This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.</p>	
1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Mathematics II, 210 WRMA
4. Modes of Attendance offered	Annual System, where the academic year is composed of 30-week regular subjects. Each graduating student has to successfully complete 163 credits. Each subject credit is one 50-minute lecture a week or 3 hours of lab a week. There is no on-line subject which may be used as supplementary material for the class room instruction Online lectures have been providing to the students using Google Classroom Application
5. Semester/Year	1st and 2nd Semesters, Academic year 2019 –2020
6. Number of hours tuition (total)	60 hr., 2 hr. theoretical per week
7. Date of production/revision of this specification	2020
8. Aims of the Course	
<ol style="list-style-type: none"> 1. Find sketches, derivation and integration of hyperbolic. 2. Inverse hyperbolic functions and their applications) Catenary Cables) 3. Achieve the transformation between the Polar and Cartesian. 4. Coordinates and graph of polar functions, conic sections in polar coordinates and their sketches and derivative and integration of polar equations. 5. Analyze of vectors in space with the dot and cross product techniques and find the equations of line and plane in space and the product of three or more vectors. 6. Derivatives of vectors and find the tangential and normal components velocity and acceleration in polar form. 7. Find the derivative of functions of more than one variable and use of chain Rule and non-independence. 8. Evaluation of the directional derivatives and the related applications. 9. How to apply the partial derivatives in the engineering problems and the higher order derivatives and the extreme points. 10. Use Lagrange Multiplier with constraint. 11. Understand the double integrals with definition, theory and how to find the 	

region of integral with applications.

12. Evaluate the double integrals in polar form, surface area and volume.

13. Use the sequences and series in the field of engineering and the tests of them for convergence.

14. Specify the alternative series and their tests.

15. Use of power series and their convergence.

16. Use of complex numbers in different forms and operations.

9• Learning Outcomes, Teaching ,Learning and Assessment Method

I. Cognitive goals

A1. To have the ability to apply knowledge of mathematics, science, and engineering.

A2. To have the ability to make decisions to meet desired needs.

A3. To have the ability to have the broad education necessary to understand the impact of engineering solutions.

A4. Knowledge of contemporary issues (this includes presenting students with issues such as the impact of globalization, the outsourcing of both engineering and other supporting jobs as practiced by modern international users).

B. The skills goals special to the course.

B1. To have the ability to analyze and interpret data.

B2. To have the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

B3. To have the ability to Apply basic mathematical and scientific concepts for the description and solution of engineering problems.

B4. To have an ability to perform water resources engineering integrated design of systems, components, or processes.

Teaching and Learning Methods

1. Lectures

2. Tutorials

3. Homework and Assignments

4. Tests and Exams

6. In-Class Questions and Discussions

7. Connection between Theory and Application

Assessment methods

1. Examinations, Tests, and Quizzes.

2. Extracurricular Activities.

3. Student Engagement during Lectures.

4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member

C. Affective and value goals

- C1. An ability to identify, formulates, and solves engineering problems.
- C2. A recognition of the need for and an ability to engage in life-long learning
- C3. Enhancing self-learning ability.
- C4. Ability to identify, formulate and provide creative/innovative/effective solution of a problems.

Teaching and Learning Methods

Discussion with students

Assessment methods

Respecting deadlines

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D2. An understanding of professional and ethical responsibility.
- D3. Ability to demonstrate the characteristics of a team leader or a manager.
- D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
	3				
1	theo.1tuto rial		Definition of hyperbolic functions	1-7 of article (11)	1 – 4 of article (12)
2	=		Inverse hyperbolic	=	=
3	=		Applications	=	=
4	=		Polar Coordinates and graph of polar functions	=	=
5	=		Conic sections in polar coordinates and their sketches	=	=
6	=		Derivative and integration of polar equations	=	=
7	=		Vectors: components , unit vectors	=	=
8	=		Dot and cross product	=	=

9	=	Equation of line and plane in space	=	=
10	=	Product of three or more vectors	=	=
11	=	Derivatives of vectors and tangential and normal components	=	=
12	=	Velocity and acceleration in polar form	=	=
13	=	Introduction to Partial derivative	=	=
14	=	Chain Rule and non-independence	=	=
15	=	Directional derivatives and the applications	=	=
16	=	Applications of partial derivatives	=	=
17	=	Higher order derivatives and the extreme points	=	=
18	=	Higher order derivatives and the extreme points	=	=
19	=	Largrange multiplier with constraint	=	=
20	=	Double integrals , definition and theory	=	=
21	=	Applications	=	=
22	=	Double integrals in polar form	=	=
23	=	Surface area and volume	=	=
24	=	Sequences and series	=	=
25	=	Tests for convergence	=	=
26	=	Tests for convergence	=	=
27	=	Alternative series and their tests	=	=

28	=		Power series and their convergence	=	=
29	=		Complex numbers and operations	=	=
30	=		Complex numbers and operations	=	=

11. Infrastructure

1. Books Required reading:	<p>1- Calculus: (Ross L. Finney and George B. Thomas , 1989)</p> <p>2- Thomas' Calculus :(George B. Thomas, Maurice D. Weir and Joel R. Hass , 2011, 12th Edition)</p> <p>حساب التفاضل والتكامل : (فرانك ايرز جونيور و اليوت مندلسون)</p>
2. Main references (sources)	
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	

12. The development of the curriculum plan

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Computer Programming, 211 WRM
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subject.
5. Semester/Year	1st and 2nd Semesters, Academic year 2020 –2021
6. Number of hours tuition (total)	60 hrs, 2 theoretical and 2 tutorials
7. Date of production/revision of this specification	2020

8. Aims of the Course

The course aims to introduce students to

- a) Introduce students to how to use Matlab and program mathematical operations.
- b) Learn about vectors and matrices, how to deal with them, methods of input and output, and the use of some of their functions, as well as solving and drawing complex mathematical equations.
- c) Giving accurate details in the style of graphs with regard to colors and other drawing elements, and knowing various methods for creating drawings in two and three dimensions and deal with them.
- d) Knowing the different methods of data input and output and how to write programs in (m-files) format, in addition to acquiring the skill of importing and exporting data and storing them in tables.
- e) Using relational and logical operators together with mathematical expressions in writing practical and applied programs

9• Learning Outcomes, Teaching, Learning and Assessment Method

J. Cognitive goals

- A1. The ability to apply knowledge in the field of MATLAB.
- A2. The ability to use mathematical and logical functions and arithmetic operations and implement them in practice.
- A3. The ability to create and manipulate arrays.
- A4. The ability to write any applied program in the field of water resources engineering.

K. The skills goals special to the course.

- B1. The student acquires the skill of programming thinking.
- B2. The student acquires the skill of using the Matlab program in various applications.
- B3. The student acquires the skill of exchanging data between the different programs
- B4. The student acquires the skill of producing and editing graphs.

Teaching and Learning Methods

- 1. Academic lectures
- 2. The practical laboratory
- 3. Discussion and dialogue in the classroom
- 4. Homework is one of the practical examples available

Assessment methods

- 1. Monthly and final exams.
- 2. Daily practical tests inside the laboratory.
- 3. Daily activities and participation.
- 4. Regular questions, which depend on the method of brainstorming ideas.

L. Affective and value goals

- C1. Analysis, explanation and comparison.
- C2. accuracy of observation and depth of thinking.
- C3. speed of retrieval of information and a priori conclusion.
- C4. speed and accuracy of decision-making.

Teaching and Learning Methods

- 1. Directing distinctive questions and inquiries with depth and accuracy.
- 2. Directing the student to understand the cause and the cause.
- 3. Development of digital sense in expression.
- 4. Brainstorming.

Assessment methods

- 1. Individualizing a part of the examination questions that require depth of thinking, explanation and accuracy of observation
- 2. The student's participation in the classroom.
- 3. Extracurricular duties.

M. General and rehabilitative transferred skills (other skills relevant to employability and personal development)

- D1. Developing the student's ability and ability to use computer programs
- D2. Developing the student's ability and ability to deal with modern technologies related to the vocabulary of the course
- D3. Developing the student's ability and ability to face problems and dilemmas and find appropriate solutions to them
- D4. Developing the student's ability and ability to translate academic information into practical reality.

10. Course Structure					
Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1.	4	Theoretical + practical	General introduction to programming in Matlab language (program operation, desktop, main windows)	Theory + practical lectures	Written + Practical Exam
2.	4	Theoretical + practical	Constants, Variables and Symbols, Arithmetic expression	Theory + practical lectures	Written + Practical Exam
3.	4	Theoretical + practical	Arithmetic and symbolic sentence, programmed functions	Theory + practical lectures	Written + Practical Exam
4.	4	Theoretical + practical	Arrays and operations on matrices (create a matrix)	Theory + practical lectures	Written + Practical Exam
5.	4	Theoretical + practical	Matrix addressing and indexing. Calculations between matrices and between matrix and singular number	Theory + practical lectures	Written + Practical Exam
6.	4	Theoretical + practical	Standard Matrices, Find solutions of linear equations	Theory + practical lectures	Written + Practical Exam
7.	4	Theoretical + practical	Find a partial matrix	Theory + practical lectures	Written + Practical Exam
8.	4	Theoretical + practical	Modification of array values (recall, substitution, add)	Theory + practical lectures	Written + Practical Exam
9.	4	Theoretical + practical	Raster operations between matrices	Theory + practical lectures	Written + Practical Exam
10.	4	Theoretical + practical	Functions that apply to arrays	Theory + practical lectures	Written + Practical Exam
11.	4	Theoretical + practical	Create 2D graphs using the two commands (plot and fplot)	Theory + practical lectures	Written + Practical Exam
12.	4	Theoretical + practical	Modify graphics using the Edit commands, add dimensions and text to the graphics	Theory + practical lectures	Written + Practical Exam
13.	4	Theoretical + practical	Inserting two or more curves into one window, dividing the window into several drawings, assigning logarithmic axes	Theory + practical lectures	Written + Practical Exam
14.	4	Theoretical + practical	Create drawings by columns, stairs, forming histograms, drawings of polar coordinates	Theory + practical lectures	Written + Practical Exam
15.	4	Theoretical + practical	Create 3D graphs	Theory + practical lectures	Written + Practical Exam
16.	4	Theoretical + practical	Using (m-file), various input statements	Theory + practical lectures	Written + Practical Exam
17.	4	Theoretical + practical	Various output phrases	Theory + practical lectures	Written + Practical Exam
18.	4	Theoretical + practical	Import data and export results	Theory + practical lectures	Written + Practical Exam
19.	4	Theoretical + practical	Boolean and relative expressions	Theory + practical lectures	Written + Practical Exam
20.	4	Theoretical + practical	Conditional sentences using the command (if-statement)	Theory + practical lectures	Written + Practical Exam

21.	4	Theoretical + practical	Conditional sentences using the command (switch-case)	Theory + practical lectures	Written + Practical Exam
22.	4	Theoretical + practical	Loops using the command (for-end loops)	Theory + practical lectures	Written + Practical Exam
23.	4	Theoretical + practical	Loops using the command (while-end loops)	Theory + practical lectures	Written + Practical Exam
24.	4	Theoretical + practical	Loops and nested conditional statements	Theory + practical lectures	Written + Practical Exam
25.	4	Theoretical + practical	Building declarations	Theory + practical lectures	Written + Practical Exam
26.	4	Theoretical + practical	Local and global variables	Theory + practical lectures	Written + Practical Exam
27.	4	Theoretical + practical	Store and call the declarative function	Theory + practical lectures	Written + Practical Exam
28.	4	Theoretical + practical	Comparison of (script file) and declarative function	Theory + practical lectures	Written + Practical Exam
29.	4	Theoretical + practical	Find the roots of polynomial equations	Theory + practical lectures	Written + Practical Exam
30.	4	Theoretical + practical	Fit geometric curves	Theory + practical lectures	Written + Practical Exam

11. Infrastructure

1. Books Required reading:	Matlab an introduction with application fifth edition/ Amos Gilat/ Department of Mechanical Engineering, The Ohio State University
2. Main references (sources)	<ul style="list-style-type: none"> • Introduction to MATLAB by Dr. Sikander M.Mirza • Introduction to Matlab for Engineering Students David Houcque, Northwestern University (version 1.2, August 2005) • MATLAB Programming for Biomedical Engineers and Scientists 1st Edition, Kindle Edition by Andrew P. King (Author), Paul Aljabar (Author)
A- Recommended books and references scientific journals, reports...).	Books located in the Central Library

B-Electronic references, Internet sites...

Various internet sources

12. The development of the curriculum plan

Motivate students to use modern means and the Internet to develop their skills in computer applications using computer programs and simulation programs.

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Strength of Materials / 212WESM
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. Online lectures have been providing to the students using Google Classroom platform.
5. Semester/Year	1st and 2nd Semesters, Academic year 2020–2021
6. Number of hours tuition (total)	90 hr., 3 hr. theoretical per week
7. Date of production/revision of this specification	2020
8. Aims of the Course	
<ol style="list-style-type: none"> 1. The objective of this course is to develop a successful machine or structural design to use mathematical reasoning and critical thinking from the output. 2. This course provides and encourages students to understand that practically impossible to have a successful design without the use of engineering mechanics and strength of materials. 	
9. Learning Outcomes, Teaching ,Learning and Assessment Method	
<ol style="list-style-type: none"> 1. Introduction to strength of Materials versus Engineering Mechanics. 2. Introduces the Simple stresses and Thin walled cylinders. 3. Introduces the Simple strain such as normal and shear strain. 4. Develop a successful understanding to Hook’s law, Young modulus of elasticity and Poisson’s ratio. 	

5. Introduces the Torsion such as in Solid and hollow circular shafts.
6. Construct shear and bending diagrams in beams.
7. Introduces stresses in beams: Flexural Stresses in beams.
8. Introduces Beam deflection.
9. Introduces Combined stresses and Mohr's Circle.
10. Develop a successful theoretical reasoning and critical thinking from the output.

N. Cognitive goals

- A1. To have the ability to apply knowledge of mathematics, science, and engineering.
- A2. To have the ability to make decisions to meet desired needs.
- A3. To have the ability to have the broad education necessary to understand the impact of engineering solutions.
- A4. Knowledge of contemporary issues (this includes presenting students with issues such as the impact of globalization, the outsourcing of both engineering and other supporting jobs as practiced by modern international users).

B. The skills goals special to the course.

- B1. To have the ability to analyze and interpret data.
- B2. To have the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- B3. To have the ability to Apply basic mathematical and scientific concepts for the description and solution of engineering problems.
- B4. To have an ability to perform water resources engineering integrated design of systems, components, or processes.

Teaching and Learning Methods

1. Lectures and Lectures Notes
2. Tutorials
3. Homework and Assignments
4. Tests and Exams
5. In-Class and online Questions and Discussions
6. Connection between Theory and Application
7. Extracurricular Activities
8. Seminars
9. In- and Out-Class oral discussion with students
10. Online lectures have been providing to the students using Google Classroom Application.

Assessment methods

Examinations, Tests, and Quizzes

1. Extracurricular Activities
2. Student Engagement during Lectures
3. In-class and online tests, and quizzes.
4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member

C. Affective and value goals

- C1. An ability to identify, formulates, and solves engineering problems.
- C2. A recognition of the need for and an ability to engage in life-long learning
- C3. Enhancing self-learning ability.
- C4. Ability to identify, formulate and provide creative/innovative/effective solution of a problems.

Teaching and Learning Methods

- 1. Lectures and Lectures Notes
- 2. Online Questions and Discussions
- 3. Out-Class oral discussion with students
- 4. Online lectures have been providing to the students using Google Classroom Application.

Assessment methods

- 1. Online discussion and conversation.
- 2. Respect deadlines

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D2. An understanding of professional and ethical responsibility.
- D3. Ability to demonstrate the characteristics of a team leader or a manager.
- D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3 2 the. 1 tut.	1-2	Definition of simple stresses	1-10 of article (11)	1 – 4 of article (12)
2	3 2 the. 1 tut.	1-2	Normal stress and axial force diagram	1-10 of article (11)	1 – 4 of article (12)
3	3 2 the. 1 tut.	1-2	Equilibrium equation and free body diagram	1-10 of article (11)	1 – 4 of article (12)
4	3 2 the. 1 tut.	1-2	Determination of internal forces	1-10 of article (11)	1 – 4 of article (12)

5	3 2 the. 1 tut.	1-2	Simple normal stress	1-10 of article (11)	1 – 4 of article (12)
6	3 2 the. 1 tut.	1-2	Simple Shear stress	1-10 of article (11)	1 – 4 of article (12)
7	3 2 the. 1 tut.	1-2	Simple bearing stress	1-10 of article (11)	1 – 4 of article (12)
8	3 2 the. 1 tut.	1-2	Stress in thin-walled cylinder	1-10 of article (11)	1 – 4 of article (12)
9	3 2 the. 1 tut.	3-4	Stress-strain diagram, Hook' law	1-10 of article (11)	1 – 4 of article (12)
10	3 2 the. 1 tut.	3-4	Axial deformation, Poisson' ratio	1-10 of article (11)	1 – 4 of article (12)
11	3 2 the. 1 tut.	3-4	Biaxial deformation	1-10 of article (11)	1 – 4 of article (12)
12	3 2 the. 1 tut.	4	Relation between modulus of rigidity and modulus of elasticity	1-10 of article (11)	1 – 4 of article (12)
13	3 2 the. 1 tut.	5	Derivation of horizontal shearing stress formula	1-10 of article (11)	1 – 4 of article (12)
14	3 2 the. 1 tut.	5	Derivation of horizontal shearing stress formula	1-10 of article (11)	1 – 4 of article (12)
15	3 2 the. 1 tut.	5	Derivation of horizontal shearing stress formula	1-10 of article (11)	1 – 4 of article (12)
16	3 2 the. 1 tut.	6	Shear-force diagram by section method	1-10 of article (11)	1 – 4 of article (12)
17	3 2 the. 1 tut.	6	Bending moment diagram by section	1-10 of article (11)	1 – 4 of article (12)
18	3 2 the. 1 tut.	6	Shear-force diagram by area method	1-10 of article (11)	1 – 4 of article (12)

19	3 2 the. 1 tut.	6	Bending moment diagram by area method	1-10 of article (11)	1 – 4 of article (12)
20	3 2 the. 1 tut.	7	Derivation of flexural stress formula	1-10 of article (11)	1 – 4 of article (12)
21	3 2 the. 1 tut.	7	Flexural stress in un-symmetrical section	1-10 of article (11)	1 – 4 of article (12)
22	3 2 the. 1 tut.	8	Derivation of differential equation for elastic curve	1-10 of article (11)	1 – 4 of article (12)
23	3 2 the. 1 tut.	8	Deflection by double integration method	1-10 of article (11)	1 – 4 of article (12)
24	3 2 the. 1 tut.	8	Theorem of area moment method	1-10 of article (11)	1 – 4 of article (12)
25	3 2 the. 1 tut.	8	Moment diagram by part	1-10 of article (11)	1 – 4 of article (12)
26	3 2 the. 1 tut.	8	Deflection by moment area of cantilever and simple beams	1-10 of article (11)	1 – 4 of article (12)
27	3 2 the. 1 tut.	8	Deflection by method of superposition	1-10 of article (11)	1 – 4 of article (12)
28	3 2 the. 1 tut.	9	Combined stresses	1-10 of article (11)	1 – 4 of article (12)
29	3 2 the. 1 tut.	9	Variation of stress at a point, Analytical derivation	1-10 of article (11)	1 – 4 of article (12)
30	3 2 the. 1 tut.	9	Determination of stresses at a point by Mhor's circle	1-10 of article (11)	1 – 4 of article (12)

11. Infrastructure	
1. Books Required reading:	<p>“Strength of Materials”; by Ferdinand L. Singer/ Andrew Pytel, Third edition 1980</p>
2. Main references (sources)	<ol style="list-style-type: none"> 1. “Mechanics of materials”; by Russel C. Hibbeler , Seven Edition, 2008 2. An introduction to mechanical engineering part 1by Clifford et al. 2009. 2-"Introduction to mechanics of solid"; By Popov,E. P., 1968. 3-"Elements of strength of materials"; By Timoshinko and Young, 4th edition, 1962
A- Recommended books and references scientific journals, reports...).	<ol style="list-style-type: none"> 1. Notebook prepared by the instructor of the course 2. Collection of sheets of solved and unsolved problems and Exam questions
B-Electronic references, Internet sites...	
12. The development of the curriculum plan	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Components of Hydraulic Structures/ 213 WRCS
4. Modes of Attendance offered	One time, day time on campus
5. Semester/Year	2nd Semesters, Academic year 2020–2021
6. Number of hours tuition (total)	45 hrs / 3 hrs per week
7. Date of production/revision of this specification	2020

8. Aims of the Course

1. Definitions of Engineering projects and component.
2. Definitions Foundations type and draw it by using AutoCAD program
3. Definitions Retaining walls type and draw it by using AutoCAD program
4. Explain the Irrigation and drainage component
5. Definitions Control and Regulator Structure and draw it by using AutoCAD program
6. Definitions Crossing Structure and draw it by using AutoCAD program
7. Definitions Protection structure and draw it by using AutoCAD program
8. Definitions Dams and spillways and draw it sections by using AutoCAD

9. Learning Outcomes, Teaching ,Learning and Assessment Method

the student in the field of water resources engineering will be able to:

1. Understand general introduction about engineering project specially irrigation project
2. Understand foundation and retaining wall types, description and sketching
3. Understand irrigation network type, longitudinal and cross section of canals
4. Understand drainage network type, longitudinal and cross section of drain
5. Understand control and regulatory structure component, description and sketching

6. Understand crossing structure component, description and sketching
7. Understand protection structure component, description and sketching
8. Understand dams and spillways component, description and sketching.

O. Cognitive goals

- A1. To have the ability to apply knowledge of mathematics, science, and engineering.
- A2. To have the ability to make decisions to meet desired needs.
- A3. To have the ability to have the broad education necessary to understand the impact of engineering solutions.

B. The skills goals special to the course.

- B2. To have the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- B3. To have the ability to Apply basic mathematical and scientific concepts for the description and solution of engineering problems.

Teaching and Learning Methods

- lectures,
- lab work
- Homework and Assignments
- Tests and Exams
- In-Class Questions and Discussions
- Connection between Theory and Application
- Extracurricular Activities

Assessment methods

- homework,
- quizzes,
- major examination during the course, and
- final examination.

C. Affective and value goals

- C2. A recognition of the need for and an ability to engage in life-long learning
- C3. Enhancing self-learning ability.

D. General and rehabilitative transferred skills (other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D2. An understanding of professional and ethical responsibility.
- D3. Ability to demonstrate the characteristics of a team leader or a manager.
- D4. Ability to communicate effectively with engineers, other professionals and community at large.

