جامعة الإسراء
ISRA UNIVERSITY

Course Syllabus

According to JORDAN National Qualification Framework (JNQF)

Course Name: Engineering Hydrology

Course Number: 04033273

General Course Information:

Course title	**Engineering Hydrology**
Course number	**04033273**
Credit hours	**3**
Education type	**[Face-to-Face]**
Prerequisites/corequisites	**Fluid Mechanics**
Academic Program	**Civil engineering**
Program code	**40**
Faculty	**Engineering**
Department	**Civil engineering**
Level of course	**Bachelor**
Academic year /semester	**2022/2023, First semester**
Awarded qualification	**B.Sc**
Other department(s) involved in teaching the course	**None**
Language of instruction	**English**
Date of production/revision	**1-10-2022**

Course Coordinator:

Coordinator's name	**Dr. Ethar al Essa**
Office No	**4208**
Office Phone extension number	
Office Hours	**Sun. (9-10 AM + 1-2 PM), Mon. (11:-12:30 PM), Tue. (9-10 AM + 1-2 PM), Wed. (12:30:-2:30 PM), and Thu. (12-1 PM)**
Email	**ethar.alessa@iu.edu.jo**

Other Instructors:

Instructor name	
Office No	
Office Phone extension number	
Office Hours	
Email	

Course Description *(English/Arabic)*:

English	*This course presents an introduction to the field of engineering hydrology. These are: hydrological cycle, precipitation, evaporation, seepage, infiltration and percolation, ground water hydrology, ground water movement and methods of usage, surface water, hydrograph analysis, flood analysis, and hydrological prediction.*
Arabic	تقدم مادة الهيدرولوجيا مقدمة في مجال الهيدرولوجيا الهندسية. وهذه هي: الدورة الهيدرولوجية، وهطول الأمطار، والتبخر، والتسرب، والتسلل والتسرب، وهيدرولوجيا المياه الجوفية، وحركة المياه الجوفية وأساليب الاستخدام، والمياه السطحية، وتحليل الهيدروغرافيا، وتحليل الفيضانات، والتنبؤ الهيدرولوجي.

Textbook: *Author(s), Title, Publisher, Edition, Year, Book website.*

1.	Viessman Jr. Warren, Gary L. Lewis, "Introduction to hydrology", 4th Edition, Pearson, USA.

References: ***Author(s), Title, Publisher, Edition, Year, Book website.***

Course Educational Objectives (CEOs):

1.	**Describe and explain the basic principles of hydrology with a focus on the climatic and hydrological characteristics of Jordan**
2.	**Learn the concept of water balance in the hydrology and applied this concept in the water budge**
3.	**Design some of the civil engineering structures related to the hydrology.**
4.	**Study the floods and the required strategy to control them**

Intended Learning Outcomes (ILO's):

1.	**Subject Intended learning outcomes (ILOs) describe what students are expected to know and be able to do at the end of the course. These outcomes are related to the knowledge, skill and competence that students acquire:**	**Relationship to CEOs**	**Contribution to PLOs**	**Bloom Taxonomy Levels***	**Descriptors****
2. A	**Knowledge and Understanding:**				
3. A1	**To learn the fundamental aspects related to the engineering hydrology, focusing on the estimation of quantity of water in the environment. In addition to learn the methods used for the determination of water income and losses like evaporation**	**1,2**	**1,2**	**1,3**	**(K,C)**
4. A2	**To learn the mathematical approaches of stream flow determination. As well as the wells hydrology concept**	**2,3**	**1,6**	**1,2,3**	**(K,C,S)**
5. B	**Intellectual skills:**				
6. B1	**To study the methods of storm water network design. In addition to To learn the design parameters of the hydrological structures such as dams and channels.**	**3,4**	**1,2,4**	**1,2,3**	**(K,S,C)**
7. B3					
8. C	**Subject specific skills:**				
9. C1					
10. C2					
11. C3					
12. D	**Transferable skills:**				
13. D1					

14. D2					
15. D3					

***Bloom Taxonomy Levels**

Level #	1	2	3	4	5	6
Level Name	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Evaluation**	**Synthesis**

**** Descriptor (National Qualification Framework Descriptors): K : Knowledge, S: Skill, C: Competency.**

Program Learning Outcome (PLOs):

Program Learning Outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills, and behaviours that students acquire as they progress through the program. A graduate of the (_____) program will demonstrate:	**Descriptors****		
	K	**S**	**C**

1.	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	**k**		
2.	an ability to 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			**c**
3.	an ability to communicate effectively with a range of audiences		**s**	
4.	an ability to 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			**c**
5.	an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives		**s**	
6.	an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions		**s**	
7.	an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	**k**		**c**

