UNIVERSITY OF MOSUL

جامعة الموصل

First Cycle – Bachelor's degree (B.Sc.) – Dams and Water Resources Engineering

بكالوريوس علوم - هندسة سدود وموارد مائية

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1. Mission & Vision Statement

Vision Statement

The vision of department of Dams and Water Resources Engineering (DWR) is to be a pioneer and leader in water development studies in Iraq and plays essential role in controlling these studies and investing them in the field of irrigation and electrical generation, storage and distribution of water in dam reservoirs and water resources engineering. DWR aims to achieve an advanced level of education in the field of dam engineering, water resources that meet the country's need for engineering alumni to secure the completion of future plans in the fields of work in which the department's specialization is part of it.

Mission Statement

The mission of DWR is

1- Qualify competent engineers to work in the field of water resources.

2- Prepare alumni with distinct capabilities to meet the current and future challenges related to the optimal use of water resources and face the drought phenomenon.

3- Provide the country and society with specialists who hold higher degrees in the hydraulic, hydrological and irrigation specialties to benefit from their scientific expertise.

4- Develop students ’performance and strategies to deal with real world problems through constructive and advanced scientific thinking.

5- Adopt the distinguished and creative ideas of students and encouraging them to work as a team.

6- Maintain communication with department's alumni through inviting them to seminars, scientific conferences, and continuing education programs.

2. Program Specification

Programme code:	BSc-DWR	**ECTS**	240
Duration:	4 levels, 8 Semesters	**Method of Attendance:**	Full Time

The Dams and Water Resources Engineering Department offers a specialized program designed to provide students with a strong foundation in the field of irrigation, hydraulic structures and water resource. The program follows the Bologna Process, ensuring a consistent educational framework across European higher education institutions. At Level 4, students are expected to acquire specific knowledge and skills related to irrigation, dams, and water resources engineering. The following outlines the type of knowledge expected at each level:

1. Knowledge of Fundamentals:
    - Understanding the basic principles and concepts of irrigation and water resources engineering.
    - Familiarity with hydrological processes, water availability, and water quality assessment.
    - Knowledge of soil-water interactions and the principles of crop water requirements.
    - Understanding the basic principles and concepts of hydraulic engineering.
    - Familiarity with mathematical and statistical techniques used in water resources analysis and modeling.
2. Applied Knowledge:
    - Applying engineering principles to design irrigation systems, including sprinkler, drip, and surface irrigation methods.
    - Utilizing software and tools for water resources planning, optimization, and modeling.
    - Applying hydrological modeling techniques to assess water availability and manage water resources effectively.
    - Knowledge of fluid mechanics and its application to hydraulic structures and water flow.
3. Specialized Knowledge:

- Understanding the design principles and construction techniques of various types of dams (e.g., concrete dams, embankment dams, and rockfill dams) and hydraulic structures.
- Knowledge of geotechnical engineering principles as they relate to dam construction and stability.
- Understanding the design and operation of irrigation infrastructure, such as canals, pumps, and water distribution networks.
- Knowledge of the principles and practices of drainage engineering for effective water management.
- Familiarity with the design and construction of small and large-scale dams for water storage and hydropower generation.

4. Advanced Knowledge:
    - In-depth knowledge of advanced irrigation technologies, including precision agriculture, nd automation.
    - Expertise in water resources planning and management strategies for sustainable and efficient water use.
    - Understanding the principles of integrated water resources management and the socio-economic aspects of water-related projects.
    - Understanding the principles of environmental impact assessment and ecosystem management in irrigation and dam projects.
5. Research and Innovation:
    - Conducting independent research in the field of irrigation, dams, and water resources engineering.
    - Contributing to the development of innovative irrigation and water management solutions.
    - Contributing to the development of innovative solutions for sustainable water management.
    - Staying up-to-date with emerging technologies and advancements in the field through continuous research and professional development.

The program is structured to build upon the knowledge gained at each level, ensuring a comprehensive understanding of irrigation, dams, and water resources engineering. Students will be assessed through a combination of coursework, practical exercises, laboratory work, and research projects to evaluate their understanding and application of the knowledge acquired.

3. Program Goals

The Program Educational Objectives of Dams and Water Resources Department may be listed as:

1- Provide well qualified graduates with considerable practice and scientific foundations in the aspects of the water resources subjects to serve and participate in achieving the needs and goals of the socio-economic development of the country.

2- The graduates were able to analyze and design the hydraulic and irrigation structures. In addition, to evaluate these projects by using modern specialized programs or built physical models.

3- Providing graduates with basic skills in managing projects, solving problems, and reports preparation related to water resources projects.

