

MATH 6663 Problem Solving 2: Geometry and Graphs

Credits: 3

Prerequisite: MATH 3003 or MATH 3243 or permission of instructor.

Text:

1. A Second Step to Mathematical Olympiad Problems (Volume 7) by Derek Allan Holton, ISBN-13: 978-9814327879.
2. Graph Theory (Mathematical Olympiad Series) by Bin Xiong, ISBN-13: 978-9814271127.
3. Euclidean Geometry in Mathematical Olympiads by Evan Chen, ISBN-13: 978-0883858394.

References: How to solve it: A new aspect of mathematical methods by George Polya and John Conway. The art of Problem Solving, Vol. 1 and 2 by Sandor Lehoczky and Richard Rusczyk.

Course Description: This is the second course in problem solving and mainly covers the area of geometry and graph theory. The goal of this course is to expose students to middle and high school mathematics contest problems in geometry which require proofs and constructions. After they learn the basic results and tools in a particular topic in geometry or graph theory, they are invited to solve typical problems, where hints will be provided by the instructor as needs be. Students will gradually be introduced to various classical problems-solving strategies.

Topics:

1. Proofs in geometry
2. Cartesian geometry
3. Construction problems
4. Graphs, chessboards, and coloring
5. Eulerian path

Learning Outcomes: The students are expected to

1. Be able to solve Eulerian trails.
2. Be able to evaluate degree of vertices of a graph.
3. Be able to solve Hamiltonian paths.
4. Understand and be able to use Euler's theorem.
5. Be able to prove equalities and inequalities of triangles.
6. Be able to construct proofs by induction and contradictions.

Grading: Grades will be based on accuracy, originality, simplicity of the solution, and meeting deadlines.

Homework 40%, Assignments 20%, Tests 40%.

COMMON LANGUAGE FOR COURSE SYLLABI

Students, please carefully review the following information at the link

<https://www.westga.edu/student-services/counseling/assets-counseling/docs/common-language-for-course-syllabi.pdf>

It contains important material pertaining to your rights and responsibilities in this class. Because these statements are updated as federal, state, university, and accreditation standards change, you should review the information each semester.