**** Descriptors according to the national qualifications framework (K: knowledge, S: skill, C: Competency)**

Weekly Schedule *(please choose the type of teaching)*

■ **Face to Face**

□ **Hybrid** *(**2 Lectures** Face – To - Face **+1 Lecture** Asynchronous)*

□ **Hybrid (***1 Lectures* Face – To - Face ***+1 Lecture*** Asynchronous)

□ **Online** *(**2 Lectures** Synchronous **+1 lecture Asynchronous**)*

Topic Outline and Schedule:

Week	First Lecture (……..)	Second Lecture (……..)	Third Lecture (……..)	Ach. ILOs	Ach. PLOs	Descriptors**
1	*Hydrologic Principles The)*	*(Introduction to Hydrology, The Hydrologic Cycle,*	*Hydrologic Budget*	***A1***	1,2	K,C
2	*Precipitation*	Estimation missing value	Estimation average Rainfall	***A1***	1,2	K,C
3	*Abstraction of precipitation*	Evaporation, ET, depression	Estimation methods	***A1***	1,2	K,C
4	*Abstraction of precipitation*			***A1***	1,2	K,C
5	*Hydrologic Analysis*	*Frequency analysis*	*Frequency analysis, cont….*	***A1***	1,2	K,C
6	*Infiltration*	*Estimation methods*	*Examples of calculation*	***A1***	1,2	K,C
7	*Stream flow and run off*	*Stream flow measurement*	*Stream flow measurement*	***A2***	1,6	K,C,S
8	*Stream flow and run off*	*Stream flow measurement*	*Stream flow measurement*	***A2***	1,6	K,C,S
9	*Stream flow and run off*	*Stream flow measurement*	*Manning equations, cont*	***A2***	1,6	K,C,S

10	*Ground water hydrology*	*Ground water hydrology*	*Ground water hydrology*	***A2***	1,6	K,C,S
11	*Storm water network*	*Storm water network,cont…*	*Storm water networ, cont*	***B1***	1,2,4	K,C,S
12	*Storm water network*	*Storm water network*	*Storm water network*	***B1***	1,2,4	K,C,S
13	*Flood Frequency analysis*	*Flood Frequency analysis, cont*	*Flood Frequency analysi, cont*	***B1***	1,2,4	K,C,S
14	*Hydrograph and dams hydrology*	*Hydrograph and dams, cont…*	*Hydrograph, cont….*	***B1***	1,2,4	K,C,S
15	*Hydrograph and dams hydrology*	*Hydrograph and dams, cont…*	*Hydrograph and dams, cont…*	***B1***	1,2,4	K,C,S
16	***FINAL EXAM***					

* **K: Knowledge, S: Skills, C: Competency**

Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

- **Interactive videos**
- **Practice Labs**
- **Discussion Forums**
- **Quizzes**
- **Other Interactive online activities**
- **Reports**

Course Policies:

A- Attendance policies:

The maximum allowed absences is 15% of the lectures.

B- Absences from exams and handing in assignments on time:

Midterm exam can be retaken based on approval of excuse by the instructor's discretion.

Not handing assignment on time will incur penalties.

C- Academic Health and safety procedures

D- Honesty policy regarding cheating, plagiarism, and misbehaviour:

Cheating, plagiarism, misbehaviour will result in zero grade and further disciplinary actions may be taken.

E- Grading policy:

- All homework is to be posted online through the e-learning system.
- Exams will be marked within 72 hours and the marked exam papers will be handed to the students.
- Online Activities (Course Videos, Practice labs, Discussion Forums, Quizzes) **__20__%**
- Midterm **__30__%**
- Final Exam **__50__%**

F- Available university services that support achievement in the course: **E-Learning Platform, Labs, Library.**

Required equipment:

- **PC / Laptop with webcam and mic**
- **Internet Connection**
- **Access to the IU E-Learning Platform at: https://elearn.iu.edu.jo/**
- **E-learning plan**
- Satisfaction questionnaires for online and face-to-face learning

- Software for e-learning
- Training

Assessment Tools implemented in the course:

- **Final Exam**
- **Midterm Exam**
- **Quizzes**
- **Homework**
- Practice Labs
- Discussion Forums
- Periodic reports for learning assessment
- Improvement plans for online or face-to-face teaching
- Others:…….

Responsible Persons and their Signatures:

Course Coordinator		**Completed Date**	/ /
		Signature	

Received by (Department Head)		**Received Date**	/ /
		Signature	