



**THE HASHEIMTE UNIVERSITY**  
**MECHANICAL ENGINEERING DEPARTMENT**  
**ME 701 Engineering Analysis**  
**Spring Semester, 2024**

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**Catalog Data- 2024 :** 3 Credit hours (3h single lecture). Studying different techniques used to solve ordinary and partial differential equations. Topics include: review of the basic types of ordinary differential equations, Bessel differential equation and Bessel function properties, Fourier series, separation of variables to solve partial differential equations.

**TextBook(s):** Kreyszig, E. , Advanced Engineering Mathematics, 10<sup>th</sup> Edition, John Wiley, New York.

**References:**

- Greenberg, M. D. (1998), Advanced Engineering Mathematics, 2<sup>nd</sup> ed., Prentice Hall New Jersey.
- Wylie, C. R. and Barrett, L. C. (1995), Advanced Engineering Mathematics, 6<sup>th</sup> ed., McGraw-Hill, New York.

**Instructor:** Dr. Mohammad A Gharaibeh  
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**Class Schedule:** Lecture Time: Thursday 2:30-5:30pm - Online

**Office Hours:** See MS-Teams Group.

**Pre/Co-Requisites:** Undergraduate Applied Math courses

**Objectives:**

1. Learning how to solve basic first and second order ordinary differential equations
2. Analyze the Bessel equations and functions
3. Familiarize the student with partial differential equations

**Topics Covered:**

1. Definitions and Review of Basic First and Second and Higher Order Ordinary Differential Equations (Chapters 1, 2,3).
2. Series solutions (Chapter 5).
3. Bessel 's Equations and Functions (Chapter 5).
4. Fourier Series and Transformation (Chapter 11).
5. Partial Differential Equations (Chapter 12 and Handouts).

**Computer Usage:** -

**Design Activities/Project(s):** None

**Lab. Experiment(s):** None

**Scientific Visit(s):** None

**Evaluation:** 1<sup>st</sup> Exam 30%  
2<sup>nd</sup> Exam 30%  
Final Exam - Project 40%

**Relationship of the Course to ME Outcomes:**

<b>ABET a – k</b>	√	<b>Mechanical eng. Program Outcomes</b>
<b>a</b>	√	a. Apply knowledge of mathematics, science, and engineering in practice.
<b>b</b>		b. Design and conduct experiments as well as analyze and interpret data.
<b>c</b>	√	c. Design a system, components, or process to meet desired needs.
<b>d</b>	√	d. Function on multidisciplinary teams.
<b>e</b>	√	e. Identify, formulate, and solve engineering problems.
<b>f</b>		f. Understanding of professional and ethical responsibility of an engineer.
<b>g</b>		g. Communicate effectively.
<b>h</b>	√	h. Broad education to understand the impact of engineering solutions in global and societal context.
<b>i</b>		i. Recognition of the need for, and possess the ability to engage in, lifelong learning.
<b>j</b>		j. Possess knowledge of contemporary issues.
<b>k</b>	√	k. Use the techniques, skills, and modern engineering tools necessary for engineering practice.
		l. Adhere to safety rules and regulations.

**ABET Category:**

Engineering Science 3 Credits  
Engineering Design 0 Credits

**Prepared By:** Dr. Mohammad A Gharaibeh      **Date:** Feb 25, 2024.