	Ministry of Higher Education and Scientific Research - Iraq Al-Mustaqbal University College for engineering and technology Department of Biomedical Engineering	

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Fluid Flow I**			**Module Delivery**	
Module Type	C			**X Theory** **X Lecture** **X Lab** **X Tutorial** **X Practical** **X Seminar**	
Module Code	**UOMU0102034**				
ECTS Credits					
SWL (hr/sem)					
Module Level	**2**		**Semester of Delivery**	**1st Semester**	
Administering Department	**Department of Chemical Engineering and Petroleum Industries**		**College**	**College of Engineering**	
Module Leader	**Asst. Prof. Dr. Fawzi Al-Qaessi**		**e-mail**	**fawzi.abdelrahman.hammadi@uomus.edu.iq**	
Module Leader's Acad. Title	**Asst. Prof. Dr.**		**Module Leader's Qualification**	**Dr.Chemical Engineering**	
Module Tutor	**Asst. Prof. Dr. Fawzi Al-Qaessi**				
Peer Reviewer Name			**e-mail**		
Review Committee Approval			**Version Number**		

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	**Mathematic I & Il,**	**Semester**	1
Co-requisites module	**Chemical Engineering Princi les I**	**Semester**	1
Module Aims, Learning Outcomes and Indicative Contents **الإرشادية والمحتويات التعلم ونتائج الدراسية المادة أهداف**			
Module Aims **الدراسية المادة أهداف**	**Define and show the student what about related with fluids statics and dynamics, its types, and flow patterns. Introduction to Fluid Flow. Course material includes an introduction to the concepts and applications of fluid flow and dimensional analysis and static fluid, analysis of engineering applications of incompressible Newtonian and fluid Non-Newtonian fluid flow pipe systems, Pumps and pumping of liquid.**		
Module Learning Outcomes **الدراسية للمادة التعلم مخرجات**	**1- Recognize the incompressible fluid flow, single- and two-phase flow, fluid statics and dynamics, Newtonian and non-Newtonian fluids and essential basic hydrodynamics.** **2- Define the problems in fluid dynamics in various engineering applications. Distinguish the energy variation and its applications spatially the fricti0nal energy losses calculations and the required energy for fluid pumping.** **3- Define the necessary fluid parameters of full scale projects by preforming simple model experiments and share ideas and work in a team in an efficient and effective manner under controlled supervision or independently.**		
Indicative Contents **المحتويات الإرشادية**			
Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**			
Strategies	**Learning the fundamentals of any engineering field is a challenging task for many students. This is oftentimes because these subjects cannot be mastered by merely memorizing the relevant concepts. They need to be understood clearly, and students must practice by working on appropriate exercises. The instructional goals of my teaching are threefold: (1) to equip students with the skills necessary to pursue their chosen disciplines, (2) to train them in engineering problem-solving, and (3) to develop their talents and personalities.**		

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الفصل خلال للطالب المنتظم الدراسي الحمل		**Structured SWL (h/w)** أسبوعيا للطالب المنتظم الدراسي الحمل	
Unstructured SWL (h/sem) الفصل خلال للطالب المنتظم غير الدراسي الحمل		**Unstructured SWL (h/w)** أسبوعيا للطالب المنتظم غير الدراسي الحمل	
Total SWL (h/sem) الفصل خلال للطالب الكلي الدراسي الحمل			

Module Evaluation الدراسية المادة تقييم					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1h/3	10		
	Assignments	1h/3	5		
	Projects / Lab.	1	10		
	Report	1	5		
Summative assessment	**Midterm Exam**	1	20		
	Final Exam	1	50		
Total assessment			100		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction Definition of a fluid, and fluid mechanics.
Week 2	Physical properties of fluids: Density, specific gravity, viscosity and kinematic viscosity.
Week 3	Surface tension and capillarity, bulk modulus of elasticity, Pressure & Shear stress, Newton's law of viscosity.
Week 4	Types of Fluids, Newtonian, non-Newtonian fluids ideal and real fluids.
Week 5	Dimensional Analysis Fundamental dimensions, dimensional homogeneity, dimensionless numbers.
Week 6	Methods of dimensional analysis, l- Rayleigh's method (power series)
Week 7	2- Buckingham's II- method / Theorem.
Week 8	Fluid Statics Basic concept of fluid statics, Pressure terminology, pressure (head) of liquid.

Week 9	Measurement of pressure: (Piezometer, Manometers, types of Manometers, Mechanical Gauges).
Week 10	Fluid Dynamics Fluid kinematics: Types of fluid flow (steady and unsteady flows, uniform and non-uniform flows, one, two, and three dimensional flows).
Week 11	Rotational and irrotational flows, laminar and turbulent, compressible and incompressible flows.
Week 12	Boundary layer, Continuity equation.
Week 13	General energy equation.
Week 14	Bernoulli's equation, equation of motion, derivation of Euler's equation of motion.
Week 15	Modified Bernoulli 's equation.

Delivery Plan (Weekly Lab. Syllabus) **المنهاج الاسبوعي للمختبر**	
	Material Covered
Week 1	**Bernoulli's Theorem Demonstration**
Week 2	**Discharge Through An Orifice**
Week 3	**Flow Through Venturi Meter**
Week 4	**Open Channel Flow Over Weir**
Week 5	**Flow Of Compressible Fluid**
Week 6	**Forced Vortex**
Week 7	**Fluidization**
Week 8	**Bernoulli's Theorem Demonstration**
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**1- Coulson, J.M and Richardson J.F. "Chemical Engineering, volume 1", Fifth edition 2002, Elsevier Science, Linacre House, Jordan Hill, Oxford.** **2- Coulson, J.M and Richardson J.F. "Chemical Engineering, volume 2", Fifth edition 2002, Elsevier Science, Linacre House, Jordan Hill, Oxford.** **3- F.A. Holland and R. Bragg " Fluid Flow for Chemical Engineers", 2nd Ed. (1995) Elsevier Ltd. Other Support books:-** **4- DARBY. R., M. Dekker "Chemical Engineering Fluid Mechanics", 2nd Ed. (2001).** **5- James O. Wilkes "Fluid Mechanics for Chemical Engineers", Prentice Hall PTR, New Jersey, USA, 1999.** **6. De Nevers, N. "Fluid Mechanics for Chemical Engineers", (1999) McGraw-Hill, Singapore.** **7- Streeter and Wylie "Fluid Mechanics", McGraw-Hill, (1981).**	
Recommended Texts		
Websites		

APPENDIX:

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	**بقرار مقبول**	(45-49)	More work required but credit awarded
	F – Fail	**راسب**	(0-44)	Considerable amount of work required
Note:				

ملاحظة :هذا النموذج تم وضعه وتقديمه من قبل مديرية ضمان الجودة في وزارة التعليم العالي والبحث العلمي