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	1 (theo.) +2 (lab.) ³	a	Introduction and Engineering projects	1-7 of article (11)	1 – 4 of article (12)
2	1 (theo.) +2 (lab.) ³	a,b	Foundations	1-7 of article (11)	1 – 4 of article (12)
3	1 (theo.) +2 (lab.) ³	a,b,c	Retaining walls	1-7 of article (11)	1 – 4 of article (12)
4	1 (theo.) +2 (lab.) ³	a,b,c,d	Irrigation Networks	1-7 of article (11)	1 – 4 of article (12)
5	1 (theo.) +2 (lab.) ³	a,b,c,d	Irrigation Networks	1-7 of article (11)	1 – 4 of article (12)
6	1 (theo.) +2 (lab.) ³	a,b,c,d	Irrigation Structure	1-7 of article (11)	1 – 4 of article (12)
7	1 (theo.) +2 (lab.) ³	a,b,c,d	Control and Regulatory Structure	1-7 of article (11)	1 – 4 of article (12)
8	1 (theo.) +2 (lab.) ³	a,b,c,d	Control and Regulatory Structure	1-7 of article (11)	1 – 4 of article (12)
9	1 (theo.) +2 (lab.) ³	a,b,c,d,e	Crossing Structure	1-7 of article (11)	1 – 4 of article (12)
10	1 (theo.) +2 (lab.) ³	a,b,c,d,e	Crossing Structure	1-7 of article (11)	1 – 4 of article (12)
11	1 (theo.) +2 (lab.) ³	a,b,c,d,e	Protection Structure	1-7 of article (11)	1 – 4 of article (12)
12	1 (theo.) +2 (lab.) ³	a,b,c,d,e, f	Protection Structure	1-7 of article (11)	1 – 4 of article (12)
13	1 (theo.) +2 (lab.) ³	a,b,c,d,e, f	Dams and Spillways	1-7 of article (11)	1 – 4 of article (12)
14	1 (theo.) +2 (lab.) ³	a,b,c,d,e, f,g	Dams and Spillways	1-7 of article (11)	1 – 4 of article (12)
15	1 (theo.) +2 (lab.) ³	a,b,c,d,e, f,g	Irrigation Structure Seminar	1-7 of article (11)	1 – 4 of article (12)

11. Infrastructure

1. Books Required reading:	<u>Textbook</u> "Irrigation Drawing", Arabic book by Abd Al-Riza, Abd Al-Rasool, Baghdad, 1992
2. Main references (sources)	<u>References</u> "Hydraulic Canals", by J. Montanes "Principles of irrigation Engineering", by Newell & Murphy
A- Recommended books and references scientific journals, reports...).	<u>Others</u> 1. Notebook prepared by the instructor of the course 2. Collection of sheets of solved and
B-Electronic references, Internet sites...	

12. The development of the curriculum plan

Review the coarse syllabus after two years

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Surveying, 214 WRSU
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subject.
5. Semester/Year	1st and 2nd Semesters, Academic year 2020 –2021
6. Number of hours tuition (total)	150 hrs / 5 hrs per week
7. Date of production/revision of this specification	2020

8. Aims of the Course

The course aims to introduce students to

- a) The basics of surveying, methods of measuring horizontal and vertical distances, and knowing how to set-out a building or survey a specific area.
- b) Calculating ground elevation of points, leveling and adjusting the ground, producing longitudinal and cross-sectional maps, determining the final volume of earthworks in engineering projects.
- c) Producing and interpreting contour maps and using them in determining the nature of the land and its slope and calculating the quantities of excavation or filling in it.
- d) Measuring horizontal and vertical angles, forming of travers, calculating the geographical coordinates of points and adjusting them.
- e) Finding areas of regular and irregular shapes in different ways of surveying and linking them with contemporary technology by using new foundations for surveying.
- f) Using modern electronic measuring devices as a Total Station instrument in measuring polygon lengths, interior angles and coordinates.

9• Learning Outcomes, Teaching, Learning and Assessment Method

A. Cognitive goals

- A1. The learner will be able to read any engineering plan, whether civil or architectural.
- A2. Knowing the details and methods of surveying and leveling and the steps followed for each type.
- A3. The learner will be able to project maps on the real earth surface or transfer a picture of natural location on the map.
- A4. Determine the height of the land above sea level and link it to the height of the neighboring buildings.

B. The skills goals special to the course.

- B1. Works to solve the problems in an intellectual way and according to the available data
- B2. Thinks in an engineering way when calculating areas and volumes for earthworks.
- B3. Acquires skill in the use of surveying devices and tools.
- B4. Acquires the skill of preparing reports, calculating results, and producing the required maps

Teaching and Learning Methods

- 1- Theoretical Lectures.
- 2- Practical and laboratory experiments
- 3- Data Show
- 4- Reading methodological and source books and looking at some websites (self-learning).
- 5- Science films.
- 6- Using and touching modern electronic software.

Assessment methods

- 1- Monthly and final exams.
- 2- Short daily exams
- 3- Discussion in the classroom.
- 4- Practical tests.

C. Affective and value goals

- C1. Adheres to the ethics of the educational institution.
- C2. Work as a teamworking.
- C3. Receives and accepts knowledge.
- C4. Fast and accurate in a decision-making.

Teaching and Learning Methods

- 1- Assigning students to tasks in groups, such as homework, within a specific period of time.
- 2- Preparing researches and reports by making use of the library and the Internet.

Assessment methods

- 1- Note the duties and solve them.
- 2- Making a questionnaire form for the students.

D. General and rehabilitative transferred skills (other skills relevant to employability and personal development)

- D1. The skill of recitation and expressing an opinion in the lecture through the (seminar).
 D2. The skill of discussion in the lecture.
 D3. The skill of solving problems through workshops.
 D4. The skill of creativity and the ability to solve brainstorming problems.

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1.	5	Theory and Practical	General basics of surveying	Theory + Practical Lectures	Written + Practical Exam
2.	5	Theory and Practical	Units of measurements, Plotting scale	Theory + Practical Lectures	Written + Practical Exam
3.	5	Theory and Practical	Linear measurements. Means for measuring distances	Theory + Practical Lectures	Written + Practical Exam
4.	5	Theory and Practical	Direct method of horizontal distances measurements	Theory + Practical Lectures	Written + Practical Exam
5.	5	Theory and Practical	Errors in surveying. Types of errors	Theory + Practical Lectures	Written + Practical Exam
6.	5	Theory and Practical	Accuracy and precision, principles of errors scattering theory	Theory + Practical Lectures	Written + Practical Exam
7.	5	Theory and Practical	Obstacles to measuring	Theory + Practical Lectures	Written + Practical Exam
8.	5	Theory and Practical	Leveling instruments	Theory + Practical Lectures	Written + Practical Exam
9.	5	Theory and Practical	Booking and reducing the levels (Rise and Fall method)	Theory + Practical Lectures	Written + Practical Exam
10.	5	Theory and Practical	Booking and reducing the levels (Height of Instrument method)	Theory + Practical Lectures	Written + Practical Exam

11.	5	Theory and Practical	Sources of errors in leveling	Theory + Practical Lectures	Written + Practical Exam
12.	5	Theory and Practical	Longitudinal sections	Theory + Practical Lectures	Written + Practical Exam
13.	5	Theory and Practical	Calculation of cut and fill	Theory + Practical Lectures	Written + Practical Exam
14.	5	Theory and Practical	Areas of cross-sections	Theory + Practical Lectures	Written + Practical Exam
15.	5	Theory and Practical	Contour lines: method of drawing and construction	Theory + Practical Lectures	Written + Practical Exam
16.	5	Theory and Practical	Volume computation from cross-sections and contour map	Theory + Practical Lectures	Written + Practical Exam
17.	5	Theory and Practical	Volume from topographic maps and grid net	Theory + Practical Lectures	Written + Practical Exam
18.	5	Theory and Practical	Areas of rectilinear Shapes (Mathematical, Coordinates, D.M.D, Planimeter)	Theory + Practical Lectures	Written + Practical Exam
19.	5	Theory and Practical	Areas of Irregular Shapes (Mid-ordinate, Trapezoidal, Simpson's)	Theory + Practical Lectures	Written + Practical Exam
20.	5	Theory and Practical	Bearing and angles	Theory + Practical Lectures	Written + Practical Exam
21.	5	Theory and Practical	Theodolite instrument (horizontal and vertical angles)	Theory + Practical Lectures	Written + Practical Exam
22.	5	Theory and Practical	Methods of angles measurement and bearing calculation	Theory + Practical Lectures	Written + Practical Exam
23.	5	Theory and Practical	Traversing, Types of traverse	Theory + Practical Lectures	Written + Practical Exam
24.	5	Theory and Practical	Horizontal Position Fixing (Trilateration, Triangulation)	Theory + Practical Lectures	Written + Practical Exam
25.	5	Theory and Practical	Traverse adjustment (Compass Rule)	Theory + Practical Lectures	Written + Practical Exam
26.	5	Theory and Practical	Traverse adjustment (Transit Rule)	Theory + Practical Lectures	Written + Practical Exam
27.	5	Theory and Practical	Local Attraction in Compass Surveying	Theory + Practical Lectures	Written + Practical Exam
28.	5	Theory and Practical	Global Positioning Systems for land surveying	Theory + Practical Lectures	Written + Practical Exam
29.	5	Theory and Practical	Total Station Survey	Theory + Practical Lectures	Written + Practical Exam
30.	5	Theory and Practical	Remote Sensing and GIS	Theory + Practical Lectures	Written + Practical Exam

11. Infrastructure

1. Books Required reading:	<ul style="list-style-type: none"> • Engineering Survey Dr. Naji Tawfiq - College of Engineering University of Baghdad • Flat area d. Fawzi Al-Khalisi - Ministry of Higher Education, Research and Scientific. • Flat and water area, Dr. Ali Shukri - Faculty of Engineering - University of Alexandria.
2. Main references (sources)	<ul style="list-style-type: none"> • A Text Book of Surveying by Jawahar Sharma • Engineering surveying by W.Schofield and M.Breach • Surveying by A.M.Chandara • Text book of surveying/S.K.Husain M.S.Naga Raj. • Introduction to surveying (second edition) by Michael Minchin • Surveying/Narinder Singh • Surveying for construction/William Irvine • Engineering Surveying by Yassin Taha Obaid • Engineering & Cadastral Surveying by Zaid Abdul Jabbar
A- Recommended books and references scientific journals, reports...).	Books located in the Central Library
B-Electronic references, Internet sites...	Various internet sources
12. The development of the curriculum plan	
<p>The course will be developed through the following:</p> <ol style="list-style-type: none"> 1- The time link between theoretical and practical lectures, so that the material is clearer to the student. 2- Holding scientific seminars based on mutual dialogue based on discussion between students and the teaching staff within the topics of the decided curriculum. 3- More workshops and brainstorming questions. 4- Enhancing the understanding and awareness of the student through making scientific trips in order to link the theoretical reality with the professional practical reality. 	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW	
COURSE SPECIFICATION	
<p>This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.</p>	
1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Soil Physics/ 215 WRSP
4. Modes of Attendance offered	Semester System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic semester is composed of 15-week regular subjects. Online lectures have been providing to the students using Google Classroom Application.
5. Semester/Year	1st Semester, Academic year 2020–2021
6. Number of hours tuition (total)	75 hrs / 5 hrs per week, 2 hrs theoretical, 1 hr tutorial, and 2 hrs laboratory
7. Date of production/revision of this specification	2020
8. Aims of the Course	
<ol style="list-style-type: none"> 1- Introduce definition of soil physics and physical proprieties of soil. 2- Specific surface area of soil particles. 3- Definition of soil structure and aggregation. 4. Introduce Soil water, energy state of water in soil. 5. Soil moisture characteristic curve. 6. Water flow in saturated soil. 7. Water flow in unsaturated soil. 8. Introduce definition of soil Infiltration. 9. Redistribution of water in soil profile 	

9• Learning Outcomes, Teaching ,Learning and Assessment Method

A. Cognitive goals

- A1. To have the ability to apply knowledge of mathematics, science, and engineering.
- A2. To have the ability to make decisions to meet desired needs.
- A3. To have the ability to have the broad education necessary to understand the impact of engineering solutions.
- A4. Knowledge of contemporary issues (this includes presenting students with issues such as the impact of globalization, the outsourcing of both engineering and other supporting jobs as practiced by modern international users).

B. The skills goals special to the course.

- B1. To have the ability to analyze and interpret data.
- B2. To have the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- B3. To have the ability to Apply basic mathematical and scientific concepts for the description and solution of engineering problems.
- B4. To have an ability to perform water resources engineering integrated design of systems, components, or processes.

Teaching and Learning Methods

- 1. Lectures.
- 2. Tutorials.
- 3. Homework and Assignments.
- 4. Lab. Experiments.
- 5. Tests and Exams.
- 6. In-Class Questions and Discussions.
- 7. Reports and presentations.

Assessment methods

- 1. Examinations, Tests, and Quizzes.
- 2. Student Engagement during Lectures.

C. Affective and value goals

- C1. An ability to identify, formulates, and solves engineering problems.
- C4. Ability to identify, formulate and provide creative/innovative/effective solution of a problems.

Teaching and Learning Methods

In-Class Questions and Discussions.

Assessment methods

- 1. Examinations, Tests, and Quizzes.
- 2. Student Engagement during Lectures.
- 3. Responses Obtained from Students, Questionnaire about Curriculum and Faculty.

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D2. An understanding of professional and ethical responsibility.
- D3. Ability to demonstrate the characteristics of a team leader or a manager.
- D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	5	A, B,C,D	Introduction about soil, soil physics	1-7 of article (10)	1-3 of article (11)
2	5	A, B,C,D	Soil physical properties	1-8 of article (10)	1-3 of article (11)
3	5	A, B,C,D	soil characteristics ,solid state	1-8 of article (10)	1-3 of article (11)
4	5	A, B,C,D	Particle size distribution, textural fraction	1-8 of article (10)	1-3 of article (11)
5	5	A, B,C,D	Specific surface area of soil particles	1-8 of article (10)	1-3 of article (11)
6	5	A, B,C,D	Soil structure and aggregation	1-8 of article (10)	1-3 of article (11)
7	5	A, B,C,D	Water content and potential	1-8 of article (10)	1-3 of article (11)
8	5	A, B,C,D	Soil water, energy state of water in soil	1-8 of article (10)	1-3 of article (11)
9	5	A, B,C,D	Soil moisture characteristics curve	1-8 of article (10)	1-3 of article (11)
10	5	A, B,C,D	Water flow in saturated soil	1-8 of article (10)	1-3 of article (11)
11	5	A, B,C,D	Water flow in saturated soil	1-8 of article (10)	1-3 of article (11)
12	5	A, B,C,D	Flow in a composite column	1-8 of article (10)	1-3 of article (11)
13	5	A, B,C,D	Water flow in unsaturated soil	1-8 of article (10)	1-3 of article (11)
14	5	A, B,C,D	Water flow in unsaturated soil	1-8 of article (10)	1-3 of article (11)
15	5	A, B,C,D	Infiltration of water in soil	1-8 of article (10)	1-3 of article (11)

11. Infrastructure

1. Books Required reading:	Introductory Soil Physics, Univ. of Colifornia, Davis 2000 Applied Soil Physics, Hanker & Ashcrof
2. Main references (sources)	Introduction to Soil Physics, Hillel, D. 1982 Method of Soil Analysis, USSSS, 1972
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	

12. The development of the curriculum plan

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TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Land Reclamation, 216 WRLR
4. Modes of Attendance offered	Five hours of study a week per unit day time on campus The academic year is composed of 15-week regular subjects.
5. Semester/Year	2nd Semesters, Academic year 2020 –2021
6. Number of hours tuition (total)	75 hr., five hours per week 3 hr. theoretical and 2 hr. laboratory
7. Date of production/revision of this specification	2020
8. Aims of the Course	
The aim of this course is to understand basic concepts of land reclamation, salt affected soils, program performance for reclamation of saline soils field and laboratory surveying and investigation, leaching requirement and assessment of water quality irrigation.	
9• Learning Outcomes, Teaching ,Learning and Assessment Method	
The student in the field of land reclamation will be able to:	
B. Introduce basic definitions and introductory concept of land reclamation,	
C. Introduce basic definitions of salt affected soils, characteristics, classification and distribution, and the properties of some important salts,	
D. Introduce the program performance for reclamation of saline soils,	
E. Introduce the fundamental leaching, leaching method and time of leaching,	
F. Determination the leaching efficiency coefficient, leaching requirement, leaching curve,	
G. Introduce the mathematical model to predict leaching water amount,	
H. Introduce the development post reclamation, and maintenance leaching,	
I. Salt balance in reclaimed soil,	
J. Assessment of irrigation water quality	
K. Introduce comparison between reclamation of gypsiferous, calcareous and desert soils	

P. Cognitive goals

- A1. An ability to apply knowledge of mathematics, science, and engineering.
- A2. An ability to design a system, or components, or process to meet desired needs.
- A3. The broad education necessary to understand the impact of engineering solutions in a global and societal context.

B. The skills goals special to the course.

- B1. B1. An ability to design and conduct experiments as well as to analyze and interpret data.
- B2. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- B3. Apply basic mathematical and scientific concepts for the description and solution of engineering problems.

10. Teaching and Learning Methods

- 1- Lectures
- 2- Tutorials
- 3- Homework and Assignments
- 4- Tests and Exams
- 5- In-Class Questions and Discussions
- 6- Connection between Theory and Application
- 7- Extracurricular Activities
- 8- Lab examination
- 9- Seminar

11. Assessment methods

- 1. Examinations, Tests, and Quizzes
- 2. Extracurricular Activities
- 3. Student Engagement during Lectures
- 4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor).

12. Grading Policy

- 1. Term Tests 25 %.
- 2. Homework, 10%
- 3. Lab examination and report 15%
- 4. Final examination 50%
 - The final exam will be comprehensive.

C. Affective and value goals

- C1. An ability to identify, formulate, and solve engineering problems.
- C2. A recognition of the need for and an ability to engage in life-long learning.

Teaching and Learning Methods

Discussion with students

Assessment methods

Respecting deadlines

D. General and rehabilitative transferred skills

(other skills relevant to employability and personal development)

D2. An understanding of professional and ethical responsibility.

Teaching and Learning Methods

Oral quizzes

Assessment methods

Write reports

13. Course Structure

Week	Hour	LOs (Article	Unit/Module or Topic Title	Teaching Method	Assessment Method
16	5 2 theo 1 tut 2 lab	a,b,c	Land reclamation concept	1-9 of article(10)	1-4 of article (11)
17	5 2 theo 1 tut 2 lab	a,b,c	1-9 of article(11)	1-9 of article(10)	1-4 of article (11)
18	5 2 theo 1 tut 2 lab	a,b,c	Properties of some important salt	1-9 of article(10)	1-4 of article (11)
19	5 2 theo 1 tut 2 lab	a,b,c	Program performance for reclamation of saline soils, field and laboratory surveying and investigation, leaching requirements	1-9 of article(10)	1-4 of article (11)
20	5 2 theo 1 tut 2 lab	a,b,c	Leaching curve, equations, mathematical form and modeling, leaching efficiency coefficient	1-9 of article(10)	1-4 of article (11)
21	5 2 theo 1 tut 2 lab	a,b,c	Leaching curve, equations, mathematical form and modeling, leaching efficiency coefficient	1-9 of article(10)	1-4 of article (11)
22	5 2 theo 1 tut 2 lab	a,b,c	Leaching methods and time of leaching	1-9 of article(10)	1-4 of article (11)

23	5 2 theo 1 tut 2 lab	a,b,c	Salt balance in reclaimed soils	1-9 of article(10)	1-4 of article (11)
24	5 2 theo 1 tut 2 lab	a,b,c	Salt storage variation	1-9 of article(10)	1-4 of article (11)
25	5 2 theo 1 tut 2 lab	a,b,c	Leaching fraction calculations	1-9 of article(10)	1-4 of article (11)
26	5 2 theo 1 tut 2 lab	a,b,c	Irrigation water, quality, classification and assessment for reclamation	1-9 of article(10)	1-4 of article (11)
27	5 2 theo 1 tut 2 lab	a,b,c	Irrigation water quality, classification and assessment for reclamation	1-9 of article(10)	1-4 of article (11)
28	5 2 theo 1 tut 2 lab	a,b,c	Reclamation of gypsiferous soil	1-9 of article(10)	1-4 of article (11)
29	5 2 theo 1 tut 2 lab	a,b,c	Reclamation of desert and sandy soils	1-9 of article(10)	1-4 of article (11)
30	5 2 theo 1 tut 2 lab	a,b,c	Reclamation of calcareous soils	1-9 of article(10)	1-4 of article (11)

14. Infrastructure

1. Books Required reading:	
2. Main references (sources)	
A- Recommended books and references scientific journals, reports...).	<ol style="list-style-type: none">1) FAO (1988). Salt –Affected Soils and their Management2) Dieleman P. J. et. al. (1977) Reclamation of Salt-Affected Soils in Iraq. World soil resources report.3) US Salinity Laboratory Staff. (1954) Diagnosis and Improvement of Saline and Alkali soils. Agriculture Handbook No.60
B-Electronic references, Internet sites...	
15. The development of the curriculum plan	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Water Quality and Treatment, 217 WRWM
4. Modes of Attendance offered	Four hours of study a week per unit day time on campus The academic year is composed of 30-week regular subjects.
5. Semester/Year	1st and 2nd Semesters, Academic year 2020 –2021
6. Number of hours tuition (total)	120 hr., four hours per week 2 hr. theoretical and 2 hr. laboratory
7. Date of production/revision of this specification	2020
8. Aims of the Course	
The aim of this course is to introduce the students on the area of water pollution and wastewater treatment plant. The course will cover wastewater treatment plant, primary, secondary & tertiary treatment process, sludge digestion and disinfection and design of water/wastewater treatment plant.	
9. Learning Outcomes, Teaching ,Learning and Assessment Method	
The student in the field of water quality and treatment will be able to:	
<ol style="list-style-type: none"> 1. Identify water pollution, sources of pollution, physical and chemical characteristics of sewage and their testing, 2. Ability to use principles of water/wastewater treatment and water quality control in the natural systems, 3. Identify and explain the purpose of wastewater treatment, primary, secondary & tertiary treatment process sludge digestion and disinfection, 4. Ability to design of wastewater treatment plant. 5. Identify quality criteria for surface water, and 	

6. Ability to design of water treatment plant.

A. Cognitive goals

- A1. An ability to apply knowledge of mathematics, science, and engineering.
- A2. An ability to design a system, or components, or process to meet desired needs.
- A3. The broad education necessary to understand the impact of engineering solutions in a global and societal context.

B. The skills goals special to the course.

- B1. An ability to design and conduct experiments as well as to analyze and interpret data.
- B2. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- B3. Apply basic mathematical and scientific concepts for the description and solution of engineering problems.

10. Teaching and Learning Methods

- 1- Lectures
- 2- Tutorials
- 3- Homework and Assignments
- 4- Tests and Exams
- 5- In-Class Questions and Discussions
- 6- Connection between Theory and Application
- 7- Extracurricular Activities
- 8. Lab. examination
- 9- Seminars

11. Assessment methods

- 1. Examinations, Tests, and Quizzes
- 2. Extracurricular Activities
- 3. Student Engagement during Lectures
 - 4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor)

12. Grading Policy

- 5. Term Tests 25 %.
- 6. Homework, 10%
- 7. Lab examination and report 15%
- 8. Final examination 50%
 - The final exam will be comprehensive.

C. Affective and value goals

- C1. An ability to identify, formulates, and solves engineering problems.
- C2. A recognition of the need for and an ability to engage in life-long learning.

Teaching and Learning Methods

Discussion with students

Assessment methods

Respecting deadlines

D. General and rehabilitative transferred skills

- (other skills relevant to employability and personal development)
 - D2. An understanding of professional and ethical responsibility.

