Ministry of Higher Education and Scientific Research
University of Anbar
College of Engineering
Dams And Water Resources Engineering Department

Dams and Water Resources Engineering Department

2024-2025

CATALOGE

About the DWE

The study of water resources is important for any country as it is one of the important pillar of the national prosperity. The presence of the Euphrates River that inters Iraq from Anbar, and the presence of Haditha Dam, AlThirthar Lake, AlHabbanyah Lake, 15 small dams in the West Desert of Iraq, and many barrages in addition to the problem of water shortage have increased the importance of the subject of water resources. Therefore, the department of Dams and Water Resources was established in 2002-2003 to provide efficient engineering staffs to satisfy the need of the country and the province. The first class included 13 students and the size of the classes currently reached 155 students while the size of the faculty reached 33 for the year of 2021-2022 and the number of the graduated classes is 15.

The study in the department includes water resources syllabus in addition to parts of the civil engineering syllabus and the department grants BSc in water resources engineering. The syllabus has been updated to be in consistence with the program accreditation criteria of ABET. The syllabus includes both theoretical and experimental studies which are achieved by many laboratories such as survey, remote sensing, soil, hydraulic, environment, geology, and computer labs.

The significant and obvious development of the department contributes to provide the industry with efficient staffs and keeping pace with the local and international developments through the participation of the faculty in the scientific conferences and workshops. The faculty also participated in research and consulting teams, under the supervision of the Engineering Consulting Bureau, that have supervised tens of different engineering projects. The department has an important role in building constructive relationships with other colleges and research centers in the university by conducting mutual research and supervisions and participating in training courses such as those with The Center of Developing High Euphrates Basin and Desert Studies Center. This collaboration has led to adopting a research line that focuses on building a series of small dams in the West Desert of Iraq and study their effects on the river basin in terms of hydraulics and electric generation in addition to completing many masters theses and research papers that have been published in international journals that have an Impact Factor.

Department Vision:

To be a national leader in education and research in the field of dams and water resources engineering recognized for world-class graduates.

Department Mission:

To provide quality education by integrating the principles of science and engineering with technical, innovative, and communication skill, and to conduct applied research that investigate pioneer solutions to the challenges of dams and water resources engineering.

Objectives:

1- Preparing engineering who are able to participate effectively in the management of water resources in its comprehensive perspective, which includes planning, design, implementation and operation of water resources projects.
2- The graduate should have the ability to realize ethical and professional responsibilities in engineering issues, taking into account the consequences of financial, environmental and societal considerations around the world.
3- The graduate should have the ability to work independently or with multidisciplinary work teams to achieve personal or institutional goals.
4- Preparing qualified cadres to carry out research and development in the fields of water resources and hydraulic facilities, and documenting the movement of scientific cooperation with scientific, engineering and technological institutions.
5- Developing the teaching staff to ensure excellence in the performance.

Programme Educational Objectives (PEO)

The Program Educational Objectives (PEOs)
The Dams Engineering program is providing graduates with solid practical and professional knowledge to excel in this field of engineering. Within a few years after graduating, our students will:

1- Be successful professionals in Dams Engineering and related fields.
2- Be adhered to the professional ethics and the accepted standards.
3- Purse leadership roles and demonstrate effective communication and collaboration in their workplace and the society.
4- Peruse lifelong learning through continued development of their technical and professional skills. Pursue graduate education and research at major research universitas in Dams Engineering and related fields.

Graduate Learning Outcomes (GO)

Students of the Dams and Water Resources Engineering program will attain (by the time of graduation):

i) An ability to distinguish, identify, define, formulate, and solve engineering problems by applying principles of engineering, science and mathematics.

ii) An ability to produce engineering designs that meet desired needs within certain constraints by applying both analysis and synthesis in the design process.

iii) An ability to create and carry out proper measurement and tests with quality assurance, analyze and interpret results, and utilize engineering judgment to make inferences.

iv) An ability to skillfully communicate orally with a gathering of people and in writing with various managerial levels.

v) An ability to perceive ethical and professional responsibilities in engineering cases and make brilliant judgments taking into account the consequences in worldwide financial, ecological and societal considerations.

vi) An ability to perceive the continual necessity for professional knowledge growth and how to find, assess, assemble and apply it properly.

vii) An ability to work adequately on teams and to set up objectives, plan activities, meet due dates, and manage risk and uncertainty.

The Department Council

No	Faculty Name	Degree	Position
1.	Asst. Prof. Dr. Yasser Abdul Majeed Mohammed Al-Ani	PhD	Chairman
2.	Prof. Dr. Khamis Nabaa Sayel Al-Subaihi	PhD	Member
3.	Prof. Dr. Juma Awad Hamad Al-Sumaidaie	PhD	Member
4.	Asst. Prof. Dr. Ammar Adham Ali	PhD	Member
5.	Asst. Prof. Udi Hatem Abdul Hamid		Member/ Secretory
6.	Dr. Haitham Zidane Hussein	PhD	Member

The department heads

No	Faculty Name	Degree	Start date	End date
	Dr. Ayad Salibi Al-Rawi	PhD	2002/10/1	2003/10/1
2.	Dr. Ammar Hatem Kamel	PhD	2003/10/1	2004/9/3
3.	Dr. Essam Mohammed Al-Hadith	PhD	2004/10/9	2004/12/3
4.	Mr. Yousef Zain Najib	Msc	2004/12/3	2005/10/1
5.	Dr. Khalil Ibrahim Aziz	PhD	2005/10/1	2006/10/1
6.	Dr. Abdul Qader Ismail Al-Hadith	PhD	2006/10/1	2011/7/1
7.	Dr. Ammar Hatem Kamel	PhD	2011/7/1	2015/11/1
8.	Dr. Sadiq Aliwi Suleiman	PhD	2015/11/1	2019/7/16
9.	Dr. Juma Awad Al-Sumaidaie	PhD	2019/7/16	2023/7/18
10.	Dr. Yasir Abdulmajeed Mohammed	PhD	2023/7/18	present

Students

Student numbers for the academic year 2024-2025
Undergraduate studies

Stage	No
First	36
Second	63
Third	54
Forth	53
Total : 206	

Postgraduate Students
MSc Water Resources

Stage	Program
Courses Stage	4
Research Stage	6
Total: 10	

Outstanding students (top of class)

No	Faculty Name	Year	Average	Grade
1.	Alaa Jassim Mohammed Ali	2005 - 2006	74.622	Good
2.	Farid Khaled Abdul Khalaf	2006 - 2007	74.099	Good
3.	Luna Yahya Zakir Noman	2007 - 2008	79.13	Good
4.	Taha Yassin Ajami Yassin Dala	2008 - 2009	71.65	Good
5.	Rasha Ismail Nayef Naji	2009 - 2010	70.27	Good
6.	Omar Ali Hadi Majoul	2010 - 2011	69.23	Average
7.	Sari Ibrahim Mohammed	2011 - 2012	77.694	Good
8.	Sabreen Hamdi Shahoud Abdul	2012 - 2013	79.63	Good
9.	Abdul Rahman Khalil Madhan	2013 - 2014	80.84	Very good
10.	Mohammed Hamed Abdul Karim Ali	2014 - 2015	77.641	Good
11.	Youssef Mohammed Abdul Aziz	2015 - 2016	82.312	Very good
12.	Ahmed Shahada Munir Raja	2016 - 2017	79.684	Good
13.	Rasoul Khalil Ibrahim Kosaj	2017 - 2018	82.76	Very good
14.	Nour Ayad Abdullah Issa	2018 - 2019	87.54	Very good
15.	Faten Adi Mohammed Abbas	2019 - 2020	89.44	Good
16.	Mustafa Sufyan Faris Mohammed	2020-2021	75.18	Very good
17.	Harith Mukhlis Saad Khatlan	2021-2022	74.34	Very good
18.	Abdul Muhaimin Fakhri Abdul Karim Mahmoud	2022-2023	72.41	Good
19.	Zahraa Ali Sabry Ibrahim	2023-2024	76.748	Good

Semester	No.	Module Code	Module Name in English	SSWL (hr/w)					
				CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)
One	1	ENG 001	Physics	3		2			
	2	ENG 002	Chemistry	3		2			
	3	ENG 003	Calculus I	3				1	
	4	ENG 005	Fundamentals of Electrical Engineering	2		2		1	
	5	DWR 001	Buildings Construction	2					
	6	UOA 005	Human Rights and Democracy	2					
				15	0	6	0	2	0
Semester	**No.**	**Module Code**	**Module Name in English**	**SSWL (hr/w)**					
				CL (hr/w)	**Lect (hr/w)**	**Lab (hr/w)**	**Pr (hr/w)**	**Tut (hr/w)**	**Semn (hr/w)**
Two	1	ENG 004	Calculus II	3				1	
	2	ENG 006	Engineering Mechanics	3				1	
	3	ENG 007	Engineering Drawing	2		3		1	
	4	UOA 003	English Language I	2					
	5	UOA 007	Computer Science I	2		2		1	
	6	DWR 002	Engineering Geology	3		2			
	7	UOA 001	Arabic Language I	2					
				17	0	7	0	4	0
Semester	**No.**	**Module Code**	**Module Name in English**	**SSWL (hr/w)**					
				CL (hr/w)	**Lect (hr/w)**	**Lab (hr/w)**	**Pr (hr/w)**	**Tut (hr/w)**	**Semn (hr/w)**
Three	1	ENG 008	Calculus III	3				1	
	2	DWR 003	Fluids Mechanics	3		2		1	
	3	DWR 004	Engineering surveying I	2		2		1	
	4	DWR 005	Concrete Technology	2		2		1	
	5	ENG 010	Engineering Statistics	3				1	
	6	UOA 006	The crimes of Baath regime in Iraq	2					
				15	0	6	0	5	0
Semester	**No.**	**Module Code**	**Module Name in English**	**SSWL (hr/w)**					
				CL (hr/w)	**Lect (hr/w)**	**Lab (hr/w)**	**Pr (hr/w)**	**Tut (hr/w)**	**Semn (hr/w)**
Four	1	ENG 009	Calculus IV	3				1	

	2	DWR 006	Open Channels	2				1	
	3	DWR 007	Dynamics	2				1	
	4	DWR 008	Engineering surveying 2	2		2		2	
	5	DWR 009	Strength of Materials	2		2		1	
	6	UOA 002	Arabic Language II	2					
	7	UOA 008	Computer Science II	2		2		1	
				15	0	6	0	7	0

THIRD YEAR					
DWE3318	Engineering Hydrology	2	2	1	---
DWE3319	Soil Mechanics	3	2	2	2
DWE3320	Environmental Engineering	2	2	1	1
DWE3213	Engineering Statistics	2	2	---	1
DWE3322	Theory of Structures	3	3	---	---
DEW3315	Engineering Management	2	2	2	---
DWE3316	Hydraulic Machines	2	2	1	---
DWE3338	Ground Water Hydrology	2	2	1	-
DWE3328	Foundations Engineering	2	2	1	-
DWE3321	Hydraulic Structures	2	2	1	1
DWE3313	Water Quality Control	3	2	1	2
DWE3323	Sanitary Engineering	2	2	1	-
DWE3324	Reinforced Concrete Design	2	2	1	-
FOURTH YEAR					
DWE4325	Engineering Optimization	3	3	1	---
DWE4326	Irrigation Engineering	3	3	1	---
DWE4327	Design of Dams	3	3	1	---
DWE4333	Design and Evaluation of On-farm Irrigation systems	2	2	1	---
DWE4329	Senior Design I	3	2	1	2
DWE4330	Methods of Construction and Estimation	3	3	1	---
DWE4332	Drainage Engineering	2	2	1	---
DWE4334	Safety and Operation of Dams	3	3	1	---
DWE4331	Water Resources Planning and Management	3	3	1	---
DWE4335	Senior Design II	3	3	---	3

Postgraduate Students

A. General Background of the Master's Courses

The Master's program in Dams and Water Resources Engineering Department aims to prepare specialized engineers in designing and managing water resources, with a focus on flow analysis, advanced fluid mechanics, and groundwater management. The program is based on advanced scientific curricula, including mathematical modeling and hydrological analysis.

B. Objectives and Goals

1-Develop students' skills in analyzing and designing hydraulic and hydrological systems.

2-Enhance their ability to model water flow and analyze sediment transport processes.

3 Equip students with research skills in water resources management.

4 Improve students' proficiency in understanding water quality control and management techniques.

5 Provide students with advanced knowledge in groundwater engineering and sustainable water resource management.

C. Knowledge Acquired by Students

1-Advanced understanding of fluid mechanics and its applications in water engineering

2- Techniques for hydrological analysis and water flow modeling

3- Mechanisms of sediment transport and its impact on hydraulic structures and water flow

4- Water resource management techniques

5- Strategies for scientific research in hydraulic engineering and water resources.

D. Research Type Performed

1-research on irrigation systems and water flow in open channels.

2-research on the mechanism of sediment movement and how it affects water flow hydrology

3-studies on the sustainability of water resources.

4-groundwater flow modelling and the impact of climate variables.

E. Program Requirements

First Semester

No.	course	Credits	Hours	course synopsis

1	Advance Fluid Mechanics	3	3	Unsteady Flow in Conduits, Oscillation of Liquid in a U-tube, Oscillation of Two Reservoirs, Establishment of Flow, Surge Control, and Water Hammer
2	Optimization for Water Resources	3	3	The system approach to water resources problems, Application of optimization and system analysis to water resources, multipurpose reservoir operation rules, other applications in water resources
3	Advance Mathematics	3	3	Matrix algebra, Matrix transformation, Applications of matrices to differential equation, Laplace transformations, vector spaces and vector analysis, Orthogonality, Complex variables
4	Open Channel Hydraulics I	3	3	Energy & momentum principles, Development & application of critical & uniform flow, Design of channels for uniform flow, Wall roughness, velocity distribution analysis & computation of gradually varied flow
5	English Language	1	1	A course to enhance academic and technical English skills, focusing on water resources engineering terminology, covering reading, writing, listening, and speaking for academic communication research and professional

Second Semester

No.	course	Credits	Hours	course synopsis
1	Water Flow Modeling	2	2	Principles of Hydraulic Similitude, Phenomena Governed by Viscous Force-Reynolds Number Law, Phenomena Governed by Gravity Force-Froude Number Law
2	Advanced Engineering Hydrology I	3	3	Flood frequency analysis, Regionalization, Rainfall runoff, routing, and analysis and use design of watershed models.
3	Sediment Transport	2	2	Transport mechanisms governing sediment motion. Sediment measurement techniques. Theories of sediment transport. Bed form and alluvial roughness. Deposition and bed erosion. Stable channels. Local and general scours
4	Research Methodology	2	2	Data analysis techniques, research methodologies, and writing scientific research
5	Groundwater Hydrology	2	2	Numerical analysis & analogy. Solution of Laplace equation for ground water flow, Anisotropy. Porous media.

6	Water Quality Control	2	2	Water pollution and pollutant, water quality factors, water quality standards, water treatment control, wastewater reuse, mathematical models for predicting distribution and fate of pollutants such as oxygen, nitrogen, and phosphorus, as water quality indicators.

Faculty

Faculty and Qualifications

No	Faculty Name	Major	Email
1.	Asst. Prof. Dr. Yasser Abdul Majeed Mohammed Al-Ani	Environmental Engineering	aniyaser@uoanbar.edu.iq
2.	Prof. Dr. Khamis Nabaa Sayel Al-Subaihi	Surveying	knsayl@uoanbar.edu.iq
3.	Prof. Dr. Sadiq Aliwi Suleiman Al-Fahdawi	Water Resources Engineering	sadeq.sulaiman@uoanbar.edu.iq
4.	Prof. Dr. Ammar Hatem Kamel Ahmed Al-Ani	Water Resources Engineering	Ammar.kamel@uoanbar.edu.iq
5.	Prof. Dr. Juma Awad Hamad Al-Sumaidaie	Project Management	jah_eng@uoanbar.edu.iq
6.	Prof. Majeed Matar Raml Al-Boumrai	Environmental Engineering	majeed.mattar@uoanbar.edu.iq
7.	Prof. Dr. Arkan Dhari Jalal Al-Fahdawi	Environmental Engineering	arkan.dhari@uoanbar.edu.iq
8.	Prof. Dr. Rafid Saadoun Rashid Al-Burisha	Water Resources	rafid.alboresha@uoanbar.edu.iq
9.	Prof. Dr. Ammar Adham Ali Al-Ani	Water Resources	engammar2000@uoanbar.edu.iq
10.	Prof. Dr. Nabil Shaker Mahmoud Al-Dulaimi	Geotechnical	nabeelshm@uoanbar.edu.iq

11.	Prof. Dr. Zaid Mohammed Kani Al-Azzawi	Construction	zaid.kani@uoanbar.edu.iq
12.	Prof. Dr. Ghassan Subhi Jameel Al-Kubaisi	Concrete Design and Technology	ghassan.alkubaisi@uoanbar.edu.iq
13.	Prof. Dr. Aseel Madallah Mohammed Al-Rawi	Concrete Design and Technology	aseel.mohammed@uoanbar.edu.iq
14.	Prof. Dr. Ayad Saeed Adi Al-Muadhidi	Building Materials	ayad_saeed@uoanbar.edu.iq
15.	Prof. Dr. Adi Hatem Abdul Hamid Al-Qazan	Water Resources Engineering	uday.hatem@uoanbar.edu.iq
16.	Prof. Dr. Ibtihal Ahmed Mawloud Al-Ani	Environmental and Health Engineering	ibtihal.maoloud@uoanbar.edu.iq
17.	Prof. Haitham Zidane Jassin Al-Kartani	Building Materials	al_raad55@uoanbar.edu.iq
18.	M.D. Majed Hadi Talal Al-Qaisi	Jurisprudence and its Principles	mqaessy@uoanbar.edu.iq
19.	M.D. Muhannad Haqi Ismail Al-Dosari	Construction	muhannad_dosary@uoanbar.edu.iq
20.	M.D. Ahmed Dalf Ahmed Al-Fahdawi	Concrete Design and Technology	H_b5566@uoanbar.edu.iq
21.	M.Hind Saad Zayan	Concrete Design and Technology	hind.saad@uoanbar.edu.iq
22.	M.Mohammed Tarrad Nour Al-Dulaimi	Structural Engineering	mohammad.nawar@uoanbar.edu.iq
23.	M.Ammar Ahmed Hammadi Al-Mohammadi	Concrete Design and Technology	Ammar.ahmed@uoanbar.edu.iq
24.	M.Mohammed Fareeh Sahab Al-Nimrawi	Environmental Engineering	mo.freeh@uoanbar.edu.iq
25.	M.Abdulrahman Suhail Mohammed Al-Ismail	Water Resources	abdulrahman.suhail@uoanbar.edu.iq
26.	M.D. Shireen Ibrahim Mohammed Al-Fahdawi	Geodesic Engineering	shireenmohammed@uoanbar.edu.iq
27.	M.D.Mohammed Hatem Abdullah Al-Ani	Structural Engineering	mohammed.alani@uoanbar.edu.iq
28.	M.D.Ghassan Abbas Hammadi	Civil Engineering	
29.	M.D.Aseel Hussam Al-Din Abdullah Abduljader	Construction Project Management	aseel.abdulla67@uoanbar.edu.iq

Course Description

1. Course Number & Title (Credit Hours, Required or Elective):
DWE1205: Calculus 1 (4, Required)

2. Catalog Description:
Calculus is the branch of mathematics that studies change and plays a vital role in science, engineering, economics, and many other fields. This course introduces the core ideas of calculus, including limits, differentiation, continuity, and methods for finding maximum and minimum values. While some topics may overlap with school mathematics, the course progresses quickly and develops these concepts at a deeper and more advanced level.

3. Prerequisite(s):
School mathematics.

4. Textbook(s) and/or other required materials:
George B. Thomas, Joel R. Hass, Christopher E. Heil, and Maurice D. Weir. *Thomas' Calculus*, 14th Edition. Pearson Education, Boston, 2018. ISBN: 9780134438986.

5. Course Objectives:

By the end of successful completion of this course, the student will be able to:

1. Understand the fundamental concepts of calculus and their role in describing change.
2. Evaluate and interpret limits of functions.
3. Apply differentiation techniques to a variety of mathematical functions.
4. Analyze continuity and determine where functions are continuous or discontinuous.
5. Use derivatives to find maximum and minimum values in practical problems.
6. Apply calculus concepts to solve problems in science, engineering, and economics

6. Topics:

1. The real numbers.
2. Intervals.
3. Inequalities.
4. The function.
5. The domain and range of function.
6. Sketch the function.
7. The limit.
8. The limit in infinity.
9. The continuity.
10. Derivatives.

11. Derivative rules.
12. Implicit derivative and higher order derivation.
13. Derivatives of Trigonometric Function.
14. Natural logarithm function.
15. The Exponential function.
16. The inverse Trigonometric functions.

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 2 times a week.

8. Design Project:

None

9. Computer/software Use:

None.

10. Evaluation Methods:

Exams 5-quizzes 25% (25), 2 assignment homework 5% (5), Activates 5% (5), Report 5% (5), 2 mid-term exams 10% each, (10), and final exam 50% (50).

11. Contribution to Professional Component:

This course provides students with fundamental mathematical tools to analyze and model change in scientific, engineering, and economic problems. It develops analytical and problem-solving skills through the study of limits, derivatives, and optimization techniques, forming a strong foundation for advanced courses in mathematics and applied sciences.

12. Relationship to Student Outcomes:

This course supports student outcomes by developing analytical thinking, quantitative reasoning, and problem-solving skills. It enables students to apply mathematical methods to analyze real world problems, interpret results, and build a strong foundation for advanced studies in science, engineering, and related fields

13. Prepared by:

Lec. Mohammed T. Nawar

1. Course Number & Title (Credit Hours, Required or Elective):
DWE1203: Physics (3, Required)

2. Catalog Description:
The main strategy that will be adopted in the delivery of the Physics course is to encourage students to understand and analyze kinematic problems and use basic mathematical equations in solving problems as well as participate in exercises, while improving and expanding their critical thinking skills at the same time. This will be achieved through classes and interactive tutorials and by looking at the types of simple experiments that involve investigating theories of kinetic physics.

