



**Course Syllabus**  
**According to JORDAN National Qualification**  
**Framework (JNQF)**

**Course Name: Hydraulic**

**Course Number: 04033271**

### General Course Information:

Course title	Engineering Statistics
Course number	04033271
Credit hours	Three Credit hours (Theory)
Education type	[Face-to-Face]
Prerequisites/corequisites	04033131
Academic Program	Civil engineering
Program code	403
Faculty	Engineering
Department	Civil engineering
Level of course	3 <sup>rd</sup> year
Academic year /semester	2nd Semester 2021-2022
Awarded qualification	B.Sc
Other department(s) involved in teaching the course	Non
Language of instruction	English
Date of production/revision	2/01/2022

### Course Coordinator:

Coordinator's name	Eng. Dua'a Almajali
Office No	4249
Office Phone extension number	2662
Office Hours	Sun, Tue, Thu (12:00-01:00)
Email	Duaa.almajali@iu.edu.jo

### Other Instructors:

Instructor name	
Office No	
Office Phone extension number	
Office Hours	
Email	

### Course Description(English/Arabic):

English	Steady flow in open channels. the hydraulic jump, valid flow in open channels, water surface profiles, introduction to theory of membrane, characteristics of laminar and turbulent flow, separation and eddy formation, hydraulic machines, selection and performance of pumps and turbines...
Arabic	التدفق الثابت في القنوات المفتوحة ، القفزة الهيدروليكية، التدفق الغير منتظم في القنوات المفتوحة بشكل تدريجي، مسار تدفق المياه، اندفق المنظم والغير منتظم، الاختيار المناسب للمضخات

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

Learson and Faber “ Elementary of statistics” 4<sup>th</sup> edition, Pearson 2012

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

1. Engineering Fluid Mechanics, by Crowe, Elger, *et. al*, John Wiley and Sons, 9<sup>th</sup> edition, 2009

### Course Educational Objectives (CEOs):

1.	Apply fundamental knowledge of fluid mechanics in solving problems and making design of pressure-pipe and open-channel hydraulics in civil and environmental engineering.
2.	Describe the operating characteristics of hydraulic machinery (pumps and turbines), and the factors affecting their operation and specifications, as well as their operation in a system
3.	Describe the principles controlling open channel flows including critical, uniform and gradually varied flows. Design of channel section for uniform flow

### Intended Learning Outcomes (ILO's):

	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**
A	<b>Knowledge and Understanding:</b>				
A1	Understand the basic equations of hydraulic analysis for steady and unsteady flows	1	1	4	K
A2	Illustrate the methods of solving hydraulic engineering problems	1	1	4	S
B	<b>Intellectual skills:</b>				
B1	Understand the basics of hydraulic machinery and their operation design in water systems.	2	1	3	K
B2	Be able to design basic hydraulic circuits and pipe network systems	1	2	3	S
B3	Apply standard techniques to design channel section for uniform flow.	3	2	3	S
C	<b>Be able to learn analyze rapidly varied flow numerically</b>				
C1	produce a concise and clearly communicated report of their research and that done by others, which includes: systematic and comprehensive explanation, synthesis of complex ideas, and originality in application to their specific problem	3	1	2	S
D	<b>Transferable skills:</b>				
D1	Work effectively in teams to analyze and develop solutions to practical fluid flow problems where critical thinking	1.2.3	5	5	S

	skills and professional judgment are employed				
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**\*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 (CE) program will demonstrate:		Descriptors**		
		K	S	C
1.	1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	✓		
2.	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.			✓
3.	3. An ability to communicate effectively with a range of audiences.		✓	
4.	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.			✓
5.	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.		✓	
6.	6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.		✓	
7.	7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	✓		✓

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

**Weekly Schedule**

**✓ Face to Face**

Week	First Hour + Second Hour + Third Hour	Ach. ILOs	Ach. PLOs	Descriptors*
1	Introduction to Hydraulic	A1	6	S
2	Properties of Fluid	A1	6	S
3	Flow types	C1	1	K
4	Hydrostatic forces.	A1	6	S

5	Pipe flow, losses, pipe in parallel/ series	A1	6	k
6	Head losses	A1	6	S
7	<b>Head losses</b>	A1	6	S
8	Water distribution systems, network	A1	6	S
9	Pumps and turbine	A1	6	S
10	Flow in open channel	C2	1	K
11	channel section for uniform flow.	A1	6	S
12	rapidly varied flow	A2	6	S
13	<b>Final exam</b>	A2	6	S
<b>Final Exam</b>				

\* 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/course/view.php?id=2105>
- 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
- ✓ Homework
- ✓ Discussion Forums
- ✓ Periodic reports for learning assessment
- Improvement plans for online or face-to-face teaching
- Others: Quiz

### Responsible Persons and their Signatures:

<b>Course Coordinator</b>	<b>Eng. Dua'a Al-Majali</b>	<b>Completed Date</b>	<b>13/ 2/ 2022</b>
		<b>Signature</b>	
<b>Received by (Department Head)</b>	<b>Dr. Ibrahim Varooqa</b>	<b>Received Date</b>	<b>15/ 2 / 2022</b>
		<b>Signature</b>	