Jordan University of Science and Technology
Faculty of Engineering
Biomedical Engineering Department

BME441 Biomedical Transport Phenomenon
First Semester 2023-2024

Course Catalog
3 Credit Hours. 3 Credit hours (3 h lectures).Principles of momentum, heat, and mass transfer with applications to medical and biological systems and medical device design

Text Book	
Title	Transport Phenomena in Biological Systems
Author(s)	George Truskey, Fan Yuan, and David Katz
Edition	2nd Edition
Short Name	TYK
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref #2	Biotransport: Principles and Applications	Kenneth R. Diller and Robert J. Roselli	11th Edition	

Instructor	
Name	**Dr. Hossam H El-Khalil**
Office Location	-
Office Hours	Sun : 13:00 - 13:30 Mon : 11:00 - 11:30 Tue : 11:00 - 14:00 Wed : 11:00 - 13:00
Email	hmhelkhalil@just.edu.jo

Class Schedule & Room

Section 1:
 Lecture Time: Mon, Wed : 13:00 - 14:30
 Room: E2010

Prerequisites		
Line Number	**Course Name**	**Prerequisite Type**
283440	BME344 Thermodynamics	Prerequisite / Study
102364	MED236A Physioanatomy	Prerequisite / Study
283420	BME342 Bio Fluid Mechanics	Prerequisite / Pass

Tentative List of Topics Covered		
Weeks	**Topic**	**References**
Week 1	Introduction	
Week 2	Conservation Relations and Fluid Mechanics	From **TYK**
Weeks 3, 4, 5, 6	Diffusive Mass Transport and Relation to Convection	From **TYK**
Week 7	Trans-vascular Transport & Blood Oxygenator	From **TYK**
Week 8	Heat Transfer	From **TYK**
Weeks 9, 10	Fluid Dynamics and Momentum Balance	From **TYK**
Weeks 11, 12	Applications and Models	From **TYK**
Weeks 13, 14	Numerical and Computational Methods	From **TYK**

Mapping of Course Outcomes to Program Outcomes	**Course Outcome Weight (Out of 100%)**	**Assessment method**
Set up shell balances for conservation of momentum, energy, and mass [25SO1]	25%	
Understand and apply flux laws in balances [20SO1]	20%	
Employ shell balance equations to obtain desired concentration profile [25SO1]	25%	
Utilize information obtained from solutions of the balance equations to obtain engineering quantities of interest [15SO1, 5SO6]	20%	
Appreciate relevance of transport principles in diverse applications [5SO2, 5SO6]	10%	

Relationship to Program Student Outcomes (Out of 100%)						
SO1	SO2	SO3	SO4	SO5	SO6	SO7
85	5				10	

Evaluation	
Assessment Tool	**Weight**
First Exam	20%
Second Exam	20%
Project	5%
Quizzes and Homeworks	15%
Final Exam	40%

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