3. Prerequisite(s):
- None

4. Textbook(s) and/or other required materials:
1. 1- R.D. Knight, Physics for Scientists and Engineers, 2nd ed., Pearson 2008 Laboratory Manual, Compiled by Instructor

5. Course Objectives:

1. Learn the basics of physics problems.
2. Study the motion of particles in one and two dimensions.
3. Study vectors
4. Study fluid mechanics.

6. Topics:

1- Physics and Measurement
1.1- Standards of Length, Mass, and Time
2- Motion in One Direction
2.1- Particle Model
3- Vectors
3.1- Coordinate System
4- Motion in Two Dimension
4.1- The Position, Velocity and Acceleration Vectors
5- The Laws of Motion
5.1- Newton's First Law and Inertial Frames
6- Circular Motion and Other Applications of Newton's Law
6.1- Non uniform Circular Motion
7- Temperature
7.1- Zeroth Law of Thermodynamics
8- Energy and Energy Transfer
8.1- Work Done by Constant Force
8.2- The Scalar Product of Two Vectors
8.3- Work Done by Varying Force
8.4- Work DONE by a Spring
8.5- Kinetic Energy and the Work-Kinetic Energy Theorem
8.6- Conservations of Energy
8.7- Situations Involving Kinetic Energy
8.8- Power
8.9- Energy and the Automobile
Physics 1 Lab
Mechanical Physics Experiments
1- Determination the Density of Solid Materials

2- Verification of Hooks Law
3- Determination the Value of Gravity Acceleration (Simple Pendulum)
4- Determination the Coefficient of Viscosity
5- Measurement of Liquid Density
6- Verification of Newton's Second Law
7- Verification of continuity Equation
8- Determination the Mechanical Equivalent of Heat
9- Determination the Specific Heat Capacity of a Solid

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 2 times a week.

8. Design Project:

None

9. Computer/software Use:

Students typically use word in writing their reports of problem-based learning.

10. Evaluation Methods:

Exams (5 quizzes 25%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 40%)

11. Contribution to Professional Component:

In this course, students learn how to apply the basics of physics and newtons laws

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1)

13. Prepared by:

Hend Saad Zayan

Course Number & Title (Credit Hours, Required or Elective):
DWE 1210: Computer Science (2, Required)

1. Catalog Description:

This course presents an overview of fundamental computer science topics essential for engineering students. The primary focus is on mastering computer applications and understanding the interaction between hardware and software. .

2. Prerequisite(s):
Non

3. Textbook(s) and/or other required materials:
- Introduction to Computers by Peter Norton.
- Shelly Cashman Series: Microsoft Office 365 & Office 2019 (or later versions) – Introductory/Advanced

5. Course Objectives:

By the end of successful completion of this course, the student will be able to:

1- To develop proficiency in using Microsoft Office applications.
2- To understand the integration of Microsoft Office tools in computer science tasks.
3- To enhance productivity and efficiency through the effective use of Office applications.
4- To apply Microsoft Office skills to real-world scenarios and projects

6. Topics:

1. Computer Fundamentals and safety

2. Computer Components

3. Operation system

4. Introduction to MS-Word

5. Insert objects in MS-Word

6. Additional tasks in MS-Word

7. Introduction to MS-Power Point

8. Introduction to MS-Excel

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 2 times a week.

8. Design Project:

None

9. Computer/software Use:

1- Microsoft Excel (Core Focus):

2- Operating Systems (Windows):

3- Technical Documentation (MS Word):

4- Presentation Tools (MS PowerPoint):

5-Internet & Research Tools:

10. Evaluation Methods:

Exams (5 quizzes 25%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 50%)

11. Contribution to Professional Component:

Engineering Tools

Data Analysis .

Technical Documentation

Digital Literacy

Professional Presentation

.**12. Relationship to Student Outcomes:**

Course Learning Objectives (related Student Outcome 1 and 2)

13. Prepared by:

Dr. Ibtihal A. Mawlood

1. Course Number & Title (Credit Hours, Required or Elective):
DWE 1209: Chemistry (5, Required)

2. Catalog Description:
principle topics in chemistry, including Atomic Number, Mass Number, and Isotopes. The Periodic Table ,Molecules and Ions , Measurements. Handling Numbers. Dimensional Analysis in Solving Problems , Chemical Formulas. Amounts of Reactants and Products. Limiting Reagent Calculations. Reaction Yield , Molecular Mass. Concentration of Solutions. Acid-Base Titrations. Gases. Pressure , The Ideal Gas Equation. Gas Stoichiometry. Partial Pressures , The Nature of Energy and Types of Energy, Enthalpy of Chemical Reactions , From Classical Physics to Quantum Theory. Bohr's Theory of the Hydrogen Atom. Quantum Numbers. Atomic Orbitals. Electron Configuration , Ionization Energy . The Concept of Resonance , Valence Bond Theory

3. Prerequisite(s):
None

4. Textbook(s) and/or other required materials:
1. GENERAL CHEMISTRY, Raymond Chang & Jason Overby , sixth Edition

2. Chang R. & College W., Chemistry, McGraw Hill 9th ed., 2007

5. Course Objectives:
In this course, students will learn:
1. Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics and be able to solve problems related to chemical principles.
2. Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
4. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
5. Develop and conduct appropriate experimentation, analyze, and interpret data, and use engineering judgment to draw conclusions.

6. Topics:

Measurements. Handling Numbers. Dimensional Analysis in Solving Problems

Recognize chemical safety and hazardous materials icons and apply laboratory safety rules.

Atomic Number, Mass Number, and Isotopes. The Periodic Table.

Molecules and Ions.

Describe laboratory instruments and some basic techniques used in the chemistry laboratory, including balances and standard volumetric equipment.

Chemical Formulas. Naming Compounds. Atomic Mass. Avogadro's number and Molar Mass of an Element.

Describe and use UV/VIS spectrophotometric methods of analysis**.**

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 2 times a week.

8. Design Project:

Lab.

9. Computer/software Use:

Students typically use word in writing their reports of problem-based learning.

10. Evaluation Methods:

Exams (5 quizzes 25%, Lab. report 6%, class and Homework 9% , test 10%, mid-term exam 10%, and three-hours final exam 40%)

11. Contribution to Professional Component:

In this course, students learn how to apply the basics of mathematics to analyze and solve engineering problems.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 5)

13. Prepared by:

Prof. Majeed Mattar Ramal

1. Course Number & Title (Credit Hours, Required or Elective):
DWE1314: Fundamentals of Electrical Engineering

2. Catalog Description:
This course introduces the basics of electric circuits, series and parallel connection, and DC circuit analysis. Additionally, the course presents ohms law, Kirchhoff laws for solving series parallel circuits. Furthermore, it introduces circuit theorem and their analysis; including mesh, nodal, and superposition theorems. Thevenin and Norton theorems are also included. Finally, the course introduces capacitors and inductor into the circuit and how to deal with it under DC condition.

3. Prerequisite(s):
Basic understanding of mathematics (algebra and calculus) and physics (fundamentals of electricity and magnetism).

4. Textbook(s) and/or other required materials:

1. Alexander and Sadiku “Fundamentals of Electric Circuits” Third Edition McGraw Hill.
2. Boylestad, R. L., Introductory Circuit Analysis (10th Edition).

5. Course Objectives:

By the end of successful completion of this course, the student will be able to:

1. Understanding basic electrical concepts and principles
2. Apply circuit analysis techniques to solve electrical problems
3. Develop problem-solving and critical thinking skills in electrical engineering.
4. To develop problem solving skills and understanding the fundamentals of electrical engineering through the application of techniques.
5. To be able to solve series and parallel DC circuit.
6. To be able to understand Ohms Kirchhoff's current and voltage Laws problems.
7. To be able to analyze Nodal analysis, Mesh analysis, Source transformation.
8. To perform mesh and Nodal analysis.
9. To be able to analyze R, L, C circuit.

5. Topics:

1. Introduction to electrical engineering
2. Charge, current, and voltage
3. Ohms law
4. Ohms law
5. Kirchhoff laws
6. Kirchhoff laws
7. Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit
8. Star delta analysis
9. Nodal analysis
10. Nodal analysis
11. Mesh analysis
12. Source transformation
13. Superposition theorem
14. Thevenin circuits

15. Norton circuits

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 2 times a week.

8. Design Project:

None

9. Computer/software Use:

Multisim

10. Evaluation Methods:

Exams (5 quizzes 25%, LAB 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 50%)

11. Contribution to Professional Component:

In this course, students will learn the fundamental principles of electrical engineering, including voltage, current, resistance, and power. They will gain the ability to analyze and solve basic electrical circuits using Ohm's Law and Kirchhoff's laws, both theoretically and practically. Students will also develop hands-on skills in laboratory experiments, using electrical instruments safely, and interpreting experimental results. The course helps students connect theory to real-world applications, build strong problem-solving and analytical skills, and understand the foundational professional practices required in engineering.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1, 2 and 3)

13. Prepared by:

Dr. Ahmed Shakir Abdullah

1. Course Number & Title (Credit Hours, Required or Elective):
DWE1101: English Language I (2, Required)

2. Catalog Description:
This course is for beginner students who want to learn basic English. Students learn simple English words, sentences, and everyday expressions. The course focuses on the four main language skills: listening, speaking, reading, and writing. Students practice basic grammar, simple conversations, and common vocabulary used in daily life. During the course, students learn how to: Introduce themselves and others, ask and answer simple questions, talk about daily activities, understand short texts and conversations, write simple sentences and short paragraphs. The course uses the Headway Beginner book and classroom activities to help students improve their English step by step. By the end of the course, students will be able to communicate in basic English in simple everyday situations.

3. Prerequisite(s):
None

4. Textbook(s) and/or other required materials:
Title: New Headway Plus: Beginner Student's Book, Authors: John Soars and Liz Soars, Publisher: Oxford University Press.

5. Course Objectives:
By the end of successful completion of this course, the student will be able to:

1. Develop basic English communication skills in listening, speaking, reading, and writing for beginner learners.
2. Introduce fundamental English grammar structures, including the verb to be, subject pronouns, basic sentence structure, and simple present tense.
3. Build essential vocabulary related to everyday topics such as greetings, personal information, family, daily activities, and numbers.
4. Enable students to participate in simple conversations using common expressions and basic question–answer patterns.
5. Improve students' listening comprehension through exposure to short dialogues and simple spoken English.
6. Develop basic reading skills through understanding short texts, dialogues, and simple written information.
7. Introduce basic writing skills, including writing simple sentences and short personal descriptions.
8. Encourage confidence in using English in everyday communication situations.
9. Provide a foundation for further English language learning in higher-level courses.

6. Topics:

1. Unit 1 – Hello.
2. Unit 2 - Your world.
3. Unit 3 - All about you.
4. Unit 4 - Family and friends.
5. Unit 5 - The way I live.
6. Unit 6 - Every day.
7. Unit 7 - My favorites.

8. Unit 8 - Where I live.
9. Unit 9 - Times past.
10. Unit 10 - We had a great time.
11. Unit 11 - I can do that.
12. Unit 12 - Please and thank you.
13. Unit 13 - Here and now.
14. Unit 14 - It's time to go.

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 1 time a week.

8. Design Project:

None

9. Computer/software Use:

None.

10. Evaluation Methods:

Exams (5 quizzes 25%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 50%)

11. Contribution to Professional Component:

The English Language I course contributes to the professional development of students by providing the fundamental language skills necessary for academic study and future professional communication. The course helps students develop the ability to understand and use basic English in educational and workplace contexts. Through the development of listening, speaking, reading, and writing skills, students gain the ability to communicate simple ideas, understand basic instructions, and interact in everyday academic situations.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 4)

13. Prepared by:

Assist. Prof Dr. Hamid Ahmed Awad

1. Course Number & Title (Credit Hours, Required or Elective):
DWE1103: Human Rights & Democracy (2, Required)

2. Catalog Description:
Familiarity with the basic principles of human rights and freedoms

Familiarity with the roots of human rights and freedoms and their development in human history

Familiarity with human rights in contemporary and modern history

Familiarity with essential human rights and collective human rights.

3. Prerequisite(s):
• UOA 005 : Human Rights & Democracy

4. Textbook(s) and/or other required materials:
Human rights and their guarantees in Islam
Mr. Dr. Mustafa Al Zalmi
5. Course Objectives:

1. The student should be able to recognize the basic concepts of human rights
2. The student should be able to identify the limits of human rights advanced in human history.
3. The student should be able to identify human rights in contemporary and modern history.

6. Topics:

1. Definition of rights and their guarantees before the judiciary.

2. Categories of human rights in Islamic law and jurisprudence.

3. Categories of individual rights in relation to society.

4. Categories of individual rights in relation to other individuals.

5. Categories of societal rights in relation to society.

7. Class/laboratory Schedule:

Each lecture lasts 120 minutes.

8. Design Project:

None

9. Computer/software Use:

None.

10. Evaluation Methods:

Exams (5 quizzes 25%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 50%)

11. Contribution to Professional Component:

In this course, the student learns the concept of human rights and democracy.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1 and 3)

13. Prepared by:

Dr. majid hadi talal

1. Course Number & Title (Credit Hours, Required or Elective):
DWE 1202: Calculus 2 (2, Required)

2. Catalog Description:
Calculus 2 is related to basic differential and integration principles related to Integration techniques, surface area and arch length, improper integrals and comparison test, polar coordinates and parametric equations, Sequences and infinite series.

3. Prerequisite(s):
Calculus 1 (DWE1201)

4. Textbook(s) and/or other required materials:
Calculus by Thomas & Finney

5. Course Objectives:

The goals of this course are to enable students to:

1. Identify integration problems using different forms and improper integrals by using different integration techniques.

2. Using integration techniques to determine arc length and surface area and sketch the graphs of polar equations and solving related problems including area and arc length.

3. Identify the properties of sequences and their limits.

6. Topics:

17. Techniques of integration: Integration by Parts
18. Integrating Rational Functions by Partial Fractions.
19. Integrals involving roots
20. Improper integrals: Types of Improper Integrals and
21. Comparison Test for Improper Integrals
22. Applications of Integrals: Applications of Integrals,
23. Arc length, Surface Area,
24. Parametric Equations and Curves
25. Parametric Equations and Curves
26. Tangents with Parametric Equations
27. Polar Coordinates Technique: Polar Coordinates
28. Tangents with Polar Coordinates Curves defined by parametric equations.
29. Arc Length with Polar coordinates, Area in Polar Coordinates
30. Sequences and Series: Infinite series
31. The comparison. Ratio and Root tests.
32. Alternating series. Conditional convergence
Maclaurin and Taylor series and their approximation, Power series

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 2 times a week.

8. Design Project:

None

9. Computer/software Use:

None.

10. Evaluation Methods:

Exams (5 quizzes 25%, online assignment homework 6%, classwork 5%, report 4%, mid-term exam 10%, and three-hours final exam 50%)

11. Contribution to Professional Component:

In this course, the student will learn the basic relationships of integrals in Math.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1)

13. Prepared by:

Assist. Prof Dr. Aseel. M. Mohammed

1. Course Number & Title (Credit Hours, Required or Elective):
DWE1204: Physics (5, Required)

2. Catalog Description :
The course is a survey of the concepts, principles, methods and major findings of classical Physics. Primarily, it covers Newtonian mechanics, and thermal Physics, with topics include: Physics and measurement, Vectors, kinematics and dynamics of motion of a single particle in one and two dimensions, work and energy, system of particles, linear momentum and collisions, kinematics and dynamics of rotational motion, equilibrium of rigid bodies, and elasticity, fluid static and fluid dynamics, oscillatory motion, wave motion, and temperature and thermal equilibrium.

3. Prerequisite(s):

• None

4• Textbook(s) and/or other required materials:

1. R.D. Knight, Physics for Scientists and Engineers, 2nd ed.(2014),

2. Pearson 2008 Laboratory Manual, Compiled by Instructor.

5. Course Objectives:

In this course, – Computer Science students will learn:

1. Understanding the basics of physics problems.
2. Study the motion of particles in one and two dimensions, vectors and newton's laws.
3. Study fluid mechanics.
4. Study temperature and thermal equilibrium.
5. Study work done and energy.

6. Topics:

1. Physics and Measurements
2. Motion in one Dimension
3. Vectors
4. Motion in two Dimensions
5. State the Newton's three laws of motion
6. Circular Motion
7. Laws of motion
8. State the two conditions of static and dynamic equilibrium of a point particle and a rigid body
9. Analyze the problems of static fluid in terms of density and pressure,
10. Simple Harmonic Motion qualitatively and quantitatively
11. Define what is meant by: temperature, specific and molar heats of capacity.
12. State zeroth and first laws of thermodynamics and use them to solve some related problems.
13. Theory of heat energy transfers and apply it in some simple situations.

Lab Topics:

1. Determination The Density of Solid Materials
2. Verification of Hooks Law
3. Determination the Value of Gravity Acceleration (Simple Pendulum)
4. Determination the Coefficient of Viscosity
5. Measurement of Liquid Density
6. Verification of Newton's Second Law
7. Verification of continuity Equation
8. Determination the Mechanical Equivalent of Heat
9. Determination the Specific Heat Capacity of a Solid

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, (120 min. Lab) 1 time a week.

8. Design Project:

None

9. Computer/software Use:

None

10. Evaluation Methods:

Exams (3 quizzes 15%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, 10% laboratory and three-hours final exam 50%)

11. Contribution to Professional Component:

In this course, students learn how to solve the basics of physics to analyze and solve engineering problems.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1)

13. Prepared by:

Lec. Dr.Haitham Zeddan Hussein

1. Course Number & Title (Credit Hours, Required or Elective):
DWE1302: Engineering Geology (5, Required)

2. Catalog Description:
Interpretation of geology for the purpose of planning, siting, design, and construction of engineered facilities. Includes an overview of geology, engineering geologic mapping, and specific consideration of engineering applications such as dams, reservoirs, and tunnels.

3. Prerequisite(s): Non

4. Textbook(s) and/or other required materials:
Terry R. West, Geology Applied to Engineering, Waveland Press, 1995.

5. Course Objectives:

1. To study and identify different types natural materials like rocks & minerals.
2. To know the physical properties of rocks & minerals.
3. Have knowledge about geohazards, earthquakes, and tunneling.
4. To know the importance of geological maps.

6. Topics:

1- Introduction

1.1 Definition, purpose and scope

1.2 The Earth and Its Systems -

2-Minerals

2.1Types and classifications of minerals

2.2 Rocks:

2.2.1Types and cycle of rock formation

2.2.2 geological folds, faults and joint

2.2.3 Engineering & physical properties of rocks

3- Engineering Maps

(Topographic & Geological Maps)

4- Geohazards

4.1-ground movements

4.2-ground failure

4.3 -slope unstability

4.4-seisms

5Introduction to Geology of Tunnels & Dams

5.1- tunnels

5.1.1-types of tunnels.

5..1.2- Methods of tunnel.

5.1.3-tunnel (opening) in massive rock, two-dimensional case.

5.1.4-stress distribution around circular opening.

5.1.5- required studies for tunnels construction (effect of layers, floods and fault).

5.2- dams

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 2 times a week.

8. Design Project:

None

9. Computer/software Use:

Students typically use word in writing their reports of problem-based learning.

10. Evaluation Methods:

Exams (5 quizzes 25%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 50%)

11. Contribution to Professional Component:

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 2)

13. Prepared by:

Dr. Rafid Saadoon Rashid

1. Course Number & Title (Credit Hours, Required or Elective):
DWE1313: Engineering Mechanics (Statics)

2. Catalog Description:
The course uses the Laws of Mechanics to predict forces in and motions of and structures. The course is the key prerequisite course to sequences of courses dealing with Engineering Mechanics, stress analysis and design of mechanics structer.
Engineering mechanics is the study of how physical systems behave under applied forces and moments. In this unit students are introduced to the fundamental tools and techniques used to analyze a range of 2D engineering mechanics problems. Topics deals with the equilibrium of bodies, that are at rest, coordinate systems, forces and moments, free body diagrams, static equilibrium for frames and trusses in palne and space.

3. Prerequisite(s):
Physics DWR1203 , Calculus- I DWR 1201

4. Textbook(s) and/or other required materials:
Engineering Mechanics: Statics (14th Edition) by R.C. Hibbeler.

5. Course Objectives:

By the end of successful completion of this course, the student will be able to:

1. To understand and use the general ideas of force vectors and equilibrium of particle and rigid body.
2. To understand and use the general ideas of structural analysis and internal force and friction.
3. To understand and use the general ideas of center of gravity, centroids and moments of inertia.

6. Topics:

General principles

2. Force vectors
3. Equilibrium of aparticle
4. Force system resultants
5. Equilibrium of a Rigid Body
6. Structural Analysis trass
7. Internal Forces
8. Friction
9. Center of Gravity and Centroid of Areas
10. Moments of Inertia (Second Moment of Areas)

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 2 times a week.

8. Design Project:

None

9. Computer/software Use:

None.

10. Evaluation Methods:

Exams (5 quizzes 25%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 50%)

11. Contribution to Professional Component:

In this course, the student will learn the basic relationships of Mechanics (Statics)

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1)

13. Prepared by:

Assist. Prof Dr. Ayad S. Aadi

1. Course Number & Title (Credit Hours, Required or Elective):
DWE1101 : Arabic (2, Required)

2. Catalog Description:
This course description provides a summary of the most important characteristics of the course and the learning outcomes that the student is expected to achieve, demonstrating whether he or she has made the most of the learning opportunities available. It must be linked to the program description

3. Prerequisite(s):
Arabic (DEW1101)

4. Textbook(s) and/or other required materials:
Ministry curriculum for the Arabic language subject.

5. Course Objectives:

7. A- Knowledge and understanding
8. Acquiring the vocabulary explained in the field "Topics to be researched and covered"
9. Acquiring correct literary writing skills
10. Ensure that the student is able to write according to language rules

6. Topics:

1. The Hamza at the Beginning of Speech
2. Punctuation
3. The Arabic Dictionary
4. Al-Mutanabbi
5. Truth and Rhyme
6. Literature and Its Types
7. Literary Schools

7. Class/laboratory Schedule:

Lecture schedule: Each lecture is 120 minutes long, once a week. .

8. Design Project:

None

9. Computer/software Use:

None.

