

# MATH 204

## Differential Equations

### **Instructor: Ibraheem Alolyan**

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Office Hours: Mon: 7 – 8, 11:00 – 1 , Wed 7 - 9, 12 – 1

(If these times are not convenient, please feel free to contact me by email,  
and we can arrange an alternative meeting time.

### **Text Books:**

- 1- Differential Equations by Said Mesloub, Mostafa Damlakhi and Khawaja Zafar Elahi.
- 2- Differential equations with boundary value problems: by Dennis G. Zill and Michael R Cullen (Seventh or sixth edition)

### **Weekly Course Topics:**

- 1- Definition of a Differential equation, Classification of Differential equations, type of solutions.
- 2- Initial value problems. Existence and uniqueness theorem, separable equations (Separable variables).
- 3- Equations with homogeneous coefficients, Exact Equations
- 4- Integrating factors, general form of a linear equation and Equations with linear coefficients
- 5- Bernoulli equation.
- 6- Applications, Linear Models: Orthogonal trajectories, Growth and decay, Newton's Law of Cooling.
- 7- Higher order Differential equations. Linear Differential equations: Existence-Uniqueness Theorem, Linearly (independent solutions, dependent solutions), Wronskian, Method of Reduction of order.
- 8- Homogeneous linear Differential equations with constant coefficients. Undetermined coefficient method.
- 9- Cauchy-Euler Equation, Variation of parameters.
- 10- Solving systems of Linear Equations by Elimination Method.
- 11- Series solutions of Linear Equations.
- 12- Orthogonal Functions and Fourier series.
- 13- Fourier cosine and sine series, Complex Fourier series.
- 14- Fourier Integral. Complex form of Fourier integral

### **Grading:**

First midterm **25**

Second midterm **25**

Quizzes **10**

Final **40**