Teaching and Learning Methods

Oral quizzes

Assessment methods

Write reports

13. Course Structure

Week	Hours	LO's (Article 10)	Unit/ Module or Topic Title	Teaching Method	Assessment Method
1	4 2 theo 2 lab	a,b,c	Introductory to water pollution	1-9 of article (9)	1-4 of article(10)
2	4 2 theo 2 lab	a,b,c	Quality and characteristics of Municipal wastewater	1-9 of article (9)	1-4 of article(10)
3	4 2 theo 2 lab	a,b,c	Biological oxidation of organic matter	1-9 of article (9)	1-4 of article(10)
4	4 2 theo 2 lab	a,b,c	Biochemical Oxygen Demand (BOD)	1-9 of article (9)	1-4 of article(10)
5	4 2 theo 2 lab	a,b,c	Biochemical Oxygen Demand (BOD)	1-9 of article (9)	1-4 of article(10)
6	4 2 theo 2 lab	a,b,c	Chemical Oxygen Demand (COD)	1-9 of article (9)	1-4 of article(10)
7	4 2 theo 2 lab	a,b,c	Decomposition of organic matter	1-9 of article (9)	1-4 of article(10)

8	4 2 theo 2 lab	a,b,c	Treatment of sewage Preliminary treatment	1-9 of article (9)	1-4 of article(10)
9	4 2 theo 2 lab	a,b,c	Primary Treatment	1-9 of article (9)	1-4 of article(10)
10	4 2 theo 2 lab	a,b,c	Secondary Treatment	1-9 of article (9)	1-4 of article(10)
11	4 2 theo 2 lab	a,b,c	Trickling Filter	1-9 of article (9)	1-4 of article(10)
12	4 2 theo 2 lab	a,b,c	Activated Sludge Process	1-9 of article (9)	1-4 of article(10)
13	4 2 theo 2 lab	a,b,c	Activated Sludge Process	1-9 of article (9)	1-4 of article(10)
14	4 2 theo 2 lab	a,b,c	Sludge digestion Process	1-9 of article (9)	1-4 of article(10)
15	4 2 theo 2 lab	a,b,c	Disposal of digested sludge	1-9 of article (9)	1-4 of article(10)
16	4 2 theo	a,b,c	Introduction to surface water quality	1-9 of article (9)	1-4 of article(10)

	2 lab				
17	4 2 theo 2 lab	a,b,c	Water quality standard	1-9 of article (9)	1-4 of article(10)
18	4 2 theo 2 lab	a,b,c	Pollution effects on aquatic life	1-9 of article (9)	1-4 of article(10)
19	4 2 theo 2 lab	a,b,c	Conventional water pollutants	1-9 of article (9)	1-4 of article(10)
20	4 2 theo 2 lab	a,b,c	Toxic water pollutants	1-9 of article (9)	1-4 of article(10)
21	4 2 theo 2 lab	a,b,c	Selection of water treatment process	1-9 of article (9)	1-4 of article(10)
22	4 2 theo 2 lab	a,b,c	Types of treatment	1-9 of article (9)	1-4 of article(10)
23	4 2 theo 2 lab	a,b,c	Screening	1-9 of article (9)	1-4 of article(10)
24	4 2 theo 2 lab	a,b,c	Settling	1-9 of article (9)	1-4 of article(10)
25	4	a,b,c	Settling	1-9 of article (9)	1-4 of article(10)

	2 theo 2 lab				
26	4 2 theo 2 lab	a,b,c	Coagulation	1-9 of article (9)	1-4 of article(10)
27	4 2 theo 2 lab	a,b,c	Flocculation	1-9 of article (9)	1-4 of article(10)
28	4 2 theo 2 lab	a,b,c	Filtration	1-9 of article (9)	1-4 of article(10)
29	4 2 theo 2 lab	a,b,c	Filtration	1-9 of article (9)	1-4 of article(10)
30	4 2 theo 2 lab	a,b,c	Disinfection	1-9 of article (9)	1-4 of article(10)

14. Infrastructure	
1. Books Required reading:	
2. Main references (sources)	
A- Recommended books and references scientific journals, reports...).	1) T. H. Y. Tebbutt, (1997).Principles of water quality control. 5 th Edition. 2) Warren Viessman Jr, Mark Hammer, Elizabeth Perez, Paul chadik. (2008). Water supply and pollution control. 8 th Edition.
B-Electronic references, Internet sites...	
15. The development of the curriculum plan	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW	
COURSE SPECIFICATION	
<p>This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.</p>	
1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Human rights and democracy, 218 WRDF
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a “Day program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects.. This subject given 2 hours theory for tow semester. There is no on-line subject which may be used as supplementary material for the class room ins.
5. Semester/Year	1st and 2nd Semesters, Academic year 2020 –2021
6. Number of hours tuition (total)	60 hrs/2 hrs per week(first semester) and second semester)
7. Date of production/revision of this specification	2020
8. Aims of the Course	
9. Learning Outcomes, Teaching ,Learning and Assessment Method	
<p>A. Cognitive goals</p> <p>A1 .Encouraging the individual to contribute effectively to teamwork.</p> <p>A2. Ability to define and maintain a creative/ innovative/effective problem –solving solution..</p>	

B. The skills goals special to the course.

Teaching and Learning Methods

1. Lectures.
2. Homework and Assignments.
3. Tests and Exams.
4. In-Class Questions and Discussions.
5. Reports and presentations.

Assessment methods

1. Examinations, Tests, and Quizzes.
2. Student Engagement during Lectures.
3. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor).

C. Affective and value goals

Teaching and Learning Methods

Assessment methods

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

10. Course Structure					
Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
	2 the.		Human rights in ancient civilizations		
1	.	2, 3		1-8 of article (11)	1-3 of article (12)
	.				

	2 the.		Human rights in the heavenly laws		
2	.	2, 3		1-8 of article (11)	1-3 of article (12)
	2 the.		Contemporary international recognition of human rights		
3	.	2, 3		1-8 of article (11)	1-3 of article (12)
	2 the.		Human rights in the Universal Declaration and international covenants		
4	.	2, 3		1-8 of article (11)	1-3 of article (12)
	2 the.		Regional conventions on human rights		
5	.	2, 3		1-8 of article (11)	1-3 of article (12)
	2 the.		Human rights in national legislation / constitution		
6	.	2, 3		1-8 of article (11)	1-3 of article (12)
	2 the.		Non-governmental organizations		
7	.	2, 3		1-8 of article (11)	1-3 of article (12)
	2 the.		Generations of human rights		
8	.	2, 3		1-8 of article (11)	1-3 of article (12)
	2 the.		Interdependence between generations of human rights		
9	.	2, 3		1-8 of article (11)	1-3 of article (12)
	2 the.		Guarantees of constitutional and judicial human rights		
10	.	2, 3		1-8 of article (11)	1-3 of article (12)
	2 the.		Political guarantees and the role of non-governmental organizations		
11	.	2, 3		1-8 of article (11)	1-3 of article (12)

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11. Infrastructure

1. Books Required reading:	Dr. Riyadh Aziz Hadi ,human rights,their development,contents,protection,The Legal Library,Baghdad,
2. Main references (sources)	
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	

12. The development of the curriculum plan

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW	
COURSE SPECIFICATION	
<p>This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.</p>	
1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	English Language II , 219WREN
4. Modes of Attendance offered	Annual System: There is only one mode of delivery, which is a “Day Program”. The students are full-time students and on campus. They attend full-day program in face-to-face mode. The academic year is composed of 30-week regular subjects. Online lectures are provided to the students using Google Classroom Application.
5. Semester/Year	1st and 2nd Semesters, Academic year 2020 –2021
6. Number of hours tuition (total)	15 hrs, 1 hr per week (first semester) 15 hrs, 1 hr per week (second semester)
7. Date of production/revision of this specification	2020
8. Aims of the Course	
<p>The aim of this course is to empower students with the language and life skills they need to carry out their goals. To this end it provides ample opportunities for students to build awareness and practice language in real- life scenarios. The integrated skills approach of the course develops the student's self-confidence to survive and succeed in professional and social encounters within an English-speaking global community.</p>	
9• Learning Outcomes, Teaching ,Learning and Assessment Method	
By the end of this communication skills course, the students will be able to:	

- 1- Find and understand information about vocabulary, pronunciation, usage, and grammar in reference texts, online resources, and English language dictionaries.
- 2- Develop conversational English skills necessary for becoming a contributing participant in small group activities, large group discussions, and oral presentations.
- 3- Understand texts using effective learning strategies for reading and vocabulary building.
- 4- Demonstrate an appropriate level of control of grammatical accuracy and lexical appropriacy in written and oral communication.

A. Cognitive goals

B. The skills goals special to the course.

Teaching and Learning Methods

1. Lectures.
2. Homework and Assignments.
3. Tests and Exams.
4. In-Class Questions and Discussions.
5. Reports and Presentations.

Assessment methods

1. Examinations, Tests, and Quizzes.
2. Student Engagement during Lectures.
3. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor).

C. Affective and value goals

Teaching and Learning Methods

Assessment methods

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	1 hr	1	Introduction to the course	1-5 of article (11)	1 – 3 of article (12)
2	1 hr	2	Unit 1: Getting to know you	1-5 of article (11)	1 – 3 of article (12)
3	1 hr	3	Unit 1: Getting to know you	1-5 of article (11)	1 – 3 of article (12)
4	1 hr	4	Unit 2: The way we live	1-5 of article (11)	1 – 3 of article (12)
5	1 hr	5	Unit 2: The way we live	1-5 of article (11)	1 – 3 of article (12)
6	1 hr	6	Unit 3: It all went wrong	1-5 of article (11)	1 – 3 of article (12)
7	1 hr	7	Unit 3: It all went wrong	1-5 of article (11)	1 – 3 of article (12)
8	1 hr	8	Unit 4: Let's go shopping!	1-5 of article (11)	1 – 3 of article (12)
9	1 hr	9	Unit 4: Let's go shopping!	1-5 of article (11)	1 – 3 of article (12)
10	1 hr	10	Unit 5: What do you want to do?	1-5 of article (11)	1 – 3 of article (12)
11	1 hr	11	Unit 5: What do you want to do?	1-5 of article (11)	1 – 3 of article (12)
12	1 hr	12	Unit 6: Tell me! What's it like?	1-5 of article (11)	1 – 3 of article (12)
13	1 hr	13	Unit 6: Tell me! What's it like?	1-5 of article (11)	1 – 3 of article (12)
14	1 hr	14	Unit 7: Fame	1-5 of article (11)	1 – 3 of article (12)
15	1 hr	15	Unit 7: Fame	1-5 of article (11)	1 – 3 of article (12)
16	1 hr	16	Unit 8: Do's and don'ts	1-5 of article (11)	1 – 3 of article (12)
17	1 hr	17	Unit 8: Do's and don'ts	1-5 of article (11)	1 – 3 of article (12)
18	1 hr	18	Unit 9: Going Places	1-5 of article (11)	1 – 3 of article (12)
19	1 hr	19	Unit 9: Going Places	1-5 of article (11)	1 – 3 of article (12)
20	1 hr	20	Unit 10: Scared to death	11-5 of article (11)	1 – 3 of article (12)
21	1 hr	21	Unit 10: Scared to death	1-5 of article (11)	1 – 3 of article (12)

22	1 hr	22	Unit 11: Things that changed the world	1-5 of article (11)	1 – 3 of article (12)
23	1 hr	23	Unit 11: Things that changed the world	1-5 of article (11)	1 – 3 of article (12)
24	1 hr	24	Unit 11: Things that changed the world	1-5 of article (11)	1 – 3 of article (12)
25	1 hr	25	Unit 12: Dreams and reality	1-5 of article (11)	1 – 3 of article (12)
26	1 hr	26	Unit 12: Dreams and reality	1-5 of article (11)	1 – 3 of article (12)
27	1 hr	27	Unit 13: Earning a living	1-5 of article (11)	1 – 3 of article (12)
28	1 hr	28	Unit 13: Earning a living	1-5 of article (11)	1 – 3 of article (12)
29	1 hr	29	Unit 14: Family ties	1-5 of article (11)	1 – 3 of article (12)
30	1 hr	30	Unit 14: Family ties	1-5 of article (11)	1 – 3 of article (12)

11. Infrastructure

1. Books Required reading:	(1) New Headway Plus (Pre-intermediate] by John and Liz Soars, Oxford: Oxford University Press (2006)
2. Main references (sources)	<p>References</p> <p>(1) Modern scientific articles from the news related to the students' specialty</p> <p>Others</p> <ul style="list-style-type: none"> - Notebook prepared by the instructor of the course - Collection of sheets of solved and unsolved - problems and Exams questions
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	

12. The development of the curriculum plan

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Computer , 220WRCO
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. Online lectures have been providing to the students using Google Classroom Application.
5. Semester/Year	1st and 2nd Semesters, Academic year 2020 –2021
6. Number of hours tuition (total)	60 hr., 2 hr. per week
7. Date of production/revision of this specification	2020

8. Aims of the Course

The aims of this course are to develop skilled Excel and Internet users with the technical background, knowledge, and adaptability to develop well-designed, robust, computer-based solutions to a range of problems. The course introduces students to Microsoft office excel and Internet

9• Learning Outcomes, Teaching ,Learning and Assessment Method

Microsoft Excel

Examine spreadsheet concepts and explore the Microsoft Office Excel environment.

Create, open and view a workbook.

Save and print workbooks.

Enter and edit data.

Modify a worksheet and workbook.

Work with cell references.
Learn to use functions and formulas.
Create and edit charts and graphics.
Filter and sort table data.
Work with pivot tables and charts.
Import and export data.
Work with Cells and Worksheets
Calculate Your Data
Format your Workbook
Add Charts and Graphics
Collaborate with Others
Data analysis
Using Lookup Formulas and Formula Auditing

Internet Skills

Using a Web Browser

What is a URL and recognizing it.

Understanding terms such as ISP, website, home page and search engine

Using the button bar to navigate through web sites

Creating a bookmark/Saving a website as a favorite link

Locating and using links on a website

Using a search engine to location information on the Internet

Printing from the Internet

A. Cognitive goals

A1. An ability to design solutions by using Excel tools

A2. The acknowledgment needed perform data analysis

A3. Acquiring the Knowledge to use the Internet Effectively

A4. To learn how to use the data and procedures and download them from the internet

B. The skills goals special to the course.

B1. The skill of working with websites and search engines

B3. The Use of Excel and internet program to write scientific assays and reports.

B4. A professional user that can deal with different types of mathematical and logical problems via the usage of excel and internet

Teaching and Learning Methods

1-Lectures

2-Tutorials

3-Homework and Assignments

4-Tests and Exams

5-In-Class Questions and Discussions

Assessment methods

1-Examination, tests, and quizzes

2-Student engagement during lectures

C. Affective and value goals

- C1. An ability to identify, formulate, and solve engineering problems.
- C2. Gain an understanding of how to use a browser to access the Internet, enter an internet address (URL), save favorite sites, and use a search tool to find information on the internet.
- C3. Ability to function effectively as an individual in a group.
- C4. Have the advanced skills developed for the use of office productivity packages

Teaching and Learning Methods

Discussion with students

Assessment methods

Respecting deadlines

D. General and rehabilitative transferred skills (other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D2. An understanding of professional and ethical responsibility.
- D3. Ability to demonstrate the characteristics of a team leader or a manager.
- D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2	1	Introduction to Excel	1 – 5 of Article (11)	1 – 2 of Article (12)
2	2	2, 3	Define and identify cells	1 – 5 of	1 – 2 of
3	2	3, 4	Identify each command tab on the ribbon and the command groups for each tab	1 – 5 of Article (11)	1 – 2 of Article (12)
4	2	4	Enter data into a worksheet	1 – 5 of Article (11)	1 – 2 of Article (12)
5	2	5	Data format	1 – 5 of Article (11)	1 – 2 of Article (12)

6	2	5	Cells format	1 – 5 of Article (11)	1 – 2 of Article (12)
7	2	6	Table format	1 – 5 of Article (11)	1 – 2 of Article (12)
8	2	6	List components of a formula	1 – 5 of Article (11)	1 – 2 of Article (12)
9	2	7	Apply filters and sort	1 – 5 of Article (11)	1 – 2 of Article (12)
10	2	7, 8	Create pivot tables	1 – 5 of Article (11)	1 – 2 of Article (12)
11	2	7,8	Apply Excel to common household applications	1 – 5 of Article (11)	1 – 2 of Article (12)
12	2	9, 10	Using If	1 – 5 of Article (11)	1 – 2 of Article (12)
13	2	9, 10	The use of nest IF	1 – 5 of Article (11)	1 – 2 of Article (12)
14	2	9,10	Apply conditional formatting	1 – 5 of Article (11)	1 – 2 of Article (12)
15	2	6	Analyze data what If	1 – 5 of Article (11)	1 – 2 of Article (12)
16	2	11	Introduction to computer netwrks	1 – 5 of Article (11)	1 – 2 of Article (12)
17	2	11	Networks components	1 – 5 of Article (11)	1 – 2 of Article (12)
18	2	12	Types of networks	1 – 5 of	1 – 2 of

				Article (11)	Article (12)
19	2	12	WWW.	1 – 5 of Article (11)	1 – 2 of Article (12)
20	2	13	Internet protocols	1 – 5 of Article (11)	1 – 2 of Article (12)
21	2	13	Cloud computing	1 – 5 of Article (11)	1 – 2 of Article (12)
22	2	15	Web browsing	1 – 5 of Article (11)	1 – 2 of Article (12)
23	2	15	Search engines	1 – 5 of Article (11)	1 – 2 of Article (12)
24	2	15	Advance search	1 – 5 of Article (11)	1 – 2 of Article (12)
25	2	15	E-mails	1 – 5 of Article (11)	1 – 2 of Article (12)
26	2	15	Microsoft outlook	1 – 5 of Article (11)	1 – 2 of Article (12)
27	2	16	Social Media-1	1 – 5 of Article (11)	1 – 2 of Article (12)
28	2	16	Negative effects of Internet usage	1 – 5 of Article (11)	1 – 2 of Article (12)
29	2	17	Technology ethics	1 – 5 of Article (11)	1 – 2 of Article (12)
30	2	17, 18	Data and computer security	1 – 5 of Article (11)	1 – 2 of Article (12)

11. Infrastructure	
1. Books Required reading:	Textbook Ghassan Hamid Abdul Majed , (2014) "Computer Fundamentals" Book store for printing publishing and translating .
2. Main references (sources)	IC3 Test Guide (2019) . Certiport. MOS study guide 2013 Exam (77-420)
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	
12. The development of the curriculum plan	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Hydrology /319WRHY
4. Modes of Attendance offered	Annual System ; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects.
5. Semester/Year	1st and 2nd Semesters, Academic year 2020–2021
6. Number of hours tuition (total)	90 hr., 3 hr. theoretical per week
7. Date of production/revision of this specification	2020
8. Aims of the Course	
9. Learning Outcomes, Teaching ,Learning and Assessment Method	
<ol style="list-style-type: none"> 1. Hydrologic cycle and measurement of precipitation 2. Estimating of missing precipitation and double-mass analysis 3. Average precipitation over area and measurements of snow 4. Stream flow and stage 5. Discharge measurement 6. Stage –discharge relations and units 7. Evaporation 8. Characteristic of hydrograph 9. Stream flow recessions 10. Hydrograph separation 11. Unit hydrograph 	

12. Derivation of unit hydrograph
13. S-curve
14. Synthetic unit hydrograph
15. Rational method
16. Rainfall runoff relation and infiltration capacity
17. Infiltration index
18. Stream flow routing and wave movement
19. Abrupt wave
20. Storage equation and routing in a river channels
21. Muskingum method
22. Reservoir routing
23. Graphical method
24. Probability and plotting positions
25. Gumbel distribution and log-pearson type III distribution

Q. Cognitive goals

- A1. To have the ability to apply knowledge of mathematics, science, and engineering.
- A2. To have the ability to make decisions to meet desired needs.
- A3. To have the ability to have the broad education necessary to understand the impact of engineering solutions.
- A4. Knowledge of contemporary issues (this includes presenting students with issues such as the impact of globalization, the outsourcing of both engineering and other supporting jobs as practiced by modern international users).

B. The skills goals special to the course.

- B1. To have the ability to analyze and interpret data.
- B2. To have the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- B3. To have the ability to Apply basic mathematical and scientific concepts for the description and solution of engineering problems.
- B4. To have an ability to perform water resources engineering integrated design of systems, components, or processes.

Teaching and Learning Methods

1. Lectures.
2. Tutorials.
3. Homework and Assignments.
4. Tests and Exams.
5. In-Class Questions and Discussions.
6. Connection between Theory and Application.
7. Extracurricular Activities.

Assessment methods

1. Examinations, Tests, and Quizzes.
2. Extracurricular Activities.
3. Student Engagement during Lectures.
4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor).

C. Affective and value goals

- C1. An ability to identify, formulates, and solves engineering problems.
- C2. A recognition of the need for and an ability to engage in life-long learning
- C3. Enhancing self-learning ability.
- C4. Ability to identify, formulate and provide creative/innovative/effective solution of a problems.

Teaching and Learning Methods

- 1-Lectures
- 2-Tutorials
- 3-Homework and Assignments
- 4-Tests and Exams

Assessment methods

- 1-Examination, tests, seminars and quizzes
- 2-Student engagement during lectures

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D2. An understanding of professional and ethical responsibility.
- D3. Ability to demonstrate the characteristics of a team leader or a manager.
- D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3 2 the. 1 tut.	1	Hydrologic cycle and measurement of precipitation	1-7 of article (11)	1 – 4 of article (12)
2	3 2 the. 1 tut.	2	Estimating of missing precipitation and double-mass analysis	1-7 of article (11)	1 – 4 of article (12)
3	3 2 the. 1 tut.	3	Average precipitation over area and measurements of snow	1-7 of article (11)	1 – 4 of article (12)
4	3 2 the. 1 tut.	4	Stream flow and stage	1-7 of article (11)	1 – 4 of article (12)
5	3 2 the. 1 tut.	5	Discharge measurement	1-7 of article (11)	1 – 4 of article (12)
6	3 2 the. 1 tut.	6	Stage-discharge relations and units	1-7 of article (11)	1 – 4 of article (12)
7	3 2 the. 1 tut.	6	Stage-discharge relations and units	1-7 of article (11)	1 – 4 of article (12)
8	3 2 the. 1 tut.	6	Stage –discharge relations and units	1-7 of article (11)	1 – 4 of article (12)
9	3 2 the. 1 tut.	7	evaporation	1-7 of article (11)	1 – 4 of article (12)
10	3 2 the. 1 tut.	8	Characteristic of hydrograph	1-7 of article (11)	1 – 4 of article (12)

11	3 2 the. 1 tut.	9	Stream flow recessions	1-7 of article (11)	1 – 4 of article (12)
12	3 2 the. 1 tut.	10	Hydrograph separation	1-7 of article (11)	1 – 4 of article (12)
13	3 2 the. 1 tut.	10	Hydrograph separation	1-7 of article (11)	1 – 4 of article (12)
14	3 2 the. 1 tut.	11	Unit hydrograph	1-7 of article (11)	1 – 4 of article (12)
15	3 2 the. 1 tut.	12	Derivation of unit hydrograph	1-7 of article (11)	1 – 4 of article (12)
16	3 2 the. 1 tut.	13	S-curve	1-7 of article (11)	1 – 4 of article (12)
17	3 2 the. 1 tut.	14	Synthetic unit hydrograph	1-7 of article (11)	1 – 4 of article (12)
18	3 2 the. 1 tut.	15	Rational method	1-7 of article (11)	1 – 4 of article (12)
19	3 2 the. 1 tut.		Rational method	1-7 of article (11)	1 – 4 of article (12)
20	3 2 the. 1 tut.	16	Rainfall runoff relation and infiltration capacity	1-7 of article (11)	1 – 4 of article (12)
21	3 2 the. 1 tut.	17	Infiltration index	1-7 of article (11)	1 – 4 of article (12)
22	3 2 the. 1 tut.	18	Stream flow routing and wave movement	1-7 of article (11)	1 – 4 of article (12)

23	3 2 the. 1 tut.	19	Abrupt wave	1-7 of article (11)	1 – 4 of article (12)
24	3 2 the. 1 tut.	20	Storage equation and routing in a river channels	1-7 of article (11)	1 – 4 of article (12)
25	3 2 the. 1 tut.	21	Muskingum method	1-7 of article (11)	1 – 4 of article (12)
26	3 2 the. 1 tut.	22	Reservoir routing	1-7 of article (11)	1 – 4 of article (12)
27	3 2 the. 1 tut.	22	Reservoir routing	1-7 of article (11)	1 – 4 of article (12)
28	3 2 the. 1 tut.	23	Graphical method	1-7 of article (11)	1 – 4 of article (12)
29	3 2 the. 1 tut.	24	Probability and plotting positions	1-7 of article (11)	1 – 4 of article (12)
30	3 2 the. 1 tut.	25	Gumbel distribution and log- pearson type III disribution	1-7 of article (11)	1 – 4 of article (12)

11. Infrastructure

1. Books Required reading:	Hydrology for engineers Ray K. Linsley, Max Adam Kohler.
2. Main references (sources)	<ul style="list-style-type: none">- Applied hydrology by Chow Maidment Mays.- Hydrology and flood plain analysis.- Hydrology in practice Elizabeth M. Show
A- Recommended books and references scientific journals, reports...).	Others 1. Notebook prepared by the instructor of the course 2. Collection of sheets of solved and unsolved problems and Exams questions
B-Electronic references, Internet sites...	
12. The development of the curriculum plan	
Review the coarse syllabus after two years	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Soil Mechanics and Foundation Design/ 320 WRSM
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a “Day program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. This subject given 2 hours theory, 2 hour tutorial, and 2 hour lab work per week. Online lectures have been providing to the students using Google Classroom Application.
5. Semester/Year	1st and 2nd Semesters, Academic year 2019 –2020
6. Number of hours tuition (total)	180 hr., 6 hr. per week
7. Date of production/revision of this specification	2020

8. Aims of the Course

- 1- Defining soil and providing basic definitions and introductory concepts to soil mechanics
2. Explain how to describe the soil, soil phases and gradient.
3. Explain the main principles of soil classification.
4. Explain the flow of water through the soil.
- 5- Explain the one-way flow in the soil.
6. Explanation of the two-way flow network.
7. Explain the stresses in the soil.
8. Explain the pressures that occurred due to external loads and geostatic pressures.
9. Moore Circle Explained.

