MODERN ALGEBRA

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INTENDED AUDIENCE : All undergraduate science and engineering students

COURSE OUTLINE :

The course discusses how algebra allows us to abstract out the geometric objects and numbers. This leads to an understanding of fundamental properties of geometry and numbers as well as allows us to manipulate them in ways not possible directly. This has resulted in some of the most remarkable applications of mathematics in real life.

ABOUT INSTRUCTOR :

Prof. Manindra Agrawal is a computer scientist by training and mathematician by profession, thus allowing him to wear different hats as per convenience. Most of his time is spent in proving, about certain problems of interest, that no one can ever solve them quickly (and deriving pleasure by the look of disappointment on those trying to solve these problems). At times, this quest, rather unexpectedly, results in a quick solution of a problem. He made his name due to one such problem: how to test if a number is prime. As a consequence, he as bestowed with several awards and honors including Shanti Swarup Bhatnagar prize, Godel prize, Fulkerson prize, Infosys prize, and Padma Shri.

COURSE PLAN :

Week 1: Introduction to abstraction; Introduction to Groups

Week 2: Properties of Finite Groups; Applications of Groups

Week 3: Introduction to Rings; Properties of Finite Rings

Week 4: Introduction to Ideals

Week 5: Properties of Ideals

Week 6: Applications of Ideals and Rings

Week 7: Introduction to Fields

Week 8: Applications of Finite Fields