

COURSE PLAN

FIRST: BASIC INFORMATION

College					
College	: Karak collage				
Department	: Mechanical Engineering				
Course					
Course Title	: Fluid Mechanics and Hydraulic Machines				
Course Code	: 020209212				
Credit Hours	: 2 (1 Theoretical, 1 Practical)				
Prerequisite	: 020209114				
Instructor					
Name	: Eng. Qutaibah Tarawneh				
Office No.	:				
Tel (Ext)	:				
E-mail	: Q.tarawneh@bau.edu.jo				
Office Hours	:				
Class Times	The building	today	Start time	End time	Hall number
Text Book					
Title	: Fluid mechanics and hydraulic machines (R.K. Bansal)				

References

1. Fluid mechanics and hydraulic machines (R.K. Bansal)
2. Hydraulics, Fluid mechanics and hydraulic machines (R.S. Khurmi)

SECOND: PROFESSIONAL INFORMATION

COURSE DESCRIPTION

This course deals with the properties of fluids, pressure and its measurement, hydrostatic forces on surfaces, introduction of ideal flow, hydraulic machines including turbine and pump, how hydraulic machine works structure of hydraulic machine, fluid system.

COURSE OBJECTIVES

The main objectives of this course are to enable to student to do follows;

- Explain hydrostatic forces at plane surfaces submerged in liquid.
- Explain the properties of fluid and ideal flow.
- Understand types of hydraulic machines including turbine and pump and how to work.
- Explain the structure of fluid system and its operation.

COURSE LEARNING OUTCOMES

On successful completion of this course, students are expected to be able to:

- CLO1. Explain hydrostatic forces on vertical plane surface, horizontal plane surface and inclined plane surface submerged in liquid
- CLO2. Explain pressure in a liquid and pressure distribution in a liquid subjected to constant acceleration
- CLO3. Explain ideal flow and fluid motion, types of fluid, continuity equation
- CLO4. Calculate velocity and acceleration of ideal flow, explain the impotent cases of potential flow and uniform flow
- CLO5. Explain layout of a hydrostatic power plant and classification of hydraulic machine including turbine, its operation
- CLO6. Explain fluid system devices such as hydraulic press, ram, lift and crane, etc. and principle and types of pump

COURSE SYLLABUS

Week	Topic	Topic details	Related L.O. and Reference (chapter)	Proposed assignments
1	Hydrostatic forces	<ul style="list-style-type: none"> • Introduction • Total pressure and center of pressure • Vertical plane surface sub-merged in liquid 	CLO1	
2	Hydrostatic forces	<ul style="list-style-type: none"> • Horizontal plane surface sub-merged in liquid • Inclined plane surface sub-merged in liquid • Curved surface sub-merged in liquid 	CLO1	
3	Hydrostatic forces	<ul style="list-style-type: none"> • Total pressure and center of pressure on lock gates • Pressure distribution in a liquid subjected to constant horizontal/vertical acceleration 	CLO2	
4	Ideal flow	<ul style="list-style-type: none"> • Introduction • Methods of describing fluid motion • Types of fluid flow 	CLO3	
5	Ideal flow	<ul style="list-style-type: none"> • Rate of flow or discharge • Continuity equation • Continuity equations in three dimensions 	CLO3	

Week	Topic	Topic details	Related L.O. and Reference (chapter)	Proposed assignments
6	Ideal flow	<ul style="list-style-type: none"> • Velocity and acceleration • Velocity potential function and stream function • Types of motion • Vortex flow 	CLO4	
7	Ideal flow	<ul style="list-style-type: none"> • Important cases of potential flow • Uniform flow • Source flow 	CLO4	
8	Midterm Exam			
9	Hydraulic machines and work	<ul style="list-style-type: none"> • Introduction • Turbines • General layout of a hydroelectric power plant 	CLO5	
10	Hydraulic machines and work	<ul style="list-style-type: none"> • Definitions of heads and efficiencies of a turbines • Classification of hydraulic turbines • Pilton wheel 	CLO5	
11	Hydraulic machines and work	<ul style="list-style-type: none"> • Radial flow reaction turbines • Francis turbines • Axial flow reaction turbine 	CLO5	
12	Hydraulic machines and work	<ul style="list-style-type: none"> • Draft tube • Specific speed • Unit quantities 	CLO5	
13	Fluid system	<ul style="list-style-type: none"> • Introduction • The hydraulic press • The hydraulic accumulator 	CLO6	
14	Fluid system	<ul style="list-style-type: none"> • The hydraulic intensifier • The hydraulic ram • The hydraulic lift 	CLO6	
15	Fluid system	<ul style="list-style-type: none"> • The hydraulic crane • The fluid of hydraulic coupling • The hydraulic torque converter • The air left pump • The gear wheel pump 	CLO6	
16	Final Exam			

COURSE LEARNING RESOURCES

Teaching will be achieved using available resources including lectures, data show, and materials uploaded on the e-learning system.



ONLINE RESOURCES

- 1) <https://teachingfluids.wordpress.com/>
- 2) <https://www.youtube.com/channel/UCIA0xKOWLnRIRIoa5eU5Prw/videos>

**ASSESSMENT TOOLS**

Assessment Tools	%
Projects and Quizzes	20%
MID Exam	30%
Final Exam	50%
Total Marks	100%

THIRD: COURSE RULES**ATTENDANCE RULES**

Attendance and participation are extremely important, and the usual University rules will apply. Attendance will be recorded for each class. Absence of 10% will result in a first written warning. Absence of 15% of the course will result in a second warning. Absence of 20% or more will result in forfeiting the course and the student will not be permitted to attend the final examination. Should a student encounter any special circumstances (i.e. medical or personal), he/she is encouraged to discuss this with the instructor and written proof will be required to delete any absences from his/her attendance records.

GRADING SYSTEM**Example:**

Average	Maximum	Minimum
Excellent	100%	90%
Very Good	89%	80%
Good	79%	70%
Satisfactory	69%	60%
Weak	59%	50%
Failed	49%	35%

REMARKS

{ The instructor can add any comments and directives such as the attendance policy and topics related to ethics }

COURSE COORDINATOR**Course Coordinator****Signature:****Date:****Department Head:****Signature:****Date:**