10. Explanation of compressibility.
11. Consolidation.
12. Explain soil resistance.
13. Explanation of bearing capacity and type of settlement.
14. Explain the stresses resulting from the retaining wall (solid or flexible wall).
15. Evidence of slopes.
- 16- Provide basic definitions and introductory concepts for foundation design.
17. Design of individual foundations.
18. Design of strip foundation and foundations.

9• Learning Outcomes, Teaching ,Learning and Assessment Method

R. Cognitive goals

- A1. To have the ability to apply knowledge of mathematics, science, and engineering.
- A2. To have the ability to make decisions to meet desired needs.
- A3. To have the ability to have the broad education necessary to understand the impact of engineering solutions.

B. The skills goals special to the course.

- B1. To have the ability to analyze and interpret data.
- B2. To have the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- B3. To have the ability to Apply basic mathematical and scientific concepts for the description and solution of engineering problems.

Teaching and Learning Methods

1. Lectures.
2. Tutorials.
3. Homework and Assignments.
4. Lab. Experiments.
5. Tests and Exams.
6. In-Class Questions and Discussions.
7. Reports and presentations.

Assessment methods

1. Examinations, Tests, and Quizzes.
2. Student Engagement during Lectures.

C. Affective and value goals

- C1. An ability to identify, formulates, and solves engineering problems.
- C4. Ability to identify, formulate and provide creative/innovative/effective solution of a problems.

Teaching and Learning Methods

In-Class Questions and Discussions.

Assessment methods

1. Examinations, Tests, and Quizzes.
2. Student Engagement during Lectures.
3. Responses Obtained from Students, Questionnaire about Curriculum and Faculty.

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D2. An understanding of professional and ethical responsibility.
- D3. Ability to demonstrate the characteristics of a team leader or a manager.
- D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	6	A, B,C,D	Introduction and soil formation	1-7 of article (10)	1-3 of article (11)
2	6	A, B,C,D	Phase relationship	1-8 of article (10)	1-3 of article (11)
3	6	A, B,C,D	Their derivations	1-8 of article (10)	1-3 of article (11)
4	6	A, B,C,D	Soil identification test	1-8 of article (10)	1-3 of article (11)
5	6	A, B,C,D	Calculation of the phase relation	1-8 of article (10)	1-3 of article (11)
6	6	A, B,C,D	Compaction	1-8 of article (10)	1-3 of article (11)
7	6	A, B,C,D	Soil classification	1-8 of article (10)	1-3 of article (11)
8	6	A, B,C,D	Stress within soil mass	1-8 of article (10)	1-3 of article (11)
9	6	A, B,C,D	Mohr circle and principle stress	1-8 of article (10)	1-3 of article (11)
10	6	A, B,C,D	Theory of one dimensional flow	1-8 of article (10)	1-3 of article (11)

11	6	A, B,C,D	Calculation of one dimensional flow	1-8 of article (10)	1-3 of article (11)
12	6	A, B,C,D	Two dimensional flow	1-8 of article (10)	1-3 of article (11)
13	6	A, B,C,D	Shear strength of soil	1-8 of article (10)	1-3 of article (11)
14	6	A, B,C,D	Compressibility of soils	1-8 of article (10)	1-3 of article (11)
15	6	A, B,C,D	Theory of settlement	1-8 of article (10)	1-3 of article (11)
16	6	A, B,C,D	Their application	1-8 of article (10)	1-3 of article (11)
17	6	A, B,C,D	Consolidation theory	1-8 of article (10)	1-3 of article (11)
18	6	A, B,C,D	Their application	1-8 of article (10)	1-3 of article (11)
19	6	A, B,C,D	Lateral earth pressure	1-8 of article (10)	1-3 of article (11)
20	6	A, B,C,D	Types of earth pressure	1-8 of article (10)	1-3 of article (11)
21	6	A, B,C,D	Types of retaining wall	1-8 of article (10)	1-3 of article (11)
22	6	A, B,C,D	Analysis of rigid retaining wall	1-8 of article (10)	1-3 of article (11)
23	6	A, B,C,D	Analysis of flexible retaining wall	1-8 of article (10)	1-3 of article (11)
24	6	A, B,C,D	Sheet piles	1-8 of article (10)	1-3 of article (11)
25	6	A, B,C,D	Slope stability analysis	1-8 of article (10)	1-3 of article (11)
26	6	A, B,C,D	Bearing capacity analysis	1-8 of article (10)	1-3 of article (11)
27	6	A, B,C,D	Shallow foundation design	1-8 of article (10)	1-3 of article (11)
28	6	A, B,C,D	Spread footing design	1-8 of article (10)	1-3 of article (11)
29	6	A, B,C,D	Combined footing design	1-8 of article (10)	1-3 of article (11)
30	6	A, B,C,D	Revision	1-8 of article (10)	1-3 of article (11)

11. Infrastructure	
1. Books Required reading:	Soil Mechanics, Si version by (T. William Lmbe and Robert V. Whitman)
2. Main references (sources)	1-Foundation Analysis and Design , Bowles,1998 2-Principles of Geotechnical Engineering, Das, B.M, 2002 3- كتاب هندسة الاسس للدكتور يوسف الشكري
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	
12. The development of the curriculum plan	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Irrigation principles / 321 WRIE
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. With an alternative using online lectures have been providing to the students using Google Classroom Application. The academic year is composed of 30-week regular subjects.
5. Semester/Year	1st and 2nd Semesters, Academic year 2020 –2021
6. Number of hours tuition (total)	90 hr., 3 hr. theoretical per week
7. Date of production/revision of this specification	2020

8. Aims of the Course

1. Introduce basic definitions and introductory concepts of irrigation.
2. Introduce the description of soil physical properties, available water, field capacity, permanent wilting point and readily available water.
3. Introduce the description of soil moisture content, methods of measuring and calculations.
4. Explain and description of net applied depth, gross depth of irrigation, application and irrigation efficiency and conveyance irrigation.
5. Introduce the principles of evapotranspiration, reference evapotranspiration, crop or actual evapotranspiration and crop coefficient.
6. Description of irrigation interval and the maximum value.

7. Introduce the principles of relation between discharges, time of irrigation, depth applied and field area.
8. Difference between continuous and intermittent irrigation operations.
9. Description the principle of water balance and budget and to learn the procedure of schedule of irrigation and methods used.
- 10- Explain the principle of infiltration process, rate of infiltration and basic infiltration.
- 11- Description the basic and important of land leveling and grading, introducing the principle of levelling, methods of calculating the required land slope and methods used for calculating the volume of cut and fill

9• Learning Outcomes, Teaching ,Learning and Assessment Method

1. Define soil moisture calculation, readily available, and soil moisture deficit.
2. Relation between depth of soil, depth of water and soil moisture content.
3. Calculate; required net depth of irrigation, gross depth of irrigation, application and irrigation efficiencies, conveyance efficiencies in the canals, and the required total water applied to the head of the canal.
4. Calculate; the reference evapotranspiration according to different methods, how to use the weather parameters and applied in the different methods. And define the crop coefficients for the plants. Additional to know how to calculate crop or actual evapotranspiration.
5. Define the irrigation intervals and the maximum irrigation intervals.
6. Calculate; the discharge applied to the field (farm) according to the applied depth of water, time of irrigation and the field area.
7. Understand and apply the calculated discharge in the operation of irrigation, continuous and intermittent discharge.
8. Formulate and solve the water duty according to the continuous discharge and the field area.
9. Calculate and managed the schedule of irrigation by using two methods, and calculate the water budget. And define the difference between the two methods.
10. Define and calculate the infiltration, infiltration rate, instantaneous infiltration rate and basic infiltration rate. Additional how to use the log-log paper, and the least squares method to define the equation.
11. Calculate; the land grading, longitudinal and horizontal slopes, cut and fill ratio, adjusting the plane of the land, and then calculation of volume of fill and cut by using different methods.

S. Cognitive goals

- A1. To have the ability to apply knowledge of mathematics, science, and engineering.
- A2. To have the ability to make decisions to meet desired needs.
- A3. To have the ability to have the broad education necessary to understand the impact of engineering solutions.
- A4. Knowledge of contemporary issues (this includes presenting students with issues such as the impact of globalization, the outsourcing of both engineering and other supporting jobs as practiced by modern international users).

B. The skills goals special to the course.

B1. To have the ability to analyze and interpret data.

B2. To have the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

B3. To have the ability to Apply basic mathematical and scientific concepts for the description and solution of engineering problems.

B4. To have an ability to perform water resources engineering integrated design of systems, components, or processes.

Teaching and Learning Methods

1. Lectures.
2. Tutorials.
3. Homework and Assignments.
4. Lab. Experiments.
5. Tests and Exams.
6. In-Class Questions and Discussions.
7. Connection between Theory and Application.
8. Extracurricular Activities

Assessment methods

1. Examinations, Tests, and Quizzes.
2. Extracurricular Activities.
3. Student Engagement during Lectures.
4. Responses Obtained from Students, Questionnaire about Curriculum and faculty member (Instructor).

C. Affective and value goals

C1. An ability to identify, formulates, and solves engineering problems.

C2. A recognition of the need for and an ability to engage in life-long learning

C3. Enhancing self-learning ability.

C4. Ability to identify, formulate and provide creative/innovative/effective solution of a problems.

Teaching and Learning Methods

1. Lectures
2. Tutorials
3. Home works
4. Test and exams
5. In class questions and discussions

Assessment methods

1. Examinations, Tests and Quizzes
2. Extracurricular activities
3. Student engagement during lectures

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D2. An understanding of professional and ethical responsibility.
- D3. Ability to demonstrate the characteristics of a team leader or a manager.
- D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3 2 the. 1 tut.	1	Introduction to the Basic Soil -Plant - Water Relations.	1-8	1 – 4
2	3 2 the. 1 tut.	1	Soil Texture (type of soils).	1-8	1 – 4
3	3 2 the. 1 tut.	1	Soil moisture content.	1-8	1 – 4
4	3 2 the. 1 tut.	1	Available water, soil moisture deficit, and readily available water.	1-8	1 – 4
5	3 2 the. 1 tut.	2	Relation between depth of soil, depth of water and soil moisture content.	1-8	1 – 4
6	3 2 the. 1 tut.	3	Plant consumptive use. and crop coefficient.	1-8	1 – 4
7	3 2 the. 1 tut.	1-4	Net depth of water and leaching requirements.	1-8	1 – 4
8	3 2 the. 1 tut.	1-4	Gross depth of water.	1-8	1 – 4
9	3 2 the.	1-5	Irrigation interval and maximum irrigation interval.	1-8	1 – 4

	1 tut.				
10	3 2 the. 1 tut.	1-5	Irrigation efficiency.	1-8	1 – 4
11	3 2 the. 1 tut.	1-5	Conveyance efficiency.	1-8	1 – 4
12	3 2 the. 1 tut.	1-6	Relation between discharge, depth, area, and time.	1-8	1 – 4
13	3 2 the. 1 tut.	1-6	Relation between discharge, depth, area, and time.	1-8	1 – 4
14	3 2 the. 1 tut.	1-7	Continues and intermittent operations.	1-8	1 – 4
15	3 2 the. 1 tut.	1-8	Water duty.	1-8	1 – 4
16	3 2 the. 1 tut.	1-9	Water balance (1).	1-8	1 – 4
17	3 2 the. 1 tut.	1-9	Water balance (2).	1-8	1 – 4
18	3 2 the. 1 tut.	1-9	Water requirements.	1-8	1 – 4
19	3 2 the. 1 tut.	1-9	Project water requirement.	1-8	1 – 4
20	3 2 the. 1 tut.	1-9	Irrigation scheduling (constant net depth method).	1-8	1 – 4
21	3 2 the.	1-9	Irrigation scheduling (constant net depth method).	1-8	1 – 4

	1 tut.				
22	3 2 the. 1 tut.	1-9	Irrigation scheduling (constant irrigation interval method).	1-8	1 – 4
23	3 2 the. 1 tut.	1-9	Irrigation scheduling (constant irrigation interval method).	1-8	1 – 4
24	3 2 the. 1 tut.	10	Soil infiltration.	1-8	1 – 4
25	3 2 the. 1 tut.	10	Infiltration rate.	1-8	1 – 4
26	3 2 the. 1 tut.	10	Instantaneous infiltration rate	1-8	1 – 4
27	3 2 the. 1 tut.	10	Basic infiltration rate.	1-8	1 – 4
28	3 2 the. 1 tut.	11	Land grading.	1-8	1 – 4
29	3 2 the. 1 tut.	11	Land grading.	1-8	1 – 4
30	3 2 the. 1 tut.	11	Volume of earth work	1-8	1 – 4

11. Infrastructure

1. Books Required reading:	“Irrigation Principle and Practice” by Israel Sen
2. Main references (sources)	- Note book from web-site - “Irrigation Engineering” by R. K. Sharma
A- Recommended books and references scientific journals, reports...).	<u>Others</u> 1. Notebook prepared by the instructor of the course 2. Collection of sheets of solved and unsolved problems and Exams question
B-Electronic references, Internet sites...	

12. The development of the curriculum plan

A Reviewing of the coarse details after 4 years

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Irrigation and Drainage Networks, 322 WRID
4. Modes of Attendance offered	One time, day time on campus
5. Semester/Year	2 nd Semesters, Academic year 2020 –2021
6. Number of hours' tuition (total)	45 hrs (3 hrs per week)
7. Date of production/revision of this specification	2020

8. Aims of the Course

This course introduces the description of design Irrigation and Drainage Networks. Topics covered: Types of Irrigation and Drainage Networks, Components, and Functions. Layout of Irrigation and Drainage Networks, Calculation of Discharge for Canals and Drains, Design of Water Course and Farm Channel (Slope), Design of Collector Drain (Slope), Determine the Water Level in Irrigation Canals, Determine the Water Level in Drains, Hydraulic Design of Canal Cross Section, the longitudinal section and synoptic diagram and Canals Lining

9• Learning Outcomes, Teaching ,Learning and Assessment Method

the student in the field of Irrigation and Drainage Networks will be able to:

- ee. Understand and define irrigation and drainage networks.
- ff. Layout of irrigation and drainage networks.
- gg. Calculation of discharge for canals and drains.
- hh. Design of water course and farm channel (slope)
- ii. Design of collector drain and main collector drain (slope).
- jj. Determine the water level in irrigation canals and slopes.
- kk. Determine the water Level in drains and slopes.
- ll. Design requires the use of steady uniform flow equation such as. Manning's and Chezy's formula.
- mm. Design by empirical methods
- nn. Design by best hydraulic section methods.

- oo. Design by Regime canals.
- pp. Draw the longitudinal section and synoptic diagram.
- qq. Understand the canal lining.

A. Cognitive goals

- A1. To have the ability to apply knowledge of mathematics, science, and engineering.
- A2. To have the ability to make decisions to meet desired needs.
- A3. To have the ability to have the broad education necessary to understand the impact of engineering solutions.

B. The skills goals special to the course.

- B1. To have the ability to analyze and interpret data.
- B2. To have the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- B3. To have the ability to Apply basic mathematical and scientific concepts for the description and solution of engineering problems.
- B4. To have an ability to perform water resources engineering integrated design of systems, components, or processes.

Teaching and Learning Methods

- a- Lectures
- b- Tutorials
- c- Homework
- d- In class Questions and Discussions
- e- Exams

Assessment methods

- a- Examination and Quizzes
- b- Student Engagement during Lectures

C. Affective and value goals

- C1. An ability to identify, formulates, and solves engineering problems.
- C2. A recognition of the need for and an ability to engage in life-long learning
- C3. Enhancing self-learning ability.
- C4. Ability to identify, formulate and provide creative/innovative/effective solution of a problems.

Teaching and Learning Methods

- lectures,
- tutorials, and
- supervised team work.

Assessment methods

- homework,
- quizzes,
- major examination during the course, and
- final examination.

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D2. An understanding of professional and ethical responsibility.
- D3. Ability to demonstrate the characteristics of a team leader or a manager.
- D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure					
Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
16	3	1	Irrigation Network. Drainage Network.	1-8 of article (11)	1-2 of article (12)
17	3	1	Comparison between Irrigation and Drainage Networks. Names and Numbers of Canals and Drains.	1-8 of article (11)	1-2 of article (12)
18	3	1-2	Layout of Irrigation and Drainage Networks.	1-8 of article (11)	1-2 of article (12)
19	3	3	Irrigation Unit. Water Duty. Drainage Coefficient	1-8 of article (11)	1-2 of article (12)
20	3	3	Calculation of Discharge for Canals and Drains.	1-8 of article (11)	1-2 of article (12)
21	3	4	Design of Water Course and Farm Channel (Slope).	1-8 of article (11)	1-2 of article (12)
22	3	5	Design of Collector Drain (Slope).	1-8 of article (11)	1-2 of article (12)
23	3	6	Determine the Water Level along the Main, Lateral, and Distributory Canal.	1-8 of article (11)	1-2 of article (12)
24	3	7	Determine the Water Level along the Main, and Main Collector Drain.	1-8 of article (11)	1-2 of article (12)
25	3	8	Hydraulic Design of Canal Section by using (Manning's Formula and Chezy's Formula).	1-8 of article (11)	1-2 of article (12)
26	3	8-9	Hydraulic Design of Canal Section by using Empirical Methods.	1-8 of article (11)	1-2 of article (12)
27	3	8-10	Hydraulic Design of Canal Section by using Best Hydraulic Section Methods.	1-8 of article (11)	1-2 of article (12)

28	3	11	Hydraulic Design of Canal Section by using Regime Canals.	1-8 of article (11)	1-2 of article (12)
29	3	3-4-5-6-7-12	Longitudinal Section and Synoptic Diagram for Irrigation and Drainage canals .	1-8 of article (11)	1-2 of article (12)
30	3	13	Lining of Canals.	1-8 of article (11)	1-2 of article (12)

11. Infrastructure	
1. Books Required reading:	
2. Main references (sources)	References Design Manual for Irrigation and Drainage / Pencil 1983. Others
A- Recommended books and references scientific journals, reports...).	• Notebook Prepared by the Instructor. Collection of Sheets of Solved and Unsolved
B-Electronic references, Internet sites...	
12. The development of the curriculum plan	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Fluid Mechanics / 323 WRFM
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. With an alternative using online lectures have been providing to the students using Google Classroom Application. The academic year is composed of 30-week regular subjects.
5. Semester/Year	1st and 2nd Semesters, Academic year 2020–2021
6. Number of hours tuition (total)	150 hr., 5 hr. theoretical per week
7. Date of production/revision of this specification	2020

8. Aims of the Course

1. Definitions and introductory concepts of fluid mechanics.
2. Introduce the description of pressure distribution in a static fluid and its effects on submerged surfaces and bodies.
3. Introduce the description of phenomena associated with fluid flow phenomena.
4. Explain and derive the conservation laws that govern fluid motion (continuity, energy, and momentum equations).
5. Introduce the principles of “Dimensional Analysis” and “Similitude” and their application to fluid mechanics problems.
6. Introduction to fluid flow in pipes, smooth and rough pipes, laminar and turbulent flow, computation of major and minor losses in pipes.
7. Enable the student to analyze and design pipes network and pumps connection.
8. Enable the student to measure the fluid properties and flow parameters.
9. Provide a good physical and analytical understanding of fluid flows.

10. Provide a background to higher level courses involving open channel and advance hydrodynamic flow engineering. The students will be familiar with the applications in this field of engineering that can be addressed using linear and nonlinear optimization.

9• Learning Outcomes, Teaching ,Learning and Assessment Method

1. Define Fluids and Fluid Mechanics and distinguish between incompressible and compressible fluids, and understand and define the basic fluid properties; especially density and viscosity, and apply Newton's law of viscosity.
2. Calculate; the pressure in static fluid, hydrostatic forces on submerged surfaces, buoyancy forces, stability of submerged and floating bodies, and forces on accelerated fluids.
3. Be familiar with continuity, energy, and momentum equations, and their applications to fluid flow problems.
4. Understand and apply the principles of dimensional analysis and similitude to fluid mechanics problems.
 5. Estimate drag and lift forces in laminar and turbulent flows for different immersed bodies.
6. Calculate frictional losses in pipe problems for both laminar and turbulent flows, by using Moody Diagram.
7. Calculate secondary (minor) losses for various pipes fittings and connections.
8. Know how to measure flow properties (pressure, velocity, and discharge) and fluid properties (density and viscosity).
9. Be able to analyze and design pipes network and connection, and pumping stations and connection.
10. Be able to use dimensional analysis to similitude different engineering problems.
11. Identify, formulate and solve engineering fluid problems.
12. Use the techniques, skills, and modern engineering tools necessary for engineering practice in fluid mechanics applications.

A. Cognitive goals

- A1. To have the ability to apply knowledge of mathematics, science, and engineering.
- A2. To have the ability to make decisions to meet desired needs.
- A3. To have the ability to have the broad education necessary to understand the impact of engineering solutions.
- A4. Knowledge of contemporary issues (this includes presenting students with issues such as the impact of globalization, the outsourcing of both engineering and other supporting jobs as practiced by modern international users).

B. The skills goals special to the course.

- B1. To have the ability to analyze and interpret data.
- B2. To have the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- B3. To have the ability to Apply basic mathematical and scientific concepts for the description and solution of engineering problems.
 - B4. To have an ability to perform water resources engineering integrated design of systems, components, or processes.

Teaching and Learning Methods

1. Lectures.
2. Tutorials.
3. Homework and Assignments.
4. Lab. Experiments.
5. Tests and Exams.
6. In-Class Questions and Discussions.
7. Connection between Theory and Application.
8. Extracurricular Activities

Assessment methods

1. Examinations, Tests, and Quizzes.
2. Extracurricular Activities.
3. Student Engagement during Lectures.
 4. Responses Obtained from Students, Questionnaire about Curriculum and faculty member (Instructor).

