



Philadelphia University

Faculty of Science
Department of Basic Sciences and Mathematics

Summer Semester, 2020/2021

Course Syllabus

Course title: Problem Solving	Course code: 250381
Course level: 3 ⁺	Course prerequisite: Completion of 60 credit hours
Lecture time: 12:45–14:00 (MW)	Credit hours: 3 Contact hours: 3

Academic Staff Specifics

Name	Rank	Office number and location	E-mail address
Rola Alseidi	Assistant Professor		ralseidi@philadelphia.edu.jo

Course description (According to the University Catalogue)

Concepts of problem solving; practice in solving a wide variety of mathematical and logical problems; techniques for attacking problems; building mathematical models.

Course objectives

This course aims at presenting to students the various techniques used in solving mathematical problems, and the methods of thinking when attacking a new problem. This is done by selecting a number of problems from various areas of mathematics, giving a summary of the material and the basic tools pertaining to each of these problems, asking the students to try to solve these problems as a homework, then discussing the solutions in full detail in later class meetings.

The course takes into consideration the needs of students who will eventually become school teachers, and also students who will pursue higher studies and go into research.

Course resources

- **Textbooks (and sites):**

1	Title	: Problem Solving Strategies
	Author	: A. Engel
	Publisher	: Springer
	Edition	: 1
	Year	: 2007
	ISBN	: 0-387-98219-1
2	Title	: Problem Solving Tactics
	Author	: A. Di. Pasquale, N. Do, and D. Mathews
	Publisher	: Australian Mathematical Trust
	Edition	: 1
	Year	: 2014
	ISBN	: 978-1-876420-75-8

Teaching methods

Students will be given problems from various areas in mathematics, and asked to think about them and try to solve them as a homework. The concepts and tools needed in their solution will be presented in class in the usual manner. After several days, solutions will be discussed in full detail in class. Finished polished solutions will not be given right away; instead, the manner in which these solutions are obtained will be highlighted.

Teaching outcomes

- **Knowledge and understanding.** The students are expected to have learned several topics and several types of problems and methods for solving them.
- **Cognitive skills (thinking and analysis).** The students will have learnt ways of thinking of given problems, and several ways of attacking them.
- **Communication skills (personal and academic).** The students will be asked to present their ideas in front of class. This will develop their communication skills and verbal abilities.
- **Transferable skills.**
- **Psychomotor skills (whenever applicable).**

Assessment instruments

- Exams (Midterm and Final Exams)
- Quizzes
- Short reports and/or presentations, and/or short research projects
- Homework assignments

Allocation of Marks	
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Assessment Instruments	Mark
Midterm Exam	30
Final Exam	40
Reports, projects, quizzes, homeworks	30
Total	100

Documentation and academic honesty

- Documentation style (with illustrative examples). Documentation is a most important component of academic honesty. Thus, if you use any material from certain sources when writing a homework, you should cite these sources and should clearly describe how you have used them.
- Protection by copyright. The rules of copyright should be completely respected when using copyrighted material.
- Avoiding plagiarism. All forms of plagiarism will be seriously taken and strongly penalized. These include cheating and trying to cheat in examinations and copying other students' work when preparing a homework. Plagiarism will result in a failing grade and will be reported to the administration for disciplinary action.

Expected workload:

On average, students need to spend 2 hours of study and preparation for each 50-minute lecture/tutorial.

Academic policy:

Absence from lectures and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.

Other Educational resources:

- **Books** Students are encouraged to have a look at the dozens of problem-solving books that are available online. These include books on mathematical Olympiads and other contests, and also books on selections of problems such as those written by Titu Andreescu, Ross Honsberger, and others. I will also refer to the following books at times:

– **Textbooks (and sites):**

1	Title	: Problem-Solving Through Problems
	Author	: L. C. Larson,
	Publisher	: Springer
	Edition	: 1
	Year	: 1983
	ISBN	: 0-387-96171-2
2	Title	: Winning Solutions
	Author	: E. Lozansky and C. Rousseau
	Publisher	: Springer
	Edition	: 1
	Year	: 1996
	ISBN	: 0-387-94743-4
3	Title	: The Art and Craft of problem Solving
	Author	: P. Zeitz
	Publisher	: John Wiley & Sons, Inc.
	Edition	: 2
	Year	: 2007
	ISBN	: 0-471-78901-1

- **Journals** Students are also encouraged to look at the following journals, specially at the problem proposals therein.

1	Title	: The Mathematical Gazette
	Publisher	: The Mathematical Association of the United Kingdom
	Since	: 1917
2	Title	: The College Mathematics Journal
	Publisher	: The Mathematical Association of America
	Since	: 1970
3	Title	: Mathematics Magazine
	Publisher	: The Mathematical Association of America
	Since	: 1928
4	Title	: The American Mathematical Monthly
	Publisher	: The Mathematical Association of America
	Since	: 1894

- **Websites**

<https://www.artofproblemsolving.com/community>