Information of the graduate level course on **Partial Differential Equations**
(MAD007P6E) at IIT Jammu, India

Instructors:

- Dr. Tanmay Sarkar

- Dr. Manmohan Vashisth

Course contents:

- Review of existence and uniqueness theorem for ODEs.

- **Local Existence Theory:** First order PDEs, Cauchy problem, Cauchy-Kowalevski Theorem, Method of characteristics, Constant coefficient operators, fundamental solutions and Generalized solutions for linear PDEs.

- Classification of 2nd order PDEs, Solutions by other methods: separation of variables, similarity methods, transform methods, power series method.

- **The Laplace Operator:** Basic properties and Fundamental solutions, mean value property, Green's functions, Dirichlet and Neumann problems, Properties of Harmonic functions.

- **The Heat Operator:** Fundamental solutions, mean value formula, properties of solutions and Energy methods.

- **The Wave Operator:** One dimensional wave equation, higher dimensional equation, solution by spherical means, non homogeneous wave equations, energy methods.

Class timing for the course:

- Monday, 4:00 PM to 5:30 PM

- Wednesday, 4:00 PM to 5:30 PM

- Friday, 4:00 PM to 5:30 PM (Tutorial class)

Credit system for the course:

- 15 marks for quizes. There will be 2 Quizes.

- 25 marks for Mid-Sem exam.

- 10 marks for presentation.

- 50 marks for End-Sem exam.

References for the course:

1. A basic course in PDEs by Qing Han.

2. Introduction to PDEs by Gerald B. Folland.

3. Partial Differential Equations by Lawrence C. Evans.

4. Partial Differential Equations in Action by Sandro Salsa.

5. Partial Differential Equations, Methods and Applications by Robert C. McOwen.