C. Affective and value goals

- C1. An ability to identify, formulates, and solves engineering problems.
- C2. A recognition of the need for and an ability to engage in life-long learning
- C3. Enhancing self-learning ability.
- C4. Ability to identify, formulate and provide creative/innovative/effective solution of a problems.

Teaching and Learning Methods

1. Lectures
2. Tutorials
3. Home works
4. Test and exams
5. In class questions and discussions

Assessment methods

1. Examinations, Tests and Quizzes
2. Extracurricular activities
3. Student engagement during lectures

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D2. An understanding of professional and ethical responsibility.
- D3. Ability to demonstrate the characteristics of a team leader or a manager.
- D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	5 3 the. 1 tut. 1 exp.	1,2	Introduction & Fluid properties, Fluid State	1-8 of article (11)	1 – 4 of article (12)
2	5 3 the. 1 tut. 1 exp.	1,2	Density, Weight density, Specific Volume, Relative Density	1-8 of article (11)	1 – 4 of article (12)
3	5 3 the. 1 tut. 1 exp.	1,2	Compressibility, Elasticity, Viscosity	1-8 of article (11)	1 – 4 of article (12)
4	5 3 the. 1 tut. 1 exp.	1,2	Surface Tension, Vapor Pressure	1-8 of article (11)	1 – 4 of article (12)
5	5 3 the. 1 tut. 1 exp.	1,2	Pressure-Density-Height Relationships	1-8 of article (11)	1 – 4 of article (12)
6	5 3 the. 1 tut. 1 exp.	1,2	Absolute and Gage Pressures, Manometry	1-8 of article (11)	1 – 4 of article (12)
7	5 3 the. 1 tut. 1 exp.	1,2	Forces on Submerged Surfaces	1-8 of article (11)	1 – 4 of article (12)
8	5 3 the. 1 tut. 1 exp.	1,2	Buoyancy and Flotation	1-8 of article (11)	1 – 4 of article (12)
9	5 3 the. 1 tut. 1 exp.	1,2	Fluid Masses Subjected to Acceleration	1-8 of article (11)	1 – 4 of article (12)
10	5 3 the. 1 tut. 1 exp.	1,2	Kinematics of Fluid Motion	1-8 of article (11)	1 – 4 of article (12)
11	5 3 the. 1 tut. 1 exp.	1,2,3	Continuity Equation	1-8 of article (11)	1 – 4 of article (12)

12	5 3 the. 1 tut. 1 exp.	1,2,3,4	Ideal Flow, Bernoulli Equation	1-8 of article (11)	1 – 4 of article (12)
13	5 3 the. 1 tut. 1 exp.	1,2,3,4	Application of Bernoulli equation	1-8 of article (11)	1 – 4 of article (12)
14	5 3 the. 1 tut. 1 exp.	1,2,3,4	Momentum Equation	1-8 of article (11)	1 – 4 of article (12)
15	5 3 the. 1 tut. 1 exp.	1 - 10	Application of Momentum Equation, Hydraulic Jump	1-8 of article (11)	1 – 4 of article (12)
16	5 3 the. 1 tut. 1 exp.	1,2	Flow of a Real Fluid	1-8 of article (11)	1 – 4 of article (12)
17	5 3 the. 1 tut. 1 exp.	1,2	Laminar and Turbulent Flow, Eddy Viscosity	1-8 of article (11)	1 – 4 of article (12)
18	5 3 the. 1 tut. 1 exp.	1 - 10	The Energy Equation, Resistance Force and Energy Dissipation	1-8 of article (11)	1 – 4 of article (12)
19	5 3 the. 1 tut. 1 exp.	1,2	Similitude and Dimensional Analysis	1-8 of article (11)	1 – 4 of article (12)
20	5 3 the. 1 tut. 1 exp.	1 - 10	Similitude and Models, Geometric, kinematic, Dynamic Similarity	1-8 of article (11)	1 – 4 of article (12)
21	5 3 the. 1 tut. 1 exp.	1 - 10	Principle of Dimensional Homogeneity, Buckingham II-Theorem	1-8 of article (11)	1 – 4 of article (12)
22	5 3 the. 1 tut. 1 exp.	1,2,3,4	Fluid Flow in Pipes	1-8 of article (11)	1 – 4 of article (12)
23	5 3 the. 1 tut. 1 exp.	1,2,3,4	Incompressible Flow, Laminar Flow	1-8 of article (11)	1 – 4 of article (12)

24	5 3 the. 1 tut. 1 exp.	1,2,3,4	Turbulent Flow-Smooth pipes, Rough pipes	1-8 of article (11)	1 – 4 of article (12)
25	5 3 the. 1 tut. 1 exp.	1 - 10	Pipe Friction Factors, Classification of Smoothness and Roughness	1-8 of article (11)	1 – 4 of article (12)
26	5 3 the. 1 tut. 1 exp.	1 - 10	Pipe Friction-An Empirical Formulation, Minor Losses in Pipelines	1-8 of article (11)	1 – 4 of article (12)
27	5 3 the. 1 tut. 1 exp.	1 - 10	Pipeline Problems-Single and multiple pipes	1-8 of article (11)	1 – 4 of article (12)
28	5 3 the. 1 tut. 1 exp.	1,2,3,4	Open channel flow, Normal depth, critical depth computation	1-8 of article (11)	1 – 4 of article (12)
29	5 3 the. 1 tut. 1 exp.	1 - 10	Specific energy curve , momentum principle	1-8 of article (11)	1 – 4 of article (12)
30	5 3 the. 1 tut. 1 exp.	1 - 10	Hydraulic jump, best hydraulic section	1-8 of article (11)	1 – 4 of article (12)

11. Infrastructure

1. Books Required reading:	Elementary fluid mechanics J.K. Vennard &R.L. Street
2. Main references (sources)	<u>References</u> Fluid mechanics by R.K. RAJPUT, ISO 9001;2000 Fluid mechanics by A.K. mohanty, New Delhi-110001;2009 Fluid mechanics by Young, Munson, Okiishi, Huebsch
A- Recommended books and references scientific journals, reports...).	<u>Others</u> 1. Notebook prepared by the instructor of the course 2. Collection of sheets of solved and unsolved problems and Exams question
B-Electronic references, Internet sites...	

12. The development of the curriculum plan

A Reviewing of the coarse details after 4 years

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Structural Analysis, 324 WRSA
4. Modes of Attendance offered	Semester System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic semester is composed of 15-week regular subjects. Online lectures have been provided to the students using google classroom application.
5. Semester/Year	1st Semester, Academic year 2020 –2021
6. Number of hours tuition (total)	60 hr., 4 hr. theoretical per week
7. Date of production/revision of this specification	2020
8. Aims of the Course	
9• Learning Outcomes, Teaching ,Learning and Assessment Method	
<ol style="list-style-type: none"> 1. introduce the students about the structure’s equilibrium 2. Teach the students how to calculate the stresses and moment for determinate structures and draw the shear and moment diagrams. 3. Teach the students how to calculate the stresses and moment for indeterminate structures and draw the shear and moment diagrams, using different analysis methods such as: <ol style="list-style-type: none"> a. Slope Deflection Method b. Moment Distribution Method c. Force Method 	

T. Cognitive goals

- A1. To have the ability to apply knowledge of mathematics, science, and engineering.
- A2. To have the ability to make decisions to meet desired needs.
- A4. Knowledge of contemporary issues (this includes presenting students with issues such as the impact of globalization, the outsourcing of both engineering and other supporting jobs as practiced by modern international users).

B. The skills goals special to the course.

- B1. To have the ability to analyze and interpret data.
- B2. To have the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- B3. To have the ability to Apply basic mathematical and scientific concepts for the description and solution of engineering problems.

Teaching and Learning Methods

- 1. Lectures.
- 2. Tutorials.
- 3. Homework and Assignments.
- 4. Tests and Exams.
- 5. In-Class Questions and Discussions.
- 6. Connection between Theory and Application.

Assessment methods

- 1. Examinations and Quizzes.
- 2. Student Engagement during Lectures.

C. Affective and value goals

- C1. An ability to identify, formulates, and solves engineering problems.
- C2. A recognition of the need for and an ability to engage in life-long learning (this includes teaching students that the underlying theory is important because the technology changes, coupled with enhancing their self-learning ability).
- C3. Ability to function effectively as an individual in a group.

Teaching and Learning Methods

Discussion with students
Oral quizzes

Assessment methods

- Respecting deadlines
- Write reports

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D2. An understanding of professional and ethical responsibility.
- D3. Ability to demonstrate the characteristics of a team leader or a manager.
- D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4	1	Types of structures and loads	1, 2, 3	1, 2, 3
2	4	1	Structure classification, stability	1, 2, 3	1, 2, 3
3	4	1	Analysis of statically determinate structures trusses	1, 2, 3	1, 2, 3
4	4	1	Analysis of statically determinate structures beams	1, 2, 3	1, 2, 3
5	4	1	Analysis of statically determinate structures	1, 2, 3	1, 2, 3
6	4	2	Analysis of Indeterminate Structures Frames	1, 2, 3	1, 2, 3
7	4	2	Slope–deflection method- General Procedure.	1, 2, 3	1, 2, 3
8	4	2	Slope –deflection method-for beams	1, 2, 3	1, 2, 3
9	4	2	Slope –deflection method- for frames	1, 2, 3	1, 2, 3
10	4	3	Moment distribution method- General Procedure.	1, 2, 3	1, 2, 3
11	4	3	Moment distribution method-for beam.	1, 2, 3	1, 2, 3
12	4	3	Moment distribution method-for frames.	1, 2, 3	1, 2, 3
13	4	3	The Force Method-General Procedure.	1, 2, 3	1, 2, 3
14	4	3	The Force Method- for beam.	1, 2, 3	1, 2, 3
15	4	3	The Force Method- for frames.	1, 2, 3	1, 2, 3

11. Infrastructure

1. Books Required reading:	Structural Analysis , R.C. Hibbeler, 6 th edition SI units, 2006.
2. Main references (sources)	<ul style="list-style-type: none">- Structural Analysis, Aslam, Kassim ali, 4th edition SI units 2006.- Structural Analysis in theory & Practice A.W Mims, 2004
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	

12. The development of the curriculum plan

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Design of Concrete Structures, 325 WRDC
4. Modes of Attendance offered	Seasonal System: There is only one mode of delivery, which is a “Day program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic semester is composed of 15-week regular subjects. This subject is given 2 hrs. theoretical and 2 hrs. tutorial per week for one semester. Online lectures have been provided to the students using google classroom application.
5. Semester/Year	2nd Semester, Academic year 2020 –2021
6. Number of hours tuition (total)	60 hr., 4 hr. theoretical per week(second semester)
7. Date of production/revision of this specification	2020

8. Aims of the Course

The aim of this course is to prepare the students to design and analysis the reinforced concrete buildings.

9• Learning Outcomes, Teaching ,Learning and Assessment Method

1. The graduate student will be able to design and analyze beams, slabs and columns.
2. Calculate the allowable load and moment the beam can carry it
3. Find stress in concrete and steel for the reinforced concrete beams.
4. Design singly reinforced rectangular section.
5. Find the necessary area of flexural reinforcement required at the beam.
6. Find the dimensions of the beam.
7. Calculate the effective flange width of T-beam section.
8. Calculate the design strength for T-beam section.
9. Calculate shear strength (nominal strength and required strength).
10. Calculate shear strength provided by concrete and steel).

11. Design stirrup spacing.
12. Define type of slab (one way or two way).
13. Find slab thickness.
14. calculate the allowable load and moment the slab can carry it.
15. calculate the allowable load and moment the column can carry it.

U. Cognitive goals

- A1. To have the ability to apply knowledge of mathematics, science, and engineering.
- A2. To have the ability to make decisions to meet desired needs.
- A3. To have the ability to have the broad education necessary to understand the impact of engineering solutions.
- A4. Knowledge of contemporary issues (this includes presenting students with issues such as the impact of globalization, the outsourcing of both engineering and other supporting jobs as practiced by modern international users).

B. The skills goals special to the course.

- B1. To have the ability to analyze and interpret data.
- B2. To have the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- B3. To have the ability to Apply basic mathematical and scientific concepts for the description and solution of engineering problems.

Teaching and Learning Methods

1. Lectures.
2. Tutorials.
3. Homework and Assignments.
4. Tests and Exams.
5. In-Class Questions and Discussions.
6. Connection between Theory and Application.

Assessment methods

1. Examinations and Quizzes.
2. Student Engagement during Lectures.

C. Affective and value goals

- C1. An ability to identify, formulates, and solves engineering problems.
- C2. A recognition of the need for and an ability to engage in life-long learning
- C3. Enhancing self-learning ability.
- C4. Ability to identify, formulate and provide creative/innovative/effective solution of a problems.

Teaching and Learning Methods

- Discussion with students
- Oral quizzes

Assessment methods

- Respecting deadlines
- Write reports

D. General and rehabilitative transferred skills (other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D3. Ability to demonstrate the characteristics of a team leader or a manager.
- D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
16	2 the.	1,2,3,4	Material properties	1-10 of article (11)	1-3 of article (12)
	2 tut.				
17	2 the.	1,2,3,4	Analysis and design methods	1-10 of article (11)	1-3 of article (12)
	2 tut.				
18	2 the.	1,2,3,4	Working stress method	1-10 of article (11)	1-3 of article (12)
	2 tut.				

19	2 the. 2 tut.	1,2,4,5	Find the cracking moment	1-10 of article (11)	1-3 of article (12)
20	2 the. 2 tut.	1,2,4,5	Analysis and design rectangular section beams	1-10 of article (11)	1-3 of article (12)
21	2 the. 2 tut.	1,2,5,6,7,8	Ultimate strength method	1-10 of article (11)	1-3 of article (12)
22	2 the. 2 tut.	1,2,5,6,7,8	Analysis and design of singly reinforced rectangular section beams	1-10 of article (11)	1-3 of article (12)
23	2 the. 2 tut.	1,2,4,5,6,9,10, 11	Analysis and design of singly reinforced T, an L sections beams	1-10 of article (11)	1-3 of article (12)
24	2 the. 2 tut.	1,2,4,5,6,9,10, 11	Introduction in shear design	1-10 of article (11)	1-3 of article (12)
25	2 the. 2 tut.	1,13,14	Design beam for shear	1-10 of article (11)	1-3 of article (12)
26	2 the. 2 tut.	1,13,14	Design of one-way slab	1-10 of article (11)	1-3 of article (12)
27	2 the. 2 tut.	1,13,14	Design of two-way slab	1-10 of article (11)	1-3 of article (12)
28	2 the. 2 tut.	1,13,14	Design of short axially loaded col.	1-10 of article (11)	1-3 of article (12)
29	2 the. 2 tut.	1,15	Interaction diagrams for short col.	1-10 of article (11)	1-3 of article (12)
30	2 the. 2 tut.	1,15	Analysis of col. Under biaxial load	1-10 of article (11)	1-3 of article (12)

11. Infrastructure

1. Books Required reading:	1. Design of Concrete Structures, 14th Edition Arthur H. Nilson, David Darwin, Charles W. Dolan, McGraw-Hill, 2020.
2. Main references (sources)	1. Design of Reinforced Concrete, ACI 318 Code Edition. Seventh Edition Jack C. McGormac, James K. Nelson, John Wiley, 2006. 2. Building Code Requirements for Structural Concrete, ACI 318M-11, American Concrete Institute, 2011. 3. Reinforced Concrete: A Fundamental Approach, 5th Edition Edward G. Nawy, Prentice Hall, 2005.
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	
12. The development of the curriculum plan	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Engineering Analysis, 326 WREA
4. Modes of Attendance offered	Annual System ; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. Online lectures have been providing to the students using Google Classroom Application.
5. Semester/Year	1st Semester, Academic year 2020 –2021
6. Number of hours tuition (total)	45 hr., 3 hr. theoretical per week
7. Date of production/revision of this specification	2020
8. Aims of the Course	
Solve the differential equation and applications to the first and second order differential equations	
9. Learning Outcomes, Teaching ,Learning and Assessment Method	
<ol style="list-style-type: none"> 1. Classify differential equations by order, linearity, and homogeneity 2. Solve any first order differential equation. 3. Demonstrate variable separable, homogeneous, exact, linear, Bernoulli linear differential equations. 4. Set up and solve physical problems such as mixture problems. 5. Solve second order differential equations with constant coefficients and complementary and particular solutions. 6. Apply the methods of undetermined coefficients, variation of parameters and reduction of order. 7. Apply second order differential equations to springs. 8. Solve differential equations using power series. 	

9. Set up systems of linear differential equations using characteristic equations.
10. Solve systems of linear differential equations
11. Apply Fourier series to periodic functions.
12. Apply Euler's Formula
13. Use the Wronskian determinant to test for linear independence or linear dependence

A. Cognitive goals

- A1. To have the ability to apply knowledge of mathematics, science, and engineering.
- A3. To have the ability to have the broad education necessary to understand the impact of engineering solutions.
- A4. Knowledge of contemporary issues (this includes presenting students with issues such as the impact of globalization, the outsourcing of both engineering and other supporting jobs as practiced by modern international users).

B. The skills goals special to the course.

- B3. To have the ability to Apply basic mathematical and scientific concepts for the description and solution of engineering problems.

Teaching and Learning Methods

1. Lectures
2. Discussions
3. Problem solving
4. Student Questions
5. Student Participation
6. Oral Presentations
7. Homework
8. Exams
9. Connections between Theory and Application

Students are expected to read the material before coming to class and are strongly encouraged to come to class with a list of questions and to ask those questions.

Assessment methods

1. Examination and Quizzes
2. Student Engagement during Lectures

C. Affective and value goals

- C1. An ability to identify, formulates, and solves engineering problems.
- C2. A recognition of the need for and an ability to engage in life-long learning
- C3. Enhancing self-learning ability.
- C4. Ability to identify, formulate and provide creative/innovative/effective solution of a problems.

Teaching and Learning Methods

Assessment methods

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D2. An understanding of professional and ethical responsibility.
- D3. Ability to demonstrate the characteristics of a team leader or a manager.
- D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3		Differential Equations	1-9 of article (11)	1-2 of article (12)
1	3		First – Order Differential Equations: 1- Separable equations	1-9 of article (11)	1-2 of article (12)
2	3		2- Exact equation. 3- Homogeneous first-order equations	1-9 of article (11)	1-2 of article (12)
3	3		4- First-order linear equations and integrating factors. 5- Bernoulli equations	1-9 of article (11)	1-2 of article (12)
4	3		Application of First- Order Differential Equations	1-9 of article (11)	1-2 of article (12)
5	3		Second – Order Differential Equations: Homogeneous Equations with Constant Coefficient	1-9 of article (11)	1-2 of article (12)
5	3		Non-Homogeneous Linear Equations	1-9 of article (11)	1-2 of article (12)
5	3		Method of undermined coefficient	1-9 of article (11)	1-2 of article (12)
6	3		Method of variation of parameters	1-9 of article (11)	1-2 of article (12)

7	3		Second –Order Differential Equations (Reduction of order)	1-9 of article (11)	1-2 of article (12)
8	3		Euler-Cauchy Equations	1-9 of article (11)	1-2 of article (12)
9	3		Equation of Higher Order	1-9 of article (11)	1-2 of article (12)
10	3		System of Simultaneous Differential Equations	1-9 of article (11)	1-2 of article (12)
11	3		Laplace transform	1-9 of article (11)	1-2 of article (12)
12	3		Laplace transform		
13	3		Inverse of Laplace transform .	1-9 of article (11)	1-2 of article (12)
14	3		Solution of differential equation by Laplace transform		
15			Fourier Series.		

11. Infrastructure

1. Books Required reading:	<p><u>Text book</u></p> <ul style="list-style-type: none"> Advanced Engineering Mathematics. References Ordinary Differential Equations.
2. Main references (sources)	<ul style="list-style-type: none"> Notebook Prepared by the Instructor. Collection of Sheets of Solved and Unsolved Problems and Exams Questions
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	

12. The development of the curriculum plan

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TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Soil Conservation, 327WRSC
4. Modes of Attendance offered	Three hours of study a week per unit day time on campus The academic year is composed of 15-week regular subjects.
5. Semester/Year	1st Semester , Academic Year 2020 – 2021
6. Number of hours tuition (total)	45 hr., three hours theoretical per week
7. Date of production/revision of this specification	2020
8. Aims of the Course	The Course aims is to provide information about basic principles of soil and water conservation engineering, the mechanism of soil erosion, the methods and ways of avoiding erosion and soil loss estimation by universal soil equation. Classification of terraces and their design, and definitions grassed waterways and their design.
9• Learning Outcomes, Teaching ,Learning and Assessment Method	<p>The student in the field of soil conservation will be able to:</p> <ol style="list-style-type: none"> 1-Introduce basic definitions and introductory concept of soil conservation engineering, 2-Introduce the importance of land use and land management for soil conservation, 3-Introduce the precipitation, analysis of precipitation data, and classification of storm, 4-Introduce the factors affecting runoff, and the methods used to determine runoff rate, 5-Introduce basic definitions, types, and process of water erosion, and principles of erosion control 6-Introduce the soil loss estimation by universal soil equation (USLE), 7-Introduce wind erosion , types of soil movement, mechanisms of wind erosion and erosion control, 8-Introduce design of shelterbelts, 9-Introduce the definitions of terraces, classification and their design, 10-Introduce the grassed waterways and their design.

A. Cognitive goals

- A1. An ability to apply knowledge of mathematics, science, and engineering.
- A2. An ability to design a system, or components, or process to meet desired needs.
- A3. The broad education necessary to understand the impact of engineering solutions in a global and societal context.

B. The skills goals special to the course.

- B1. An ability to design and conduct experiments as well as to analyze and interpret data.
- B2. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- B3. Apply basic mathematical and scientific concepts for the description and solution of engineering problems.

10. Teaching and Learning Methods

- 1- Lectures
- 2- Tutorials
- 3- Homework and Assignments
- 4- Tests and Exams
- 5- In-Class Questions and Discussions
- 6- Connection between Theory and Application
- 7- Extracurricular Activities
- 8- Seminars
- 9- In- and Out-Class oral conversations

11. Assessment methods

- 1. Examinations, Tests, and Quizzes
- 2. Extracurricular Activities
- 3. Student Engagement during Lectures
- 4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor)

12. Grading Policy

- 1. Quizzes 10%
- 2. Term Tests 20 %.
- 3. Final Exam: 70 %
 - The final exam will be comprehensive.
 - The final exam will count 70% of the total course grade

C. Affective and value goals

C1. An ability to identify, formulates, and solves engineering problems.

C2. A recognition of the need for and an ability to engage in life-long learning.

Teaching and Learning Methods

Discussion with students

Assessment methods

Respecting deadlines

D. General and rehabilitative transferred skills (other skills relevant to employability and personal development)

D2. An understanding of professional and ethical responsibility.