4- To provide the graduates with skills and scientific bases to be able to continue in higher education.

5- Sharing and expanding our potential by communicating with the related international educational institutions, such as universities and research centers, to add and enhance our expertise of institutions.

4. Student Learning Outcomes

The Department of Dams and Water Resources Engineering aims to foster well-rounded professionals equipped with the necessary knowledge and skills to excel in the field. The program's student learning outcomes are designed to ensure graduates possess a solid foundation in technical knowledge and understanding of irrigation systems, dams, and water resources engineering. Students develop problem-solving and design skills, enabling them to analyze complex challenges and propose innovative solutions in water management and infrastructure design. The program emphasizes technical proficiency through hands-on experiences in laboratory work, field measurements, and data analysis. Effective communication and teamwork skills are honed through collaborative projects and the ability to articulate technical concepts to diverse audiences. Students also develop a strong ethical foundation and understanding of professional practices, emphasizing environmental sustainability and adherence to legal and regulatory frameworks. The program encourages research and lifelong learning, enabling students to contribute to the existing body of knowledge and stay up-to-date with advancements in the field. Overall, the student learning outcomes of the department promote the development of highly skilled and adaptable professionals capable of addressing the complex challenges in irrigation, hydraulic structures, and water resources engineering.

The Department of Dams and Water Resources Engineering aims to equip students with the necessary knowledge and skills to become competent professionals in the field. Upon completion of the program, students will demonstrate the following learning outcomes:

Outcome 1:

Technical Knowledge and Understanding

1. Demonstrate a comprehensive understanding of the principles and concepts in irrigation, dams, and water resources engineering.
2. Apply engineering knowledge to analyze, design, and manage irrigation systems, dams, and water resources projects.
3. Understand the interaction between water, soil, and crops, and effectively address water-related challenges in agriculture.

Outcome 2:

Problem Solving and Design Skills

1. Identify and analyze complex problems related to irrigation, dams, and water resources engineering.
2. Develop innovative solutions and design appropriate systems for water management and irrigation infrastructure.
3. Apply critical thinking and engineering principles to optimize water use, minimize environmental impact, and ensure sustainability.

Outcome 3:

Technical Proficiency

1. Utilize state-of-the-art tools, software, and technologies to model, simulate, and analyze water resources and irrigation systems.
2. Demonstrate proficiency in conducting laboratory experiments, field measurements, and data analysis related to irrigation and water management.
3. Effectively operate and maintain irrigation and water resources equipment and infrastructure.

Outcome 4:

Communication and Teamwork

1. Communicate effectively, both orally and in writing, with professional and non-technical audiences.
2. Collaborate efficiently as part of multidisciplinary teams to solve complex water resources and irrigation engineering problems.
3. Present and defend technical information, project proposals, and research findings to diverse stakeholders.

Outcome 5:

Ethical and Professional Practices

1. Demonstrate a commitment to professional ethics, social responsibility, and environmental sustainability in irrigation and water resources engineering.
2. Understand and adhere to relevant legal and regulatory frameworks related to water management and hydraulic infostructures construction.
3. Continuously engage in professional development, staying updated with advancements in the field and adopting best practices.

Outcome 6:

Research and Lifelong Learning

1. Conduct independent research in irrigation, dams, and water resources engineering, contributing to the existing body of knowledge.
2. Analyze and interpret research findings, and apply them to solve real-world problems in the field.
3. Cultivate a passion for lifelong learning, seeking opportunities for professional growth and staying abreast of emerging trends and technologies.

The student learning outcomes reflect the comprehensive and integrated nature of the program, ensuring that graduates are well-prepared to address the challenges and contribute effectively to the field of irrigation, dams, and water resources engineering

5. Academic Staff

The academic staff of the Department of Dams and Water Resources Engineering consists of highly qualified and experienced professionals dedicated to delivering quality education and conducting impactful research in the field. The department's academic staff comprises individuals with diverse expertise and specializations, providing students with a well-rounded and comprehensive learning experience. The faculty members possess advanced degrees in areas such as irrigation and drainage engineering, hydraulic engineering, water resources management and geotechnical engineering engineering. Their collective knowledge and expertise enable them to cover a wide range of subjects related to dams, water resources engineering, and associated disciplines. The academic staff is actively engaged in research, contributing to advancements in the field and bringing their up-to-date knowledge into the classroom. They mentor and guide students, fostering a supportive learning environment that encourages critical thinking, innovation, and academic excellence. Through their dedication to teaching, research, and industry collaboration, the academic staff of the Department of Dams and Water Resources Engineering plays a crucial role in shaping the future professionals in the field and addressing the challenges of water management and infrastructure development. The following table shows the information of academic staff of the department.