10. Evaluation Methods:

Exams (5 quizzes 25%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 50%)

11. Contribution to Professional Component:

In this course, the student will learn the basic relationships of soils

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1 and 2)

13. Prepared by:

Assist. Prof Dr. Majid Hadi Talal

1. Course Number & Title (Credit Hours, Required or Elective)
DWE1206: Engineering Drawing (3 Credit Hours, Required)

2. Catalog Description
This course introduces the basic principles of engineering drawing and its importance in engineering communication. Students learn the use of drawing instruments, geometric constructions, orthographic projections, sectional views, dimensioning, and isometric drawing. The course develops practical skills in preparing accurate engineering drawings used in engineering applications.

3. Prerequisite(s)
None.

4. Textbook(s) and/or Other Required Materials
1. Engineering Drawing, Abdul-Rasool Al-Khafaf.

2. Engineering Drawing Workbook, Civil Engineering Department, College of Engineering, University of Basra.

5. Course Objectives
1. Understand the importance of engineering drawing as the language of engineering.

2. Learn how to use engineering drawing instruments correctly.

3. Understand the basic principles and standards of engineering drawing.

4. Perform geometric constructions and drawing operations.

5. Apply orthographic projections and sectional drawings.

6. Develop the ability to prepare accurate engineering drawings.

6. Topics
1. Introduction to engineering drawing and its importance.

2. Drawing instruments and their uses.

3. Basic principles of engineering drawing and types of lines.

4. Geometric constructions in engineering drawing.

5. Division of lines and angles and drawing basic geometric shapes.

6. Drawing circles, arcs, and tangents.

7. Drawing geometric figures using drawing instruments.

8. Practical exercises in geometric constructions.

9. Orthographic projections (multi-view drawings).

10. Applications of orthographic projections.

11. Sectional views in engineering drawing.

12. Applications of sectional views.

13. Dimensioning in engineering drawing.

14. Isometric drawing.

15. Practical drawing exercises.

7. Class/Laboratory Schedule
15 weeks of 180 min. lectures, 1 time a week.

8. Design Project
None.

9. Computer/software Use
Students typically use manual drawing tools such as drawing boards, T-square, triangles, compasses, and pencils during practical drawing exercises.

10. Evaluation Methods
Exams (Quiz 10% (10), Mid-Term Exam 40% (40), Final Exam 50% (50)).

11. Contribution to Professional Component
The student will learn the basic principles of engineering drawing, the use of drawing instruments, geometric constructions, orthographic projections, sectional views, dimensioning, and isometric drawing used in engineering applications.

12. Relationship to Student Outcomes
Course Learning Objectives (related Student Outcome 3 & 5).

13. Prepared by
Dr. Ahmed Adnan

Assist. Prof. Khalid Awadh Mohammed

1. Course Number & Title (Credit Hours, Required or Elective):
DWE1104 : Baath regime crimes in Iraq (2, Required).

2. Catalog Description:
This course description provides a summary of the most important characteristics of the course and the learning outcomes that the student is expected to achieve, demonstrating whether he or she has made the most of the learning opportunities available. It must be linked to the program description.

3. Prerequisite(s):
Baath regime crimes in Iraq (DWE1104).

4. Textbook(s) and/or other required materials:

The Ministry's curriculum for the subject of Baath Party crimes.

5. Course Objectives:

To identify the data and information that the defunct and dissolved Ba'ath Party controls for the benefit of the Iraqi people from various components of its spectrum and to establish public awareness to reject all forms of injustice and domination over these electronics and to demand civil and political rights.

6. Topics:

1.Ba'ath Party Crimes under the Iraqi Criminal Court Law.

2.The Concept and Classification of Crimes.

3.Definition of Crimes in Linguistics and Terminology.

4.Types of International Crimes.

5. Decisions Issued by the Criminal Court.

6.Psychological and Social Crimes and the Most Prominent Violations of the Ba'ath Party.

7. Psychological Crimes.

8. Social Crimes.

9. Militarization of Society.

11. The Ba'ath Party's Stance on Religion.

12. Violations of Iraqi Laws.

7. Class/laboratory Schedule:

Lecture schedule: Each lecture is 120 minutes long, once a week.

8. Design Project:

None.

9. Computer/software Use:

None.

10. Evaluation Methods:

Exams (5 quizzes 25%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 50%).

11. Contribution to Professional Component:

In this course, the student will learn about the crimes that occurred during the previous regime and how they were dealt with.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1 and 2).

13. Prepared by:

Assist. Dr. Yassin Jumaa Muhammad .

1. Course Number & Title (Credit Hours, Required or Elective):
DWE2211: Calculus -III (3, Required)

2. Catalog Description:
Advanced topics in calculus, including vectors and vector-valued functions, partial differentiation, Lagrange multipliers, multiple integrals, and Jacobians; application of the line integral, including Green's Theorem, the Divergence Theorem, and Stokes' Theorem.

3. Prerequisite(s):
• DWE1201-Calculus I

• DWE1202-Calculus II

4. Textbook(s) and/or other required materials:
1. Thomas' Calculus Early Transcendentals 12th Edition.by George B. Thomas Jr. (Author), Maurice D. Weir (Author), Joel R. Hass (Author).
2. Calculus, by H. Anton, I. Bivens, and S. Davis, 8th Edition, 2002, Wiley

5. Course Objectives:

In this course, – Computer Science students will learn:
6. Convergence tests
7. Power Series
8. Taylor Series
9. Representations of Functions by Taylor Series
10. representations and operations with functions

11. vector functions
12. directional derivatives
13. gradient
14. tangent planes

6. Topics:

1. The Geometry of Space
1.1 Lines, planes, and surfaces in space
1.2 Cylindrical and spherical coordinates

2. Vector-Valued Functions
2.1 Space curves and vector-valued functions
2.2 Differentiation of vector-valued functions
2.3 Integration of vector-valued functions
2.4 Applications of vector-valued functions

3. Functions of Several Variables
3.1 Partial derivatives and differentials
3.2 Chain rule for one or two independent variables
3.3 Implicit partial differentiation
3.4 The directional derivative of a function of two variables
3.5 The gradient of a function of two variables and applications

4. Multiple Integration
4.1 Iterated integrals and area of a plane region
4.2 Double integrals and volume of a solid region

5. Vector Calculus
5.1 Vector fields and line integrals
5.2 The fundamental theorem of line integrals
5.3 Green's theorem and applications
5.4 Parametric and surface integrals
5.5 Divergence theorem and applications
5.6 Stokes's theorem and applications

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 2 times a week.

8. Design Project:

None

9. Computer/software Use:

Students typically use word in writing their reports of problem-based learning.

10. Evaluation Methods:

Exams (5 quizzes 25%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 50%)

11. Contribution to Professional Component:

In this course, students learn how to apply the basics of mathematics to analyze and solve engineering problems.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1)

13. Prepared by:

Hend Saad Zayan

1. Course Number & Title (Credit Hours, Required or Elective):
DWE2304: Dynamics (3, Required)

2. Catalog Description:
Study of the motion of particles and rigid bodies, covering kinematics of displacement and velocity, and kinetics involving force, acceleration, work-energy, and impulse-momentum.

3. Prerequisite(s):
• DWE1203: Physics, DWE1201: Calculus I, DWE2303: Static

4. Textbook(s) and/or other required materials:

J.L. MERIAM L.G. KRAIGE, Engineering Mechanics: Vol 2. Dynamics. Ninth Edition

5. Course Objectives:

The goals of this course are to enable students to:

1. Understand basic kinematics concepts: displacement, velocity, and acceleration.

2. Understand basic dynamics concepts: force, momentum, work and energy.

3. Understand and be able to apply Newton's laws of motion.

4. Understand and be able to apply other basic dynamics concepts - the Work-Energy principle, Impulse-Momentum principle and the coefficient of restitution.

5. Learn to solve dynamics problems. Appraise given information and determine which concepts apply, and choose an appropriate solution strategy.

6. Gain an introduction to basic machine parts such as pulleys and mass-spring systems.

6. Topics:

1) Introduction of Dynamics.

2) Attractive Force between two bodies.

3) Kinematics of Particles.

4) Rectilinear Kinematics: Erratic Motion.

5) Curvilinear Motion / Kinematics.

6) Motion of a Projectile / Kinematics.

7) Absolute Dependent Motion Analysis of Two Particles.

8) Curvilinear Motion Normal and Tangential Components.

9) Kinetics of a Particle Force and Acceleration.

10) Newton's Second Law of Motion.

11) Rectilinear Motion / Kinetics.

12) Kinetics of a Particle Work and Energy.

13) Principle of Work and Energy.

7. Class/laboratory Schedule:

15 weeks of 180 min. lectures, 1 time a week.

8. Design Project:

None

9. Computer/software Use:

None

10. Evaluation Methods:

Exams 5-quizzes 25% (25), 2 assignment homework 5% (5), Activates 5% (5), Report 5% (5), 2 mid-term exams 10% each, (10), and final exam 50% (50).

11. Contribution to Professional Component:

Dynamics contributes to the professional component by establishing the fundamental principles of motion and time-dependent forces necessary for structural analysis. It bridges basic physics with advanced engineering applications, such as designing for seismic loads, wind impacts, and moving traffic on bridges. The course enhances analytical skills through the mathematical modeling of complex systems using work-energy and impulse-momentum methods. Ultimately, it equips civil engineers with the essential tools to ensure the safety and stability of structures under dynamic real-world conditions.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1&2)

13. Prepared by:

Lec. Mohammed T. Nawar

1. Course Number & Title (Credit Hours, Required or Elective):
DWE2305: Fluids Mechanics (6, Required)

2. Catalog Description:
Fluid mechanics combines the study of fluid behavior with topics from engineering mechanics and hydraulic structures (pressure , energy, and loss of flow) in order to design all manner of hydraulic structures. In general, practical concepts of fluid properties, and basic mechanics are applied in this course to the design of hydraulic structures.

3. Prerequisite(s):
• None

4. Textbook(s) and/or other required materials:
1. Fluid Mechanics, Streeter

5. Course Objectives:
The goals of this course are to enable students to:

1. Understand the practical concepts of fluid behavior and their interaction with fluid and structures.
2. Apply the knowledge of fluid properties and basic mechanics to analyze and design hydraulic structures that are related to Dams and Water Resources Engineering program.

6. Topics:

1. Introduction,
2. Properties of fluids
3. Fluid in static pressure
4. Hydrostatic force on submerged surface
5. Acceleration fluids mass
6. Liquid in motion
7. Rate of change of momentum,
8. Energy and hydraulic grade lines
9. Pipes flow
10. Losses in flow of fluid
11. Friction factor in pipes
12. Simple pipe problems
13. Pipes in series and in parallel
14. Branch of pipes lines

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 2 times a week.

8. Design Project:

None

9. Computer/software Use:

Students typically use word in writing their reports of problem-based learning.

10. Evaluation Methods:

Exams (5 quizzes 25%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 50%).

11. Contribution to Professional Component:

In this course, students learn how to apply the basics of fluid mechanics to analyze and solve engineering problems.

12. Relationship to Student Outcomes:

By the end of successful completion of this course, the student will be able to:
1. The students should be able to define and describe the following basic properties of fluid such as relative density or specific density, viscosity, surface tension, atmospheric pressure as well as Newtonian and Non-Newtonian fluids.
2. The students will be able describe and define the hydrostatic forces on submerged surface, and calculate it.
3. The student will be able to identify the laminar and turbulent flow .
4. The students should demonstrate an understanding of the following concepts relating to fluid in motion: Continuity equation, Bernoulli equation, Momentum concept
5. The student will be able to apply the fundamental concepts to problems of flow in pipes.
6. The student will be able to determine the losses of flow in pipes.
7. The students will learn the differences and similarities between pipe flow systems like, pipes in series, pipe in parallel and branch pipes and how solve these problems.
8. The student will be able to draw energy and hydraulic grade lines.

13. Prepared by:

Yasir Abdulmajeed Mohammed &Uday Hatem Abdulhameed

1. Course Number & Title (Credit Hours, Required or Elective):
DWE2306: Engineering Surveying I (3, Required)

2. Catalog Description:
In this course, students are introduced to the fundamental concepts of Engineering Surveying that will be used to analyze problems related to measurements of distances and angles. Specifically, the methods of direct and indirect horizontal and vertical distances, and traversing will be discussed. The laboratory component of this course will provide different instruments for distance measurements, and level instruments for vertical distances, as well as a theodolite for angle measurements.

3. Prerequisite(s):
DWE1201-Calculus I
DWE1202-Calculus II

4. Textbook(s) and/or other required materials:
An Introduction to Geomatics by CHARLES D. GHILANI & PAUL R. WOLF "", 6th edition

5. Course Objectives:

Following completion of this course, students will be able to:

1. Show the student the necessity of redundant information and methods for determining and evaluating errors.
2. Understand the principles of leveling, measure vertical distances and apply the skills of leveling.
3. Understand the principle of angles measurements and determine the directions.
4. Develop, test and calibrate of sensors, instruments and systems for the surveying purposes.
5. Define the importance of traverse computation in omitted measurement and compute area of plots by using different types of area computation techniques.

6. Topics:

1- Basic principles of surveying.
2- Tapping measurements.
3- Leveling theory and methods.
4- Distances measurements tacheometeric or optical method.
5- Distances measurements using Electronic mehods(EDM).
6- Angles, Azimuth and bearing
7- Traversing

7. Class/laboratory Schedule:

15 weeks of 150 min. lectures, 2 times a week.

8. Design Project:

None

9. Computer/software Use:

None.

10. Evaluation Methods:

Exams (5 quizzes 25%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 50%)

11. Contribution to Professional Component:

In this course, the student will learn the basic measurements of distances and angles

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1 and 3)

13. Prepared by:

Prof Dr. Khamis N. Sayl

1. Course Number & Title (Credit Hours, Required or Elective):
DWE2307: Building Materials Technology (1, Required)

2. Catalog Description:
Advanced topics in building construction, including Excavations, earth fillings, how to deal with groundwater at the work site, foundation work, and basic information about the design of hydraulic facilities such as dams, bridges, culverts, etc.

3. Prerequisite(s):
Not Found

4. Textbook(s) and/or other required materials:
1. Building Constructions, Artin Levon and Zuhair Sako
2. Building Construction, Mohammed Abdullah

5. Course Objectives:

In this course, –students will learn:
1.Understand the construction materials and equipment's used in the creation of buildings

2.Apply the principles of construction used in the buildings above ground level, the buildings below the level of the earth's surface and lining.

6. Topics:

Introduction – Stages of building construction, Buildings types, Building construction development

Earth works

Mechanical equipment's, Groundwater drainage, Earth fillings.

Footing and foundations

Piles, Concrete works underwater

Girder and columns

Water tanks

Dams

Retaining walls, Special constructions of hydraulic accumulators, Lining

Regulators, Culverts

Energy dissipation installations

Arches

Bridges

Damp proofing

Cladding works

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 1 time a week.

8. Design Project:

None

9. Computer/software Use:

Students typically use word in writing their reports of problem-based learning.

10. Evaluation Methods:

Exams (5 quizzes 25%, online assignment homework 6%, classwork 5%, report 4%, mid-term exam 10%, and three-hours final exam 50%)

11. Contribution to Professional Component:

In this course, students learn how to deal with the hydraulic structures to analyze and solve engineering problems.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1)

13. Prepared by:

Assist.Prof. Dr Aseel Madallah Mohammed

1. Course Number & Title (Credit Hours, Required or Elective):
DWE: English Language II (2, Required)

2. Catalog Description:
This course is for beginner students who want to learn basic English. Students learn simple English words, sentences, and everyday expressions. The course focuses on the four main language skills: listening, speaking, reading, and writing. Students practice basic grammar, simple conversations, and common vocabulary used in daily life. During the course, students learn how to: Introduce themselves and others, ask and answer simple questions, talk about daily activities, understand short texts and conversations, write simple sentences and short paragraphs. The course uses the Headway Beginner book and classroom activities to help students improve their English step by step. By the end of the course, students will be able to communicate in basic English in simple everyday situations.

3. Prerequisite(s):
None

4. Textbook(s) and/or other required materials:
Title: New Headway Plus: Beginner Student's Book, Authors: John Soars and Liz Soars, Publisher: Oxford University Press.

5. Course Objectives:
By the end of successful completion of this course, the student will be able to:

10. Develop basic English communication skills in listening, speaking, reading, and writing for beginner learners.
11. Introduce fundamental English grammar structures, including the verb to be, subject pronouns, basic sentence structure, and simple present tense.
12. Build essential vocabulary related to everyday topics such as greetings, personal information, family, daily activities, and numbers.
13. Enable students to participate in simple conversations using common expressions and basic question–answer patterns.
14. Improve students' listening comprehension through exposure to short dialogues and simple spoken English.
15. Develop basic reading skills through understanding short texts, dialogues, and simple written information.
16. Introduce basic writing skills, including writing simple sentences and short personal descriptions.
17. Encourage confidence in using English in everyday communication situations.
18. Provide a foundation for further English language learning in higher-level courses.

6. Topics:

15. Unit 1 – Hello.
16. Unit 2 - Your world.
17. Unit 3 - All about you.
18. Unit 4 - Family and friends.
19. Unit 5 - The way I live.

20. Unit 6 - Every day.
21. Unit 7 - My favorites.
22. Unit 8 - Where I live.
23. Unit 9 - Times past.
24. Unit 10 - We had a great time.

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 1 time a week.

8. Design Project:

None

9. Computer/software Use:

None.

10. Evaluation Methods:

Exams (5 quizzes 25%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 50%)

11. Contribution to Professional Component:

The English Language I course contributes to the professional development of students by providing the fundamental language skills necessary for academic study and future professional communication. The course helps students develop the ability to understand and use basic English in educational and workplace contexts. Through the development of listening, speaking, reading, and writing skills, students gain the ability to communicate simple ideas, understand basic instructions, and interact in everyday academic situations.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 4)

13. Prepared by:

Dr. Hamid Maher Zuhair

1. Course Number & Title (Credit Hours, Required or Elective):
DWE1209: Computer Programming- Visual Basic
2. Catalog Description:

This course presents an overview of fundamental computer science topics essential for engineering students. The primary focus is on mastering computer applications and understanding the interaction between hardware and software. .

3. Prerequisite(s):
Non

4. Textbook(s) and/or other required materials:
- Introduction to Computers by Peter Norton.
- Shelly Cashman Series: Microsoft Office 365 & Office 2019 (or later versions) – Introductory/Advanced

5. Course Objectives:

By the end of successful completion of this course, the student will be able to:

5- To develop proficiency in using Microsoft Office applications.
6- To understand the integration of Microsoft Office tools in computer science tasks.
7- To enhance productivity and efficiency through the effective use of Office applications.
8- To apply Microsoft Office skills to real-world scenarios and projects

6. Topics:

1. Computer Fundamentals and safety

2. Computer Components

3. Operation system

4. Introduction to MS-Word

5. Insert objects in MS-Word

6. Additional tasks in MS-Word

7. Introduction to MS-Power Point

8. Introduction to MS-Excel

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 2 times a week.

8. Design Project:

None

9. Computer/software Use:

1- Microsoft Excel (Core Focus):

2- Operating Systems (Windows):

3- Technical Documentation (MS Word):

4- Presentation Tools (MS PowerPoint):

5-Internet & Research Tools:

10. Evaluation Methods:

Exams (5 quizzes 25%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 50%)

11. Contribution to Professional Component:

Engineering Tools

Data Analysis .

Technical Documentation

Digital Literacy

Professional Presentation

.**12. Relationship to Student Outcomes:**

Course Learning Objectives (related Student Outcome 1 and 2)

13. Prepared by:

Dr. Ibtihal A. Mawlood

1.Course Number & Title (Credit Hours, Required or Elective):
DWE2212: Calculus-IV (3, Required)

2.Catalog Description:

This course introduces methods for solving first-order and second-order ordinary differential equations and their applications in engineering problems. The course also includes complex numbers, Laplace transforms, matrices, and Fourier series as mathematical tools used in engineering analysis.

3. Prerequisite(s):

• **DWE2212**Calulus I, **DWE2212**Calulus II, **DWE2212**Calulus III.

4.Textbook(s) and/or other required materials:

Differential Equations with Boundary-Value Problems, Dennis G. Zill and Michael R. Cullen, Seventh Edition.

5. Course Objectives:

The goals of this course are to enable students to:

1. Understand the basic concepts of differential equations.

2. Solve first-order and second-order differential equations.

3. Study complex numbers and their algebraic and trigonometric forms.

4. Apply Laplace transforms in solving differential equations.

6. Topics:

1) Introduction to differential equations

2) First-order differential equations

3) Applications of first-order differential equations

4) Second-order differential equations

5) Complex numbers and complex plane

6) Exponential and trigonometric forms of complex numbers

7) Laplace transform and properties

8) Inverse Laplace transform

9) Solving differential equations using Laplace transform

10) Laplace transform of periodic functions

11) Matrices and determinants

12) Inverse matrices and systems of equations

13) Fourier series representation

14) Even and odd functions in Fourier series

15) Solving equations using Fourier series

7. Class/laboratory Schedule:

15 weeks of 180 min. lectures, 1 time a week.

8. Design Project:

None

9. Computer/software Use:

Students typically use word or mathematical software in writing their reports and solving mathematical problems.

10. Evaluation Methods:

Exams (2 quizzes 5% (5), 2 assignment homework 5% (5), Projects / Lab. 10% (10), 2 mid-term exams 15% each ,(30), and final exam 50% (50).

11. Contribution to Professional Component:

The student will learn mathematical techniques including differential equations, Laplace transforms, complex numbers, matrices and Fourier series used in engineering analysis.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1&2)

13. Prepared by:

Asst. Prof. Khalid Awadh Mohammed

1. Course Number & Title (Credit Hours, Required or Elective):
DWE3314: open channels (6, Required)

2. Catalog Description:
Open channel flow and its classification. ,Properties of open channel flow, energy and momentum principals, critical flow with computation and applications, uniform flow with computation and applications, design of channel for uniform flow.