Teaching and Learning Methods

Oral quizzes

Assessment methods

Write reports

13. Course Structure

Week	Hour	LOs (Article	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3 theo	a, b, c	soil conservation concept	1-9 of article(10)	1-4 of article (11)
2	3 theo	a, b, c	precipitation, analysis of precipitation data	1-9 of article(10)	1-4 of article (11)
3	3 theo	a, b, c	classification of storm	1-9 of article(10)	1-4 of article (11)
4	3 theo	a, b, c	Runoff ,factors affecting runoff, determine runoff rate	1-9 of article(10)	1-4 of article (11)
5	3 theo	a, b, c	Erosion, types of erosion ,process and erosion control	1-9 of article(10)	1-4 of article (11)
6	3 theo	a, b, c	Universal soil equation (USLE) and its application	1-9 of article(10)	1-4 of article (11)
7	3 theo	a, b, d	Universal soil equation (USLE) and its application	1-9 of article(10)	1-4 of article (11)

8	3 theo	a, b, c	Wind erosion ,types of soil movement, mechanisms of wind erosion	1-9 of article(10)	1-4 of article (11)
9	3 theo	a, b, c	Wind erosion control	1-9 of article(10)	1-4 of article (11)
10	3 theo	a, b, c	Design of shelterbelts	1-9 of article(10)	1-4 of article (11)
11	3 theo	a, b, c	Terraces, classification of terraces,	1-9 of article(10)	1-4 of article (11)
12	3 theo	a, b, c	Design of terraces,	1-9 of article(10)	1-4 of article (11)
13	3 theo	a, b, c	Grassed waterways	1-9 of article(10)	1-4 of article (11)
14	3 theo	a, b, c	Design of grassed waterways	1-9 of article(10)	1-4 of article (11)
15	3 theo	a, b, c	Design of grassed waterways	1-9 of article(10)	1-4 of article (11)

14. Infrastructure	
1. Books Required reading:	
2. Main references (sources)	Schwab, et al. (1993). Soil and Water Conservation Engineering. Published by John Wiley & Sons, Inc.
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	
15. The development of the curriculum plan	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW	
COURSE SPECIFICATION	
<p>This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.</p>	
1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Numerical Analysis, 328 WRNM
4. Modes of Attendance offered	Annual System ; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program

	in face-to-face mode. The academic year is composed of 30-week regular subjects. Online lectures have been providing to the students using Google Classroom
5. Semester/Year	2nd Semester, Academic year 2020 –2021
6. Number of hours tuition (total)	60 hours, 2 hrs theoretical and 2 hrs laboratory
7. Date of production/revision of this specification	2020
8. Aims of the Course	
<p>understanding of numerical methods to obtain solutions of mathematical expressions.</p> <p>In general, the course was designed to provide the students with computational techniques to solve engineering problems when no mathematical solution exists.</p>	
9. Learning Outcomes, Teaching ,Learning and Assessment Method	
<ol style="list-style-type: none"> 1. finding roots of equations, 2. solving system of linear simultaneous equations, 3. finding values by interpolation, 4. finding values of integration expressions, 5. solving ordinary differential equations, 6. solving boundary value problems 	
A.Cognitive goals	
<p>A1. To have the ability to apply knowledge of mathematics, science, and engineering.</p> <p>A3. To have the ability to have the broad education necessary to understand the impact of engineering solutions.</p>	
B. The skills goals special to the course.	
<p>B3. To have the ability to Apply basic mathematical and scientific concepts for the description and solution of engineering problems.</p>	
Teaching and Learning Methods	
<ol style="list-style-type: none"> a. lectures, b- tutorials, and c- supervised team work 	
Assessment methods	
<ol style="list-style-type: none"> a- homework, b- quizzes, c- major examination during the course, and d- final examination 	

C. Affective and value goals

C1. Affective and value goals

An ability to identify, formulates, and solves engineering problems.

C2. A recognition of the need for and an ability to engage in life-long learning

(this includes teaching students that the underlying theory is important because the technology changes, coupled with enhancing their self-learning ability).

C3. Ability to function effectively as an individual in a group.

C4. Ability to identify, formulate and provide creative/innovative/effective solution to a problem

Teaching and Learning Methods

Assessment methods

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).

D2. An understanding of professional and ethical responsibility.

D3. Ability to demonstrate the characteristics of a team leader or a manager.

D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
15	4 2 theo 2 lab	a	Introduction	a	a, b, c, and d
16, 17	8 4 theo 4 lab	a, b, and h	Roots of equations	a, b, c, and d	a, b, c, and d
18, 19	4 2 theo 2 lab	a, c, and h	Systems of simultaneous linear equations	a, b, c, and d	a, b, c, and d
20	4 2 theo 2 lab	a, d, and h	Interpolation	a, b, c, and d	a, b, c, and d

21, 22	8 4 theo 4 lab	a, e, and h	Numerical Integration	a, b, c, and d	a, b, c, and d
23	4 2 theo 2 lab		Examination		
24, 25	8 4 theo 4 lab	a, f, and h	Numerical solution of First order differential equations	a, b, c, and d	a, b, c, and d
26	4 2 theo 2 lab	a, f, and h	Numerical solution of Higher order ordinary differential equations	a, b, c, and d	a, b, c, and d
27	4 2 theo 2 lab	a, g, and h	Finite differences	a, b, c, and d	a, b, c, and d
28, 29	8 4 theo 4 lab	a, g, and h	Numerical solution of boundary value problems	a, b, c, and d	a, b, c, and d
30	4 2 theo 2 lab		Examination		
15	4 2 theo 2 lab	a	Introduction	a	a, b, c, and d
16, 17	8 4 theo 4 lab	a, b, and h	Roots of equations	a, b, c, and d	a, b, c, and d
18, 19	4 2 theo 2 lab	a, c, and h	Systems of simultaneous linear equations	a, b, c, and d	a, b, c, and d
20	4 2 theo 2 lab	a, d, and h	Interpolation	a, b, c, and d	a, b, c, and d
21, 22	8 4 theo 4 lab	a, e, and h	Numerical Integration	a, b, c, and d	a, b, c, and d
23	4 2 theo 2 lab		Examination		
24, 25	8 4 theo 4 lab	a, f, and h	Numerical solution of First order differential equations	a, b, c, and d	a, b, c, and d
26	4 2 theo 2 lab	a, f, and h	Numerical solution of Higher order ordinary differential equations	a, b, c, and d	a, b, c, and d

27	4 2 theo 2 lab	a, g, and h	Finite differences	a, b, c, and d	a, b, c, and d
28, 29	8 4 theo 4 lab	a, g, and h	Numerical solution of boundary value problems	a, b, c, and d	a, b, c, and d
30	4 2 theo 2 lab		Examination		

11. Infrastructure

1. Books Required reading:	Amir Wadi Al Khafaji and John R. Tooley, Numerical methods in engineering practice. - Advanced Engineering Mathematics, Fifth Edition, C. Ray Wylie and Louis C. Barrett - Theory and Problems of Laplace Transforms by Murray R. Spiegel, Shaum's Outline
2. Main references (sources)	
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	

12. The development of the curriculum plan

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TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	English Language III, 329WREN
4. Modes of Attendance offered	Annual System: There is only one mode of delivery, which is a “Day Program”. The students are full-time students and on campus. They attend full-day program in face-to-face mode. The academic year is composed of 30-week regular subjects. Online lectures are provided to the students using Google Classroom Application.
5. Semester/Year	1st and 2nd Semesters, Academic year 2019 –2020
6. Number of hours tuition (total)	30 hr., 1 hr. per week
7. Date of production/revision of this specification	2020
8. Aims of the Course	
The aim of this course is to empower students with the language and life skills they need to carry out their goals. To this end it provides ample opportunities for students to build awareness and practice language in real- life scenarios. The integrated skills approach of the course develops the student's self-confidence to survive and succeed in professional and social encounters within an English-speaking global community.	
9• Learning Outcomes, Teaching ,Learning and Assessment Method	
By the end of this communication skills course, the students will be able to:	
1- Find and understand information about vocabulary, pronunciation, usage, and grammar in reference texts, online resources, and English language dictionaries.	
2- Develop conversational English skills necessary for becoming a contributing participant in small group activities, large group discussions, and oral presentations.	
3- Understand texts using effective learning strategies for reading and vocabulary building.	
4- Demonstrate an appropriate level of control of grammatical accuracy and lexical appropriacy in written and oral communication.	

B. Cognitive goals
B. The skills goals special to the course.
Teaching and Learning Methods
1. Lectures. 2. Homework and Assignments. 3. Tests and Exams. 4. In-Class Questions and Discussions. 5. Reports and Presentations.
Assessment methods
1. Examinations, Tests, and Quizzes. 2. Student Engagement during Lectures. 3. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor).
C. Affective and value goals
Teaching and Learning Methods
Discussion with students
Assessment methods
Respecting deadlines
D. General and rehabilitative transferred skills (other skills relevant to employability and personal development) D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure					
Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	1 hr	1	Introduction to the course	1-5 of article (11)	1 – 3 of article (12)
2	1 hr	2	Unit 1: A world of different	1-5 of article (11)	1 – 3 of article (12)
3	1 hr	3	Unit 1: A world of different	1-5 of article (11)	1 – 3 of article (12)
4	1 hr	4	Unit 2: The working week	1-5 of article (11)	1 – 3 of article (12)
5	1 hr	5	Unit 2: The working week	1-5 of article (11)	1 – 3 of article (12)
6	1 hr	6	Unit 3: Good times, bad times	1-5 of article (11)	1 – 3 of article (12)
7	1 hr	7	Unit 3: Good times, bad times	1-5 of article (11)	1 – 3 of article (12)

8	1 hr	8	Unit 4: Getting it right	1-5 of article (11)	1 – 3 of article (12)
9	1 hr	9	Unit 4: Getting it right	1-5 of article (11)	1 – 3 of article (12)
10	1 hr	10	Unit 5: Our changing world	1-5 of article (11)	1 – 3 of article (12)
11	1 hr	11	Unit 5: Our changing world	1-5 of article (11)	1 – 3 of article (12)
12	1 hr	12	Unit 6: What matters to me	1-5 of article (11)	1 – 3 of article (12)
13	1 hr	13	Unit 6: What matters to me	1-5 of article (11)	1 – 3 of article (12)
14	1 hr	14	Unit 7: Passions and fashions	1-5 of article (11)	1 – 3 of article (12)
15	1 hr	15	Unit 7: Passions and fashions	1-5 of article (11)	1 – 3 of article (12)
16	1 hr	16	Unit 8: No fear!	1-5 of article (11)	1 – 3 of article (12)
17	1 hr	17	Unit 8: No fear!	1-5 of article (11)	1 – 3 of article (12)
18	1 hr	18	Unit 9: It depends how you look at it	1-5 of article (11)	1 – 3 of article (12)
19	1 hr	19	Unit 9: It depends how you look at it	1-5 of article (11)	1 – 3 of article (12)
20	1 hr	20	Unit 10: All things high tech	11-5 of article (11)	1 – 3 of article (12)
21	1 hr	21	Unit 10: All things high tech	1-5 of article (11)	1 – 3 of article (12)
22	1 hr	22	Unit 11: Seeing is believing	1-5 of article (11)	1 – 3 of article (12)
23	1 hr	23	Unit 11: Seeing is believing	1-5 of article (11)	1 – 3 of article (12)
24	1 hr	24	Unit 11: Seeing is believing	1-5 of article (11)	1 – 3 of article (12)
25	1 hr	25	Unit 11: Seeing is believing	1-5 of article (11)	1 – 3 of article (12)
26	1 hr	26	Unit 12: Telling it how it is	1-5 of article (11)	1 – 3 of article (12)
27	1 hr	27	Unit 12: Telling it how it is	1-5 of article (11)	1 – 3 of article (12)
28	1 hr	28	Unit 12: Telling it how it is	1-5 of article (11)	1 – 3 of article (12)
29	1 hr	29	Unit 13: Family ties	1-5 of article (11)	1 – 3 of article (12)
30	1 hr	30	Unit 13: Family ties	1-5 of article (11)	1 – 3 of article (12)

11. Infrastructure	
1. Books Required reading:	(1) New Headway Plus [intermediate] by John and Liz Soars, Oxford: Oxford
2. Main references (sources)	<p>References (1) Modern scientific articles from the news related to the students' specialty</p> <p>Others Notebook prepared by the instructor of the course Collection of sheets of solved and unsolved problems and Exams questions</p>
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	
12. The development of the curriculum plan	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Design of Hydraulic Structures, 429 WRDH
4. Modes of Attendance offered	Annual System ; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. Online lectures have been providing to the students using Google Classroom Application.
5. Semester/Year	1st and 2nd Semesters, Academic year 2020 –2021
6. Number of hours tuition (total)	150 hr., 5 hr. per week
7. Date of production/revision of this specification	2020
8. Aims of the Course	
9. Learning Outcomes, Teaching ,Learning and Assessment Method	
<ol style="list-style-type: none"> 1- Introduce basic definitions and introductory concepts of hydraulic structures and their use. 2- Introduce the definition, name, location and direction of regulator. 3- Introduce the hydraulic calculation of regulators (velocity and discharge). 4- Introduce the line of creep and up lift pressure theories (Bligh’s creep theory and Lane’s weighed line of creep method). 5- Introduce the flow net (Khosla’s theory / exit gradient, cut off depths and scouring depth) 6- Introduce the concrete floor thickness. 7- Introduce the transitions (kinds, properties, hydraulics, discharge equation, Mitra’s method, Hind’s method). 8- Introduce the energy dissipation (hydraulic jump, types and efficiency, type of flow D/S of gates and types of stilling basins). 9- Introduce protection of approaches U/S and D/S of concrete floors. 10- Introduce gates (types, water pressure and forces on gates, design principle for sliding steel gates). 11- Introduce the closed regulating and conveyance structures (concrete pipes, 	

reinforced concrete culverts, single and multiple barrels and siphons).

- 12- Introduce the weirs (sharp and broad crested weirs).
- 13- Introduce the level control structures (canal outlet, canal escape, falls or drops).
- 14- Introduce aqueducts.
- 15- Introduce some types of bridges that used in hydraulic canals, Drainages and reverses.
- 16- Introduce concrete design of two types of bridges (slab and dick concrete girder bridges).
- 17- Introduce comparison between rigid and elastic foundation with solving the differential equation of elastic foundation.
- 18- Introduce the concrete design of circular and rectangular tanks.

C. Cognitive goals

- A1. To have the ability to apply knowledge of mathematics, science, and engineering.
- A2. To have the ability to make decisions to meet desired needs.
- A3. The broad education necessary to understand the impact of engineering solutions in a global and societal context.
- A4. Knowledge of contemporary issues (this includes presenting students with issues such as the impact of globalization, the outsourcing of both engineering and other supporting jobs as practiced by modern international users).

B. The skills goals special to the course.

- B1. An ability to design and conduct experiments as well as to analyze and interpret data.
- B2. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- B3. Apply basic mathematical and scientific concepts for the description and solution of engineering problems.
- B4. Perform water resources engineering integrated design of systems, components, or processes by means of practical experiences

Teaching and Learning Methods

- 1-Lectures
- 2-Tutorials
- 3-Homework and Assignments
- 4-Tests and Exams
- 5-In-Class Questions and Discussions

Assessment methods

- 1-Examination, tests, and quizzes
- 2-Student engagement during lectures

C. Affective and value goals

- C1. An ability to identify, formulates, and solves engineering problems.
- C2. A recognition of the need for and an ability to engage in life-long learning. (this includes teaching students that the underlying theory is important because the technology changes, coupled with enhancing their self-learning ability).
- C3. Ability to function effectively as an individual in a group.
- C4. Ability to identify, formulate and provide creative/innovative/effective solution of a problems.

Teaching and Learning Methods

Discussion with students

Assessment methods

Respecting deadlines

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D2. An understanding of professional and ethical responsibility.
- D3. Ability to demonstrate the characteristics of a team leader or a manager.
- D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	5	1	Review & Rigid Foundations	1 – 5 of Article (11)	1 – 2 of Article (12)
2	5	2 , 3	Introduction – Types of Hydraulic Structures and their use & elastic foundation	1 – 5 of Article (11)	1 – 2 of Article (12)
3	5	3 , 4	Regulators & examples of elastic foundation	1 – 5 of Article (11)	1 – 2 of Article (12)
4	5	4	Hydraulic calculations of regulators & examples of elastic foundation	1 – 5 of Article (11)	1 – 2 of Article (12)
5	5	5	Line of creep and uplift pressure / Bligh's theory and types of bridges.	1 – 5 of Article (11)	1 – 2 of Article (12)
6	5	5	Weighed line of creep / Lane's method & slab bridge design.	1 – 5 of Article (11)	1 – 2 of Article (12)
7	5	6	The cutoff depth & flow net& slab bridge design.	1 – 5 of Article (11)	1 – 2 of Article (12)

8	5	6	Khosla's theory & slab bridge design.	1 – 5 of Article (11)	1 – 2 of Article (12)
9	5	7	Design example & deck girder bridge design.	1 – 5 of Article (11)	1 – 2 of Article (12)
10	5	7, 8	Scouring depth / Floor thickness & deck girder bridge design.	1 – 5 of Article (11)	1 – 2 of Article (12)
11	5	5, 6, 7, 8	Design example & deck girder bridge design.	1 – 5 of Article (11)	1 – 2 of Article (12)
12	5	9, 10	Transitions (kinds and properties) & deck.	1 – 5 of Article (11)	1 – 2 of Article (12)
13	5	9, 10	Design of transition / Metra method + Hind method.	1 – 5 of Article (11)	1 – 2 of Article (12)
14	5	9,10	Design Examples	1 – 5 of Article (11)	1 – 2 of Article (12)
15	5	11	Energy Dissipation / Hydraulic jump type and efficiency.	1 – 5 of Article (11)	1 – 2 of Article (12)
16	5	11	Energy Dissipation / Hydraulic jump type and efficiency and box culvert concrete design.	1 – 5 of Article (11)	1 – 2 of Article (12)
17	5	11	Stilling Basins and box culvert concrete design.	1 – 5 of Article (11)	1 – 2 of Article (12)
18	5	12	Protection of approaches and box culvert concrete design.	1 – 5 of Article (11)	1 – 2 of Article (12)
19	5	12	Design Examples and box culvert concrete design.	1 – 5 of Article (11)	1 – 2 of Article (12)
20	5	13	Gates / Types of gates	1 – 5 of Article (11)	1 – 2 of Article (12)

21	5	13	Design principle for sliding steel gates and concrete design of circular tanks (fixed base free top)	1 – 5 of Article (11)	1 – 2 of Article (12)
22	5	15	Pipes / losses in pipes and concrete design of circular tanks (fixed base free top)	1 – 5 of Article (11)	1 – 2 of Article (12)
23	5	15	Reinforced concrete culverts / single barrel.	1 – 5 of Article (11)	1 – 2 of Article (12)
24	5	15	Reinforced concrete culverts / multiple barrels.	1 – 5 of Article (11)	1 – 2 of Article (12)
25	5	15	Siphons / Design example and concrete design of circular tanks (hinge base free top)	1 – 5 of Article (11)	1 – 2 of Article (12)
26	5	15	Design example and concrete design of circular tanks (hinge base free top)	1 – 5 of Article (11)	1 – 2 of Article (12)
27	5	16	Weirs (sharp and broad crested)	1 – 5 of Article (11)	1 – 2 of Article (12)
28	5	16	Weirs (sharp and broad crested) and concrete design of rectangular tanks	1 – 5 of Article (11)	1 – 2 of Article (12)
29	5	17	Escapes and concrete design of rectangular tanks	1 – 5 of Article (11)	1 – 2 of Article (12)
30	5	17, 18	Flumes, Aqueduct and Drops	1 – 5 of Article (11)	1 – 2 of Article (12)

11. Infrastructure

1. Books Required reading:	Varshney –Gupta– Gupta 1977 "Theory and Design of Irrigation Structures" 3rd. Edition
2. Main references (sources)	<p>References</p> <ol style="list-style-type: none"> 1- Chow, V.T.,1959 “Open Channel Hydraulics” 2- Davis, C.V., 1969 “Handbook of Applied Hydraulics” 3rd Edition. 3- U.S.B.R. 1958 “Hydraulic Design of Stilling Basins and Bucket Energy Dissipaters 4- Linsley and Franzini, 1972 “Water Resources Engineering” 2nd Edition. 5- U.S.B.R. 1974 “Design of Small Canal Structures” 6- FAO 1975 “Small Hydraulic Structures”. 7- Varshney – Gupta – Gupta 1977 "Theory and Design of Irrigation Structures" 3rd. Edition Vol. II 8- Punmia .B.C. & Pande B.B. Lal 1981 “Irrigation and Water Power”. 9- Santosh Kumar Garg 1997 “Irrigation Eng. & Hyd. Str.” 10- Larry W. Mays 2005 “Water Resources Eng.” 11- R.K. Sharma & T.K. Sharma 2008 “Irrigation Eng.”. 12- Dr.K.R. Arora 2009 “Irrigation, Water Resources Eng.”
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	

12. The development of the curriculum plan

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Design of On- Farm Irrigation Systems / 430 WRDI
4. Modes of Attendance offered	Annual System; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. With an alternative using online lectures have been providing to the students using Google Classroom Application. The academic year is composed of 30-week regular subjects.
5. Semester/Year	1st and 2nd Semesters, Academic year 2020 –2021
6. Number of hours tuition (total)	120 hr., 4 hr. per week
7. Date of production/revision of this specification	2020

8. Aims of the Course

1. Review basic irrigation principles.
2. Introduce the main types of mechanized on-farm irrigation systems.
3. Present the main steps followed to design irrigation systems.
4. Analyze each component of the various irrigation systems.
5. Discuss various methods of selecting each component of the systems.
6. Discuss the methods of selecting alternative designs.
7. Present the main methods to evaluate the performance of mechanized irrigation systems. ■

9• Learning Outcomes, Teaching ,Learning and Assessment Method

1. Understand and apply the irrigation principles in the design.
2. Define irrigation efficiency, distribution uniformity, coefficient of uniformity and overall efficiency.
3. Understand mechanized irrigation systems. Types of sprinkle irrigation systems.
4. Understand basic components of sprinkle systems.
5. Understand sprinkler selection.
6. Be able to calculate sprinkler discharge in sprinkle systems.
7. Be able to designed a lateral pipe (multi sizes) in sprinkle systems.
8. Be able to designed a lateral pipe (level lateral) in sprinkle systems.
9. Be able to designed a lateral pipe (uphill lateral) in sprinkle systems.
10. Be able to designed a lateral pipe (downhill lateral) in sprinkle systems.
11. Be able to calculate mainline discharges in sprinkle systems.
12. Be able to designing a mainline (hydraulic methods) in sprinkle systems.
13. Be able to designing a mainline (economical method) in sprinkle systems.
14. Be able to calculate total dynamics head.
15. Be able to designed sample of sprinkle irrigation systems.
16. Define an introduction to trickle irrigation systems.
17. Understand a basic components of trickle systems.
18. calculation a typical layout of a trickle irrigation system.
19. Be able to calculate an emitter selection.
20. Be able to calculate an emitter discharge.
21. Be able to calculate a water loss.
22. Be able to calculate a dimension of the wetted area.
23. Be able to calculate a head loss in the emitter connection.
24. Be able to designed a lateral in a trickle irrigation system.
25. Be able to designed a Manifold in a trickle irrigation system.
26. Be able to designed a Mainline in a trickle irrigation system.
27. Be able to calculate an emission uniformity.
28. Be able to designs of subunits in a trickle irrigation system.
29. Evaluation of fixed-grid sprinkle systems.
30. Evaluation of a trickle irrigation systems.

A. Cognitive goals

- A1. To have the ability to apply knowledge of mathematics, science, and engineering.
- A2. To have the ability to make decisions to meet desired needs.
- A3. To have the ability to have the broad education necessary to understand the impact of engineering solutions.
- A4. Knowledge of contemporary issues (this includes presenting students with issues such as the impact of globalization, the outsourcing of both engineering and other supporting jobs as practiced by modern international users).

B. The skills goals special to the course.

- B1. An ability to design and conduct experiments as well as to analyze and interpret data.
- B2. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- B3. Apply basic mathematical and scientific concepts for the description and solution of engineering problems.
- B4. Perform water resources engineering integrated design of systems, components, or processes by means of practical experiences (group projects).

Teaching and Learning Methods

- 1. Lectures.
- 2. Tutorials.
- 3. Homework and Assignments.
- 4. Lab. Experiments.
- 5. Tests and Exams.
- 6. In-Class Questions and Discussions.
- 7. Connection between Theory and Application.
- 8. Extracurricular Activities

Assessment methods

- 1. Examinations, Tests, and Quizzes.
- 2. Extracurricular Activities.
- 3. Student Engagement during Lectures.
- 4. Responses Obtained from Students, Questionnaire about Curriculum and faculty member (Instructor).

