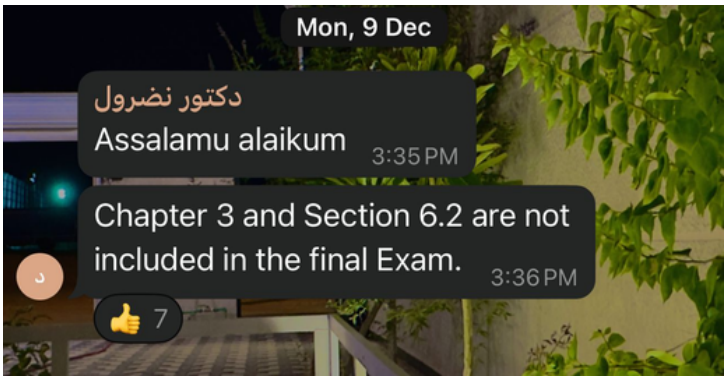
Math218

فاينل معادلات تفاضلية
ترم 461

د.نضرول

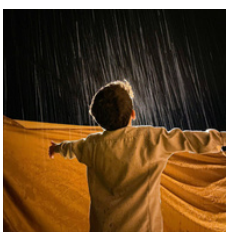
التحديد :



➢ **Schedule**

Date	Topics and/or Activities	References	Representative Questions
Week 1	Introduction to Differential Equations	**Chap. 1** Sec 1.1	Classification of differential equation
Week 2	**First –Order Differential Equations** Separable Variables Homogeneous Equations Exact Equations Linear Equations Equations of Bernaulli, Riccati, and Claraut Picard's Method	**Chap. 2** Sec. 2.2 Sec. 2.3 Sec. 2.4 Sec. 2.5 Sec. 2.6 Sec. 2.8	Solve the differential equation by using different methods.
Week 3	**Applications of First –Order Differential Eq"s** Orthogonal Trajectories Applications of Linear Equations	**Chap. 3** Sec. 3.1 ✗ Sec. 3.2 ✗	Application of first order differential equation in circuit.
Week 4-5	**Linear Differential Equations of Higher order** Preliminary Theory Constructing a Second Sol" from a known Sol" Homo.Linear Equations with Constant Coefficients Undetermined Coefficients Variation of Parameters	**Chap. 4** Sec. 4.1 Sec. 4.2 Sec. 4.3 Sec. 4.4 Sec. 4.5	Solve the linear differential equation by using various methods.
Week 6	**Applications of Second-Order Differential Equations: Vibrational Model** Simple Harmonic Motion Damped Motion Forced Motion Electric Circuits and Other Analogous Systems	**Chap. 5** Sec. 5.1 Sec. 5.2 Sec. 5.3 Sec. 5.4	Evaluate the S.H. M. or LCR Circuits using second order differential equations.
Week 7	**Differential Equations with Variable Coefficients** Cauchy-Euler Equation Power Series Solution	**Chap. 6** Sec. 6.1 Sec. 6.2 ✗	Solve differential equation by using power series solution.
Week 8-10	**Laplace Transform** Laplace Transform Inverse Laplace Transform Operational Properties Applications Dirac Delta Function	**Chap. 7** Sec. 7.1 Sec. 7.2 Sec. 7.3 Sec. 7.4 Sec. 7.5	Solve differential equation with boundary condition by applying Laplace transform.
Week 11	System of Linear Differential Equations **Fourier Series** Fourier Series Fourier Cosine and Sine Series	**Chap. 8** Sec 8.1 **Chap. 10** Sec10.2 Sec10.3	Evaluate systems of simultaneous linear differential equations and the Fourier series.

ادعوا لامي بالشفاء والصحه والعافيه
وبالتوفيق لكم يارب



Kingdom of Saudi Arabia
Ministry of Education
College of Computer
Department of Computer Engineering

المملكة العربية السعودية
وزارة التعليم
كلية الحاسب
قسم هندسة الحاسب

Qassim University
جامعة القصيم
College of Computer

Course Code and Name: MATH218 & Differential Equations
Final Exam (B)
461 - Date: 31/12/2024 Duration: 2 hours

Total Marks
50

Student Name: **Student ID:**

Answer All Questions

1. Solve the differential equation $x^2 y'' - xy' + 2y = 0$. **(4 Marks)**
2. Evaluate $L[cos2t + e^{4t} + 2t]$ **(4 Marks)**
3. Solve $L^{-1}\left[\frac{1}{s^2+5} + \frac{1}{s+3}\right]$ **(4 Marks)**
4. Find $L\{f(t)\}$ if $f(t) = \begin{cases} t, & 0 \le t \le 1, \\ 0, & t \ge 1. \end{cases}$ **(4 Marks)**
5. Determine whether the given equation is exact. If exact,
   Solve $2xydx + (x^2 - 3siny)dx$ **(5 Marks)**
6. Write the solution of the equation $x''+2x = 0$ with initial value problem $x(0) = 1,\ x'(0) = -2\sqrt{2}$. **(5 Marks)**
7. Solve the homogeneous differential equation $(x - 2y)dx + xdy = 0$. **(6 Marks)**
8. Solve the differential equation by undetermined coefficients $\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + 2y = 4x^2$. **(6 Marks)**
9. Solve $\frac{dy}{dt} - 3y = e^{2t}$ subject to $y(0) = 1$ using Laplace Transform. **(6 Marks)**
10. Expand $f(x) = x,\ -2 < x < 2$ in a Fourier Series. **(6 Marks)**