التسلسل	اسم التدريسي الرباعي واللقب	الاختصاص العام	الاختصاص الدقيق	البريد الجامعي الرسمي	رقم الجوال
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6. Credits, Grading and GPA

Credits

University of Mosul is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 25 hrs student workload, including structured and unstructured workload.

Grading

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

GRADING SCHEME مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب - قيد المعالجة	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:				
Number Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Calculation of the Cumulative Grade Point Average (CGPA)

1. The CGPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

   CGPA of a 4-year B.Sc. degree:

   CGPA = [(1st ^{m}odule score x ECTS) + (2nd ^{m}odule score x ECTS) + ……] / 240

7. Curriculum/Modules

Semester 1 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
DWRE 111	Mathematics I	93	82	**7.00**	B	
DWRE 112	Engineering Mechanics I	93	82	**7.00**	B	
DWRE 113	Engineering Drawing	93	57	**6.00**	B	
DWRE 114	Human Rights and Democracy	33	17	**2.00**	B	
DWRE 115	Introduction to Water Resources Engineering	63	37	**4.00**	C	
DWRE 116	Hydrogeology	63	37	**4.00**	S	

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
DWRE 121	Mathematics II	93	82	**7.00**	B	
DWRE 122	Engineering Mechanics II	78	72	**6.00**	B	
DWRE 123	Computer Drawing	93	57	**6.00**	B	
DWRE 124	Engineering Statistics	63	62	**5.00**	B	
DWRE 125	Water Quality and Pollution	63	37	**4.00**	S	
DWRE 126	English I	33	17	**2.00**	S	

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
DWRE 211	Mathematics III	63	62	**5.00**	B	
DWRE 212	Fluid Mechanics I	93	57	**6.00**	C	
DWRE 213	Strength of Materials	78	72	**6.00**	B	
DWRE 214	Surveing I	93	32	**5.00**	C	
DWRE 215	Computer Programming (MatLab)	63	37	**4.00**	B	
DWRE 216	Building Construction	63	37	**4.00**	C	

Semester 4 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
DWRE 221	Engineering Analysis	63	62	**5.00**	B	
DWRE 222	Fluid Mechanics II	93	57	**6.00**	C	DWRE 212
DWRE 223	Structures	78	72	**6.00**	B	
DWRE 224	Surveing II	93	32	**5.00**	C	
DWRE 225	Soil Physics	93	57	**6.00**	C	
DWRE 226	English II	33	17	**2.00**	S	

Semester 5 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
DWRE 311	Hydraulics	78	47	**5.00**	C	
DWRE 312	Surface Hydrology	78	47	**5.00**	C	
DWRE 313	Irrigation Principles and Practices	63	37	**4.00**	C	
DWRE 314	Concrete Design	93	82	**7.00**	S	
DWRE 315	principles of Soil Mechanics	108	67	**7.00**	C	
DWRE 316	English III	33	17	**2.00**	S	

Semester 6 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
DWRE 321	Numerical Analysis	78	72	**6.00**	C	
DWRE 322	Open Channels	78	47	**5.00**	C	DWRE 311
DWRE 323	Groundwater Hydrology	63	37	**4.00**	C	
DWRE 324	Drainage Engineering	78	72	**6.00**	C	
DWRE 325	Soil Mechanics and Foundations	93	32	**5.00**	C	
DWRE 326	Consumptive Use and Water Duty	63	37	**4.00**	C	

Semester 7 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
DWRE 411	Design of Hydraulic Structures I	78	72	**6.00**	C	
DWRE 412	Design of Gravity Irrigation Systems	78	72	**6.00**	C	
DWRE 413	Design of Earth and Earth Rock Fill Dams	78	72	**6.00**	C	
DWRE 414	Engineering Management and Economics	63	62	**5.00**	C	
DWRE 415	Design of Irrigation and Drainage Networks	63	62	**5.00**	C	
DWRE 416	Engineering Project I	33	17	**2.00**	C	

Semester 8 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
DWRE 421	Design of Hydraulic Structures II	78	72	**6.00**	C	
DWRE 422	Design of Sprinkler and Drip Irrigation Systems	93	82	**7.00**	C	
DWRE 423	Design of Gravity and Arch Dams	78	72	**6.00**	C	
DWRE 424	Estimations and Specifications	93	82	**7.00**	S	
DWRE 425	English IV	33	17	**2.00**	S	
DWRE 426	Engineering Project II	33	17	**2.00**	C	DWRE 416

8. Contact

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