3. Prerequisite(s):
ENG 004 Calculus-II

DWR 003 Fluid mechanics

4. Textbook(s) and/or other required materials:
open channel hydraulics - chow

5. Course Objectives:

By the end of successful completion of this course, the student will be able to:

1. Ability to identify the types and regimes of flow in open channel.
2. Ability to identify the principals of momentum in open channel.
3. Ability to identify the energy and specific energy in open channel
4. Ability to analyze the problems of open channel flow and design open channel.
5. Ability to solve analysis and design problems related to bed material.
6. The student will be able to determine the losses of flow in pipes.
7. The students will learn the differences and similarities between pipe flow systems like, pipes in series, pipe in parallel and branch pipes and how solve these problems.
8. The student will be able to draw energy and hydraulic grade lines.

6. Topics:
Week Topic

1.Introduction

2.Types, state, and regimes of flow

3.Kinds of open channel

4.Channel geometry

5.Velocity-distribution coefficients

6.Pressure distribution in a channel section

7.Effect of slope on pressure distribution

8.Energy, and specific energy in open channel

9.Critical flow

10.Uniform flow

11.Erodible channels

12.Non erodible channels

13.Best hydraulic section

14.Determination of section dimensions.

15.rivew

7. Class/laboratory Schedule:

15 weeks of 180 min. lectures, 1 time a week.

8. Design Project:

None

9. Computer/software Use:

None.

10. Evaluation Methods:

Exams (5 quizzes 25%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 50%)

11. Contribution to Professional Component:

In this course, the student will learn the basic relationships of soils

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 2)

13. Prepared by:

Assist. Prof. UDAY HATEM

1. Course Number & Title (Credit Hours, Required or Elective):
DWE2309: Concrete Technology (3, Required)

2. Catalog Description:
Advanced topics in calculus, including cement, aggregates, fresh concrete, concrete durability, shrinkage and creep of concrete, and mix design of concrete.

3. Prerequisite(s):
Non

4. Textbook(s) and/or other required materials:
Concrete technology, Nevil.

5. Course Objectives:

In this course, – Concrete Technology students will learn:
15. Types of cement
16. Quality of aggregates
17. Sieve analysis of aggregate
18. Properties of fresh concrete
19. Design of concrete mixtures
20. Testing of cement and concrete

6. Topics:

1. Cement
1.1 Cement manufacturing and chemistry
1.2 Testing of cement

2. Types of cement
2.1 General types of cement
2.2 Types of Portland cement
2.3 prepared of deferent types of cement
2.4 special types of cement

3. Additives (admixtures) and water
3.1 definitions and types of additives
3.2 properties of water used in concrete mixtures
3.3 conditions of used additives

4. Aggregates
4.1 Important and purpose of aggregates in concrete
4.2 sieve analysis of aggregate
4.3 tests conducts on aggregate

5. Fresh concrete
5.1 fresh, green and hardened concrete
5.2 properties of fresh concrete
5.3 tests of fresh concrete
5.4 segregation of concrete, definition and avoid

6. **Types of concrete**
6.1 classifications of concrete
6.2 types of concrete
6.3 Special type of concrete

7. Design of mixtures

6.1- method of design
6.2- deferent between volumetric and weight method of proportions

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 2 times a week.

8. Design Project:

None

9. Computer/software Use:

Students typically use word in writing their reports of problem-based learning.

10. Evaluation Methods:

Exams (5 quizzes 25%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 50%)

11. Contribution to Professional Component:

In this course, students learn how design of concrete mixtures and make sieve analysis of aggregate. In addition to, evaluate of concrete quality in field and lab.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 3)

13. Prepared by:

Ghassan Subhi Jameel

1. Course Number & Title (Credit Hours, Required or Elective):
DWE2310: Engineering Surveying II (3, Required)

2. Catalog Description:
In this course, introduces knowledge about areas and volumes. Then, it moves to horizontal curves and types of horizontal curves. Also, this course presents astronomical surveying, GPS, type of measurements using GPS, and basic principles of remote sensing. Then this course ends with hydrographic surveying

3. Prerequisite(s):
DWE1201-Calculus I
DWE1202-Calculus II

4. Textbook(s) and/or other required materials:
An Introduction to Geomatics by CHARLES D. GHILANI & PAUL R. WOLF "", 6th edition

5. Course Objectives:

Following completion of this course, students will be able to:

1. Compute area by using different types of area computation techniques.

2. Determine volumes of various types of material and determine of quantities of water in reservoir.

3. Lay out different type of horizontal curve in the field with surveying equipment.

4. Determine the position of point using GPS.

5. Apply different type of surveying equipment in hydrographic surveying.

6. Topics:

8- Areas
9- Volumes.
10- Type of horizontal curve.
11- Global positioning system(GPS).
12- Basic principle of Remote Sensing.
13- Hydrographic surveying

7. Class/laboratory Schedule:

15 weeks of 150 min. lectures, 2 times a week.

8. Design Project:

None

9. Computer/software Use:

None.

10. Evaluation Methods:

Exams (5 quizzes 25%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 50%)

11. Contribution to Professional Component:

In this course, the student will learn the basic calculation of areas, volumes, and determine the position of points using GPS

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1 and 3)

13. Prepared by:

Prof Dr. Khamis N. Sayl

1. Course Number & Title (Credit Hours, Required or Elective):
DWE3313: Strength of Materials (3, Required)

2. Catalog Description:
The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

3. Prerequisite(s):
- Engineering Mechanics (Static) ENG 006

• Textbook(s) and/or other required materials:

1. Engineering mechanics (6th edition) j. l. meriam, l. g. kraige.
2. Strength of materials, 15th edition Russell C. Hibbeler

5. Course Objectives:

1. Understand concept of stress and strain.

2. Understand relation between stress and strain.

3. Ability to identify and solve statically indeterminate problems.

6. Topics:

Chapter 1: Stress

-Concept of stress.

-Thin-Walled Pressure Vessels.

- Lab. (10 hurs)

Chapter 2: Strain

- Simple strain

- Solved Problems in Poison's ratio.

- Lab. (15 hrs)

Chapter 3: Thermal Stresses

-Introduction

- Solved Problems in Thermal Stress.

- Lab. (10 hrs)

Chapter 4: Beams

- Introduction.

- Classification of Beams.

- Types of Loading

-Shear Force and Bending Moment Diagrams

- Lab. (15 hrs)

Chapter 5: Stresses In Beams

- Flexure Formula.

- Moment of inertia.

- Bending moment stress distribution in beam.

Chapter 6: Stress Transformation and Mohr's Circle

- Transformation equation

- Principal Stresses and Maximum Shearing Stress

- Mohr's Circle.(10 hrs)

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 2 times a week, lab, once aweek.

8. Design Project:

9. Computer/software Use:

Students typically use word in writing their reports of problem-based learning.

10. Evaluation Methods:

Exams (5 quizzes 25%, online assignment homework 4%, classwork 5% ,Lab 6%, report 4%, mid-term exam 10%, and three-hours final exam 40%, 10% final Lab)

11. Contribution to Professional Component:

In this course, students learn how to apply the basics of mathematics to analyze and solve engineering problems.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1)

13. Prepared by:

Hend Saad Zayan

1. Course Number & Title (Credit Hours, Required or Elective):
DWE3317: Engineering Hydrology (6, Required)

2. Catalog Description:
Hydrologic cycle, precipitation and runoff data, groundwater hydraulics, infiltration, peak runoff calculations, application to water resources problems.

3. Prerequisite(s):

4. Textbook(s) and/or other required materials:
1- Warren vissman , Introduction to hydrology, 5th ed, 2003.

2- Ven Te Chow, Applied hydrology.

3- Em. Wilson, Engineering hydrology

5. Course Objectives:

In this course, – Computer Science students will learn:
1. Develop problem solving skills and understanding of hydrology application.
2. Understand and establish its relevance in civil engineering.
3. Addressing issues related to water balance and developing hydrological calculation methods and accuracy.
4. Understand water expenditures and forecasting future water expenditures.
5. Determine the volume of reservoirs and simple hydraulic components.

6. Topics:

1. Introduction
2. Precipitation
3. Abstract from Precipitation
4. Evaporation, Physics of Evaporation, Measurements of Evaporation.
5. Infiltration, Infiltration Capacity, Measuring of Infiltration, Φ and W–Indexes
6. Stream Flow Measurements
7. Measurements of Velocity.
8. Flow-Measurements
9. Runoff
10. Catchment Yield, Rainfall-Runoff Correlation.
11. SCS-CN Method of Estimating Runoff Volume, Rational Method
12. Hydrographs
13. Hydrograph analysis, Factors Affecting Flood Hydrograph.
14. Unit hydrograph, Synthetic hydrograph.
15. Groundwater

7. Class/laboratory Schedule:
15 weeks of 180 min. lectures, once a week.

8. Design Project:

None

9. Computer/software Use:

Students typically use word in writing their reports of problem-based learning.

10. Evaluation Methods:

Exams (2 quizzes 10%, assignment homework 5%, classwork 5% , 2 mid-term exam2 20%, and three-hours final exam 60%)

11. Contribution to Professional Component:

In this course, students learn how to apply the basics of mathematics to analyze and solve engineering problems.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 4)

13. Prepared by:

Ammar Adham Ali

1. Course Number & Title (Credit Hours, Required or Elective):
DWE3318: Soil Mechanics (3, Required)

2. Catalog Description:
In this course students are introduced to the fundamental concepts of soil mechanics that will be used to analyze problems related to foundations, retaining walls, earth structures, and highways. Specifically, the physical, mechanical, and hydraulic properties of soils will be discussed. The laboratory component of this course will provide hands-on experience with characterizing soils for engineering purposes and help to familiarize the student with ASTM geotechnical laboratory testing procedures and standards.

3. Prerequisite(s):
DWE3313: Strength of Materials
DWE2305: Fluid Mechanics,

4. Textbook(s) and/or other required materials:
Fundamental of geotechnical Engineering, Braja Das McGraw-Hill, 9th edition

5. Course Objectives:

Following completion of this course, students will be able to:

1. Construct flow net and use it to determine two-dimensional flow through soil.
2. Determine total stresses, pore water pressures and effective stresses for in-situ soils.
3. Estimate the magnitude (settlement) and time-rate of primary consolidation for clay soils.
4. Describe the Mohr-Coulomb failure criteria for soils
5. Identify drained and undrained loading, shear strength parameters from triaxial testing

6. Topics:

6. Introduction to Soil Mechanics
7. Mass-volume relationship
8. Soil Plasticity, texture and structure
9. Soil Classification
10. Soil Compaction
11. Permeability and seepage
12. Stresses within soil mass
13. Compressibility
14. Shear strength

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 2 times a week.

8. Design Project:

None

9. Computer/software Use:

None.

10. Evaluation Methods:

Exams (5 quizzes 25%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 50%)

11. Contribution to Professional Component:

In this course, the student will learn the basic relationships of soils

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1 and 3)

13. Prepared by:

Assist. Prof Dr. Nabeel S. Mahmood

1. Course Number & Title (Credit Hours, Required or Elective):
DWE3319: Environmental Engineering (3, required)

2. Catalog Description:
This course introduces fundamental concepts in the field of wastewater engineering and environmental engineering.

3. Prerequisite(s):
• DWE1205Chemistry, Calculus, DWE2305Fluid Mechanics, DWE3312Water Quality Control

Textbook(s) and/or other required materials:

WATER SUPPLY AND SEWERAGE, E.W. STEEL & TERENCE J. MCGHEE, FIFTH Edition

5. Course Objectives:

The goals of this course are to enable students to:

1.Identify the quantity, quality, types and characterization of wastewater generated

2.To understand the properties and the design criteria of the conventional wastewater treatment plant (WWTP).

3. To learn the objectives and methods of sewage treatment and to study the features and function of different primary treatment units.

4. To study the features and function of different secondary treatment units.

5. To learn the objectives and methods of sewage disposal.

6. To learn the objectives and methods of sludge treatment.

6. Topics:

1) Wastewater treatment objective
2) Sanitary sewage flow estimation
3) Characteristicsand composition of sewage
4) Sewerage system
5) Types and method of wastewater treatment
6) Primary treatment
7) Screens
8) Grit chamber
9) Primary sedimentation tanks
10) Secondary Treatment of Sewage
11) Biological treatment (activated sludge)
12) Biological treatment (activated sludge)
13) Trickling filter

7. Class/laboratory Schedule:

15 weeks of 180 min. lectures, 1 time a week.

8. Design Project:

None

9. Computer/software Use:

Students typically use word in writing their reports of problem-based learning.

10. Evaluation Methods:

Exams (2 quizzes 5% (5), 2 assignment homework 5% (5), Projects / Lab. 10% (10), mid-term exam#1 15%(15) 2hrs%, mid-term exam#2 15%(15), and three-hours final exam 50% (50).

11. Contribution to Professional Component:

The student will learn about wastewater and their characteristics, wastewater treatment, methods, processes, primary, biological, tertiary and advanced treatment, activated sludge processes, extended aeration processes.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1)

13. Prepared by:

Assist. Prof. Dr. Arkan Dhari Jalal

1. Course Number & Title (Credit Hours, Required or Elective):
DWE3321: Theory of Structures (3, Required)

2. Catalog Description:
This course covers the outlines of general principles, indeterminacy and stability, shear and moment diagrams of structures, trusses, approximate analysis, influence lines and moving concentrated loads, analysis of statically determinate structures, analysis of statically indeterminate structures.

3. Prerequisite(s):
DWR2314 Strength of materials

4. Textbook(s) and/or other required materials:
Structural Analysis by R. C. Hibbeler- 8th edition.

Recommended Readings:

- Theory of Structures by S.P. Timoshenko and D. H. Young - 2nd edition.
- Theory of Structures by Yuang Yu Hsiegh.
- Structural Analysis by Aslam Kassimali, 4th edition.
- Structural and Stress Analysis by Dr. T.H.G Megson – 2nd edition, 2000.

5. Course Objectives:

In this course, student will learn:

1. Understand analysis of indeterminate structures and adopt an appropriate structural analysis technique.
2. Determine response of structures by classical, iterative and matrix methods.

5. Topics:

Week 1	Introduction to structural analysis
Week 2	Determinacy and stability of structures
Week 3	Shear and moment diagrams of structures
Week 4	Shear and moment diagrams of structures
Week 5	Simple Trusses and Compound Trusses
Week 6	Complex Trusses OR Approximate Analysis of Structures
Week 7	Influence lines and moving concentrated loads
Week 8	Influence lines and moving concentrated loads
Week 9	Deflection of determinate structures
Week 10	Deflection of determinate structures
Week 11	Analysis of indeterminate structures- Consistent deformation method.
Week 12	Analysis of indeterminate structures- Consistent deformation method.

Week 13 Analysis of indeterminate structures using Slope-Deflection Method

Week 14 Analysis of indeterminate structures using Moment-Distribution Method

Week 15 Review

7. Class/laboratory Schedule:

15 weeks of 180 min. lectures, 1 times a week.

8. Design Project:

None

9. Computer/software Use:

- Students typically use MS Office in writing their reports of problem-based learning.

- Students will be required to use one of the structural analysis software's such us Etabs, Safe, Staad Pro; depending on the project and availability.

10. Evaluation Methods:

Exams (quizzes 10%, assignment homework 10%, mid-term exam 20%, and three-hours final exam 60%)

11. Contribution to Professional Component:

In this course, students learn how to apply the basics of mathematics, science and engineering to analyze and solve complex engineering problems, specifically, analysis of indeterminate structures.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1)

13. Prepared by:

Dr. Zaid Al-Azzawi

1. Course Number & Title (Credit Hours, Required or Elective):
DWE3215: Engineering Management (2 , Required)

2. Catalog Description:
This course inculcates the fundamental principles of construction planning; and studies the key project management skills. Critical path scheduling, durations, logic, resource allocation, and the calculation of costs. Typical contract formats: project planning with emphasis on legal aspects, cash flows, related costs, and agreements. Cost control. Linear programming as applicable in Civil Engineering Projects..

3. Prerequisite(s):
ENG010 Engineering Statistics
UOA 007 Computer Science I

4. Textbook(s) and/or other required materials:
- Daniel W. HalpinPurdue University,Bolivar A. Senior Colorado State University, Construction Management, John Wiley & Sons, Inc. 4th ed., 2011
- Clifford J. Schexnayder, Richard E. Mayo, Construction Management Fundamentals, McGraw-Hill, 2nd ed., 2008

5. Course Objectives:
Following completion of this course, students will be able to:

4. Inculcates the fundamental principles of construction planning and studies the key project management skills.
5. Learn how to effectively utilize technical, financial, and human resources in an engineering career.
6. Apply the knowledge of Engineering management basically: Planning, Organizing, Directing, and Controlling related to the Dams and Water Resources Engineering program.

6. Topics:

1. Principles of engineering management, construction technology, and the construction industry
2. Planning and scheduling construction projects and methods of planning and scheduling projects: Gantt chart and activity priority charts
3. Program Evaluation & Review Technique (PERT)
4. Project Progress reporting
5. Line of Balance Applied to Construction
6. Work Breakdown Structure: techniques and tools
7. Earned Value Method
8. Major Construction Contract Types
9. Project Delivery Methods
10. Project Cost Control Systems
11. Value Engineering
12. Resource Planning& Allocation.
13. Optimization techniques

7. Class/laboratory Schedule:

15 weeks of : 120 min. lectures, 2 times a week

8. Design Project:
None

9. Computer/software Use:
MS Project & MS Word.

10. Evaluation Methods:
Exams (5 quizzes 25%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 50%)

11. Contribution to Professional Component:
In this course, students learn how to effectively utilize technical, financial, and human resources in their engineering career, and apply the knowledge of engineering management basically: Planning, Organizing, Directing, and Controlling related to the Dams and Water Resources Engineering program.

12. Relationship to Student Outcomes:
Course Learning Objectives (related Student Outcome 5)

13. Prepared by:
Prof. Dr. Jumaa Awad Hemed AL-Somaydaii
Dr. Aseel Hossam Aldin Abdaljader

1. Course Number & Title (Credit Hours, Required or Elective):
DWE3305: Groundwater Hydrology (6, Required)

2. Catalog Description:
This course covers fundamentals of groundwater flow; emphasizing the role of groundwater in the hydrologic cycle, the relation of groundwater flow to geologic structure, aquifer properties and characteristics and well hydraulics.

3. Prerequisite(s):
Engineering Hydrology DWR 010

4. Textbook(s) and/or other required materials:
1- Groundwater Hydrology by Herman
2- Groundwater Hydrology by Todd

5. Course Objectives:

In this course, – Computer Science students will learn:
1. To develop problem solving skills and understanding of groundwater hydrology application.
2. To understand and estimate the available water quantity.
3. This course deals with the basic concept of groundwater hydrology.
4. This is addressing issues related to water balance and developing hydrological calculation methods and accuracy.
5. To understand water expenditures and forecasting future water expenditures.
6. To determine the volume of reservoirs, aquifers and hydraulics wells.

6. Topics:

1. Introduction, the hydrology and hydrologic cycle, basic definitions.
2. Aquifer Basics
3. Properties, Basic definitions, Water Content, Volumetric Water Content,
4. Darcy Law
5. Groundwater Steady Flow
6. Catchment Yield, Rainfall-Runoff Correlation.
7. Groundwater wells
8. Basic Assumptions, Forms of Subsurface Water.
9. Flow through a confined aquifers and Unconfined Aquifers.
10. Equilibrium hydraulics.
11. Well Hydraulics
12. Steady Radial Flow to a Well in Confined Aquifers.
13. Steady State Analysis (Unconfined Aquifers).
14. Unsteady State Analysis
15. Review

7. Class/laboratory Schedule:
15 weeks of 180 min. lectures, once a week.

8. Design Project:

None

9. Computer/software Use:

Students typically use word in writing their reports of problem-based learning.

10. Evaluation Methods:

Exams (2 quizzes 10%, assignment homework 5%, classwork 5% , 2 mid-term exam2 20%, and three-hours final exam 60%)

11. Contribution to Professional Component:

In this course, students learn how to apply the basics of mathematics to analyze and solve engineering problems.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 4)

13. Prepared by:

Assist. Prof Dr. Ammar Adham Ali

1. Course Number & Title (Credit Hours, Required or Elective):
DWE3320: : Hydraulic structures (3, Required)

2. Catalog Description:
Principles of Hydraulic Systems Analysis, Classification and Use of Structures for Flow Control, Channel Regulating Structures, Channel Intake and Outlet, Flow Measurement Structures, Dam Spillways and Outlet Works, Energy Dissipation Structures, Culverts.

3. Prerequisite(s):
DWR 006 open channels

DWR 003 Fluid mechanics

• Textbook(s) and/or other required materials:

1.Textbook(s): open channel hydraulics - chow

2.Hydraulic Structures: Fourth Edition 5. Course Objectives:

- Identification requester the most important hydraulic structures and their design methods Because he one Basic topics Scientific for dam and water resources engineering.
- It has an important role in Increasing the student's intellectual awareness to deal with problems the Engineering facing hydraulic structures and find Solutions For these problems.
- Turn Basic And prominent in Preparation Designs and plans Its facilities relationship With engineering Irrigation and dams.

6. Topics:

1.Introduction
2.Principles of Hydraulic Systems Analysis
3.Classification of Structures for Flow Control
4.Design of floors by bligh theory
5.Design of floors by lianas theory
6.Introduction of Channel Regulating Structures (weirs, barrages, sluice gates, etc.)
7.Quiz with Resolving problems and discussion
8.weirs
9.weirs (Tutorial (examples)
10.Design of sluice gates
11.Channel Intake and Outlet (Diversion) Structures
12.Flow Measurement Structures
13.Dam Spillways and Outlet Works
14.Energy Dissipation Structures
15.Design of sittling basin

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 2 times a week.

8. Design Project:

None

9. Computer/software Use:

Students typically use word in writing their reports of problem-based learning.

10. Evaluation Methods:

Exams (10 quizzes, assignment homework 5%, classwork 5% , Lab 10% mid-term exam 20%, and three-hours final exam 50%)

11. Contribution to Professional Component:

In this course, students learn how to apply the basics of mathematics to analyze and solve engineering problems.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1)

13. Prepared by:

Dr. Mohammed Falah Allawi

1. Course Number & Title (Credit Hours, Required or Elective):
DWE3308: Theory of Structures (3, Required) (ECTS=5)

2. Catalog Description:
This course covers the outlines of general principles, indeterminacy and stability, shear and moment diagrams of structures, trusses, approximate analysis, influence lines and moving concentrated loads, analysis of statically determinate structures, analysis of statically indeterminate structures.

