Module Syllabus:

Course Title: Problem Solving
Course Code: 250381
Semester: First / 2015–2016
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Short Description:

This course focuses on problem solving techniques that are demonstrated within various topics in pure and applied mathematics.

Lesson Plan:

Students will be trained first of all in the area of mathematical writing while at the same time we review methods of proof: mathematical induction, proof by contradiction, etc. When we feel that students are already proficient in writing and reading proofs, then each lesson will be a problem-oriented approach. We will not teach the students a solution to the problem, but we will guide them toward discovering an already-learned technique suitable to the given problem. We will select problems with minimal prerequisites, to be chosen from diverse topics in Classical Geometry, Number Theory, Combinatorics, Graph Theory, Probability Theory, and Recreational Mathematics.

Recommended Books:

There are no required texts for this course. Solow [4] is probably the best reference for students who wish to learn or brush up on mathematical proofs. There are so many books available on problem solving techniques and examples, e.g., a classic by Pólya [3] or a recent collection by Andreescu and Andrica [2]. Advanced students will also enjoy reading Aigner and Ziegler [1], which contains beautiful proofs of some very well-known theorems in Mathematics.

1. Martin Aigner and Günter M. Ziegler, Proofs from THE BOOK, 4th Edition (2010) Springer.
2. Titu Andreescu and Dorin Andrica, Number Theory: Structures, Examples, and Problems (2009) Birkhäuser.
3. George Pólya, How to Solve It: A New Aspect of Mathematical Method, 2nd Edition (1957).
4. Daniel Solow, How to Read and Do Proofs: An Introduction to Mathematical Thought Processes, 6th Edition (2013) Wiley.

Mark Distribution:

Homework   10%
Participation 10%
Exam 1   20%
Exam 2   20%
Final Exam   40%