C. Affective and value goals

- C1. An ability to identify, formulate, and solve engineering problems.
- C2. A recognition of the need for and an ability to engage in life-long learning.
(this includes teaching students that the underlying theory is important because the technology changes, coupled with enhancing their self-learning ability).
- C3. Ability to function effectively as an individual in a group.
- C4. Ability to identify, formulate and provide creative/innovative/effective solution of a problems.

Teaching and Learning Methods

- 1. Lectures
- 2. Tutorials
- 3. Home works
- 4. Test and exams
- 5. In class questions and discussions

Assessment methods

- 1. Examinations, Tests and Quizzes
- 2. Extracurricular activities
- 3. Student engagement during lectures

D. General and rehabilitative transferred skills (other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D2. An understanding of professional and ethical responsibility.
- D3. Ability to demonstrate the characteristics of a team leader or a manager.
- D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	4 2 the. 2 tut.	1	Review of irrigation principles.	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
2	4 2 the. 2 tut.	1,2	Irrigation efficiency, distribution uniformity, coefficient of uniformity and overall efficiency.	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
3	4 2 the. 2 tut.	3	Introduction to mechanized irrigation systems.	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4

			Types of sprinkle irrigation systems.		
4	4 2 the. 2 tut.	3,4	Basic components of sprinkle systems.	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
5	4 2 the. 2 tut.	5	Sprinkler selection.	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
6	4 2 the. 2 tut.	6	Sprinkler discharge	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
7	4 2 the. 2 tut.	7	Lateral pipes (multi sizes)	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
8	4 2 the. 2 tut.	6,7,8	Lateral design (level lateral).	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
9	4 2 the. 2 tut.	6,7,8,9	Lateral design (uphill lateral).	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
10	4 2 the. 2 tut.	6,7,8,10	Lateral design (downhill lateral).	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
11	4 2 the. 2 tut.	6,7,8,9,10,11	Mainline discharges.	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
12	4 2 the. 2 tut.	6,7,8,9,10,11,12	Methods of designing a mainline (hydraulic methods).	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
13	4 2 the. 2 tut.	6,7,8,9,10,11,13	Methods of designing a mainline (economical method).	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
14	4 2 the. 2 tut.	12,14	Total dynamics head calculation.	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
15	4 2 the. 2 tut.	1-15	Sample designs of sprinkle system.	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
16	4 2 the. 2 tut.	16	Introduction to trickle irrigation systems.	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
17	4 2 the. 2 tut.	17	Basic components of trickle systems.	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
18	4 2 the. 2 tut.	17,18	A typical layout of a trickle irrigation system.	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4

19	4 2 the. 2 tut.	19	Emitter selection.	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
20	4 2 the. 2 tut.	20	Emitter discharge.	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
21	4 2 the. 2 tut.	21	Water losses.	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
22	4 2 the. 2 tut.	22	Dimension of the wetted area.	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
23	4 2 the. 2 tut.	23	Head loss in the emitter connection.	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
24	4 2 the. 2 tut.	19,20,24	Lateral design.	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
25	4 2 the. 2 tut.	19,20,24, 25	Manifold design.	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
26	4 2 the. 2 tut.	19,20,24, 25,26	Mainline design.	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
27	4 2 the. 2 tut.	27	Emission uniformity.	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
28	4 2 the. 2 tut.	16-28	Sample designs of subunits.	1, 2, 3, 5, 6, 7, 8	1, 2, 3, 4
29	4 2 the. 2 tut.	1-15,29	Evaluation of fixed-grid sprinkle systems	1, 2, 3, 4, 5, 6, 7, 8	1, 2, 3, 4
30	4 2 the. 2 tut.	16-28,30	Evaluation of trickle systems	1, 2, 3, 4, 5, 6, 7, 8	1, 2, 3, 4

11. Infrastructure

1. Books Required reading:	1. Kay. M. 1986, Sprinkler Irrigation System and Practice, Bedford, 141 p. 2. Keller, J. and Bliesner, R.D. 1990. Sprinkler Trickle Irrigation, Chapman and Hall, New York. Keller, J. 1989. Sprinkler and Trickle Irrigation. Utah State University. Utah.
2. Main references (sources)	1. Notebook prepared by the instructor of the course 2. Collection of sheets of solved and unsolved problems and Exams
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	
12. The development of the curriculum plan	
A Reviewing of the coarse details after 4 years	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Groundwater, 431 WRGW
4. Modes of Attendance offered	Semester System ; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The semester is composed of 15-week regular subjects.
5. Semester/Year	1st Semester, Academic year 2020–2021
6. Number of hours tuition (total)	45 hrs (2 theoretical and 1 tutorial per week)
7. Date of production/revision of this specification	2020

8. Aims of the Course

This course aims to provide undergraduate students with the ability and skills to deal with principles of groundwater pooling (hydrology) and movement (hydraulics).

9. Learning Outcomes, Teaching ,Learning and Assessment Method

A. Cognitive goals

- A1. Understand important concepts in mathematics, science, and engineering.
- A2. Learning the necessary issues to understand the impact of engineering solutions in a global and societal context.
- A3. Acquainting students with sources and references for the development of their scientific and engineering skills.
- A4. Develop a basic understanding of physical processes and properties that control the occurrence and movement of water in porous media.

B. The skills goals special to the course.

- B1. Understand important concepts in groundwater.
- B2. Develop a basic understanding of physical processes and properties that control the occurrence and movement of groundwater in the subsurface.
- B3. Develop a basic understanding of aquifer properties and the movement of groundwater in the aquifers.
- B4. Understand important concepts in groundwater flow towards a well in confined and unconfined aquifers.

Teaching and Learning Methods

- 1-Lectures
- 2-Tutorials
- 3-Homework and Assignments
- 4-Tests and Exams
- 5-In-Class Questions and Discussions

Assessment methods

- 1-Examination, tests, and quizzes
- 2-Student engagement during lectures

C. Affective and value goals

- C1. An ability to identify, formulates, and solves Engineering problems.
- C2. Teaching students that basic theory is important because technology is changing, along with enhancing their ability to self-learn.
- C3. Ability to function effectively as an individual in a group.
- C4. Ability to identify, formulate and provide creative/innovative/effective solution of a problems.

Teaching and Learning Methods

- a. Lecture notes
- b. Computer Software
- c. Internet sources

Assessment methods

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D2. An understanding of professional and ethical responsibility.
- D3. Ability to demonstrate the characteristics of a team leader or a manager.
- D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3	1,2	Groundwater and Aquifers	1,2,3	1,2
2	3	1,2	Applications of DARCY's law	1,2,3	1,2
3	3	1,2	Applications of DARCY's law	1,2,3	1,2
4	3	1,2	Applications of DARCY's law	1,2,3	1,2
5	3	3	Numerical solution of Laplace's equation.	1,2,3	1,2
6	3	3	Numerical solution of Laplace's equation.	1,2,3	1,2
7	3	4	Steady groundwater flow systems.	1,2,3	1,2
8	3	4	Steady groundwater flow systems.	1,2,3	1,2
9	3	4	Steady groundwater flow systems.	1,2,3	1,2
10	3	4	Steady groundwater flow systems.	1,2,3	1,2
11	3	5	Unsteady groundwater flow systems.	1,2,3	1,2
12	3	5	Unsteady groundwater flow systems.	1,2,3	1,2
13	3	6	Superposition and Bounded aquifers	1,2,3	1,2
14	3	6	Superposition and Bounded aquifers	1,2,3	1,2
15	3	6	Superposition and Bounded aquifers	1,2,3	1,2
8	3	4	Steady groundwater flow systems.	1,2,3	1,2

11. Infrastructure

1. Books Required reading:	Todd, D.K. and Mays, L.W. 2005, Groundwater Hydrology (Third Edition), John Wiley and Sons, NJ USA
2. Main references (sources)	<ol style="list-style-type: none">1. Charles R. Fitts (2002), Groundwater Science. Elsevier Science .2. Mays, L.W. (2012), Ground and Surface Water Hydrology. John Wiley ad Sons, NJ USA.3. Mohammed, T.A. and Huat, B.K. (2004), Groundwater Engineering and Geotechnique, University Putra Malaysia Press, Serdang, Selangor, Malaysia.
A- Recommended books and references scientific journals, reports...).	ASCE, Engineering Journal, University of Baghdad
B-Electronic references, Internet sites...	Iraqi virtual library

12. The development of the curriculum plan

Update the syllabus and adding examples of applied cases.

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Drainage Engineering, 432 WRDE
4. Modes of Attendance offered	Semester System ; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The semester is composed of 15-week regular subjects.
5. Semester/Year	2nd Semester, Academic year 2019 –2020
6. Number of hours tuition (total)	45 hr., 3 hr per week
7. Date of production/revision of this specification	2020

8. Aims of the Course

This course aims to provide the undergraduate students with appility and skiles to deal with the groundwater occurence and movement.

9• Learning Outcomes, Teaching ,Learning and Assessment Method

- 1- Analysis of the horizontal, vertical and radial components of flow
- 2- Derivation and application of the steady state equations
- 3- Derivation and applications of the non-steady state equations
- 4- How to design composite pipe collectors

A. Cognitive goals

- A1. Understand important concepts in mathematics, science, and engineering.
- A2. The education necessary to understand the impact of engineering solutions in a global and societal context.
- A3. Acquainting students with sources and references for the development of their scientific and engineering skills.
- A4. Develop a basic understanding of physical processes and properties that control the occurrence and movement of water in porous media.

B. The skills goals special to the course.

- B1. Understand important concepts in Drainage Engineering.
- B2. Develop a basic understanding of physical processes and properties that control the flow of water towards the drain channel.
- B3. Develop a basic understanding of field drain properties and the movement of excess water in it.
- B4. Understand important equations control the flow in a drain and calculated the spacing between drains.

Teaching and Learning Methods

- 1- Lecture notes
- 2- Computer software
- 3- Internet sources

Assessment methods

- 1- Written exams
- 2- Quizzes and a computer project

C. Affective and value goals

- C1. An ability to identify, formulates, and solves Engineering problems.
- C2. Teaching students that basic theory is important because technology is changing, along with enhancing their ability to self-learn.
- C3. Ability to function effectively as an individual in a group.
- C4. Ability to identify, formulate and provide creative/innovative/effective solution of a problems.

Teaching and Learning Methods

- 1- Lecture notes
- 2- Computer software
- 3- Internet sources

Assessment methods

- 1- Written exams
- 2- Quizzes and a computer project

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D2. An understanding of professional and ethical responsibility.
- D3. Ability to demonstrate the characteristics of a team leader or a manager.
- D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
17	3	1,2	Drainage definition	1,2,3	1,2
18	3	1,2	Drainage networks and types of field drains	1,2,3	1,2
19	3	1,2	Steady state drainage theories	1,2,3	1,2
20	3	3	Hooghoudt Equations	1,2,3	1,2
21	3	3	Nomograph of Boumans	1,2,3	1,2
22	3	3	Ernst Equations	1,2,3	1,2
23	3	4	Generalized Hooghoudt-Ernst Equations	1,2,3	1,2
24	3	4	Van-Bears approach	1,2,3	1,2
25	3	4	Applications of steady state equations	1,2,3	1,2
26	3	5	Derivation of unsteady state equations	1,2,3	1,2
27	3	5	Glover and dumm equations	1,2,3	1,2
28	3	6	Hydraulic design of pipe drains	1,2,3	1,2
29	3	6	Design of Uniform and nonuniform flow, rough and smooth pipes	1,2,3	1,2
30	3	7	Hydraulic design of the open drains and their structures	1,2,3	1,2

11. Infrastructure	
1. Books Required reading:	1-H.P. Ritzema(1994)"Drainage Principles and Applications" International Institute for Land Reclamation and Improvemen.
2. Main references (sources)	<ul style="list-style-type: none"> - Ministry of Irrigation (1983) “Design Manual for Irrigation and Drainage “ Ministry of irrigation, Baghdad. Iraq in cooperation with pencol Engineering consultants, London, England. - G.S .Ghuman (1990) “ Design of typical irrigation and drainage project “ Ministry of irrigation / state Organization for Land Reclamation ,Baghdad ,Iraq . - Vaughan .E. Hansen, Orson W, Israelsen and Glen E. Stringham (1980) “Irrigation Principle and Practices
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	
12. The development of the curriculum plan	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Construction Management / WRPM 434
4. Modes of Attendance offered	Annual System ; There is only one mode of delivery, which is a “Day Program”. The students are full time students, and on campus. They attend full day program in face-to-face mode. The academic year is composed of 30-week regular subjects. Online lectures have been providing to the students using Google Classroom Application.
5. Semester/Year	1st and 2nd Semesters, Academic year 2020 –2021
6. Number of hours tuition (total)	90 hr., 3 hr. per week
7. Date of production/revision of this specification	2020
8. Aims of the Course	
<ul style="list-style-type: none"> 1- Developing the student's ability to understand and manage the project time. 2- How to manage time in different methods, 3- How to prepare the work activities schedule, 4- To calculate the progress of work, 5- To read and prepare the Bill of Quantities, and 6- Calculate the cost of the project activities and the factors affecting them. <p>Study the construction equipment and their productivities</p>	
9• Learning Outcomes, Teaching ,Learning and Assessment Method	
<ul style="list-style-type: none"> 1- Introduce basic definitions and introductory concepts of management and its application in construction / projects. 2- Introduce the definition, names, and types of contracts. 3- Identification of how to manage the contracts and award on qualified contractors. 4- Introducing the main contracts which applying for the Iraqi environment work. 	

5- Introducing the types of construction equipment and plant and their productivities.

A. Cognitive goals

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

A2. An ability to assign the management of work, or components, or process to meet desired needs.

A3. The broad and different education which necessary to understand the impact of engineering solutions in a global and societal context.

A4. Knowledge of contemporary issues (this includes the presenting to the students of issues such as the impact of globalization on the modern management of construction, the outsourcing of both engineering and other supporting jobs as practiced by modern international users).

B. The skills goals special to the course.

B1. An ability to design the perfect path for complete the project and conduct experiments as well as to analyze and interpret data.

B2. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

B3. Apply basic mathematical and scientific concepts for the description and solution of engineering problems.

B4. Performing the successful of project activity network with their necessary resources.

Teaching and Learning Methods

1-Lectures

2-Tutorials

3-Homework and Assignments

4-Tests and Exams

5-In-Class Questions and Discussions

Assessment methods

1-Examination, tests, and quizzes

2-Student engagement during lectures

C. Affective and value goals

C1. An ability to identify, formulates, and solves engineering problems.

C2. A recognition of the need for and an ability to engage in life-long learning.

(this includes teaching students that the underlying theory is important because the technology changes, coupled with enhancing their self-learning ability).

C3. Ability to function effectively as an individual in a group.

C4. Ability to identify, formulate and provide creative/innovative/effective solution of a problems.

Teaching and Learning Methods

Discussion with students

Assessment methods

Respecting deadlines

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D2. An understanding of professional and ethical responsibility.
- D3. Ability to demonstrate the characteristics of a team leader or a manager.
- D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3	a, b	Concepts and Terms of construction and management, the resources required for any project.	a-f of article (11)	1-4 of article (12)
2	3	C	The project life cycle .The major types of contracts between owner and the contractor.	a-f of article (11)	1-4 of article (12)
3	3	D	Types of Planning and Scheduling (Gantt Chart) or the Bar Chart.	a-f of article (11)	1-4 of article (12)
4	3	e, f	The Principles of Estimation.	a-f of article (11)	1-4 of article (12)
5	3	e, f, u	Estimation of excavation volume for foundation, and estimating the concrete materials.	a-f of article (11)	1-4 of article (12)
6	3	e, f, u	Preparing the contract in Iraq - Bill of Quantities-(B.O.Q) Reviewing the Official Documents in Contract; (Standard Documents)	a-f of article (11)	1-4 of article (12)

7	5	e, f, u	The Standard Weights for the activities in project	a-f of article (11)	1-4 of article (12)
8	3	G	The Standard Weights for the activities in project-part 2	a-f of article (11)	1-4 of article (12)
9	3	h, i, v	Planning with scheduling Critical Path Method (Activities on Arrow)	a-f of article (11)	1-4 of article (12)
10	3	h, i, v	Planning and scheduling with Critical Path Method (Activities on Arrow) part 2	a-f of article (11)	1-4 of article (12)
11	3	J	Planning and scheduling with Grid Time Diagram	a-f of article (11)	1-4 of article (12)
12	3	k, v	Planning and scheduling with Activities on Nodes	a-f of article (11)	1-4 of article (12)
13	3	k, v	Planning and Scheduling the activities of Project with Precedence Method	a-f of article (11)	1-4 of article (12)
14	3	l, v	Planning and Scheduling the activities of Project with PERT Technique.	a-f of article (11)	1-4 of article (12)
15	3	m, v	Time Cost Relationship (Reduction the Time of Project)	a-f of article (11)	1-4 of article (12)
16	3	n, v	Allocation (Smoothing) the Resources in Project	a-f of article (11)	1-4 of article (12)
17	3	o, v	Allocation (Smoothing) the Resources in Project / part 2	a-f of article (11)	1-4 of article (12)
18	3	o, v	Equipment Economics - Elements of Ownership Cost	a-f of article (11)	1-4 of article (12)

19	3	p, v	Equipment Economics - Elements of Operating Cost Part 2	a-f of article (11)	1-4 of article (12)
20	3	p, v	Planning for Earth Work Construction Earth Work Quantities	a-f of article (11)	1-4 of article (12)
21	3	q, v	Planning for Earth Work Construction Mass Diagram Properties	a-f of article (11)	1-4 of article (12)
22	3	q, v	Soil and Rock, Soil Weight –Volume Relationships	a-f of article (11)	1-4 of article (12)
23	3	R	Soil and Rock, Amount of Water Required	a-f of article (11)	1-4 of article (12)
24	3	r, v	Compaction and Stabilization Equipment, Types of Compacting Equipment.	a-f of article (11)	1-4 of article (12)
25	3	S	Compaction and Stabilization Equipment, Roller Production Estimating.	a-f of article (11)	1-4 of article (12)
26	3	S	Mobile Equipment Power, Requirements, Machine, Performance, Rolling Resistance	a-f of article (11)	1-4 of article (12)
27	3	T	Mobile Equipment Power Requirements, Grade Resistance Available Power, Rimpull, Drawbar Pull	a-f of article (11)	1-4 of article (12)
28	3	T	Dozers, Dozer Performance, Characteristics, Blades (Blades Performance).	a-f of article (11)	1-4 of article (12)
29	3	T	Dozers; Dozer Production Estimating	a-f of article (11)	1-4 of article (12)

			Scrapers: General Information, Scraper Types, Scrapers Volume of a Scraper and Scraper Operation	a-f of article (11)	
30	3	T			1-4 of article (12)

11. Infrastructure	
1. Books Required reading:	Construction Planning, Equipment, and Methods (Eighth Edition 2011) by: Robert L. Peurifoy, Clifford J. Schexnayder, Aviad Shapira, and Robert L. Schmitt
2. Main references (sources)	<ul style="list-style-type: none"> - Construction Methods and Management by: S.W. Nunnally (Seventh Edition -2007) - Construction Management by: Daniel W. Halpin and Bolivar A. Senior (Fourth Edition – 2012) - Construction Management Fundamentals by: Kraig Knutson, Clifford J. Schexnayder and Chistine Fiori (Indian Edition – 2009). - Standard Guide for analyzing the prices in construction sector. - The Standard Documents in construction contracts.
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	
12. The development of the curriculum plan	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Analysis of Water Resources Systems, 435 WRAS
4. Modes of Attendance offered	One time, day time on campus
5. Semester/Year	1st and 2nd Semesters, Academic year 2019 –2020
6. Number of hours tuition (total)	60 hr., 2 hr. theoretical per week
7. Date of production/revision of this specification	2020

8. Aims of the Course

Water Resources Systems Analysis refers to the application of science of optimization in the field of water resources engineering. The course provides a basic concepts and methods that can help the water resources engineer in making his decision. The course is focused on the concepts and procedures used in formulation and solving problems in the field of water resources engineering. The students will be familiar with the applications in this field of engineering that can be addressed using linear and nonlinear optimization.

9. Learning Outcomes, Teaching ,Learning and Assessment Method

the student in the field of water resources engineering will be able to:

- a. understand the concepts of optimization,
- b. formulate optimization problems in mathematical forms,
- c. manipulate the mathematical forms,
- d. solve linear mathematical forms, and
- e. solve nonlinear mathematical forms.

A. Cognitive goals

- A1. To have the ability to apply knowledge of mathematics, science, and engineering.
- A2. To have the ability to make decisions to meet desired needs.
- A3. To have the ability to have the broad education necessary to understand the impact of engineering solutions.

B. The skills goals special to the course.

- B1. To have the ability to analyze and interpret data.
- B2. To have the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- B3. To have the ability to Apply basic mathematical and scientific concepts for the description and solution of engineering problems.
- B4. To have an ability to perform water resources engineering integrated design of systems, components, or processes.

Teaching and Learning Methods

- a- lectures,
- b- tutorials, and
- c- supervised team work..

Assessment methods

- a- homework,
- b- quizzes,
- c- major examination during the course, and
- d- final examination

C. Affective and value goals

- C1. An ability to identify, formulates, and solves engineering problems.
- C2. A recognition of the need for and an ability to engage in life-long learning
- C3. Enhancing self-learning ability.
- C4. Ability to identify, formulate and provide creative/innovative/effective solution of a problems.

Teaching and Learning Methods

- a. lectures,
- b. tutorials, and
- c. supervised team work.

Assessment methods

- a) homework,
- b) quizzes,
- c) major examination during the course, and
- d) final examination.

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D1. An ability to function on multi-disciplinary teams (multi-disciplinary teams mean teams of individuals with similar educational backgrounds focusing on different aspects of a project as well as teams of individuals with different educational backgrounds).
- D2. An understanding of professional and ethical responsibility.
- D3. Ability to demonstrate the characteristics of a team leader or a manager.
- D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2	a	Introduction	a	a, b, c and d
2-3	4	a and b	Mathematical formulation	a, b, and c	a, b, c and d
4	2	a, b and c	Problem manipulation	a, b, and c	a, b, c and d
5-6	4	a and d	Linear problems: graphical method	a, b, and c	a, b, c and d
7-8	4	a and d	One phase simplex method	a, b, and c	a, b, c and d
9	2	a and d	Two phase simplex method	a, b, and c	a, b, c and d
10	2		Examination		
11-12	4	a and d	Duality in linear problems	a, b, and c	a, b, c and d
13-14	4	a and d	Transportation problems	a, b, and c	a, b, c and d
15	2	a and d	Assignment problems	a, b, and c	a, b, c and d
16	2		Examination	a, b, and c	a, b, c and d
17-18	4	a and d	Network problems	a, b, and c	a, b, c and d
19	2	a and e	Introduction to nonlinear problems	a, b, and c	a, b, c and d
20	2	a and e	Extreme values of functions	a, b, and c	a, b, c and d
21	2	a and e	Methods of solution	a, b, and c	a, b, c and d
22	2	a and e	Newton method	a, b, and c	a, b, c and d
23	2	a and e	Hook and Jeeves Method	a, b, and c	a, b, c and d
24	2	a and e	Nelder and Mead method	a, b, and c	a, b, c and d
25	2	a and e	Steepest ascent method	a, b, and c	a, b, c and d
26	2	a and e	Rosenbrock method	a, b, and c	a, b, c and d
27	2		Examination		
28-29	4	a to e	Optimal management of water resources	a	a, b, c and d
30	2		Examination		

11. Infrastructure

1. Books Required reading:	- Hamdy A. Taha , Operation Research. - McCormick, G.P., Nonlinear Programming
2. Main references (sources)	Theory and Applications, Wiley, Hoboken, NJ. Lectures notes of Prof. Dr. A. M. Ali
A- Recommended books and references scientific journals, reports...).	Water Resources Systems: modeling techniques and analysis
B-Electronic references, Internet sites...	

