MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Fluid Mechanics -static**			**Module Delivery**	
Module Type	**C**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒**Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**ATU12031**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	1		**Semester of Delivery**	3	
Administering Department	ATU12		**College**	PMTEC	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Fluid Mechanics -Dynamic	**Semester**	4
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The learning aims for the subject are the following: 1. Know, understand and apply the basic concepts of Fluid Mechanics to carry out professional engineering activities in the field of fluids. 2. Apply scientific method strategies to fluid mechanics: analyze qualitatively and quantitatively the problem situation, propose hypotheses and solutions. 3. Use specific vocabulary and terminology and the appropriate means to effectively communicate knowledge, procedures, results, skills and aspects inherent to fluid mechanics. 4. Work efficiently in a group, integrating skills and knowledge to make decisions in the performance of fluid mechanics tasks, adopting a responsible and organized attitude to work and a willingness to learn. 5. Plan and carry out designs and processes in the field of fluid mechanics in accordance with the relevant specific technology, applying the quality principles and methods and analyzing and assessing the social and environmental impact of the technical solutions adopted.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Define what is a fluid 2. Describe the fundamental fluid properties 3. Understand pressure 4. Find the forces on submerged planar objects of arbitrary shapes 5. Find the forces on submerged objects of curved shapes 6. Solve buoyancy problems
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Fluid properties Introduction - General definitions, Fluid types, definition of Fluid Power System, Types of Fluid Power System, [3 hrs] Fluid properties (part A) General definitions, Measures of Fluid Mass and Weight: Density, Specific Weight, Specific Gravity. Ideal Gas Law, Viscosity, Kinematic viscosity, Bulk Modulus of elasticity, Surface tension, Surface Tension and capillary effect. [14 hrs] Fluid properties (part B) Compressibility of Fluids, Vapor Pressure [3hrs]

	Part B - Fluid Statics - Definitions, Pressure at a point, Variation of Pressure in a static fluid, Basic Equations for the Pressure Field. [3 hrs] Part C - Hydrostatic Forces and stability Hydrostatic Condition, Standard Atmosphere, Manometry and Pressure Measurements. Hydrostatic Force on a Plane Surface, Hydrostatic Force on a Curved Surface, Buoyant force, Example Problems, Stability of floating and submerged bodies, Relative equilibrium, Fluid in rigid-body motion, (Linear acceleration) - Relative equilibrium (uniform rotation) [37 hrs]

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 محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	10	10% (10)	2 to 12	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	5 and 14	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction - General definitions, Fluid types, definition of Fluid Power System, Types of Fluid Power System,
Week 2	Fluid properties (part A) - General definitions Measures of Fluid Mass and Weight: Density -Specific Weight -Specific Gravity
Week 3	Ideal Gas Law, Viscosity
Week 4	Kinematic viscosity, Bulk Modulus of elasticity, Surface tension
Week 5	Surface Tension and capillary effect
Week 6	Fluid properties (part B) -Compressibility of Fluids -Vapor Pressure
Week 7	Fluid Statics - Definitions - Pressure at a point - Variation of Pressure in a static fluid - Basic Equations for the Pressure Field
Week 8	Hydrostatic Condition, Standard Atmosphere, Manometry and Pressure Measurements
Week 9	Hydrostatic Force on a Plane Surface

	. Example Problems
Week 10	Hydrostatic Force on a Curved Surface . Example Problems
Week 11	Buoyant force . Example Problems
Week 12	Stability of floating and submerged bodies - Relative equilibrium
Week 13	Fluid in rigid-body motion . Example Problems
Week 14	Special case 1: fluid at rest Special case 2: free fall of a fluid body
Week 15	(Linear acceleration) - Relative equilibrium (uniform rotation)

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Fluid density using the pycnometer
Week 2	Lab 2: Liquid viscosity measurement using capillary type viscometer
Week 3	Lab 3: Pressure gauge, Bourdon gauge, manometer.
Week 4	Lab 4: Center of Pressure on Submerged Plane Surface
Week 5	Lab 5: Hydrostatics Force on Flat Surfaces/Curved Surfaces
Week 6	Lab 6: Stability of Floating Body

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	F L U I D M E C H A N I C S F U N D A M E N Ta L S A N D A P P L I C At I O N S, Yunus A. Çengel And John M.Cimbala, Published By Mcgraw-Hill, 2006	Yes
Recommended Texts	Fundamentals of Fluid Mechanics, 7th Edition, Bruce R. Munson. Theodore H. Okiishi. Alric P. Rothmayer John Wiley & Sons, Inc.l, 2013	No
Websites	https://www.coursera.org/lecture/fe-exam/fluid-statics-introduction-and-pressure-variation-a8cwc	

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.