

## **FIZ 362E – MATHEMATICAL METHODS IN PHYSICS II SPRING 2020**

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**Course Days :** Thursday 15:30-17:30 (D101)

Friday 14:30-17:30 (D101)

### **Contents**

#### **1- Gauss Equation, Hypergeometric and Confluent-Hypergeometric Equations**

The Gamma Function (Factorial Function)

Hypergeometric Function, Bessel Function, Legendre Function

Orthogonal Polynomials : Hermite, Legendre, Laguerre, Chebyshev

#### **2- Partial Differential Equations**

Coordinate Transformations: Spherical, Cylindrical, Parabolic, ...

The Method of Separation of Variables

Elliptic, Parabolic, Hyperbolic Equations

Asymptotic Behaviors of Some Special Functions

#### **3- Introduction to Group Theory**

Finite Groups

Cyclic, Symmetric (Permutation), Alternating, Dihedral Groups

Space-time Isometry Groups

Lie Groups, Lie Algebras and Representations

Symmetry Concept in Nature: Lagrangian Formalism, Noether's Theorem and Conserved Quantities

Kinematical Symmetries and Dynamical Symmetries

### **Grading :**

Midterm	(30%)
Quizes	(15%)
Homeworks	(15%)
Final	(40%)