

**American University of Beirut
Faculty of Arts and Sciences
Department of Education**

**Course Number and Title:
EDUC 271 Mathematics for Elementary Teachers I**

1. Course Learning Outcomes

This course is designed for students preparing a B.A. in Education, with an emphasis on Elementary Education. The overall purpose of the course is to support students to develop a deep understanding of basic mathematical skills, concepts, and relationships from the point of view of an elementary teacher. The course also aims to help students gain an appreciation for the nature of mathematics as dynamic and the nature of doing mathematics as an active, generative, and creative process. Using a problem-solving, investigative approach, students will study topics primarily in the domains of Number and Computation, Patterns and Functions, Proportional Reasoning, and Measurement. Mathematical communication skills will also be addressed throughout the course in all domains. Through the experiences in this course students will be able to:

- Express both orally and in writing their own mathematical thinking in all domains;
- Solve complex problems in all domains in more than one way;
- Employ concrete, visual, symbolic, and verbal representations to model and solve problems and to express solutions and solution methods in all domains;
- Articulate important relationships across domains;
- Understand selected research results about children's learning in specific domains; and
- In collaboration with others, design and carry out complex, long-term investigations in at least two domains.

2. Resources Available to Students

Required text:

Billstein, R., Libeskind, S., & Lott, J. (2003). *A Problem Solving Approach to Mathematics for Elementary School Teachers, 8th Edition*. Boston: Addison Wesley.

Optional Materials:

- NCTM *Principles and Standards for School Mathematics* available on-line (www.nctm.org)

- Curriculum materials available in SMEC library

Articles and Artifacts

Articles from relevant journals and other materials will be distributed in class (generally) at least one week prior to the due date, unless it is an in-class reading or activity.

3. Grading Criteria

The grading scale used will be the standard scale for Arts & Sciences. There will be no curve. Learning Logs, Research Reflections, and the projects will be graded according to the rubrics appearing later in this syllabus. Cheating will not be tolerated. If you are suspected of cheating, you will receive a grade of ZERO on the assignment in question. Your grade will be determined as follows:

Participation in class	10%
Group Projects	15%
Learning Logs + Quizzes	25%
Reflections on Research	10%
Midterm Exam	20%
Final Exam	20%

Major Assignments

1. Group Projects

In this course you will complete two group projects. For each project you will be assigned to groups and given different options to choose from related to mathematical topics we are studying in class. Your investigation will culminate with a comprehensive written group report of what you discovered in your investigation, an individual reflection on your own contribution to and learning from the project, as well as a group poster presentation of your findings. At the appropriate time in the course, your professor will provide you with group assignments and choices for your project.

The following will be taken into account when grading the group projects:

- quality of writing (including grammar and spelling) and organization of ideas
- quality and completeness of analyses and explanations as appropriate
- articulation of any significant relationships or connections among mathematical ideas or connections to any readings from the course
- accuracy and completeness of the project overall
- quality of the group presentation
- your level of participation in the project
- your ability to reflect on your experiences and knowledge gained from the project

For all projects you will receive a grade that is 2/3 based on the group products and 1/3 based on your individual participation and written reflection. Plagiarism will not be tolerated. If you are caught plagiarizing any portion of this assignment your project will receive a grade of ZERO.

2. Learning Logs

The learning log is designed to be an ongoing collection of your day to day work in the course and your own self-assessment of that work, as well as a record of your individual growth in understanding during the course. The assignments are intended to stimulate you to think and reason independently about the mathematical ideas and relationships embedded in the math tasks you will solve in the course. **You are always expected to explain your thinking and reasoning as carefully and completely as you can.**

Learning Log assignments will be made at the end of each class and will be due at the beginning of the next class after they are assigned. All learning log assignments are due again at the end of the semester so **YOU MUST KEEP THEM AFTER THEY ARE GRADED**. If you do not turn them in at the end of the semester you will receive no more than 70% of the learning log portion of your overall grade. Each assignment will be graded using a 0-4 scale (as described below) and feedback will be provided by the professor. Points will be awarded at the end of the semester based on grades of individual learning log assignments **as well as growth over time** in the quality of the work produced.

General Rubric for Learning Log Assignments

3.5-4.0 Advanced

The student demonstrates thoughtful individual reflection and sound reasoning about all the key skills, concepts, or relationships that are the focus of the assignment. The student's ideas or analytical approaches with respect to the key mathematical issues are creative, original, accurate and complete. The student provides multiple solutions or approaches to solving the task when possible and *goes far beyond the minimum requirements*. The work is neatly written (or typed when appropriate) and well-organized and contains NO grammar or spelling errors.

2.5-3.4 Proficient

The student demonstrates some thoughtful individual reflection and reasoning about all of the key skills, concepts, or relationships that are the focus of the assignment. The student has attempted to be complete in addressing all aspects of the assignment, however the work does not go beyond what is minimally required. There may be minor computational errors, but the quality of mathematical reasoning is sound and the quality of mathematical communication is high. The work is neatly written (or typed when appropriate) and well-organized.