3. Prerequisite(s):
Strength of Materials (DWR 009)

4. Textbook(s) and/or other required materials:
Textbook: Structural Analysis by R. C. Hibbeler- 8th edition.

Recommended Readings:

- Theory of Structures by S.P. Timoshenko and D. H. Young - 2nd edition.
- Theory of Structures by Yuang Yu Hsiegh.
- Structural Analysis by Aslam Kassimali, 4th edition.
- Structural and Stress Analysis by Dr. T.H.G Megson – 2nd edition, 2000.

5. Course Objectives:

By the end of successful completion of this course, the student will be able to:

1. To understand analysis of indeterminate structures and adopt an appropriate structural analysis technique.

2. Determine response of structures by classical, iterative and matrix methods.

5. Topics:
1-Introduction to structural analysis

2-Determinacy and stability of structures

3-Shear and moment diagrams of structures

4-Shear and moment diagrams of structures

5-Simple Trusses and Compound Trusses

6-Complex Trusses OR Approximate Analysis of Structures

7-Influence lines and moving concentrated loads

8-Influence lines and moving concentrated loads

9-Deflection of determinate structures

10-Deflection of determinate structures

11-Analysis of indeterminate structures- Consistent deformation method.

12-Analysis of indeterminate structures- Consistent deformation method.

13-Analysis of indeterminate structures using Slope-Deflection Method

14-Analysis of indeterminate structures using Moment-Distribution Method

15-Review

7. Class/laboratory Schedule:

15 weeks of 180 min. lectures, 2 times a week.

8. Design Project:

None

9. Computer/software Use:

None.

10. Evaluation Methods:

Exams (5 quizzes 25%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 50%)

11. Contribution to Professional Component:

In this course, the student will learn the basic theories of structural analysis

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1)

13. Prepared by:

Assist. Prof Dr. Zaid Al-Azzawi

1. Course Number & Title (Credit Hours, Required or Elective):
DWE3312: Water Quality Control (5, Required)

2. Catalog Description:

3. The student first learn about pollution , types and sources ,water needs and water quality , natural water characteristics , physical , chemical, radiation and biological water quality parameters . then go into water pollution and its control, then learn about salinity in water and distillation processes , sediment and its control , finally present wastewater reuse for industrial , agricultural , municipal and other uses. In addition to some important water lab. Tests.

4. Prerequisite(s):
Chemistry ENG 002
Fluid Mechanics

5. Textbook(s) and/or other required materials:

1. Principle of water quality control, TEBBUTT ,2003.
2. "Environmental Engineering" , Peavy.H.S and et al ,International Ed. , 1985

5. Course Objectives:

By the end of successful completion of this course, the student will be able to:

1. know the basics and importance of environment and water characteristics .
2. identify the ways in which humans influence aquatic systems and Identify the major types of water pollution and their effects on aquatic ecosystems

6. Topics:

1: Introduction
2: Water quality

- **Scheduling of laboratory and other non-lecture sessions, including online sessions, as appropriate (if applicable)**

Week Topic Comments

2- Measurement of pH, TDS,E.C 3 Lectures

3-M easurement of Alkalinity and Hardness by EDTA method 3 Lectures

4-Estimation of Chlorides and Residual Chlorine.3 Lectures

5-Determination of Turbidity by using Nephlometer and Estimation of Optimum Coagulant Dose by Jar Test 3 Lectures

6-Estimation of Suspended, Settleable, Volatile and fixed solids 3 Lectures

7-Estimation of D.O. by Wrinkler's methods and BOD test for water and waste water

8-COD test for water and waste water

9-Estimation of Ammonia Nitrogen

10- weeks of 150 min. lectures, 2 times a week.

8. Design Project:

Lab

9. Computer/software Use:

None.

10. Evaluation Methods:

Exams (5 quizzes 25%, Lab. report 6%, class and Homework 9% , test 10%, mid-term exam 10%, and three-hours final exam 40%)

11. Contribution to Professional Component:

In this course, students learn how to apply the basics of mathematics to analyze and solve engineering problems.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 3)

13. Prepared by:

Prof. Majeed M. Ranal

1. Course Number & Title (Credit Hours, Required or Elective):
DWE3309: Sanitary Engineering (3, Required)

2. Catalog Description:
3. This course introduces fundamental concepts in the field of water supply engineering and sanitary engineering.
4. Prerequisite(s):
• DWE1205Chemistry, Calculus , DWE2305Fluid Mechanics , DWE3312Water Quality Control.

Textbook(s) and/or other required materials:

WATER SUPPLY AND SEWERAGE , E.W.STEEL & TERENCE J .MCGHEE , FIFTH Edition

5. Course Objectives:

The goals of this course are to enable students to:

1. To know the basics, importance, and methods of water supply.

2. To study the various sources and properties of water.

3. To understand the various methods of conveyance of water.

4. To learn the objectives and methods of water treatment and to study the features and function of different water treatment units.

6. Topics:

1) Introduction, WATER SUPPLY ENGINEERING

2) Water Quantity Estimation

3) Population Forecast Method

4) Water Pollution and Pollutant Types

5) Drinking Water Characteristics

6) Drinking water treatment Plant Units

7) Water Intake and Screen Units Design

8) Pumps and Pumping Stations Installation

9) Conventional Water Treatment (Coagulation Unit Design)

10) Conventional Water Treatment (Flocculation Unit Design)

11) Conventional Water Treatment (Sedimentation Unit Design)

12) Conventional Water Treatment (Sedimentation Unit Design),

13) Conventional Water Treatment (Filtration Unit) and Back Wash Process

14) Conventional Water Treatment (Filtration Unit) and Back Wash Process

15) Chlorination system Units Design

16) Final Exam

7. Class/laboratory Schedule:

15 weeks of 180 min. lectures, 1 time a week.

8. Design Project:

None

9. Computer/software Use:

Students typically use word in writing their reports of problem-based learning.

10. Evaluation Methods:

Exams (2 quizzes 5% (5), 2 assignment homework 5% (5), 1 report 10% (10), mid-term exam 20(20) 2hrs%, and three-hours final exam 60% (60).

11. Contribution to Professional Component:

The student will learn about wastewater and their characteristics, wastewater treatment, methods, processes, primary, biological, tertiary and advanced treatment, activated sludge processes, extended aeration processes.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1)

13. Prepared by:

Assist.Prof. Dr. Arkan Dhari Jalal

1. Course Number & Title (Credit Hours, Required or Elective):
DWE3314: Reinforced Concrete Design (3, Required)

2. Catalog Description:
In this course students are introduced to the fundamental concept of reinforced concrete design that will be used analyze problems related to design and analysis of beam by working stress method, Analysis and design of singly and doubly reinforced rectangular beam by ultimate strength method, understand the shear force applied on beams and design beam to resist it, understand the bond strength and calculate the development length.

3. Prerequisite(s):
Non

4. Textbook(s) and/or other required materials:
Design of Reinforced concrete Structures, Winter

5. Course Objectives:

In this course, – Concrete Technology students will learn:
1. Analyze and interpret data to obtain design information's.
2. Design and analysis of beam by working stress method.
3. Analysis and design of singly and doubly reinforced rectangular beam by ultimate strength method.
4. Understand the shear force applied on beams and design beam to resist it.
5. understand the bond strength and calculate the development length.

6. Topics:

1- Concrete behavior and reinforcement.
2- Methods of analysis and design.
3- Analysis of beam by working stress method.
4- Design of beam by working stress method.
5- Analysis of rectangular singly reinforced beam by ultimate strength method.
6- Design of rectangular singly reinforced beam by ultimate strength method.
7- Analysis of rectangular doubly reinforced beam by ultimate strength method.
8- Design of rectangular doubly reinforced beam by ultimate strength method.
9- Analysis of T-shape reinforced beam by ultimate strength method.
10- Design of T-shape reinforced beam by ultimate strength method.
11- Analysis and design of beam to resist shear force.
12- Calculate development length of reinforced bars.

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 2 times a week.

8. Design Project:

None

9. Computer/software Use:

None

10. Evaluation Methods:

Exams (5 quizzes 25%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 50%)

11. Contribution to Professional Component:

In this course, students learn how design of concrete members and reinforced theme against moment and shear force. In addition to, calculate development length in reinforced bares.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 3)

13. Prepared by:

Assist. Prof Dr. Ghassan Subhi Jameel

1. Course Number & Title (Credit Hours, Required or Elective):
DWE4324: **Engineering Optimization (3, Required)**

2. Catalog Description:
This course will provide the student with an introduction to the planning, design, and operation of water resource systems using mathematical optimization methods and models. The student will learn how to apply basic economic analysis (engineering economic analysis and microeconomics) and operations research techniques (linear and non-linear dynamic programming) and apply them to various water resource allocation problems.

3. Prerequisite(s):
• DWE2213 Engineering Statistics

• DWE4324 Engineering Optimization

• **Textbook(s) and/or other required materials:**

Loucks D.P. and Beek E.V. (2005) Water Resources Systems Planning and Management. UNESCO

5. Course Objectives:

1. Be able to develop and solve various types of optimization models of water resources planning and management problems.
2. Understand the advantages and limitations of various types of modeling methods and algorithms.
3. Understand and appreciate how models have been and can be used in planning and management decision-making processes.

6. Topics:

1.Integer Programming: The Transportation Algorithm
2.Northwest Corner with Modified Distribution method
3.Tutorials
4.Vogel's method
5.Tutorials
6.Quiz
7.Assignment Problem
8.Tutorials
9.Quiz
10.Linear programming without constraints
11.Tutorials
12.Quiz
13.Linear programming with constraints
14.Tutorials
15.Quiz
16.Final Exam

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 2 times a week.

8. Design Project:

None

9. Computer/software Use:

Students typically use word in writing their reports of problem-based learning.

10. Evaluation Methods:

Exams (10 quizzes, assignment homework 5%, classwork 5% , mid-term exam 20%, and three-hours final exam 60%)

11. Contribution to Professional Component:

In this course, students learn how to apply the basics of mathematics to analyze and solve engineering problems.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1)

13. Prepared by:

Dr. Mohammed Falah Allawi

1. Course Number & Title (Credit Hours, Required or Elective):
DWE4325: Irrigation Engineering (5, Required)

2. Catalog Description:
Principle topics in irrigation engineering, including the basics of Irrigation Engineering, Sources of Water for Irrigation, Irrigation Water Classification, Irrigation Projects, Duty of Water, Irrigation Efficiencies, Consumptive Use or Evapotranspiration, the relationship between soil, water and crops, Methods of Irrigation Engineering, Plant available water, Irrigation frequency, Infiltration of water into soils, Kostiakov Equation, Horton Equation, Field measurements of Infiltration, Irrigation Canals, Unlined canal design, lined canal design, Irrigation Structure, Canal Fall.

3. Prerequisite(s):

DWE3313: Strength of Materials
DWE2305: Fluid Mechanics,

4. Textbook(s) and/or other required materials:
1. IRRIGATION ENGINEERING AND HYDRAULIC STRUCTURES, Santosh Kumar, fifth Edition.

5. Course Objectives:

In this course, – Computer Science students will learn:
21. The basics of Irrigation Engineering, Sources of Water for Irrigation, Irrigation Water Classification
22. Irrigation Projects, Duty of Water, Irrigation Efficiencies
23. Consumptive Use or Evapotranspiration
24. The relationship between soil, water and crops, Methods of Irrigation Engineering, Plant available water, Irrigation frequency.
25. Infiltration of water into soils, Kostiakov Equation
26. Horton Equation, Field measurements of Infiltration
27. Un lined canal design
28. lined canal design
29. Irrigation Structure
30. Canal Fall.

6. Topics:

The basics of Irrigation Engineering

Sources of Water for Irrigation

Irrigation Water Classification

Irrigation Projects.

Duty of Water

Irrigation Efficiencies

Consumptive Use or Evapotranspiration

The relationship between soil, water and crops

Plant available water, Irrigation frequency.

Infiltration of water into soils, Kostiakov Equation

Horton Equation, Field measurements of Infiltration

Un lined canal design

lined canal design

Irrigation Structure

Canal Fall.

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 2 times a week.

8. Design Project:

Lab.

9. Computer/software Use:

Students typically use word in writing their reports of problem-based learning.

10. Evaluation Methods:

Exams (5 quizzes 25%, Lab. report 6%, class and Homework 9% , test 10%, mid-term exam 10%, and three-hours final exam 40%)

11. Contribution to Professional Component:

In this course, students learn how to apply the basics of mathematics to analyze and solve engineering problems.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1)

13. Prepared by:

Lecturer: Mohammed Freeh Sahab.

5. Course Number & Title (Credit Hours, Required or Elective):
DWR020: Design of Dams (6, Required)

6. Catalog Description:
Environmental and lifestyle considerations, hydrology for design , choose the type of the dam, , earth dams , rock dams , concrete dams, the design consideration of dams, spillway design.

7. Prerequisite(s):
DWR017(Hydraulic Structures)

8. Textbook(s) and/or other required materials:
Hydraulic Structures, P. Novak, A.I.B. Moffat and C. Nalluri

5. Course Objectives:

1. To impart the principles of analysis, design, and behavior of dam and hydraulic structures belong to it.

2. To enable the student how to choose the suitable type of dams and how to select the perfect site to construct the dam.

3. Familiarity with professional and contemporary issues.

6. Topics:

1Introduction:

1.1Important Terms for The main Parts of Dam, Planning Consideration, Classification of Dams and Factors Governing Selection Site of Dams.

1.2 Flood Hydrology for Design Purposes

1.3 Estimation of design flood

2 Gravity Dams

3 Concrete Arch Dams

4 Buttress Dams

5 Earth Dams and Rock fill

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 2 times a week.

8. Design Project:

None

9. Computer/software Use:

Students typically use word in writing their reports of problem-based learning.

10. Evaluation Methods:

Exams (2 quizzes 20%, online assignment homework 5%, classwork 5% , mid-term exam 10%, and three-hours final exam 60%)

11. Contribution to Professional Component:

By the end of successful completion of this course, the student will be able to:

1. The basics, and consideration of dam design.
2. Understanding of the principles of hydrology for design.
3. Gain tools for planning, analysis and design for different types of dams,

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 2 & 6)

13. Prepared by:

Dr. Rafid Saadoon Rashid

1. Course Number & Title (Credit Hours, Required or Elective):
DWE4101: Ethics and Leader Skills (2, S)

2. Catalog Description:
This course is designed for engineering students who are interested in advancing into management and leadership roles. You will gain a perspective on what it is like to be an engineering leader. You will develop awareness of your own strengths and weaknesses as a leader when you are placed in charge of a project. You will learn how to leverage your strengths and control your weaknesses. You will also learn how to manage relationships with your team members and how to set up a creative environment for your team to motivate each team member to reach his or her potential. You will also learn how to deal with different ethical issues that are related to engineering field.

3. Prerequisite(s):
Non

4. Textbook(s) and/or other required materials:
- Benator, Barry and Thumann, Albert "**Project Management and Leadership Skills for Engineering and Construction Projects**." 2003, The Fairmont Press, Inc., USA

2- Fleddermann, C. B. (2012). **Engineering Ethics**. Upper Saddle River, NJ: Prentice Hall.

5. Course Objectives:

Following completion of this course, students will be able to:

1- The graduate has outstanding leadership and administration skills that can be utilized to manage his/her workplace effectively.

2- The graduate is aware of the modern styles of leadership and administration skills.

3- The graduate is aware of the ethical issues in the engineering practice.

6. Topics:

1. Introduction to leadership, Leadership definition
2. Why is leadership important for engineers? ,Are leaders born or made?
3. Personality assessment.
4. Leadership and management styles, Management styles , Attributes of the engineering leader
5. Modern leadership, Characteristics of servant leader
6. Effective team leadership,What is team,Why work in teams?
7. Different types of teams ,Role of team leader
8. Practical Implementation ,Time management (first things first),Project related activities
9. Conducting Effective Meetings,Giving effective feedback,Recognition and reward
10. Communication,Communication types,Thoughts emotion and communication (head, heart and hands)
11. Introduction to Engineering Ethics,Professional Codes of Ethics,
12. Ethical Issues in Engineering Practice
13. Steps in Confronting Moral Dilemmas
14. Case Studies

a. Denver International Airport (DIA)
b. Space shuttle Challenger accident:

15. Case Studies

a. Denver International Airport (DIA)

b. Space shuttle Challenger accident:

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 1 time weekly.

8. Design Project:

None

9. Computer/software Use:

None.

10. Evaluation Methods:

Exams (2 quizzes 6%, homework 5%, classwork 4% , report 5%, 1st-term exam 10%, 2nd-term exam 10% and three-hours final exam 60%)

11. Contribution to Professional Component:

In this course, the student will learn the basic relationships of Ethics and Leader Skills

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 5)

13. Prepared by:

Assist. Prof Dr. Ayad S. Aadi

1. Course Number & Title (Credit Hours, Required or Elective):
DWE4332: Design and Evaluation of On-Farm Irrigation System (4, Required)

2. Catalog Description:
Principle topics in irrigation engineering, including the basics of Irrigation Engineering, Sources of Water for Irrigation, Irrigation Water Classification, Irrigation Projects, Duty of Water, Irrigation Efficiencies, Consumptive Use or Evapotranspiration, the relationship between soil, water and crops, Methods of Irrigation Engineering, Plant available water, Irrigation frequency, Infiltration of water into soils, Kostiakov Equation, Horton Equation, Field measurements of Infiltration, Irrigation Canals, Unlined canal design, lined canal design, Irrigation Structure, Canal Fall.

3. Prerequisite(s):

DWE3313: Irrigation Engineering
DWE2305: Fluid Mechanics,

4. Textbook(s) and/or other required materials:
1. IRRIGATION ENGINEERING AND HYDRAULIC STRUCTURES, Santosh Kumar, fifth Edition.

5. Course Objectives:

In this course, – Computer Science students will learn:
31. The basics of Irrigation Engineering, Sources of Water for Irrigation, Irrigation Water Classification
32. Irrigation Projects, Duty of Water, Irrigation Efficiencies
33. Consumptive Use or Evapotranspiration
34. The relationship between soil, water and crops, Methods of Irrigation Engineering, Plant available water, Irrigation frequency.
35. Infiltration of water into soils, Kostiakov Equation
36. Horton Equation, Field measurements of Infiltration
37. Un lined canal design
38. lined canal design
39. Irrigation Structure
40. Canal Fall.

6. Topics:

Sources of Water for Irrigation

Irrigation Water Classification

Irrigation Projects.

Duty of Water

Irrigation Efficiencies

Consumptive Use or Evapotranspiration

The relationship between soil, water and crops

Plant available water, Irrigation frequency.

Infiltration of water into soils, Kostiakov Equation

Horton Equation, Field measurements of Infiltration

Un lined canal design

lined canal design

Irrigation Structure

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 2 times a week.

8. Design Project:

Lab.

9. Computer/software Use:

Students typically use word in writing their reports of problem-based learning.

10. Evaluation Methods:

Exams (5 quizzes 25%, Lab. report 6%, class and Homework 9% , test 10%, mid-term exam 10%, and three-hours final exam 40%)

11. Contribution to Professional Component:

In this course, students learn how to apply the basics of mathematics to analyze and solve engineering problems.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1)

13. Prepared by:

Lecturer: Ather salem ubaid.

1. Course Number & Title (Credit Hours, Required or Elective):
DWE4335: **Remote Sensing & GIS Applications in Hydrology (4, Required)**

2. Catalog Description:
This course introduces knowledge about concepts and foundations of Remote Sensing, elements of Photograph systems, remote sensing scanning systems. Then, it moves to understand the principle of interpretation of aerial photographs. Also, this course introduces basic principle of GIS. Then this course ends with the application of remote sensing in water resources (water pollution Detection - Lake Eutrophication Assessment - Flood Damage - Water Quality and Turbidity - Water Penetration and depth measurement-Soil Moisture- Ground Water). It includes computer applications.

3. Prerequisite(s):
Surveying I- DWE2308
surveying II- DWE2309

4. Textbook(s) and/or other required materials:
REMOTE SENSING AND IMAGE INTERPRETATION by Thomas M. Lillesand, 6th edition

5. Course Objectives:

Following completion of this course, students will be able to:

1. Students will gain the concepts and foundation of remote sensing.

2. Science – Scientific procedures in remote sensing show the student the necessity of types of remote sensing data to extract different information for dams and water resources

3. Student will use new technologies to play an increasingly important role in science, engineering, resource management.

4. - Students will learn to use different type of remote sensing data to extract data for dams and water resources projects.

5. Students will use GIS tools for drawing thematic maps for water resources projects.

6- Student will apply different data in water resources engineering.

6. Topics:

1- Concepts and foundations of Remote Sensing
2. Elements of Photograph systems
3. Remote Sensing scanning systems
4. Interpretation of Aerial Photographs for Site Investigations.
5. Principle of GPS
6. Basic principle of GIS

7. Class/laboratory Schedule:

15 weeks of 150 min. lectures, 2 times a week.

8. Design Project:

None

9. Computer/software Use:

None.

10. Evaluation Methods:

Exams (5 quizzes 25%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 50%)

11. Contribution to Professional Component:

In this course, the student will learn the basic calculation of areas, volumes, and determine the position of points using GPS

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1 and 3)

13. Prepared by:

Prof Dr. Khamis N. Sayl

1. Course Number & Title (Credit Hours, Required or Elective):
DWE4328: Senior Design Project I. (2, Required)

2. Catalog Description:
Problem statement, design concept, simulation work and hardware concept, or field work carried out in accordance with a preapproved project plan under the supervision of faculty member(s).

3. Prerequisite(s):
By Topics

4. Textbook(s) and/or other required materials:
Depends on the subject and specificity of the project

5. Course Objectives:

Following completion of this course, students will be able to:

1. Provide the student who is nearing completion of BSc. degree in Dam and water resources engineering with the opportunity to do research and/or a scholarly literature review on a contemporary issue in counseling or a related area that is of specific interest to them.
2. Provide the student with a learning experience that is individualized and supervised by a staff member of the Dam and water resources engineering department who has expertise and/or interest in the study area selected for research by the capstone project student and supervisor.
3. Provide the student with an integrated learning experience in which coursework taken throughout the study program is synthesized and culminates in the completion of a final project that shows graduate-level research, writing, and skills.
4. Provide the student with a public spot for presenting the final capstone project. It is expected the student will acquire a sense of confidence and comfort with presenting professional work in public.
5. Provide the student with an opportunity to show their professionalism.

