Palestine Technical University-Kadoorie

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**Department of Applied Mathematics**

**Engineering Math 1 Syllabus**

**Second Semester 2020/2021**

**Textbooks:**

1. Linear Algebra with Applications, 7th Edition, Steven J. Leon.
2. Elementary Differential Equations and Boundary Value Problems, 7th Edition, W. E. Boyce and R.C.Diprima.

**Instructors:** Dr. Rania Wannan, Mrs. KefayaAyyash, Mrs. Raghad Abu -shaer

**Course Evaluation:**

* First Exam 30%.
* Second Exam 30%.
* Final Exam 40%.

**Course Outline:**

**Part I.**

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| **Chapter One** | **Matrices and Systems of Linear Equations.**   * 1. Systems of linear equations.   2. Row echelon form.   3. Matrix algebra. |
| **Chapter Two** | **Determinants.**  2.1 Determinant of a matrix.  2.2 Properties of determinants.  2.3 Cramer’s rule. |
| **Chapter Three** | **Vector Spaces.**  3.1 Definition and examples.  3.2 Subspaces.  3.3 Linear independence.  3.4 Basis and dimension.  3.6 Row space and column space. |
| **Chapter Four** | **Linear Transformations**.  4.1 Definition and examples. |
| **Chapter Six** | **Eigenvalues**.  6.1 Eigenvalues and eigenvectors.  6.3 Diagonalization of matrices. |

**Part II.**

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| **Chapter One** | **Introduction.**   * 1. Classification of differential   equations. |
| **Chapter Two** | **First Order Differential Equations**  2.1 Linear equations with variable  coefficients.  2.2 Separable equations.  2.4 Differences between linear and  nonlinear equations.  2.6 Exact equations and integrating  factors. |
| **Chapter Three** | **Second Order Linear Equations**  3.1 Homogeneous equations with  constant coefficients.  3.2 Fundamental solutions of linear  homogeneous equations.  3.3 linear independence and the  Wronskian.  3.4 Complex roots of the  characteristic equation.  3.5 Repeated roots; reduction of  order.  3.6 Nonhomogeneous equations;  method of undetermined  coefficients.  3.7 Variation of Parameters. |