



**Jordan University of Science and Technology**  
**Faculty of Science & Arts**  
**Basic Sciences And Humanities Department**

HSS103MATH Mathematical Applications Of Biological Sciences

First Semester 2023-2024

**Course Catalog**

3 Credit Hours. 3 Credit Hours. This course is design for the Biological Sciences students. First, we give the students an overview of the structure and applications of functions, differentiation, integration, then, first order differential equations, Modelling with ordinary differential equations: population growth (logistic and harvesting), more applications, Modelling change with difference equations, Model Fitting: graphically, least squares, linear programming, the diet problem.

**Text Book**

<b>Title</b>	A First Course in Mathematical Modeling
<b>Author(s)</b>	Frank R. Giordano, Maurice D. Weir, William P. Fox
<b>Edition</b>	4th Edition
<b>Short Name</b>	Ref# 1
<b>Other Information</b>	

**Course References**

Short name	Book name	Author(s)	Edition	Other Information
Ref# 2	Elementary Differential Equations	Earl Rainville, Phillip Bedient and Richard Bediant	8th Edition	<a href="https://www.abebooks.com/book-search/title/elementary-differential-equations/author/phillip-e-rainville-earl-d/">https://www.abebooks.com/book-search/title/elementary-differential-equations/author/phillip-e-rainville-earl-d/</a>
Ref# 3	A First Course in Differential Equations with Modeling Applications	Dennise Zill	9th Edition	<a href="https://www.academia.edu/33171896/_Dennis_G_Zill_A_First_Course_in_Differential_Equations">https://www.academia.edu/33171896/_Dennis_G_Zill_A_First_Course_in_Differential_Equations</a>
Ref# 4	Finite Mathematics Daniel Maki, Maynard, Thompson, Stephen McKinley	Daniel Maki, Maynard, Thompson, Stephen McKinley	6th Edition	<a href="https://ebin.pub/qdownload/finite-mathematics-6th-edition-6nbsped-1259819760-9781259819766.html">https://ebin.pub/qdownload/finite-mathematics-6th-edition-6nbsped-1259819760-9781259819766.html</a>

Ref# 5	Applied Finite Mathematics 2016 Revised and Updated by Roberta Bloom.	2016 Revised and Updated by Roberta Bloom.	3rd Edition	<a href="https://www.deanza.edu/faculty/bloomroberta/documents/AppliedFiniteMath-3ed-Current.pdf">https://www.deanza.edu/faculty/bloomroberta/documents/AppliedFiniteMath-3ed-Current.pdf</a>
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Instructor	
Name	Prof. Mohammad Al-Towaiq
Office Location	Ph L0
Office Hours	
Email	towaiq@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Sun, Tue, Thu : 12:30 - 13:30 Room: NG41

Tentative List of Topics Covered		
Weeks	Topic	References
Weeks 1, 2	Review of functions, Logarithmic and exponential functions, trigonometric functions.	
Week 3	Review of integration: Indefinite Integrals, Definite Integrals, Techniques of Integrations; Substitutions, integration by parts, integration of rational functions.	
Weeks 4, 5	First order differential equations; existence and Uniqueness Theorem, separable equations, linear equations, exact equations and Special Integrating Factors.	
Weeks 5, 6	Applications of linear differential equations to Biology such as the growth law ( Logistic model with and without harvesting) and the cooling law.	
Weeks 7, 8	Modelling Fitting: graphically and least squares.	
Week 9	Basic Statistics	
Weeks 10, 11	Basic Probability	
Week 12	Introduction to matrices.	
Weeks 13, 14	Introduction to Linear Programming, examples: Disease and Diet problems.	
Week 15	Review	

Mapping of Course Outcomes to Program Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Understand the basic (fundamental) mathematical concepts. [30SLO1, 10SLO2]	40%	
Gain proficiency in correct mathematical reasoning and to apply the mathematical tools to practical situations. [10SLO1, 5SLO2, 15SLO3]	30%	
Understand the complex nature of developing biological models: what they are, how they are constructed, and how they are interpreted and, as a result, should have an appreciation for the power of mathematics. [10SLO1, 10SLO2, 10SLO3]	30%	

Relationship to Program Student Outcomes (Out of 100%)					
SLO1	SLO2	SLO3	SLO4	SLO5	SLO6
50	25	25			

Evaluation	
Assessment Tool	Weight
First Exam	30%
Second Exam	30%
Final Exam	40%

Policy	
Additional Notes	<p>Exams: The format for the exams is generally (but NOT always) as follows: Problem formulation, computation, analytic solutions, and analysis.            Grades will not be given out via e-mail. The final exam covers all the material in the course.            Makeup Exams: Let the instructor know about your makeup exam before 3 days prior to the scheduled exam time. Makeup exam should not be given unless there is a valid excuse.            Drop Date: According to the university calendar.</p> <p>Cheating: Cheating or copying from neighbor on exam, or quiz is an illegal and unethical activity. Standard JUST policy will be applied.            Attendance: Excellent attendance is expected. JUST policy requires the faculty member to assign ZERO grade (35) if a student misses 20% of the classes that are not excused. Sign-in sheets will be circulated. If you miss class, it is your responsibility to find out about any announcements or assignments you may have missed.            Workload : Average work-load student should expect to spend is 4 hours/week.            Graded Exams: Instructor should return in term exam, quiz, HW, and project papers graded to students during the week after the due date.            Participation: Participation in, and contribution to class discussions will affect your final grade positively. Raise your hand if you have any question.            Finally: Smoking is prohibited in all in-door places.</p>

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