6. Topics:

1. Preparing and installing the project plan
2. Collecting information and literature related to the project
3. Preparation of materials and software used in the project
4. Submission of progress tracking form to projects consultants
5. Laboratory work, examinations or/and preparation of spreadsheets
6. Laboratory work, examinations or/and preparation of spreadsheets
7. Laboratory work, examinations or/and preparation of spreadsheets and results
8. Submission of progress tracking form to projects consultants
9. Writing and arranging the first part of the project and amending it as directed by the supervisor
10. Writing and arranging the first part of the project and amending it as directed by the supervisor
11. Submission of progress tracking form to projects consultants
12. First draft report submitted to the supervisor and receiving comments from supervisor(s)
13. Report submission to projects consultants for checking format adherence and receiving comments from projects consultants
14. Final Submission of revised report

15. Senior design project I presentation

7. Class/laboratory Schedule:

15 weeks of 180 min. lectures and Lap.

8. Design Project:

None

9. Computer/software Use:

None.

10. Evaluation Methods:

Supervisor Evaluation Form D (40%), Format Adherence Certification Form I (10%) and Presentation Evaluation Form F (50%)

11. Contribution to Professional Component:

In this course, the student will learn the basic relationships of Senior Design Project I Depends on the subject.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 2,7)

13. Prepared by:

Assist. Prof Dr. Ayad S. Aadi

1. Course Number & Title (Credit Hours, Required or Elective):
DWE4329: Methods of Construction and Estimation (3, Required)

2. Catalog Description:
Advanced topics in calculus, including vectors and vector-valued functions, partial differentiation, Lagrange multipliers, multiple integrals, and Jacobians; application of the line integral, including Green's Theorem, the Divergence Theorem, and Stokes' Theorem.

3. Prerequisite(s):
DWR001 Buildings Construction
ENG007 Engineering Drawing

4. Textbook(s) and/or other required materials:

- Estimating and costing in civil engineering by: B.N.Dutta 2012 , Civil estimating. Costing and Evaluations.
- Quantity surveying for building and civil eng. works: Byp.Lbhasin and S.Chand, new Delhi.
- Civil estimating and costing :A.K.Upadhyay 2010

5. Course Objectives:

In this course, students will learn:

1. Definition of construction methods used in the construction sites.
2. Teaching the methods and concepts of calculating the different quantities of the structural vertebrae, the specifications of the structural materials, the appropriate estimating methods for calculating them, and calculating the different geometric shapes.
3. Calculating the quantities of different items in construction projects, the proportions of materials used, and analyzing the quantities to their original resources.
4. Converting quantities into bills of quantities and bids for projects, and how to deal with documents for projects.

6. Topics:

1. Introduction to construction methods and types of Estimating.
2. Tables of quantities and units used.
3. Main activities in the construction project.
4. Principles of calculating the quantities of excavation and filling for canals and earthworks: earth excavation works: digging and filling
5. Calculation of quantities of concrete items and molds.
6. Analysis of quantities of construction finishing works for buildings
7. Building and construction equipment
8. Soil grouting work
9. Estimating labor, materials, and equipment
10. Profit margins, overheads, and cost sections
11. Engineering specifications for construction works.
12. Preparing reports and bills of quantities.

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 2 times a week.

8. Design Project:

None

9. Computer/software Use:

Students typically use Word in writing their reports of problem-based learning.

10. Evaluation Methods:

Exams (5 quizzes 10%, assignment homework 5%, classwork 5% , 2 mid-term exam 20%, and three-hours final exam 60%)

11. Contribution to Professional Component:

In this course, students learn construction methods used in the construction sites and concepts of calculating the different quantities of the structural members for different geometric shapes, the specifications of the structural materials for different items in construction projects, the proportions of materials used, and analyzing the quantities to their original resources to converting quantities into bills of quantities and bids for projects, and how to deal with documents for projects.

12. Relationship to Student Outcomes:

Course Learning Objectives (Related Student Outcome 5)

13. Prepared by:
Prof. Dr. Jumaa Awad Hemed AL-Somaydaii
Dr. Aseel Hossam Aldin Abdaljader

1. Course Number & Title (Credit Hours, Required or Elective):
DWE4331: Drainage Engineering (3, Required)

2. Catalog Description:
This course introduces fundamental concepts in the field of drainage engineering.

3. Prerequisite(s):
• DWE1205Chemistry, Calculus, DWE2305Fluid Mechanics, DWE3312Water Quality Control.

Textbook(s) and/or other required materials:

1- Drainage Principles and Applications", International Institute for Land Reclamation and Improvement (ILRI), Third Edition.

5. Course Objectives:

The goals of this course are to enable students to:

1. Identify the quantity, quality, types and characterization of drainage water

2. To understand the advantages and dis advantage of drainage water

3. To learn the type of drainage water

4. To study the groundwater hydraulic properties.

5. To find the spacing between the drain.

6. To study the drainage by wells.

6. Topics:

1) Introduction a boat the drainage

2) Systems of drainage

3) Open drains

4) Covered drains

5) Reclamation of the soils affected by the salts

6) Leaching Requirement L.R

7) Groundwater hydraulics

8) Parallel flow of soil layers:

9) Design of open drain sections

10) Spacing between Drains:

11) Equivalent Depth

12) Ernst's Formula:

13) Subsurface drainage: Drain wells

14) Interference between the wells

15) Irrigation returns flow and the drain maintenance

7. Class/laboratory Schedule:

15 weeks of 180 min. lectures, 1 time a week.

8. Design Project:

None

9. Computer/software Use:

Students typically use word in writing their reports of problem-based learning.

10. Evaluation Methods:

Exams (2 quizzes 5% (5), 2 assignment homework 5% (5), Projects / Lab. 10% (10), 2 mid-term exams 15% each ,(30), and final exam 50% (50).

11. Contribution to Professional Component:

The student will learn about drainage water and their characteristics, advantages, and disadvantages of drainage water, groundwater hydraulic, Drainage water treatment, spacing between drains, drain wells, and maintenance of drains.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 1&2)

13. Prepared by:

Assist Prof. Mohammed Freeh Sahab

1. Course Number & Title (Credit Hours, Required or Elective):
DWE4333: Safety and Operation of Dams

2. Catalog Description:
The Safety and Operation of Dams covers the outlines of general principles for Spillways, Dam outlet works, Energy dissipation of Dams, Introduction of Reservoirs, Types of Reservoirs, ,Zones of Storage, Reservoir Yield, Selection of Capacity for a River Reservoir, Monitoring of dam operation, Dam safety (instrumentation and surveillance), Emergency Operation Plan, Dam failure, Sustainable management of reservoirs

3. Prerequisite(s):

DWE017(Hydraulic Structures)

DWR 020 Design of Dams

4. Textbook(s) and/or other required materials:

Hydraulic Structures,

1- P. Novak, A.I.B. Moffat and C. Nalluri
School of Civil Engineering and Geosciences,

University of Newcastle upon Tyne, UK

And R. Narayanan

2- Formerly Department of Civil and Structural Engineering, UMIST,
University of Manchester, UK

Fourth edition published 2007 by Taylor & Francis

5. Course Objectives:

The goals of this course are to enable students to:

- To develop problem solving skills and understanding of Dams operation application and safety of dams.
- To understand and establish its relevance in civil engineering.
- This is addressing issues related to water balance and developing hydraulic calculation methods and accuracy.
- To determine the volume of reservoirs, reservoir Yield and simple hydraulic components.

6. Topics:

33. Introduction to Overflow Spillway: Ogee Spillway, Design of Ogee Spillway,
34. Side-Channel Spillway, Design Criteria. Flow Profile Analysis for Side-Channel Spillway: Chute Spillway: General Specification: Chute Sidewalls
35. Shaft Spillway, Siphon Spillway: Siphon Behavior.
36. Outlet Work: Functions of outlet works: Sluiceways:
37. Hydraulics of Outlet Works
38. Energy Dissipation below Spillways: Characteristics of a Hydraulic Jump: Hydraulic Jump as an Energy Dissipater: Length of Hydraulic Jump
39. Jump High Curve (JHC): Tail water rating curve: Location of a Hydraulic Jump
40. Stilling Basins: Types of Stilling Basin
41. Stilling Basins: Types of Stilling Basin
42. Dams Operation: Reservoirs: Types of Reservoirs
43. Zones of Storage: Reservoir Yield
44. Reservoir Mass Curve and Storage
45. Site Investigations
46. Monitoring

7. Class/laboratory Schedule:

15 weeks of 120 min. lectures, 2 times a week.

8. Design Project:

None

9. Computer/software Use:

None.

10. Evaluation Methods:

Exams (2 quizzes 10%, homework 10%, classwork 5% , report 5%, exam 10%, and three-hours final exam 60%)

11. Contribution to Professional Component:

In this course, the student will learn the basic relationships and principals of safety and dam operation

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 2 and 7)

13. Prepared by:

Prof Dr. Ammar Hatem Kamel

1. Course Number & Title (Credit Hours, Required or Elective):
DWE4330: Water resources planning and management (3, Required)

2. Catalog Description:
This course will provide the student with an introduction to the planning, design, and operation of water resource systems using mathematical optimization methods and models. The student will learn how to apply basic economic analysis (engineering economic analysis and microeconomics) and operations research techniques (linear and non-linear dynamic programming) and apply them to various water resource allocation problems.

3. Prerequisite(s):
Engineering Optimization DWE4324

4. Textbook(s) and/or other required materials:
Loucks D.P. and Beek E.V. (2005) Water Resources Systems Planning and Management. UNESCO

5. Course Objectives:

By the end of successful completion of this course, the student will be able to:

7. Be able to develop and solve various types of optimization models of water resources planning and management problems.

8. Understand the advantages and limitations of various types of modeling methods and algorithms.
9. Understand and appreciate how models have been and can be used in planning and management decision-making processes.
10. Understand and critically evaluate literature in water resources systems engineering.

11. Topics:

1.Integer Programming: The Transportation Algorithm

2.Northwest Corner with Modified Distribution method

3.Tutorials

4.Vogel's method

5.Tutorials

6.Quiz

7.Assignment Problem

8.Tutorials

9.Quiz

10.Non-linear programming without constraints

11.Tutorials

12.Quiz

13.Non-linear programming with constraints

14.Tutorials

15.Quiz

16.Final Exam7. Class/laboratory Schedule:

None.

8. Design Project:

None

9. Computer/software Use:

None.

10. Evaluation Methods:

Exams (10 quizzes 25%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 40%)

11. Contribution to Professional Component:

In this course, the student will learn the basic relationships of water resources planning and management.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 4)

13. Prepared by:

Dr. Mohammed Falah Allawi

1. Course Number & Title (Credit Hours, Required or Elective):
DWE4334: Senior Design Project II. (3, Required)

2. Catalog Description:
Problem statement, design concept, simulation work and hardware concept, or field work carried out in accordance with a preapproved project plan under the supervision of faculty member(s).

3. Prerequisite(s):
Senior Design Project I

4. Textbook(s) and/or other required materials:
Depends on the subject and specificity of the project

5. Course Objectives:

Following completion of this course, students will be able to:

6. Provide the student who is nearing completion of BSc. degree in Dam and water resources engineering with the opportunity to do research and/or a scholarly literature review on a contemporary issue in counseling or a related area that is of specific interest to them.
7. Provide the student with a learning experience that is individualized and supervised by a staff member of the Dam and water resources engineering department who has expertise and/or interest in the study area selected for research by the capstone project student and supervisor.
8. Provide the student with an integrated learning experience in which coursework taken throughout the study program is synthesized and culminates in the completion of a final project that shows graduate-level research, writing, and skills.
9. Provide the student with a public spot for presenting the final capstone project. It is expected the student will acquire a sense of confidence and comfort with presenting professional work in public.
10. Provide the student with an opportunity to show their professionalism.

6. Topics:

1. Implement the approved project plan

2. Summarize project-related information and references

3. Use the materials and software employed in the project

4. Submit the progress tracking form to the projects committee

5. Complete laboratory work, tests, and/or prepare data tables and results

6. Submit the progress tracking form to the projects committee

7. Write, organize, and revise the project components as directed by the supervisor and discussion committees

8. Create a poster to present to the evaluation committee

9. Submit the progress tracking form to the projects committee

10. Submit the near-final draft of the report to the supervisor and receive feedback from the supervisor(s)

11. Submit the report to the project committee to verify adherence to the format and receive their feedback

12. Submit the final revised report

13. Present the final graduation project to the discussion committees

7. Class/laboratory Schedule:

15 weeks of 180 min. lectures and Lap.

8. Design Project:

None

9. Computer/software Use:

None.

10. Evaluation Methods:

Supervisor Evaluation Form G (35%), Format Adherence Certification Form I (15%), Poster Evaluation Form H (10%) and Presentation Evaluation Form J (40%)

11. Contribution to Professional Component:

In this course, the student will learn the basic relationships of Senior Design Project I Depends on the subject.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 2,7)

13. Prepared by:

Assist. Prof Dr. Ayad S. Aadi

1. Course Number & Title (Credit Hours, Required or Elective):
DWE4102: English language-IV (2, Required)

2. Catalog Description:
This course is designed to enable academic writing course which provides an opportunity for the students to learn and practice the skills needed for handling topics related to the field of study. The course emphasizes the development of academic writing skills as well as the ability to read and think critically.
Prerequisite(s):
• DWE1101 English II**,III**

3. Textbook(s) and/or other required materials:
- John & Liz Soars, "New Headway Plus", the third Edition, Upper Intermediate Level, Oxford University Press

5. Course Objectives:

The goals of this course are to:

1. Give a clear presentation on a familiar topic, and answer predictable or factual questions.

2. Discuss topics currently in the news.

3. Scan texts for relevant information and grasp main point of view.

4.

6. Topics:

- Vocabulary (Hot verbs-take, put)
- Reading ('Today's teenagers are just fine')
- Listening arranging to meet-three friends decide a time and a place to get together)
- Reading ('Meet the kippers'-an article about grown-up children who won't leave home)
- Listening (Getting married-an Indian lady talks about her marriage)
- Speaking (The pros and cons of arranged marriage)
- Everyday English (Exaggeration and understatement)
- Reading ('Chukotka, the coldest place on earth'-an article about a remote territory of Russia)
- Listening (Extreme experiences-people describe their experiences in extreme weather conditions)
- Speaking (Making descriptions longer, talking about your experiences)
- Everyday English (The world around)
- Speaking (Discussion-a teacher I'll never forget)

- Everyday English (Making your point)
- Grammar (Hypothesizing)
- Vocabulary (Word pairs)
- Reading ('Have you ever wondered'?-the answers to some important questions in life)
- Listening (The interpretation of dreams-paul's amazing dream)
- Speaking (Practicing a conversation and describing your dreams)
- Everyday English (Moans and groans)
- Writing (narrative writing 2)

7. Class/laboratory Schedule:

15 weeks of 120min. lectures, 1 time a week.

8. Design Project:

None

9. Computer/software Use:

Students typically use word in writing their reports of problem-based learning.

10. Evaluation Methods:

Exams (2 quizzes 5% each (10), 2 assignment homework 5% each (10), Projects / 2 mid-term exams 10% each ,(20), and final exam 60% (60).

11. Contribution to Professional Component:

Students will learn to use the library and appropriate online resources to find and evaluate sources to inform, develop and support their ideas in term paper writing. They will also learn skills for reading analysis, such as comprehension and inference.

12. Relationship to Student Outcomes:

Course Learning Objectives (related Student Outcome 4)

13. Prepared by:

Assist.Prof. Dr. Arkan Dhari Jalal

Faculty C.V

Name: Yasir Abdulmajeed Mohammed Al-Ani

1. Education:

- Ph.D., Environmental Eng., China University of Geosciences (Wuhan), Hubei, China. 2013
- M.Sc., Environmental Eng., University of Technology, Baghdad, Iraq, 2002
- B.Sc., Civil Eng., University of Anbar, Anbar, Iraq, 1999

2. Academic Experience:

- University of Anbar, Iraq, Professor, 2025, full time
- University of Anbar, Iraq, Assistant Professor, 2020-2025, full time
- University of Anbar, Iraq, Instructor, 2006-2020, full time

3. Non-Academic Experience:

- Consultant Engineer for Pipes networks design, 2002-present
- Consultant Engineer for WTP and WWTP design, 2002-present
- Consultant Engineer for EIA reports, 2013- present
- Consultant Engineer for plumbing of buildings

4. Certifications or Professional Registrations:

- None

5. Current Membership in Professional Organizations:

- Member, The Iraqi Academic Union, 2025-present
- Member, The Iraqi Engineers Union, 2001-present

6. Honors and Awards:

- None

7. Principal Publications and Presentations of Past Five Years:

- Ahmed Rahomi Rajab, Ahmad Jamrah, **Yasir Al-Ani**, Zainab Malik Ismael. Biokinetics and Treatability of Dairy Wastewater Using Sequencing Batch Reactor.2021 The 4th International Conference on Materials Engineering and Science. Duhok, Kurdistan - Iraq]. " Scopus indexd"
- Ahmed Rahomi Rajab, **Yasir Al-Ani**, Zainab Malik Ismael. Feasibility of horizontal subsurface flow as an alternative technique for wastewater treatment in developing countries. 2022 Jurnal Teknologi.
- Ahmed Rahomi Rajab, **Yasir Al-Ani**, Johan Sohaili, Mohd Razman Salim, Aznah Nor Anuar. A New Phenomenon Helped in Sludge Wasting Reduction from the Novel Bioreactor.2022 the 2nd International Conference for Engineering Sciences and Information Technology (ESIT 2022). The AIP Conference Proceedings " Scopus indexd"
- Abedalkareem Shihab, **Yasir Al-Ani**, Ayad Sleibi Mustafa. Assessment of Quantity of a Specified Groundwater Wells in Anbar Governorate, Iraq. 2022 the 2nd International Conference for Engineering Sciences and Information Technology (ESIT 2022) Accepted. the AIP Conference Proceedings " Scopus indexd"

- **Yasir Al-Ani**, Zainab Malik Ismael, Ahmed Rahomi Rajab. Efficient Reduction Of Nitrite By Structural Fe(II) In Montmorillonite.2023 Environmental Engineering and Management Journal,
- **Yasir Al-Ani**, Arkan Dhari Jalal, Zainab Malik Ismael. Evaluation of X-3B Dye Removal and COD Reduction from Dyeing Wastewater Using Iron Wastes and Coagulation Process.2023 International Journal of Design & Nature and Ecodynamics.
- Arkan Dhari Jalal, **Yasir Al-Ani**, Salah Sabbar Thameel, Zainab Malik Ismael. Study of the Euphrates River's Water Quality in Front of and Behind the Haditha Dam in Anbar Province, Iraq.2023 the 2nd International Scientific Conference of Water, 2023. IOP Conference Proceedings " Scopus indexd".

8. Service Activities: University:

- Head of Dams and Water Resources Engineering Department.
- Member and chair of the Scientific promotion committee, Faculty of Engineering
- Member of the scientific committee, Dams and Water Resources Engineering Department
- Member of the examination committee, Civil Engineering Department
- Director of Scientific affairs and postgraduate's studies unit, Deanship of Eng., Univ. of Anbar
- Head assistant of Civil engineering Department.