12. The development of the curriculum plan

Review the coarse syllabus after two years

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Dams Engineering 436 WRDE
4. Modes of Attendance offered	Students should attend 30 weeks that covering both in person and electronic education modes
5. Semester/Year	1st and 2nd Semesters, Academic year 2020 –2021
6. Number of hours tuition (total)	90 hr., 3 hr per week
7. Date of production/revision of this specification	2020

8. Aims of the Course

1. select the site and type of the dam
2. check the stability of gravity dams and assess the safety of earth dams
3. predict the generated power from dam site
4. determine the storage capacity of the dam reservoir

9. Learning Outcomes, Teaching ,Learning and Assessment Method

1. To select the site and the type of the dam
 2. To analyze the forces on gravity dams
 3. To check and quantity of seepage from earth dams for safety assessment
 4. To predict the generated power from dam site
 5. To design the size of the dam reservoir

2. Teaching and Learning Assessment Methods: The methods used are
 1. Lectures
 2. Tutorials
 3. Assignments (3 assignments)
 4. Participations in class discussions

5. Tests and examinations (3 tests and on final examination)

A. Cognitive goals

A1. Apply knowledge of mathematic and engineering sciences

A2.

A3. The broad education necessary to understand the impact of engineering solutions in a global and societal context

A4.

B. The skills goals special to the course.

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

B2.

B4. Perform water resources engineering integrated design of systems, components, or processes by means of practical experiences (group projects)

Teaching and Learning Methods

Assessment methods

C. Affective and value goals

C1. Ability to describe of professional and ethical responsibility

C2. Ability to function effectively as an individual in a group

Teaching and Learning Methods

Assessment methods

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D1. Ability to communicate effectively with engineers, other professionals and community at large
- D2. Ability to demonstrate the characteristics of a leader or a manager
- D3.
- D4.

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2 (theo.) +1 (tut.)	a	Syllabus and Course policy	Lectures	Assignment, Tests And Examination
2	2 (theo.) +1 (tut.)	a,b	Investigation for dams	Lectures	Assignment, Tests And Examination
3	2 (theo.) +1 (tut.)	a,b,c	Selection of dam site	Lectures	Assignment, Tests And Examination
4	2 (theo.) +1 (tut.)	a,b,c,d	Site investigations	Lectures	Assignment, Tests And Examination
5	2 (theo.) +1 (tut.)	a,b,c,d	Types of dams	Lectures	Assignment, Tests And Examination
6	2 (theo.) +1 (tut.)	a,b,c,d	Gravity dams definitions, characteristics and	Lectures	Assignment, Tests

			classifications and forces on gravity dams		And Examination
7	2 (theo.) +1 (tut.)	a,b,c,d	Gravity dams forces on gravity dams	Lectures	Assignment, Tests And Examination
8	2 (theo.) +1 (tut.)	a,b,c,d	Gravity dams Combinations of forces for design	Lectures	Assignment, Tests And Examination
9	2 (theo.) +1 (tut.)	a,b,c,d,e	Gravity dams Modes of failure	Lectures	Assignment, Tests And Examination
10	2 (theo.) +1 (tut.)	a,b,c,d,e	Applications Test 1	Lectures	Assignment, Tests And Examination
11	2 (theo.) +1 (tut.)	a,b,c,d,e	Gravity dams Principal and shear stresses	Lectures	Assignment, Tests And Examination
12	2 (theo.) +1 (tut.)	a,b,c,d,e,f	Applications on gravity dam	Lectures	Assignment, Tests And Examination
13	2 (theo.) +1 (tut.)	a,b,c,d,e,f	Arch dams Classification Types of arch dams	Lectures	Assignment, Tests And Examination
14	2 (theo.) +1 (tut.)	a,b,c,d,e,f,g	Arch dams	Lectures	Assignment, Tests

			Cylindrical theory Application		And Examination
15	2 (theo.) +1 (tut.)	a,b,c,d,e,f,g	Earth dams Advantages and disadvantages	Lectures	Assignment, Tests And Examination
16	2 (theo.) +1 (tut.)	a,b,c,e	Earth dams Types of earth dams Types of failure	Lectures	Assignment, Tests And Examination
17	2 (theo.) +1 (tut.)	a,b,c,d,e,	Seepage through homogenous and zoned earth dams	Lectures	Assignment, Tests And Examination
18	2 (theo.) +1 (tut.)	a,b,c,d,e,	Applications on seepage through earth dams	Lectures	Assignment, Tests And Examination
19	2 (theo.) +1 (tut.)	a,b,c,d,e,	Seepage under the earth dams Methods of control	Lectures	Assignment, Tests And Examination
20	2 (theo.) +1 (tut.)	a,b,c,d,e,f,g	Applications Test 2	Lectures	Assignment, Tests And Examination
21	2 (theo.) +1 (tut.)	a,b,c,d,e,f,g,h	Hydropower Components of hydropower house Types of hydropower house	Lectures	Assignment, Tests And Examination

			Types of Turbines		
22	2 (theo.) +1 (tut.)	a,b,c,d,e,f,g,h	Hydropower Selection of turbine type Estimation of hydropower	Lectures	Assignment, Tests And Examination
23	2 (theo.) +1 (tut.)	a,b,c,d,e,f,g,h,	Planning for a dam reservoir Function of a reservoir Storage zones a reservoir	Lectures	Assignment, Tests And Examination
24	2 (theo.) +1 (tut.)	a,b,c,d,e,f,g,h, I,	Types of reservoirs Yield of a reservoir	Lectures	Assignment, Tests And Examination
25	2 (theo.) +1 (tut.)	a,b,c,d,e,f,g,h, I,	Sedimentation of a reservoir Trap efficiency of a reservoir	Lectures	Assignment, Tests And Examination
26	2 (theo.) +1 (tut.)	a,b,c,d,e,f,g,h, I,j,	Measures for Silting control in reservoirs	Lectures	Assignment, Tests And Examination
27	2 (theo.) +1 (tut.)	a,b,c,d,e,f,g,h, I,j,	Losses in reservoirs	Lectures	Assignment, Tests And Examination
28	2 (theo.) +1 (tut.)	a,b,c,d,e,f,g,h, I,j,	Determination of reservoir capacity Mass curve	Lectures	Assignment, Tests And Examination
29	2 (theo.) +1 (tut.)	a,b,c,d,e,f,g,h, I,j,	Applications	Lectures	Assignment, Tests

					And Examination
			Test 3		Assignment, Tests
30	2 (theo.) +1 (tut.)	a,b,c,d,e,f,g,h, I,j,		Lectures	And Examination

11. Infrastructure

1. Books Required reading:	Design of Small Dams, United States Bureau of Reclamation, USBR, Oxford and IBH Publishing Company, 1974.
2. Main references (sources)	<ul style="list-style-type: none"> - Irrigation Water Power and Water Resources Engineering, Arora K.R., Standard Publisher, Delhi, 2009 - Engineering for Dams, Creager W.P., Justin J.D., Hinds J. Wiley Eastern Pvt. Ltd., New Delhi, 1968. - Roller Compacted Concrete Dams, Mehrotra V. K. Standard Publishers Distributors, Delhi, 2004. - Earth and Earth Rock Dams, Sherard J. L., Woodward R. J., John Wiley & Sons, Inc., 1963
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	

12. The development of the curriculum plan

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TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Applied Hydraulics, 437 WRAH
4. Modes of Attendance offered	One time, day time on campus, Online lectures have been providing to the students using Google Classroom Application
5. Semester/Year	2nd Semester, Academic year 2020 –2021
6. Number of hours tuition (total)	45 hr., 2 hr. theoretical and 1 hr tutorial per week
7. Date of production/revision of this specification	2020

8. Aims of the Course

To apply the theoretical foundations of hydraulics that students have learned in previous years for different practical applications.

9. Learning Outcomes, Teaching ,Learning and Assessment Method

A. Cognitive goals

A1. To have the ability to apply knowledge of mathematics, science, and engineering.

B. The skills goals special to the course.

B2. To have the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Teaching and Learning Methods

- a- lectures,
- b- tutorials, and
- c- supervised team work..

Assessment methods

- a- homework,
- b- quizzes,
- c- major examination during the course, and
- d- final examination

C. Affective and value goals

C1. An ability to identify, formulates, and solves engineering problems.

Teaching and Learning Methods

Discussion with students

Assessment methods

Respecting deadlines

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D3. Ability to demonstrate the characteristics of a team leader or a manager.

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
	3	=			
16	2 theo 1 tut		Introduction, Pumps types and its hydraulics	(Article 11)	(Article 12)
	3	=		=	=
17	2 theo 1 tut		Pumps curves and pumps connection		
	6	=		=	=
18, 19	4 theo 2 tut		Similarity, cavitation and selection of pumps		
	3	=		=	=
20	2 theo 1 tut		Estimation of Water demand		
	6	=		=	=
21, 22	4 theo 2 tut		Water distribution system analysis: Hardy Cross method		
	3	=		=	=
23	2 theo 1 tut		Review and examination		
	6	=		=	=
24, 25	6	=	Hydraulic Turbines		

	4 theo 2 tut				
	6	=		=	=
26, 27	4 theo 2 tut		Water Hammer		
	6	=		=	=
28, 29	4 theo 2 tut		Unsteady flow in open channels		
	3	=		=	=
30	2 theo 1 tut		Review and examination		

11. Infrastructure

1. Books Required reading:	- Chaudary, M. H., Transient analysis. - Karassik, H. et al., Pumps Hand Book.
2. Main references (sources)	
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	
12. The development of the curriculum plan	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Engineering Economy, 438 WREE
4. Modes of Attendance offered	Annual system: There is only One mode of delivery, which is a "Day Program "The students are full time students, and on campus. They attend full day program in face-to-face. The academic year is composed of 15-week regular subjects. Each week there are three lectures, and each lecture 50-mintues. Online lectures have been provided to the students using google classroom application.
5. Semester/Year	1st Semester, Academic year 2020 –2021
6. Number of hours tuition (total)	45 hr
7. Date of production/revision of this specification	2020

8. Aims of the Course

1. Graduate water resources engineers to serve in water resource management
2. Improving the teaching and the administrative activities to meet international accreditation standards and the mission of departments.
3. Improving the academic abilities of the faculty and attracting highly skilled personnel.
4. Improve the abilities of management and technical support staff and attract the highly skilled for employment.
5. Optimum use of resources and potential of the department.

9• Learning Outcomes, Teaching ,Learning and Assessment Method

At the end of the class, the student will be able to:

- a-Define economics in general and all terms that will be used at the course.
- b- Know about types of interest and their effects on present value and estimation of the future value.
- c- Give the students a sound understanding of the basic aspects of the subject and some insight into approaches that can be used for making sound economic decisions concerning the type of problem he is likely to encounter in his engineering career.
- d- Know about the depreciation and its effect on the asset.
- e- Acquire a solid base for further studies after graduation, which will permit him to understand and use more advanced, and constantly developing, procedures needed to help in analyzing the more complex economic problem that he may encounter in his career.

- f- Evaluate engineering projects.
- g- Be able to carry out economics studies and alternatives.

A. Cognitive goals

- A1. An ability to apply knowledge of mathematics, science, and engineering.
- A4. Knowledge of contemporary issues (this includes presenting students with issues such as the impact of globalization, the outsourcing of both engineering and other supporting jobs as practiced by modern international users).

B. The skills goals special to the course.

- B2. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- B3. Apply basic mathematical and scientific concepts for the description and solution of engineering problems.

Teaching and Learning Methods

- 1-Lectures
- 2- Tutorials
- 3-Homework and Assignment
- 4-Test and Exams
- 5-In class Questions and Discussion

Assessment methods

- 1. Examinations and Quizzes.
- 2. Student Engagement during Lectures.

C. Affective and value goals

- C1. An ability to identify, formulates, and solves engineering problems.
- C2. A recognition of the need for and an ability to engage in life-long learning. (this includes teaching students that the underlying theory is important because the technology changes, coupled with enhancing their self-learning ability).
- C3. Ability to function effectively as an individual in a group.
- C4. Ability to identify, formulate and provide creative/innovative/effective solution to a problem

Teaching and Learning Methods

- Discussion with students
- Oral quizzes

Assessment methods

- Respecting deadlines
- Write reports

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D2. An understanding of professional and ethical responsibility.

D3. Ability to demonstrate the characteristics of a team leader or a manager.

D4. Ability to communicate effectively with engineers, other professionals and community at large

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3 th	a	Introduction, simple and compound interest	1-5 of article (11)	1-3 of article (12)
2	3 th	a, b	Nominal and effective interest	1-5 of (11) article	1-3 of article (12)
3	3 th	a, b	Annuity(uniform series payments)	1-5of article (11)	1-3 of article (12)
4	3 th	b, c	Annuity(uniform series payments)	1-5 of article (11)	1-3 of article (12)
5	3 th	d	Arithmetic gradient uniform series	1-5 of article (11)	1-3 of article (12)
6	3 th	d	Arithmetic gradient uniform series	1-5of article (11)	1-3 of article (12)
7	3 th	d	Depreciation, SL Method	1-5 of article (11)	1-3 of article (12)
8	3 th	d	S.F Method	1-5 of article (11)	1-3 of article (12)
9	3 th	d	Matheson Method	1-5 of article (11)	1-3 of article (12)
10	3 th	e, f	S.Y.D method	1-5 of article (11)	1-3 of article (12)
11	3 th	e, f	Basic Methods for Economic Studies	1-5 of article (11)	1-3 of article (12)
12	3 th	f, g	Basic Methods for Economic Studies	1-5 of article (11)	1-3 of article (12)
13	3 th	f, g	Compare the alternatives	1-5 of article (11)	1-3 of article (12)
14	3 th	f, g	Compare the alternatives	1-5 of article (11)	1-3 of article (12)
15	3 th	g	Compare the alternatives	1-5 of article (11)	1-3 of article (12)

11. Infrastructure	
1. Books Required reading:	1- Engineering Economy (fifth edition),by E. Paul De Garmo ,Jhon R. Canada .1985,Macmillan Publishing Co., Inc.
2. Main references (sources)	- Fundamentals of Engineering Economics by Chan S. Park - Engineering Economic Analysis, Eleventh Edition, by Donald G. Newnan,2012
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	
12. The development of the curriculum plan	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.

1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	Water Quality / 439 WREC
4. Modes of Attendance offered	Semester System: There is only one mode of delivery, which is a “Day Program”. The students are full time Students and, on campus. They attend full day program in face-to-face mode. The academic semester is composed of 15-week regular subjects. Online lectures are provided to the students using Google Classroom Application.
5. Semester/Year	1st and 2nd Semesters, Academic year 2020 –2021
6. Number of hours tuition (total)	45 hr., 3 hr. per week
7. Date of production/revision of this specification	2020

8. Aims of the Course

1. General review of open channel hydraulic
2. Definitions and introductory concepts of water quality.
3. Definitions and introductory concepts of water and pollution processes in rivers, lakes and ground water
4. Definitions of surface water pollution
5. Explain and definition source of pollution type
6. Explain discharge of pollutant into river and mixing zone
7. Definitions conservative and non-conservative pollutant
8. Explain and definition surface water impurities
9. Definitions BOD and Oxygen sag curve
10. Definition Iraqi law for water quality protection in river No. 25 for 1967
11. Assessment the water quality in Iraq rivers and surface water

9. Learning Outcomes, Teaching Learning and Assessment Method

At the end of the class, the student will be able to:

1. Define and introduce concepts of water quality
2. Understand and apply concepts of water quality and pollution processes in rivers and lakes
3. Understand and apply the different steps of the monitoring cycle in rivers and lakes;

4. Understand the basic concepts of groundwater quality and monitoring;
5. Apply common statistical techniques for water quality data evaluation;
6. Design sound and sustainable freshwater quality monitoring and assessment programs under specified conditions.
7. Understand modeling BOD/DO in a river system
8. Understand and apply the Iraqi law for water quality protection in river No. 25 for 1967
9. Understand and apply the water quality in Iraq rivers and water surface

E. Cognitive goals

- A1. To have the ability to apply knowledge of mathematics, science, and engineering.
- A2. To have the ability to make decisions to meet desired needs.
- A3. To have the ability to have the broad education necessary to understand the impact of engineering solutions.

B. The skills goals special to the course.

- B1. To have the ability to analyze and interpret data.
- B2. To have the ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- B3. To have the ability to Apply basic mathematical and scientific concepts for the description and solution of engineering problems.

Teaching and Learning Methods

- 1- Lectures
- 2- Tutorials
- 3- Homework and Assignments
- 4- Tests and Exams
- 5- In-Class Questions and Discussions
- 6- Connection between Theory and Application
- 7- Extracurricular Activities
- 8- Seminars
- 9- In- and Out-Class oral conversations

Assessment methods

1. Examinations, Tests, and Quizzes
2. Extracurricular Activities
3. Student Engagement during Lectures
4. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor)

C. Affective and value goals

- C1. An ability to identify, formulates, and solves engineering problems.
- C2. A recognition of the need for and an ability to engage in life-long learning

Teaching and Learning Methods

Discussion with students

Assessment methods

Respecting deadlines

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

D2. An understanding of professional and ethical responsibility.

10. Course Structure

Week	Hours	LO's	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2 (theo.) +1 (tut.)	1	Introduction to Water Quality	1-9 of article (11)	1 – 4 of article (12)
2	2 (theo.) +1 (tut.)	2	Water Quality Parameters	1-9 of article (11)	1 – 4 of article (12)
3	2 (theo.) +1 (tut.)	3	General Types of Water Pollutants	1-9 of article (11)	1 – 4 of article (12)
4	2 (theo.) +1 (tut.)	4	Iraqi Specifications for Drinking Water, WHO Standards	1-9 of article (11)	1 – 4 of article (12)
5	2 (theo.) +1 (tut.)	5	Sampling Methods and Equipment of Surface Water	1-9 of article (11)	1 – 4 of article (12)
6	2 (theo.) +1 (tut.)	6	Sampling Methods and Equipment of Groundwater	1-9 of article (11)	1 – 4 of article (12)
7	2 (theo.) +1 (tut.)	7	Modeling Surface Waters Flow and Pollution, Mass Balance Approach	1-9 of article (11)	1 – 4 of article (12)
8	2 (theo.) +1 (tut.)	8	Oxygen Demand of wastewater, Reaeration and deoxygenating Rate constants	1-9 of article (11)	1 – 4 of article (12)
9	2 (theo.) +1 (tut.)	9	Self-Purification, Sag-Curve	1-9 of article (11)	1 – 4 of article (12)
10	2 (theo.) +1 (tut.)	10	Longitudinal Dispersion	1-9 of article (11)	1 – 4 of article (12)
11	2 (theo.) +1 (tut.)	11	Models of Surface Water Quality	1-9 of article (11)	1 – 4 of article (12)
12	2 (theo.) +1 (tut.)	12	Application	1-9 of article (11)	1 – 4 of article (12)
13	2 (theo.) +1 (tut.)	13	Models of Ground water Quality	1-9 of article (11)	1 – 4 of article (12)
14	2 (theo.) +1 (tut.)	14	Application	1-9 of article (11)	1 – 4 of article (12)
15	2 (theo.) +1 (tut.)	15	Water Quality Index	1-9 of article (11)	1 – 4 of article (12)

11. Infrastructure	
1. Books Required reading:	- No text book
2. Main references (sources)	<p>References</p> <ol style="list-style-type: none"> 1. Water Supply and Pollution Control, John W. Clark Models for Water Quality Managements, 2. Principles of Water Quality Control by T.H.Y. Tebbutt 5ed. 1998 <p>Others</p> <ol style="list-style-type: none"> 1. Notebook prepared by the instructor of the course 2. Collection of sheets of solved and solved problems and exams questions
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	
12. The development of the curriculum plan	

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAM REVIEW	
COURSE SPECIFICATION	
<p>This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the program specification.</p>	
1. Teaching Institution	University of Baghdad College of Engineering
2. University Department/Centre	Department of Water Resources
3. Course title/code	English Language / 440WREN
4. Modes of Attendance offered	<p>Annual System; There is only one mode of delivery, which is a “Day program”. The students are full time students, and on campus. They attend the subject using electronic education at the time being and face-to-face mode after the pandemic will over. The academic year is</p> <p>Composed of 30-week regular subjects. This subject is given one per hour per for whole academic year.</p>
5. Semester/Year	1st and 2nd Semesters, Academic year 2020 –2021
6. Number of hours tuition (total)	30 hr., 1 hr. per week
7. Date of production/revision of this specification	2020
8. Aims of the Course	
<ol style="list-style-type: none"> 1. Use English verbs and tenses properly in their writing and speaking 2. Pronounce the English words correctly 3. Use the countable and uncountable nouns in the written and spoken sentences 4. Express the quantities in the written and spoken sentences 5. Use the participles in the written and spoken sentences 6. Write academic report for laboratory and for any other topic related to the field of water resources engineering 	
9. Learning Outcomes, Teaching ,Learning and Assessment Method	

The graduate student will be able to:

1. Write sentence without making mistakes in the tenses of the verbs
2. Express the quantities, countable and uncountable nouns and properly use the participles in the written and spoken sentences
3. Improve his vocabulary in reading, writing, listening and speaking

G. Cognitive goals

B. The skills goals special to the course.

Teaching and Learning Methods

- a- lectures,
- b- tutorials, and
- c- Homework and Assignments
- d- Tests and Exams
- e- In-Class Questions and Discussions

Assessment methods

1. Examinations, Tests, and Quizzes.
2. Student Engagement during Lectures.
3. Responses Obtained from Students, Questionnaire about Curriculum and Faculty Member (Instructor).

C. Affective and value goals

Teaching and Learning Methods

Assessment methods

D. General and rehabilitative transferred skills(other skills relevant to employability and personal development)

- D4. Ability to communicate effectively with engineers, other professionals and community at large

14. Course Structure

Week	Hours	LOs	Topic Title	Teaching method	Assessment Methods
1	3	1	Tenses such as simple present, present continuous, past simple, past continuous, present perfect, future simple, modal, modal perfect, active and passive.	Lectures	Quiz, test, exam
2					
3					
4	3	1	Auxiliary or helping verbs (have, be and do), Modal auxiliary verbs, Phrase verb, Pronunciation, proposition, Vocabulary (reading, writing, listening and speaking)	Lectures	Quiz, test, exam
5					
6					
7	3	1,2	Phrase verb, Pronunciation, proposition,	Lectures	Quiz, test, exam
8					
9					
10	1	1,2	Test		
11	3	1,2	Phrase verb, Pronunciation, proposition,	Lectures	Quiz, test, exam
12					
13					
14	3	3	Vocabulary (reading, writing)	Lectures	Quiz, test, exam
15					

16					
17	3		Vocabulary		
18		3	(listening and speaking)	Lectures	Quiz, test, exam
19					
20	3		Countable and uncountable nouns		
21		3		Lectures	Quiz, test, exam
22					
23	3		Vocabulary		
24		3	(Countable and uncountable nouns)	Lectures	Quiz, test, exam
25					
26	4		expressing quantity, participles		
27		1,2,3		Lectures	Quiz, test, exam
28					
29					
30	1	1,2,3	test	Lectures	Quiz, test, exam

11. Infrastructure

1. Books Required reading:	The new Headway (Upper Intermediate workbook with Key) By Liz and John Soars, Sylvia Wheel don
2. Main references (sources)	
A- Recommended books and references scientific journals, reports...).	
B-Electronic references, Internet sites...	
12. The development of the curriculum plan	