



ADVANCED PARTIAL DIFFERENTIAL EQUATIONS

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TYPE OF COURSE : New | Core | PG

COURSE DURATION : 12 Weeks (18 Jan' 21 - 09 Apr' 21)

EXAM DATE : 25 Apr 2021

PRE-REQUISITES : A basic knowledge of several variable calculus is enough

INTENDED AUDIENCE : Graduate students (MSc) and advanced undergraduate

COURSE OUTLINE :

The precise idea to study partial differential equations is to interpret physical phenomenon occurring in nature. Most often the systems encountered, fails to admit explicit solutions but fortunately qualitative methods were discovered which does provide ample information about the system without explicitly solving it. In this course we will explore the basic ideas of studying first order equations starting with the inner workings of method of characteristics followed by the three fundamental second order PDEs namely Laplace equation, Heat equation and Wave equation.

ABOUT INSTRUCTOR :

Dr Kaushik Bal, assistant professor in the dept of Math and Stat, IIT Kanpur. He completed PhD in 2011 under the supervision of Prof Jacques Giacomoni from UPPA, France with a specialization in elliptic and parabolic PDEs. Currently his research interest revolves around nonlinear Schrodinger equation and nonlocal Hardy and Poincare inequalities in Sobolev space setting.

COURSE PLAN :

Week 1: First order Equations

Week 2: First order Equations (Cont'd)

Week 3: First order Equations (Cont'd)

Week 4: Laplace Equation

Week 5: Laplace Equation (Cont'd)

Week 6: Laplace Equation (Cont'd)

Week 7: Heat Equation

Week 8: Heat Equation (Cont'd)

Week 9: Heat Equation (Cont'd)

Week 10: Wave equation

Week 11: Wave equation (Cont'd)

Week 12: Wave equation (Cont'd)