

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Fluid Mechanics		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory
Module Code	COGTEK 200		<input type="checkbox"/> Lecture
ECTS Credits	7		<input checked="" type="checkbox"/> Lab
SWL (hr/sem)	175		<input checked="" type="checkbox"/> Tutorial
			<input type="checkbox"/> Practical
			<input type="checkbox"/> Seminar
Module Level	2	Semester of Delivery	3
Administration Department	RETE	College	College of Oil and Gas Techniques Engineering - Kirkuk, Northern Technical University, Iraq
Module Leader	Obed Majeed Ali	e-mail	obedmajeed@ntu.edu.iq
Module Leader's Acad. Title	Assistant lecturer	Module Leader's Qualification	M.Sc.
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		Version Number	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims أهداف المادة الدراسية</p>	<p>This module will give students a thorough introduction to the fundamental principles of fluid mechanics and deal with engineering applications of inviscid and viscous flow.</p> <p>On completion of this module, students should be able to:</p> <ol style="list-style-type: none">1. Understand the fundamental principles of fluid statics and fluid flow, with consideration of both ideal (inviscid) and real (viscous) flow.2. Compute basic parameters for hydrostatic fluid problems, including forces on submerged bodies.3. Analyse ideal fluid flow in one- and two-dimensions using the continuum concepts of conservation of mass, momentum and energy.4. Knowledge and understanding of viscous flow with application to boundary layers, pipe flow, flow around bodies, lubrication and other application areas.5. Identify appropriate methodologies for modelling flows using non-dimensional parameters.6. Describe the operation of turbomachinery for incompressible flow, including the dynamics of centrifugal pumps.7. Recognise and simply describe the complex nature of turbulent flow.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Understand how to convert the unit system from British to SI. unit or vice versa.2. Training the students how to solve the problems associated with fluid mechanics.3. Measure the fluid flow of liquids by different types of flow meters.4. Analyze the magnitude of the horizontal and vertical components of the force of the water on the gate.5. Determine the reading on the pressure gauge by the different types of manometers.6. Draw simple hydraulic and energy gradient lines.7. Solve the formulas of open channel flow. <p>Skills outcomes</p> <ul style="list-style-type: none">- Analysis- synthesis- interpretation,- report writing- laboratory- computational.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following. Part A- Introduction: Basic concepts of fluid mechanics. Fundamental terms. Physical values. Fluids and their properties. Forces inside fluid. Measurement of pressure. Relative statistics of fluid – constant acceleration, rotation. Forces of hydrostatic pressure. Buoyancy. Streamlines. Stream surface. Stream tube. Mass/volume flow. Control volume. Fluid Dynamics: Continuity equation. Basic laws of fluid dynamics – conservation of mass, conservation of linear momentum, conservation of energy. Ideal fluid flow. Application of Bernoulli's equation. Real fluid flow. Viscosity. Determination of losses. Reynolds experiment. Laminar and turbulent flow. Boundary layer. Velocity profile. Losses in pipes. Frictional</p>

	<p>losses. Moody's diagram. Local losses. Pumps, types. Turbines and the working principle of the turbine.</p> <p>Part B- • Analyze characteristics of a particular flow. • Formulate the governing equations and boundary conditions. • Solve these equations analytically in simple cases. Revision problem classes and quiz [6 hrs]</p>
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: 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

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	82	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.46
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	10% (10)	3,5,7,9, and 11	LO #4,6,8,10 and #12
	Assignments	5	10% (10)	2, 6,9, 11,13	LO #3, #5, #8, #10 and #13
	Lab Report	10	20% (20)	All	2,4,6,7,8,9,10,11,12,13
Summative assessment	Mid Term exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All
100% (100 Marks)					

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

Week 1	Introduction - Units system
Week 2	Physical properties of fluids.
Week 3	Physical properties of fluids
Week 4	Fluid pressure at static.
Week 5	Fluid pressure instruments
Week 6	Hydrostatic force on a plane surface.
Weeks 7	Mid-Term Exam
Weeks 8	Hydrostatic force on an inclined surface
Week 9	Hydrostatic force on a curved surface.
Week 10	Fluid dynamics / classifications of fluids.
Week 11	Conservation of mass
Week 12	Conservation of momentum and its application.
Week 13	Conservation of energy- Bernoulli equation.
Week 14	Viscous flow in pipes.
Week 15	Preparing for the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Density and Specific Gravity
Week 2	Lab 2: DETERMINATION OF LIQUID VISCOSITY USING STOCK'S METHOD.
Week 3	Lab 3: Determination of Centre of Pressure and Hydro-static Force on Plane surface (Part One).
Week 4	Lab 4: Determination of Centre of Pressure and Hydro-static Force on Plane surface (Part Two).
Week 5	Lab 5: Reynolds Number Investigation.

Week 6	Lab 6: Estimation of the Volume Flow Rate Using Orifice Meter Apparatus.
Week 7	Lab 7: IMPACT OF WATER JET ON VANES.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	FLUID MECHANICS	Yes
Recommended Texts	1- A TEXTBOOK OF FLUID MECHANICS AND HYDRAULIC MACHINES BY RAJPUT. 2- Fluid Mechanics by Yunus A. Cengel, John M. Cimbala. 3- Fluid mechanics frank m. white 4th ed.	No

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: Marks 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.