1.5-2.4 Partially Proficient

The student demonstrates a sound understanding of at least some of the key skills, concepts or relationships that are the focus of the assignment; however, the student demonstrates little

evidence of thoughtful reasoning or explanations are vague or confusing or unclear. There may be some computational errors even though the reasoning may be on the right track or the work may be incomplete. The work is poorly organized or messy and contains more than 5 grammar and spelling errors.

0.1-1.4 Novice

The student does not demonstrate a sound understanding of the majority of the key skills, concepts or relationships that are the focus of the assignment. There are substantial errors in reasoning or the student has used an inappropriate approach to solving the assignment. There may also be substantial computational errors present in the student's work. The work is poorly organized and contains more than 10 grammar and spelling errors.

0 No Grade

No work is turned in or the assignment is late or the student does not attempt to address at least half of the key skills, concepts or relationships that are the focus of the assignment **or the student's work contains no reasoning or communication of their solution or solution method.**

3. Quizzes

Throughout the semester there may be some announced and some drop quizzes in order to monitor your individual progress on course material. Quizzes will be based on text material and/or material covered in previous class sessions.

4. Research Reflections

At least twice during the semester you will read an example of research on student learning of the mathematical topic you are studying. After the article has been discussed in class, you will be required to write a 2-4 page typed reflection paper that contains the following:

- Your summary of the main conclusions discussed by the authors of the article.
- Your own analysis and discussions of the implications of each conclusion for classroom teaching of the topic that is the focus of the article.

You are not required to do so, but you are encouraged to find a related article on your own and include a discussion of important elements of the related article. Your paper will be graded according to the following criteria:

- Quality and clarity of writing (including spelling and grammar and organization of ideas)
- Clarity of your discussion of the main conclusions in the assigned article
- Depth of your analysis of the implications and relevance of this research for classroom teaching.

5. Schedule

Tentative

Week	Topic(s)
1	Introduction, Course Syllabus Problem Solving (Patterns)
2	Sets
3	Number Sense
4	Number and Place Value
5	Number and Place Value
6	Whole Number Computation
7	Whole Number Computation
8	Relating Fractions, Decimals, and Percents
9	Rational Number Computation
10	Rational Number Computation Integers
11	Integers and Number Theory
12	Number Theory, Patterns and Functions
13	Patterns and Functions
14	Ratio and Proportion
15	Proportional Reasoning
16	Introduction to Geometry and Measurement

5. Course Policies

Attendance

In accordance with AUB policy, the expectation is that you will be present, on time, and prepared for every class meeting. Attendance is expected at all scheduled class meetings. Just as any professional teacher does in school, in the event of an emergency or other special circumstances, please contact the instructor in advance if you will not be present in class for any reason. It is your responsibility to arrange for turning in (on time) any assignments due. You must notify the instructor directly via e-mail or telephone.

Sending a message through another student is not acceptable.

Overall, missing more than two class meetings (the equivalent of one week) will be considered excessive and will result in a lower grade for the course. If you miss more than one week (2 classes) you will forfeit your potential to earn an A in the course. If you miss two full weeks (4 classes) you will forfeit your potential to earn a B in the course. If you miss five classes, you will forfeit your potential to earn a C in the course. If you miss more than five classes you will be in grave danger of failing the course. In accordance with AUB policy guidelines, if you miss more than 1/5 of the class sessions, you may be asked to withdraw from the course. Tardiness may be accumulated as an absence at the discretion of the professor. If there is a special circumstance regarding

your ability to attend classes or to arrive on time, it is your responsibility to inform the professor and make special arrangements as appropriate.

Class Participation

All students are expected to complete in-class assignments and to participate in class discussions and activities in a reflective and professional manner. ***Average performance requirements*** include the following:

- Being prepared for class (including completion of reading and writing assignments in advance, bringing all needed materials to class, etc.)
- Being on time for class
- Listening respectfully to others
- Occasionally contributing to discussions in a professional and thoughtful manner
- Occasionally asking questions of the instructor or fellow students when appropriate

To obtain a higher than average rating for participation, you must surpass these minimal requirements (i.e., participate and raise thoughtful questions on a regular basis).

Late Assignments

It is your responsibility to make sure that the professor receives your assignments on time. Turning in assignments late jeopardizes both the professor's ability to give you feedback in a timely manner, and your ability to benefit from the professor's feedback. Assignments are due during class on the due date. In general, assignments that are not received within 30 minutes after class on the day they are due will receive a grade of "zero." Feedback will be given, but the assignment will not be graded.

In the case of extenuating circumstances, extensions may be granted at the discretion of the professor. It is your responsibility to assess your own schedule and time limitations and anticipate problems well in advance. ***Last minute extensions will rarely be granted***, and only in the most grave circumstances. If you find yourself overwhelmed, the best thing to do is to talk to your professor and try to make arrangements that will enable you to do your best on all assignments. Please be advised that last minute computer/printing problems will not be accepted as extenuating circumstances, so it is best to complete assignments as early as possible in order to avoid computer problems in a time crunch.

Academic Integrity

Cheating will not be tolerated. Final, full stop. **If you decide to cheat or participate in cheating by others, be sure that you are prepared to accept the consequences of your actions.** Depending upon the specific situation, your cheating may result in lower grades on any assignments or exams, a lower final grade in the course, or in certain circumstances, being dropped from the course and/or the from the Faculty of Arts and Sciences.

