OAKLAND UNIVERSITY
Department of Mathematics and Statistics
Student Information Sheet and Syllabus

COURSE: **MTH 3001, Putnam seminar**, 0 or 2 credits

SEMESTER: **Fall 2024**

Faculty	Office	Section	Class Time	Room	Phone
László Lipták	**346 MSC**	**45342**	**W 5:30–6:47 p.m.**	**311 SFH**	**370-4054**

E-MAIL: `liptak@oakland.edu` Course info will be available in Moodle.

OFFICE HOURS: Wednesdays 2–3 p.m. in 372 MSC or by appointment in 346 MSC. During office hours I help everyone who showed up together and discuss questions in a round-robin manner. If you need to meet me at a different time, ask me for an appointment.

PREREQUISITES: An interest in solving problems and instructor permission.

TEXT: None. There will be problem sets posted in Moodle that we will work on throughout the semester.

CATALOG DESCRIPTION: Students solve and present solutions to challenging mathematical problems in preparation for the William Lowell Putnam Mathematical Competition, a national undergraduate mathematics competition. May be repeated three times for additional credit.

COURSE OBJECTIVES: To discuss problem solving strategies in mathematics and have fun. Many people like to solve problems and puzzles for enjoyment, and sometimes there is more to solving puzzles than just having fun. To solve mathematical problems we will need some knowledge (sometimes a lot, sometimes not so much), but the main things we need are creativity and the ability to apply your creativity. The main purpuse of the seminar is to learn some common techniques and tools that are used in solving mathematical problems and to practice these techniques to solve some challenging problems.

In this seminar we will seek to solve the types of problems that appear in the William Lowell Putnam Mathematical Competition. The Putnam Competition is held the first Saturday in December, and every seminar participant is encouraged to participate in the competition. Although it is possible to win some fellowship money, most students take part in the competition purely for the pleasure of competing. The problems that appear in the competition usually range from doable (though still not easy) to very challenging. Each year there are some problems that most students participating in the competition are capable of solving. By solving problems from old competitions you will gain some knowledge and experience to be successful on the Putnam Competition.

In the seminar we shall discuss various themes and methods of proof that occur frequently in the Putnam Competition. On the Moodle page of the course there will be about fourteen topics posted, each with some discussion, a number of old Putnam problems and hints. We shall cover approximately one per week and discuss a couple of problems from the set, though most likely not all. It is normal to initially find it very hard to solve even one problem in the competition. Even some very good mathematicians (including myself) would not fare much better in the competition (in past years I was able to solve on average

about two problems out of each six problems contained in each problem set in the allotted time). By learning some common techniques and by practicing a lot, you should be able to find problems on the Putnam Competition that you can solve.

Each problem on the posted problem sets has a certain number of stars indicating how hard the problem is. One star indicates a relatively straighforward problem that can be solved using usual techniques. Three stars indicate that the problem is of moderate difficulty requiring some tricks or ideas. Five stars indicate that the problem is really hard, and most students and even mathematicians would not be able to solve the problem even outside the Putnam Competition (i.e., given a lot more time). The number of stars is subjective, and you may find a problem with one star hard, and a problem with a couple of stars not so hard (this is unlikely to be true for problems with four or five stars). You should read all problems and attempt the ones you find interesting. It is OK to attempt only problems with one or two stars, though I hope eventually you will at least try some harder problems.

Grading Policy: If you are taking this seminar for credit (either 0 or 2) there will be two requirements:

1. Attempt at least one problem on each set and turn it in the following week with a writeup of what you have tried. Scores will be based on effort, not on whether the problem was solved completely or even correctly.
2. Participate in the Putnam Competition on Saturday, December 7. There will be two sessions that day running 10 a.m.–1 p.m. and 3–6 p.m. On the day of the competition participants will be taken out for lunch and dinner courtesy of the Department. Your score on the competition will not affect your final grade. This is probably the only mathematics course where effort really does count.

Most importantly: Have fun and learn as much as you can!

Important Dates:

Sep. 2	Labor Day recess (no classes)
Sep. 4	Classes begin
Sep. 17	Last day for "no-grade" drop and adding a class
Oct. 18	Fall break (no classes)
Nov. 5	Last day official withdrawal and drops
Nov. 28–29	Thanksgiving Recess (no classes)
Dec. 7	**Putnam competition, 10 a.m. – 6 p.m.**
Dec. 7	Fall classes end 10:00 p.m.
Dec. 8	Study day