Module Information
معلومات المادة الدراسية

Module Title	TRANSPORT PHENOMENA IN BME	**Module Delivery**	
Module Type	CORE	❖ **Theory Lecture** ✓ **Lab** ❖ **Tutorial** ✓ **Practical** ✓ **Seminar**	
Module Code	UOMU0101053		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGI	**Semester of Delivery**	5
Administering Department	BME	**College**	Engineer
Module Leader	Dr. Amir Najah Saud	**e-mail**	amir_najah@uomus.edu.iq
Module Leader's Acad. Title	Assistant Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	None	**e-mail**	None
Peer Reviewer Name		**e-mail**	
Review Committee Approval	2025\9\1	**Version Number**	1.0

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

Module Aims أهداف المادة الدراسية	This course aims at providing the student with the necessary basic and advanced concepts for the followings: 1- Fluid properties and definitions 2- Basic equation to fluid statics 3- Basic equations of fluid mechanics; fluid flow in the circulation and tissues; transport in porous media; mass transport in biological systems; kinetics; heat conduction; heat convection; heat exchangers.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Students will become comfortable applying fundamental biotransport fundamentals to physiological systems. 2. Students will be able to apply dimensional analysis to the equations for the problems in fluid transport. 3. Students will understand the relationship between blood flow and physiological function and dysfunction in the surrounding tissues and organs. 4. Students will develop an intermediate/advanced understanding of mass transport to tissues and organs
Indicative Contents المحتويات الإرشادية	This course will prepare students to apply advanced mathematics to solve problems at the interface of engineering and physiology. Specific to the BME program educational outcomes, students will gain experience applying a knowledge of biotransport fundaments to understand the relationship between blood flow and physiological function and dysfunction in the surrounding tissues and organs.
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 type 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	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.2
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**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Lab.	2 hr.	10% (10)	Continuous	
	Report	0	10% (0)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr.	10% (20)	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**
Week 2	**Fluid properties and definitions**
Week 3	**Fluid static's pressure at point**
Week 4	**Basic equation to fluid statics**
Week 5	**Archimedes' Principle and Buoyancy**
Week 6	**Archimedes' Principle and Buoyancy**
Week 7	**Viscous effects– fluid resistance**
Week 8	**Viscous effects– fluid resistance**
Week 9	**Fluid flow: concepts and basic equation**
Week 10	**Fluid flow: concepts and basic equation**
Week 11	**Pressure measurement fluid mechanics**
Week 12	**Mass, Bernoulli and Energy Equations**
Week 13	**Blood flow in the heart**
Week 14	**Blood flow in arties, veins ,and microcirculation**
Week 15	**Preparatory Week**
Week 16	**Final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Basic Transport Phenomena in Biomedical Engineering	Yes
Recommended Texts	Transport Phenomena in Biomedical Engineering: Artifical organ Design and Development, and Tissue Engineering	No
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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				

NB 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.