9. Professional Development Activities:

- None

Name: Nabeel Shaker Mahmood

1. Education:

- Ph.D., Civil Eng., University of Arkansas, Fayetteville, AR, USA, 2018
- M.Sc., Civil Eng., University of Baghdad, Baghdad, Iraq, 2004
- B.Sc., Civil Eng., University of Anbar, Anbar, Iraq, 2001

2. Academic Experience:

- University of Anbar, Anbar, Assistant Professor, 2022-present, full time
- University of Anbar, Anbar, Instructor, 2018-2022, full time
- University of Arkansas, USA, Adjunct Instructor, 2015-2018, part time
- University of Anbar, Anbar, Assistant Instructor, 2005-2012, full time

3. Non-Academic Experience:

- Consultant Engineer preparing geotechnical reports and designing foundations, 2008-present
- ASTM Proctor, Center for Training Transportation Professionals, University of Arkansas, USA, 2016-2018
- Consultant Engineer for small dams in the Western Desert of Iraq, 2004-2011
- Co-owner Al-Saddiq Consulting Bureau, Anbar, Iraq, 2011- 2021
- On-site Engineer for construction of border observation posts, Anbar, Iraq, 2004-2006
- Administration Assistant Manager for Ramadi Youth Employment Bureau, Anbar, 2004

4. Certifications or Professional Registrations:

- Certified Field Concrete Testing Technician from the American Concrete Institute (ACI)
- Certified Leadership Trainer from CEO Global USA

5. Current Membership in Professional Organizations:

- Member, The Iraqi Engineers Union, 2001-present
- Member, American Society of Civil Engineers (ASCE), from 2014-present

6. Honors and Awards:

- Third place winner in the GeoPrediction 2018 Competition, IFCEE, USA, 2018

- Nominated by the College of Engineering, University of Anbar for Saddam's Award, 2001
- Third place winner in the National Competition of Undergraduate Students Research, 2000

7. Principal Publications and Presentations of Past Five Years:

- The Durability of an Organic Soil Treated with Fly Ash and Alkaline Activators, Ameen, S.K., Abdulkareem, A.H., Mahmood, N.S., AIP Conference Proceedings, 2024, 3009(1), 030122
- Sarah K. Ameen, Ahmed H. Abdulkareem, Nabeel S. Mahmood (2022). Compressibility Characteristics of an Organic Soil Treated with Fly Ash and Fly Ash-based Geopolymer. Iraqi Journal of Civil Engineering, 16(2), 23-29. https://www.iasj.net/iasj/article/256488
- . https://geomatejournal.com/geomate/article/view/3458
- Mahmood, N. S., Alboresha, R., Sulaiman, S. O., & Al-Ansari, N. (2022). Seepage Problem Through the Foundation of a Spillway with Selected Treatment Methods. Mathematical Modelling of Engineering Problems, 9(3), 819-824.
- Mahmood, N. S., Aude, S. A., Abdullah, H. H., Sulaiman, S. O., & Al-Ansari, N. (2022). Analysis of Slope Stability and Soil Liquefaction of Zoned Earth Dams Using Numerical Modeling. International Journal of Design & Nature and Ecodynamics, 17(4), 557-562.
- Sulaiman, S. O., Mahmood, N. S., Kamel, A. H., & Al-Ansari, N. (2021). The evaluation of the SWAT model performance to predict the runoff values in the Iraqi western desert. Environment and Ecology Research, 9(6), 330-339. DOI:10.13189/eer.2021.090602

8. Service Activities: University:

- Director of quality assurance and academic accreditation unit, Dean of Eng., Univ. of Anbar
- Member and chair of the accreditation committee, Dams and Water Resources Department
- Member of the examination committee, Dams and Water Resources Department

9. Professional Development Activities:

- None

Name: Uday Hatem Abdulhameed

1. Education:

- M.Sc., Civil Eng., University of Anbar, Anbar, Iraq, 2001
- B.Sc., Civil Eng., University of Anbar, Anbar, Iraq, 1998

2. Academic Experience:

- University of Anbar, Anbar, Instructor, 2001-present, full time

3. Non-Academic Experience:

- Consultant Engineer preparing hydraulically reports and designing, 2008-present

4. Certifications or Professional Registrations:

5. Current Membership in Professional Organizations:

- Member, The Iraqi Engineers Union, 1998-present

6. Principal Publications and Presentations:

- Abdulhameed,U.H., .2013. Two Dimensional Finite Element Model to Calculate the Influence of Channel Width Variation in Alluvial Channels on Bed Transport Capacity With Constant Value of Manning Coefficient. Iraqi Journal for Civil Engineering, Volume 9, Issue 1.
- Abdulhameed,U.H., .2010. Two Dimensional Finite Element Model to Calculate the Influence of graunes on the Value of Manning Coefficient in sand channels. Iraqi Journal for Civil Engineering, Volume 6, Issue2.
- Rafid Alboresha., Abdulrahman S. Mohammed., Uday Hatem., .2022. Forecasting The Water Level Of The Euphrates River In Western Iraq Using Artificial Neural Networks (ANN). International journal of design and nature and ecodynamics, Volume 2, Issue17.
- Abdulhameed,U.H.,2021. Empirical and Numerical Solution Of Seepage Problems Underneath Hydraulic Structures.. Anbar journal of engineering science, Volume 12, Issue 1.
- Majeed Mattar Ramal., Arkan Dhari Jalal . , Uday Hatem Abdulhameed.,2021.
- . Heavy Metal Assessment in Taps Drinking Water of Ramadi City Using Water Quality Indices, Anbar Province, International journal of sustainable development and planning, Volume 16, Issue 7.
- Majeed Mattar Ramal., Uday Hatem Abdulhameed., Arkan Dhari Jalal.,2021. Trace Elements Risk Assessment in Taps Drinking Water of Ramadi City, Anbar Province, Iraq. Volume 11, Issue 6.
- Mohammed Falah Allawi, Uday Hatem Abdulhameed, Ammar Adham,
- Khamis Naba Sayl, Sadeq Oleiwi Sulaiman, Majeed Mattar Ramal, Mohsen
- Sherif & Ahmed El-Shafie., 2023. Monthly rainfall forecasting modelling based on advancedmachine learning methods: tropical region as case study. engineering applications of computational fluid mechanics. Volume 17, Issue 1.Mahmood, N. S., Aude, S. A., Abdullah, H. H., Sulaiman, S. O., & Al-Ansari, N. (2022). Analysis of Slope Stability and Soil Liquefaction of Zoned Earth Dams Using Numerical Modeling. International Journal of Design & Nature and Ecodynamics, 17(4), 557-562.

8. Service Activities: University:

- Member of the examination committee, Dams and Water Resources Department
- Member of the scientific committee, Dams and Water Resources Department
  - incontestable, Dams and Water Resources Department

9. Professional Development Activities:

- None

Name: Ammar Adham Ali

1. Education:

- Ph.D., Water Resources Eng., Wageningen university, The Netherlands, 2017
- M.Sc., Dams and Water Resources Eng, University of Technology, Baghdad, Iraq, 2008
- B.Sc., Civil Eng., University of Anbar, Anbar, Iraq, 2000

2. Academic Experience:

- University of Anbar, Assistant Professor, 2022-present, full time
- University of Anbar, Instructor, 2017-2022, full time
- Wageningen university, The Netherlands, Adjunct Instructor, 2015-2017, part time
- University of Anbar, Assistant Instructor, 2008-2012, full time

3. Non-Academic Experience:

- Extensive experience in engineering design for water and sewage networks in both the government and private sectors.
- More than 10 years in supervising, consulting and designing engineering in the University of Al Anbar Engineering Consultant bureau.
- Over four years' experience working in Urban Planning.
- More than 8 years in scientific research in water, hydrology, and rainwater harvesting fields.
- Modeling and climate change researching.
- The use of ArcGIS, AutoCAD, MS office and other programs in researching.

4. Certifications or Professional Registrations:

5. Current Membership in Professional Organizations:

- Member, The Iraqi Engineers Union, 2001-present

6. Honors and Awards:

7. Principal Publications and Presentations of Past Five Years:

- Sayl, K., Adham, A., & Ritsema, C. J. (2020). A GIS-based multicriteria analysis in modeling optimum sites for rainwater harvesting. Hydrology, 7(3), 51.
- Seeyan, S., Adham, A., Mahdi, K., & Ritsema, C. (2021). Water quality, availability, and uses in rural communities in the kurdistan region, iraq. Water, 13(20), 2927.

- Wesseling, J. G., Adham, A., Riksen, M. J., Ritsema, C. J., Oostindie, K., & Heidema, N. (2021). A Microsoft Excel Application to Simulate Water Harvesting in a Catchment. Water Harvesting Research, 4(1), 1-18.
- Mohammad, E. I., Mustafa, A. S., & Adham, A. (2021). Simulation of storm sewer network using a storm water man-agement model (SWMM), ramadi city as a case study. Anbar Journal for Engineering Sciences, 9(1), 83-89.
- Adham, A., Abed, R., & Ritsema, C. (2021). A Reliability Analysis of Rainwater Catchment System. Water Resources, 48(3), 361-367.
- Mohamed, H. S., Ali, A. A., & Mustafa, A. S. (2021). Assessment of Selected Small Dams in the Western Desert of Iraq. Solid State Technology, 64(2), 7502-7520.
- Assaf, A. T., Sayl, K. N., & Adham, A. (2021, August). Surface Water Detection Method for Water Resources Management. In Journal of Physics: Conference Series (Vol. 1973, No. 1, p. 012149). IOP Publishing.
- Adham, A., Seeyan, S., Abed, R., Mahdi, K., Riksen, M., & Ritsema, C. (2022). Sustainability of the Al-Abila Dam in the Western Desert of Iraq. Water, 14(4), 586.
- Allawi, M. F., Abdulhameed, U. H., Adham, A., Sayl, K. N., Sulaiman, S. O., Ramal, M. M., ... & El-Shafie, A. (2023). Monthly rainfall forecasting modelling based on advanced machine learning methods: Tropical region as case study. Engineering Applications of Computational Fluid Mechanics, 17(1), 2243090.
- Abed, R., Adham, A., Allawi, M. F., & Ritsema, C. (2023). Potential Impacts of Climate Change on the Al Abila Dam in the Western Desert of Iraq. Hydrology, 10(9), 183.

8. Service Activities: University:

- Member and chair of the accreditation committee, Dams and Water Resources Department
- Member of the examination committee, Dams and Water Resources Department
- Member of the scientific committee, Dams and Water Resources Department
- Member of the curriculum development committee, Dams and Water Resources Department

9. Professional Development Activities:

- None

Name: Zaid M. Al-Azzawi, PhD

1. Education:

- Ph.D., Civil Eng., University of Edinburgh, UK, 2016
- M.Sc., Structural Eng., University of Technology, Baghdad, Iraq, 1998
- B.Sc., Civil Eng., University of Anbar, Anbar, Iraq, 1995

2. Academic Experience:

- University of Anbar, Ramadi, Associate Professor, 2020- present, full time
- University of Anbar, Ramadi, Senior Lecturer, 2016-2020, full time
- University of Edinburgh, UK, Instructor, 2013-2016, part time
- University of Anbar, Ramadi, Senior Lecturer, 2012-2013, full time
- University of Anbar, Ramadi, Assistant Instructor, 2005-2008, full time

3. Non-Academic Experience:

- Consultant Engineer in structural engineering, 2007-present
- The Effect of Fires on People, Property, and the Environment. A Fire Safety Course, University of Maryland, between Nov. 5th and Dec. 17th, 2018.
- OSHA first aid Basics training course, 5th of January 2020.
- Publons Academy Practical Peer Review Course (10 modules), 8th of June 2020.
- Computer competency training course, Aug. 2020.

4. Certifications or Professional Registrations:

- Certified ICAEE evaluator
- Certified ToT in hybrid education
- Certified English linguistic reviewer and teacher

5. Current Membership in Professional Organizations:

- A consultant and member of the Iraqi Engineers Union No. 76955 in 26 July 1995.
- Member of the Jordanian Engineers Union No. 15030/1 in 19 Feb. 2001.

6. Honors and Awards:

- Best teaching award for Visual Basic Programming Class, 2012.
- PhD scholarship from MOHESR, 2013-2016.
- Fulbright Visiting Scholar award, 2018.
- RULA International Distinguished Researcher Award of the Year, 2020.
- **Patent:** Strengthening Shear Capacity and Improving Buckling Strength of Thin-Walled Steel Plates Using a Novel Section Prefabricated from Carbon Fibre Reinforced Polymers (CFRP). B32B13/02- E04B1/04 in 19-11-2017

7. Principal Publications and Presentations of Past Five Years:

FRP Strengthening of Web Panels of Steel Plate Girders against Shear Buckling Part-II: Fatigue Study and Cyclic Series of Tests, Composite Structures, 210 (2019).

Utilizing Recycled Concrete and Stone Aggregate as Replacement for Natural and Crushed Virgin Aggregate, International Journal of Engineering & Technology (UAE) 7 (4.37) 2018, 90-97.

- Mechanical properties of high strength self-compacting concrete with reused steel fibers at high temperatures, in Journal of Green Engineering, 2020, 10(6), pp. 3156-3170.

Strengthening of Composite Castellated Beams Web with Corrugated Carbon Fiber Reinforced Polymer Struts, in Key Engineering Materials Vol. 870, pp 49-60, October 2020.

A new design method for a novel FRP strengthening technique against shear buckling of steel plate girders, Thin-Walled Structures, Volume 148, March 2020.

8. Service Activities: University:

- Head of central academic accreditation committee, Dean of Eng., Univ. of Anbar
- Member of the examination committee, Dams and Water Resources Department
- Member of university quality assurance committee.
- National Evaluator for Engineering Education Programs.

9. Professional Development Activities:

- ABET working group webinar series, In January - March 2017 through the U.S.-Iraq Higher Education Partnerships Program, a program developed by IREX with the support of the US Embassy in Iraq.
- A one-month concentrated course in Professional English held by the Continuous Education Centre at the University of Anbar in March 2018. After graduation we received a license from MOHESR to become English Teachers and Evaluators. This course is allowed only for PhD holders graduated from universities based in (UK, USA, Canada, and Australia).
- Steven's initiative Faculty Institute, faculty training and partnership development of a cross-cultural STEM collaboration between the United States and Iraq institutions of higher learning, March 4-6, 2018.

Name: Khamis Naba Sayl

1. Education:

- Ph.D., Engineering and Built Environment, University UKM, Malaysia, 2018
- M.Sc., Engineering Surveying , University of Baghdad, Baghdad, Iraq, 1996
- B.Sc., Engineering Surveying , University of Baghdad, Baghdad, Iraq, 1991

2. Academic Experience:

- University of Anbar, Anbar, Professor, 2022-present, full time
- University of Anbar, Anbar, Assistant Professor, 2008-2022, full time

3. Non-Academic Experience:

- Consultant Engineer preparing Engineering Surveying, 2004-present,
- Consultant Engineer for small dams in the Western Desert of Iraq, 2004-2011

4. Certifications or Professional Registrations:

- None

5. Current Membership in Professional Organizations:

- Member, The Iraqi Engineers Union, 1991-present

6. Honors and Awards:

- None

7. Principal Publications and Presentations of Past Five Years:

- Sameer, Y.M., Abed, A.N., Sayl, K.N (2023) Geomaticsbased approach for highway route selection. AppliedGeomatics, 15: 161-176. https://doi.org/10.1007/s12518-023-00495-x
- Mohammed, O. A., Sayl, K. N., Sulaiman, S. O., Mahmood, N. S., Allawi, M. F., & Al-Ansari, N. (2023). Geoinformatics-Based Approach for Aquifer Recharge Zone Identification in the Western Desert of Iraq. GEOMATE Journal, 25(110), 220-234. https://geomatejournal.com/geomate/article/view/3448

- Mohammed, O.A., Sayl, K.N. (2020). Determination of groundwater potential zone in arid and semi-arid regions: A review. In 2020 13th International Conference on Developments in eSystems Engineering (DeSE), Liverpool, United Kingdom, pp. 76-81.
- Sameer, Y.M., Abed, A.N., Sayl, K.N (2021) Highway route selection using GIS and analytical hierarchy process case study Ramadi Heet rural highway. Journal of Physics: Conference Series, 1973: 012060. 10.1088/1742-6596/1973/1/012060
- Jaafar, Q.N., Sayl, K.N., Kamel, A.H. (2023). Numerical modelling of river training work: A review. IOPConference Series: Earth and Environmental Science, 1222: 012010. https://doi.org/10.1088/1755-1315/1222/1/012010
- Assaf, A.T., Sayl, K.N., Adham, A. (1973). Surface water detection method for water resources management. Journal of Physics: Conference Series, 1973: 012149. https://doi.org/10.1088/1742-6596/1973/1/012149
- K.N. Sayl, S.O. Sulaiman, A.H. Kamel, N.S. Muhammad, J. Abdullah, and N. Al-Ansari, Minimizing the Impacts of Desertification in an Arid Region: A Case Study of the West Desert of Iraq, Advances in Civil Engineering 2021, (2021).
- A. Adham, K. N. Sayl, R. Abed, M. A. Abdeladhim, J. G. Wesseling, M. Riksen, L. Fleskens, U. Karim, and C. J. Ritsema. A GIS-based approach for identifying potential sites for harvesting rainwater in the Western Desert of Iraq, International Soil and Water Conservation Research, 6(4), 297–304. (2018) https://doi.org/10.1016/j.iswcr.2018.07.003

8. Service Activities: University:

- Editotr-in-chief **Iraqi Journal of Civil Engineering (IJCE)** , Univ. of Anbar
- Member and chair of the accreditation committee, Dams and Water Resources Department
- Member of the scientific committee, Dams and Water Resources Department
- Member of the curriculum development committee, Dams and Water Resources Department

9. Professional Development Activities:

- None

Name: Ghassan Subhi Jameel

1. Education:

- Ph.D., Civil Eng., University of Gaziantep, Gaziantep, Turkey, 2017
- M.Sc., Civil Eng., University of Anbar, Anbar, Iraq, 2008
- B.Sc., Civil Eng., University of Anbar, Anbar, Iraq, 2002

2. Academic Experience:

- University of Anbar, Anbar, Assistant Professor, 2023-present, full time
- University of Anbar, Anbar, Instructor, 2017-2023, full time
- University of Gaziantep, Turley, Doctorate students, 2013-2017, part time
- University of Anbar, Anbar, Assistant Instructor, 2008-2013, full time

3. Non-Academic Experience:

- Consultant Engineer preparing concrete testing reports, 2009-present
- Consultant Engineer for concrete test control, 2020-2023

4. Certifications or Professional Registrations:

- Certified Field Concrete Non-destructive Testing Technician from the Technology University

5. Principal Publications and Presentations of Past Five Years:

- Producing of Workable Structural Lightweight Concrete By Partial Replacement of aggregate With Yellow and/or Red Crushed Clay Brick (CCB) Aggregate, Journal of King Saud University-Engineering Sciences.
- Physical and Mechanical Properties of Cementitious PVC Composites, Al-Nahrain Journal for Engineering Sciences.
- Evaluation the Properties of Mortar Containing Plastic Boxes Waste, Journal of University of Babylon for Engineering Sciences.
- Production and Properties of Plastic Boxes Waste Concrete, University of Thi_Qar Journal for Engineering Sciences.

6. Service Activities: University:

- Member of the examination committee, Dams and Water Resources Department
- Member of the senior design committee, Dams and Water Resources Department

7. Professional Development Activities:

- None

Name: Majed Hadi Talal

1. Education:

1. Academic Qualifications:

• PhD in Comparative Islamic Jurisprudence, College of Islamic Sciences, University of Anbar, 2013.

• Master's Degree in Islamic Sciences, University of Baghdad, Iraq, 2004.

• Bachelor's Degree in Islamic Sciences, University of Baghdad, Iraq, 2000.

2. Academic Experience:

• University of Anbar, Lecturer, 2018, Full-time

•University of Anbar, Anbar, Assistant Lecturer, 2005-2017, Full-time

3. Non-Academic Experience:

• Affiliated with the University Psychological Counseling Unit from 2017-2019

• Director of the University Psychological Counseling Unit from 2019 to the present

4. Certifications or Professional Registrations:

• Holds a TOT (Training of Trainers) certificate in guidance and counseling

5. Current Membership in Professional Organizations:

- Member of the Iraqi Academics Syndicate, from 2001 to the present

6. Honors and Awards:

nothing

7. Principal Publications and Presentations of Past Five Years:

More than one research paper and article have been published so far.

8. Service Activities: University:

- Director of the University's Psychological Counseling Unit
- Member of the Quranic Competitions Committee for several years
- Member of the Committee for Updating Arabic Language, Human Rights, and Democracy Curricula at the College of Engineering

9. Professional Development Activities:

- None

Name: Arkan Dhari Jalal

1. Education:

- Ph.D., Civil (Environmental) Eng., University of Kansas, USA, 2018
- M.Sc., Civil (Environmental) Eng., University of Technology, Baghdad, Iraq, 2002
- B.Sc., Civil Eng., University of Anbar, Anbar, Iraq, 1999

2. Academic Experience:

- University of Anbar, Iraq, Assistant Professor, 2022-present, full time
- University of Anbar, Iraq, Instructor, 2018-2022, full time
- University of Anbar, Iraq, Assistant Instructor, 2006-2012, full time

3. Non-Academic Experience:

- Consultant and Designer Engineer at Anbar University Engineering Consulting Office for some projects, such as designing a network of sewer water for Hit city-2002.
- Site engineer at the Ministry of Water resource-Al-Nasr company- executes open channel for irrigation and drainage for the period 2002-2006.
- Designer Engineer of water supply networks for some buildings in Al-Anbar University- 2008.
- Designer Engineer for Al-Kurtan Water Project for Water Treatment Plant in Al-Khalidiya Area Consulting Bureau, Anbar, Iraq, 2020- 2021
- Environmental Impact Assessment for various projects, Consulting Bureau, Anbar, Iraq, 2010- Present

4. Certifications or Professional Registrations:

5. Current Membership in Professional Organizations:

- Member, The Iraqi Engineers Union, 1999-present, and the Iraqi Academics Union

6. Honors and Awards:

7. Principal Publications and Presentations of Past Five Years:

- Heavy Metal Assessment in Taps Drinking Water of Ramadi City Using Water Quality Indices, Anbar Province, Iraq MM Ramal, AD Jalal, UH Abdulhameed International Journal of Sustainable Development and Planning 16 (7), 1349-1357
- River water turbidity removal using new natural coagulant aids: case study of Euphrates River, Iraq MM Ramal, AD Jalal, MF Sahab, ZM Yaseen Water Supply 22 (3), 2721-2737
- Trace Elements Risk Assessment in Taps Drinking Water of Ramadi City, Anbar Province, Iraq ADJ Majeed Mattar Ramal, Uday Hatem Abdulhameed International Journal of Safety and Security Engineering 11 (6), 623-634
- Groundwater quality parameters prediction based on data-driven models MF Allawi, Y Al-Ani, AD Jalal, ZM Ismael, M Sherif, A El-Shafie Engineering Applications of Computational Fluid Mechanics 18 (1), 2364749
- Response of fly ash based quarry dust cement mortar to magnesium sulphate attack AD Ahmed, AA Hammadi, MM Assel, AD Jalal Annales de Chimie. Science des Materiaux 47 (2), 67
- Combustion of pelletized freshwater macroalgae and pine blends using a fixed bed reactor B Gessler, A Jalal, J Yun, E Peltier, C Depcik Bioresource Technology Reports 16, 100871
- Study of the Euphrates River's Water Quality in Front of and Behind the Haditha Dam in Anbar Province, Iraq AD Jalal, Y Al Ani, SS Thameel, ZM Ismael IOP Conference Series: Earth and Environmental Science 1222 (1), 012042

8. Service Activities: University:

- Member of the accreditation committee, Dams and Water Resources Department 2023-2024
- Member of the examination committee of Postgraduate Studies, Dams and Water Resources Department 2019- Present.
- Member of the Postgraduate Studies committee, Dams and Water Resources Department 2019- Present

9. Professional Development Activities:

- None

Name: Aseel Hossam Aldin Abdulla Abdaljader

1. Education:

- Ph.D., Civil Eng., Gaziantep University, Türkiye, 2024
- M.Sc., Civil Eng., University of Baghdad, Baghdad, Iraq, 2000
- B.Sc., Civil Eng., Salahaddin University, Erbil, Iraq, 1991

2. Academic Experience:

- University of Anbar, Ramadi, Lecturer, 2025.
- University of Anbar, Ramadi, Assistant Instructor, 2008.
- Al-Nahrain University, Baghdad, Assistant Instructor, 2006-2008, full time
- Lecturer at Zawiya University and the Institute for Training Trainers in Regdalin / Libya, 2002-2005, full time

3. Non-Academic Experience:

- Project Engineer / Corporation of Research and Industrial Development - Ministry of Industry, Baghdad, Iraq, 1992-2002.

