

**King Fahd University of Petroleum and Minerals**  
**Department of Mathematics and Statistics**  
**SYLLABUS**  
**Semester I, 2013-2014 (131)**  
**(Dr. Bilal Chanane)**

**Course #:** Math 695

**Title:** Optimal Control of Partial Differential Equations

**Textbook:** Optimal Control of Partial Differential Equations by Fredi Tröltzsch, (Graduate Studies in Mathematics), American Mathematical Society, 2010

**Student Name:** Iyiola, Olanniyi Samuel

**Student ID:** g201203280

**Objectives:** The aim of this course is to introduce the student to the area of optimal control of partial differential equations. We shall focus on basic concepts and notions such as: Existence theory for linear and semilinear partial differential equations, existence of optimal controls, necessary optimality conditions and adjoint equations, second-order sufficient optimality conditions and foundation of numerical methods.

Week	Chapters/ Sections	Topic
1	Chapter 1 (1.1-1.4)	Introduction
2-5	Chapter 2 (2.1-2.10,2.12)	Linear-quadratic elliptic control problems
6-9	Chapter 3 (3.1-3.7)	Linear-quadratic parabolic control problems
10-12	Chapter 4 (4.1-4.7,4.8-4.10)	Optimal control of semilinear elliptic equations
13-15	Chapter 5 (5.1-5.9)	Optimal control of semilinear parabolic equations

**Evaluation Scheme:** Two weekly presentations and regular assignments including a term paper.

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