***MATH 204 (Introductory Differential Equations)***

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***Prerequisite****: Math 201 or Math 203*

***1st Midterm :***

***2nd Midterm:***

***Text****: Differential equations with boundary value problems: by Dennis G. Zill and Michael R Cullen (Seventh or sixth edition)*

***Reference****:Differential Equations by Said Mesloub, Damlakhi Mostafa, and Khawaja Zafar Elahi.*

***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****. Series solutions of linear equations.*

***11****. Solving systems of linear equations by Elimination method.*

***12****. Orthogonal functions and Fourier series.*

***13****. Fourier cosine and sine series, Complex fourier series.*

***14****. Fourier integral.*

***15****. Revision*

***Grading:***

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| 25+25 | *Midterms*  |
| 10 | *Tutorial and Punctuality* |
| 40 | *Final* |
| 100 | *Total* |