4. Certifications or Professional Registrations:

5. Current Membership in Professional Organizations:

- Member, The Iraqi Engineers Union,1992 -present

6. Honors and Awards:

7. Principal Publications and Presentations of Past Five Years:

- J. A. Al-somaydaii, A. H. Abdaljader, S. Shartooh, and N. Al, "Using support vector machine (SVM) technology to predict the duration of irrigation canal projects in western Iraq," vol. 14, no. January, pp. 73–81, 2023.
- J. A. AL-Somaydaii and A. Abdaljader, "Earned value management application in construction projects of Anbar governorate," 2ND Int. Conf. Eng. Sci. Inf. Technol. (ESIT 2022) ESIT2022 Conf. Proc., vol. 3009, p. 030126, 2024, doi: 10.1063/5.0190450.

- A. Abdaljader and G. Mustafa, “Identification of risks causing delays in design development and construction stages of state-owned irrigation projects in Turkey,” vol. 14, no. July 2022, pp. 2341–2349, 2023.
- A. Abdaljader and M. Günal, “Main Risk Factors Causing Delays in GAP Construction Projects in Turkey by Using Relative Importance Index (RII) Method,” Iran. J. Sci. Technol. - Trans. Civ. Eng., no. 0123456789, 2023, doi: 10.1007/s40996-023-01207-6.
- S. S. Sharqi, J. A. Al-somaydaii, and A. H. Abdaljader, “Improving Construction Engineering through using TQM Model Frameworks : Iraq as a case study .” The 5th International Conference on Buildings, Construction and Environmental Engineering – Sulaymaniyah - Iraq, 2023, AIP Conference Proceedings 3219 (1), 020002 , 2024.
- H Zayan, A Abdaljader, I Mawlood, A Mahmoud, “State-Of-Art of One-And Two-Way Voided Reinforced Concrete Slab” Iraqi Journal of Civil Engineering 18 (2), 118-130 , 2024, https://doi.org/10.37650/ijce.2024.180210

8. Service Activities: University:

- Member of Quality Assurance Committee, Dams and Water Resources Department.
- Member of the examination committee, Dams and Water Resources Department.
- Member of the Student Graduation Projects Committee, Dams and Water Resources Department.
- Member of the Student Absences Committee, Dams and Water Resources Department.

9. Professional Development Activities:

- None

Name: Aseel Madallah Mohammed

1. Education:

- Ph.D., Civil Eng., University of Gaziantep, Turkey, 2017
- M.Sc., Civil Eng., University of Anbar, Ramadi, Iraq, 2005
- B.Sc., Civil Eng., University of Anbar, Anbar, Iraq, 200

2. Academic Experience:

- University of Anbar, Ramadi, Assistant Professor, 2024-present, full time
- University of Anbar, Ramadi, Instructor, 2010-2024, full time
- University of Anbar, Ramadi, Assistant Instructor, 2005-2010, full time

3. Non-Academic Experience:

Not Found

4. Certifications or Professional Registrations:

Not Found

5. Current Membership in Professional Organizations:

- Member, The Iraqi Engineers Union, 2002-present
- Member of academic union, 2025

6. Honors and Awards:

Not Found

7. Principal Publications and Presentations of Past Five Years:

●Impact Resistance and Flexural Strength of Concrete Containing Fly Ash and Glass Powder, Ahmed Dalaf Ahmed* | Assel Madallah Mohammed, Annales de Chimie - Science des Matériaux,Vol. 48, No. 5, October, 2024, pp. 679-684

● Utilizing Local Waste Materials to Produce Eco-friendly, Thermally Resistant Concrete

Alfahdawi, I.H., Armoosh, S.R., Mohammed, A.M., Jehad, A.E. Annales de Chimie: Science des Materiaux, 2024, 48(4), pp. 481–490

● Production of Groundwater Resistance Mortar Using Glass Sand and Polypropylene Fibres Mohammed, A.M. Hammadi, A.A., Alfahdawi, I.H., Aadi, A.S., Al-Hadithi, A.I.

Annales de Chimie: Science des Materiaux, 2024, 48(2), pp. 207–214

● Response of Fly Ash Based Quarry Dust Cement Mortar to Magnesium Sulphate Attack

Ahmed, A.D., Hammadi, A.A., Mohammed, A.M., Jalal, A.D. Annales de Chimie: Science des Materiaux, 2023, 47(2), pp. 67–73

● Experimental and statistical evaluation of rheological properties of self-compacting concrete containing fly ash and ground granulated blast furnace slag Mohammed, A.M.

, Asaad, D.S., Al-Hadithi, A.I. Journal of King Saud University - Engineering Sciences, 2022, 34(6), pp. 388–397

● Enhancing of Concrete Properties by Using Aluminium and Iron Residues as a Partial Replacement of Fine Aggregate Hammadi, A.A., Mohammed, A.M., Ramal, M.M.

Annales de Chimie: Science des Materiaux, 2022, 46(4), pp. 207–211

● Investigating Transport Properties of Low-Binder Ultrahigh-Performance Concretes: Binary and Ternary Blends of Nanosilica, Microsilica and Cement Mohammed, A.M.

, Al-Hadithi, A.I., Asaad, D.S. Arabian Journal for Science and Engineering, 2020, 45(10), pp. 8369–8378

8. Service Activities: University:

- Member and chair of the Quality Assurance and University Performance Committee, Dams and Water Resources Department
- Member of the examination committee, Dams and Water Resources Department
- Member of the scientific activities , Dams and Water Resources Department
- Member of the Bologna track qualitycommittee, Dams and Water Resources Department

9. Professional Development Activities:

- None

Name: Ayad S. Aadi

1. Education:

- Ph.D., Civil Eng., Savitribai Phule Pune University, Pune, MH, India, 2017
- M.Sc., Building Materials Eng., University of Technology, Baghdad, Iraq, 2005
- B.Sc., Civil Eng., University of Technology, Baghdad, Iraq, 1984

2. Academic Experience:

- University of Anbar, Anbar, Assistant Professor, 2023-present, full time
- University of Anbar, Anbar, Instructor, 2017-2023, full time
- Savitribai Phule Pune University, India, Adjunct Instructor, 2010-2017, part time
- University of Anbar, Anbar, Assistant Instructor, 2006-2010, full time

3. Non-Academic Experience:

- Consultant Engineer for Iraqi Engineers Union , Baghdad, 2009
- Lecturer Ministry of Higher Education and Research, Anbar, Iraq, 2006- present
- Advisor Engineer for Ministry of Constriction & Housing,Iraq, 1996-2006
- Site Engineer on Ministry of Defence,Iraq, 1987-1996

4. Certifications or Professional Registrations:

5. Current Membership in Professional Organizations:

- Member of The Iraqi Engineers Union, 1987-present
- Member of The Iraqi Academics Syndicate

6. Honors and Awards:

7. Principal Publications and Presentations of Past Five Years:

- The Impact Resistance of Fire Shooting for Self-Compacted Concrete Slabs Containing Ceramic Powder and Reinforced by Novel Waste Nylon Fiber, Annales de Chimie - Science des Matériaux , https://doi.org/10.18280/acsm.480413
- Mechanical performance of eco-friendly self-compacting concrete (SCC) mixtures and two-way slabs partially containing cement kiln dust as cement replacement and internally reinforced with waste plastic mesh (2024), Structures , https://doi.org/10.1016/j.istruc.2024.106864
- Production of Groundwater Resistance Mortar Using Glass Sand and Polypropylene Fibres(2024), Annales de Chimie - Science des Matériaux, https://doi.org/10.18280/acsm.480413
- Investigations of hardened and thermal conductivity of eco-efficient mortar by recycling waste foil aluminum of water glass cover as fine aggregate (2023), AIP Conference Proceeding, https://doi.org/10.1063/5.0157162
- Effects of Coal Ash and Walnut Shell on the Impact Resistance and Mechanical Properties of Eco-Efficient Self-Compacting Concrete(2023), Annales de Chimie - Science des Matériaux , https://doi.org/10.18280/acsm.470402

- Ultra-high performance of eco-friendly self-compacting concrete incorporated cement Kiln dust with/without waste plastic and polypropylene fiber (2023), Innov. Infrastruct. Solut. 8, 94 . 10.1007/s41062-023-01058-0
- Ultra-Fine Treated and Untreated Walnut Shell ash incorporated cement mortar: Properties and environmental impact assessments (2023), Annales de Chimie - Science des Matériaux, https://doi.org/10.18280/acsm.460605
- Investigations of hardened and thermal conductivity of eco-efficient mortar by recycling waste foil aluminum of water glass cover as fine aggregate(2023), https://doi.org/10.1063/5.0157162
- The mechanical properties of green mortar contained aluminum wastes as substitution of sand, Materials Today: Proceedings 42 (2021) 3002–3009 , https://www.sciencedirect.com/science/article/pii/S2214785320405309?via%3Dihub
- The behavior of eco-friendly self – compacting concrete partially utilized ultra-fine eggshell powder waste(2021) Journal of Physics: Conference Series, https://iopscience.iop.org/article/10.1088/1742-6596/1973/1/012143/pdf

8. Service Activities: University:

- Member of quality assurance and academic accreditation unit, College of Eng., Univ. of Anbar
- Member of the Committee for Assessing the Scientific Reality of Iraqi Colleges of Engineering
- Head of the Graduation Projects Committee, Dams and Water Resources Department
- Member of the Engineering and Industrial Consulting Committee, Dams and Water Resources Department
- Chairman of the Bologna Registration Committee, Dams and Water Resources Department
-
- Member of the curriculum development committee, Dams and Water Resources Department

9. Professional Development Activities:

- None

Name: Rafid Saadoon Rashid Alboresha

1. Education:

- Ph.D., Water Resources Eng., University of Lorraine, France, 2016
- M.Sc., Water Resources Eng., University of Technology, Iraq, 2008
- B.Sc., Civil Eng., University of Anbar, Iraq, 2003

2. Academic Experience:

- University of Anbar, Assistant Professor, 2022-present, full time
- University of Anbar, Instructor, 2016-2022, full time
- University of Anbar, Assistant Instructor, 2008-2011, full time

3. Non-Academic Experience:

- Consultant Engineer in water resources, 2022-present
- On-site Engineer and Office Engineer in IRD (International Relief and Development), Ramadi, 2007-2008
- On-site Laboratory Engineer for small dams in the Western Desert of Iraq, 2005-2007

4. Current Membership in Professional Organizations:

- Member, The Iraqi Engineers Union, 2004-present

5. Principal Publications and Presentations of Past Five Years:

- M. H. Dakheel, W. H. Khalil, and R. S. Rashid, "Numerical and experimental investigation of main parameters affecting the performance of micro gravitational water vortex turbine," AIP Conference Proceedings, vol. 3303, p. 120001, 2025.
- Sattar, B., Sayl, K., Rashid, R. (2024). Modeling of Spatially Distributed Sedimentation in Houran Dam H-3 AIP Conference Proceedings, 2024, 3009(1), 030125
- Jabar, B.S.,Sayl, K.N.,Alboresha, R.(2023). Incorporating a GIS-Based Approach and SWAT Model to Estimate Sediment in the Western Desert of Iraq. International Journal of Design and Nature and Ecodynamics, 2023, 18(4), pp. 791–800
- Jabar, B.S., Sayl, K.N., Rashid, R.S.(2023). Approaches to Modeling Soil Erosion Caused by Water: A Review.AIP Conference Proceedings, 2023, 2775(1), 040001
- Mahmood, N. S., Alboresha, R., Sulaiman, S. O., & Al-Ansari, N. (2022). Seepage Problem Through the Foundation of a Spillway with Selected Treatment Methods. Mathematical Modelling of Engineering Problems, 9(3), 819-824.

- Jalal, A.D., Alboresha, R., Ramal, M.M.(2022). Evaluation of Fluoride Concentration in Drinking Water of Some Cities within Anbar Province, Iraq.International Journal of Design and Nature and Ecodynamics, 2022, 17(4), pp. 607–613
- Forecasting the Water Level of the Euphrates River in Western Iraq Using Artificial Neural Networks (ANN)
- Alboresha, R., Mohammed, A.S., Hatem, U. (2022). Forecasting the Water Level of the Euphrates River in Western Iraq Using Artificial Neural Networks (ANN).International Journal of Design and Nature and Ecodynamics, 2022, 17(2), pp. 303–309
- Kosaj, R., Alboresha, R.S., Sulaiman, S.O.(2022).Comparison between Numerical Flow3d Software and Laboratory Data, for Sediment Incipient Motion.IOP Conference Series: Earth and Environmental Science, 2022, 961(1), 012031

6. Service Activities: University:

- Planning Unit Maneger, Dean of Eng., Univ. of Anbar
- Member and chair of the accreditation committee, Dams and Water Resources Department
- Member of the examination committee, Dams and Water Resources Department
- Member of the scientific committee, Dams and Water Resources Department
- Member of the curriculum development committee, Dams and Water Resources Department
- A member of the ministerial committee representing the University of Anbar to enhance cooperation between Iraq and France.

7. Professional Development Activities:

- None

Name: Mohammed Falah Allawi

1. Education:

- Ph.D., Civil Eng., National University of Malaysia, Malaysia, 2019
- M.Sc., Civil Eng., National University of Malaysia, Malaysia, 2016
- B.Sc., Dams and Water Resources Engineering, University of Anbar, Anbar, Iraq, 2010

2. Academic Experience:

- University of Anbar, Anbar, Lecturer, 2021-present, full time

3. Non-Academic Experience:

- Consultant Engineer preparing geotechnical reports and designing foundations, 2008-present
- Consultant Engineer for west water in Falluja city, Iraq, 2012-2014
- On-site Engineer for construction of border observation posts, Anbar, Iraq, 2010-2012

4. Certifications or Professional Registrations:

- Certified Field Concrete Testing Technician from the American Concrete Institute (ACI)
- Certified Leadership Trainer from CEO Global USA

5. Current Membership in Professional Organizations:

- Member, The Iraqi Engineers Union, 2010-present
- Member, The Federation of Arab Engineers, 2012-present

6. Honors and Awards:

- First place winner in the Distinguished Researcher Award at Anbar University 2024

7. Principal Publications and Presentations of Past Five Years:

Scopus Link: https://www.scopus.com/authid/detail.uri?authorId=57057678400

Number of Publication: 38

H-index: 25

8. Service Activities: University:

- Director of Postgraduate Studies unit, College of Engineering, University. of Anbar
- Director of Scientific Journals Unit, College of Engineering, University of Anbar
- Member of the examination committee, Dams and Water Resources Department
- Member of the scientific committee, Dams and Water Resources Department
- Member of the curriculum development committee, Dams and Water Resources Department

9. Professional Development Activities:

- None

Name: Hend Saad Zayan

1. Education:

- Lecture, Civil Eng., University of Anbar, Anbar, Iraq, 2022.

- MSc., Civil Eng., University of Anbar, Anbar, Iraq, 2018.

- BSc., Civil Eng, University of Anbar, Anbar, Iraq, 2008.

2. Academic Experience:

- Dams and Water Resources Department, Engineering College, University of Anbar, Anbar, Lecturer, (2022-present), full time

- Dams and Water Resources Department, Engineering College, University of Anbar, Anbar, MSc Civil Eng., (2021-2022), full time

- Deanship of Faculty of Engineering, Engineering College, University of Anbar, Anbar, MSc Civil Eng., (2018-2021), full time

- Civil Engineering Department, Engineering College, University of Anbar, Anbar, BSc. Civil Eng., (2010-2018), full time

- Department of Construction and Projects, University Presidency, University of Anbar, Anbar, BSc. Civil Eng., (2009-2010), full time

3. Non-Academic Experience:

None

4. Certifications or Professional Registrations:

None

5. Current Membership in Professional Organizations:

Iraqi Engineers Union

6. Honors and Awards:

None

7. Principal Publications and Presentations of Past Five Years:

- Behavior of steel stud shear connectors in self-compacting concrete having polypropylene fibers, Zahraa A. Ali, Hend Zayan, Hameed Saleh Al-Falahy, Akram S. Mahmoud, Conference: THE 5TH INTERNATIONAL CONFERENCE ON CIVIL AND ENVIRONMENTAL ENGINEERING TECHNOLOGIES, December 2023

• The behavior of concrete incorporating ring shape waste plastic fibers under different load conditions, Hama, S.M., Zayan, H.S., Hama, S.M., Innovative Infrastructure Solutions, 2023, 8(5), 134

• Shear transfer strength estimation of concrete elements using generalized artificial neural network models, Zayan, H.S., Mahmoud, A.S., Hamdullah, D.N.,Journal of the Mechanical Behavior of Materials, 2023, 32(1), 20220219

• Structural behavior of reinforced concrete incorporating glass waste as coarse aggregate

Hama, S.M., Ali, Z.M., Zayan, H.S., Mahmoud, A.S.,Journal of Structural Integrity and Maintenance, 2023, 8(1), pp. 59–66

• Estimations the Combined Flexural-Torsional Strength for Prestressed Concrete Beams Using Artificial Neural Networks,Zayan, H.S., Mahmoud, A.S.,Geotechnical Engineering and Sustainable Construction - Sustainable Geotechnical Engineering, 2022, pp. 583–596

• A parametric study and design equation of reinforced concrete deep beams subjected to elevated temperature,Zayan, H.S., Farhan, J.A., Mahmoud, A.S., AL-Somaydaii, J.A.

Lecture Notes in Civil Engineering, 2019, 9, pp. 193–214.

8. Service Activities: University:

None

• Journal Reviews:

None

9. Professional Development Activities:

None

Name: Majeed Mattar Ramal

1. Education:

- M.Sc., Environmental Eng., University of Technology, Baghdad, Iraq, 2002
- B.Sc., Civil Eng., University of Anbar, Anbar, Iraq, 1999

2. Academic Experience:

- University of Anbar, Baghdad, Professor, 2006-present, full time

3. Non-Academic Experience:

- Consultant Engineer preparing EIA reports and designing Drainage and Sewer networks , 2006-present

4. Certifications or Professional Registrations:

5. Current Membership in Professional Organizations:

- Member, The Iraqi Engineers Union, 1999-present

6. Honors and Awards:

7. Principal Publications and Presentations of Past Five Years:

1. **Ground Water Quality Evaluation for Irrigation Purpose: Case Study Al-Wafaa Area, Western Iraq**

Sahab, M.F., Abdullah, M.H., Hammadi, G.A., ... Sayl, K.N., Ramal, M.M.

International Journal of Design and Nature and Ecodynamics, 2024, 19(4), pp. 1415–1424

2. **Trace Element Risk Assessment of Euphrates River in Fallujah City, Anbar province, Iraq**

Hasham, G.J., Ramal, M.M.

AIP Conference Proceedings, 2024, 3009(1), 030133

3. **Monthly rainfall forecasting modelling based on advanced machine learning methods: tropical region as case study**

Allawi, M.F., Abdulhameed, U.H., Adham, A., ... Sherif, M., El-Shafie, A.

Engineering Applications of Computational Fluid Mechanics, 2023, 17(1), 2243090

4. **Heavy metals assessment in sediments bed of Habbaniyah Lake, Iraq**

Ghalib, H.S., Ramal, M.M.

Journal of Applied Research and Technology, 2023, 21(2), pp. 281–296

5. **Application of Computational Model Based Probabilistic Neural Network for Surface Water Quality Prediction**

Allawi, M.F., Salih, S.Q., Kassim, M., ... Mohammed, A.S., Yaseen, Z.M.

Mathematics, 2022, 10(21), 3960

6. **Enhancing of Concrete Properties by Using Aluminium and Iron Residues as a Partial Replacement of Fine Aggregate**

Hammadi, A.A., Mohammed, A.M., Ramal, M.M.

Annales de Chimie: Science des Materiaux, 2022, 46(4), pp. 207–211

7. **Water Quality Assessment of Euphrates River within Fallujah City Using Water Quality Indices Technique**

Hasham, G.J., Ramal, M.M.

International Journal of Design and Nature and Ecodynamics, 2022, 17(4), pp. 563–570

8. **Evaluation of Fluoride Concentration in Drinking Water of Some Cities within Anbar Province, Iraq**

Name: Mohammed Freeh Sahab

1. Education:

- M.Sc., Environmental Eng., Belgorod State Technological University, Russia, 2017

- B.Sc., Civil Eng., University of Anbar, Iraq, 2006

2. Academic Experience:

- University of Anbar, Instructor, 2022 - to present, full time
- University of Anbar, Assistant Instructor, 2017-2022, full time

3. Non-Academic Experience:

- Consultant Engineer in Environmental Engineering, 2021-present

4. Current Membership in Professional Organizations:

- Member, The Iraqi Engineers Union, 2006-present

5. Principal Publications and Presentations of Past Five Years:

- Hilal, N. N., Sahab, M. F., & Ali, T. K. M. (2021). Fresh and hardened properties of lightweight self-compacting concrete containing walnut shells as coarse aggregate. *Journal of King Saud University-Engineering Sciences*, *33*(5), 364-372.
- . Ramal, M. M., Jalal, A. D., Sahab, M. F., & Yaseen, Z. M. (2022). River water turbidity removal using new natural coagulant aids: case study of Euphrates River, Iraq. *Water Supply*, *22*(3), 2721-2737.
- Sahab, M. F., Abdullah, M. H., Hammadi, G. A., Hamad, N. S., Abdulazez, A. A., Fayyadh, A. H., ... & Ramal, M. M. (2024). Ground Water Quality Evaluation for Irrigation Purpose: Case Study Al-Wafaa Area, Western Iraq. *Journal homepage: http://iieta. org/journals/ijdne*, *19*(4), 1415-1424.
- Aldosary, M. H., Abdullah, M. H., Sahab, M. F., Fayyadh, A. H., & Abdulazez, A. A. (2024, October). Effect of High-Velocity Impact Loading on Concrete Slabs Reinforced by Metallic Strips from Soft Drink Cans as Fiber. In *Annales de Chimie-Science des Matériaux* (Vol. 48, No. 5, pp. 691-697).

6. Service Activities: University:

• Member of the accreditation committee, Dams and Water Resources Department.

7. Professional Development Activities:

- None