

Faculty of Education

Department of Elementary Education

EGE 221: Primary School Mathematics

Fall 2016 Course Syllabus

Instructor: Dr. Sinan OLKUN

Teaching Assist.: Sinem Sözen Özdoğan

Syllabus

Outline

Course Number:	EGE 221
Course Title:	Primary School Mathematics
Number of Credit Hours:	3 Cr/ 6 ECTS
Required or Elective:	Required
Term:	Fall 2016
Meeting Day and Time:	Tuesday 9:00-10:50 (B441)
	Wednesday 14:00-15:50 (B441)
Research assistant:	Sinem Sözen Özdoğan

Professor/Instructor

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Office Hours: Tuesday 14-16	
Wednesday 14-16	

Required texts

- Van de Walle, J. A., Karp, K., & Bay-Williams, J. M. (2013). *Elementary and middle school mathematics: teaching developmentally*. Boston : Allyn & Bacon.
- Olkun, S. & Toluk Uçar, Z. (2012). İlköğretimde etkinlik temelli matematik öğretimi (5th ed.). Ankara: Eğiten Kitap.
- American Psychological Association [APA] (2010). Publication manual of the American Psychological Association (6th ed.). Washington, DC, US: American Psychological Association.

COURSE DESCRIPTION

EGE 221 is a course designed for the sophomore students of primary education in TEDU Faculty of Education. Topics include the structures of the National and International primary school mathematics curricula (e.g. NCTM, Common Core State Standards and National primary Mathematics Curriculum) and learning areas within these standards (content strands). Important skills integrated with the curricula are to be discussed accompanied with the mathematical representations, fundamental primary mathematical concepts and their developments respectively. This course also aims to develop content knowledge in the light of pedagogical content knowledge within the context of number concept, natural numbers, number systems, arithmetical operations, fractions (percent, ratio, and proportion), geometry as shape, development of geometrical thinking, geometry as measurement, and data.

RATIONALE

The primary school mathematics curricula emphasize mathematical knowledge and skills that should help the young people to develop fundamental mathematical competence to be able to function effectively in society. Demands of contemporary life require them to use numbers competently, read and interpret numerical data, reason logically, solve problems and communicate effectively which can be considered as the necessities of the changing societies. To satisfy these needs of the children, primary teachers are to improve themselves in terms of mathematical knowledge and teaching skills. The principles, the order of the topics, structure of the primary mathematics curriculum are the main issues that a teacher candidate needs. Besides common content knowledge, interdisciplinary and intra-disciplinary connections among topics, reasons underlying mathematical conventions should be investigated to have a deep understanding of elementary mathematics. Teacher candidates need to develop their own repertoire of teaching strategies by discussing different instructional theories in mathematics education.

COURSE LEARNING OUTCOMES

At the end of this course, students will be able to

1. Use the knowledge and understanding of mathematical conventions, representations, processes and skills relative to numbers, fractions, geometry as shape, measurement and data.

2. Identify similarities and differences between the Common Core State Standards, National Primary Mathematics Curriculum and NCTM Content Strands.

3. Interpret how learners construct mathematical knowledge, acquire skills, and develop thinking processes.

4. Discuss different instructional theories and approaches for different contents.

5. Recognize fundamental skills for teaching and learning of mathematics.

6. Create own problem solving strategies, extend and apply them.

PLAGIARISM

Plagiarism is a form of dishonesty that occurs when a person passes off someone else's work as his or her own. Inappropriate citations or failing to cite are two common forms of plagiarism. Moreover, cutting and pasting paragraphs from different websites is also plagiarism. Please, appropriately cite your work and avoid plagiarism that is strictly forbidden (See APA, 2010).

Gra	Grading Structure				
MIDTERM					
1	Reflections (3*5%)	15%			
2	PC [(5+5)*5%]	50%			
	FINAL				
1	Final Homework	15%			
2	Participation	10%			
3	Share and Presentation	10%			
10% per week penalty for late work.					

COURSE ASSIGNMENTS, EXPECTATIONS AND GRADING PROCEDURES1

<u>Reading Assignments and Active Participation:</u> Class meets at scheduled times. Students are expected to **actively participate** in the classroom discussions and activities. Active participation requires students **reading chapters** each week before the class meets. Contributions of the teacher candidates for the topics will enrich the learning environment.

- Active participation involves
 - preparing for the topic of each session
 - sharing, discussing and reflecting your own ideas
 - taking notes, collecting and synthesizing them
 - asking questions, questioning your knowledge and the source of knowledge

<u>Reflections</u>: The teacher candidates are required to write **three reflections** by relating their ideas with new learning.

<u>Final Homework:</u> There is only one homework for this semester. Students are expected to submit a **compare & contrast essay** of Singapore Primary Mathematics Program, Turkish National Primary Mathematics Program and Common Core State Standards. The candidates are expected to synthesize their new and prior knowledge by accommodating and assimilating them.

<u>Share</u>: This homework is for the teacher candidates to have a chance to share their work with peers about a topic they choose and a hands-on material that can be used for teaching that topic. They are expected to present their interest by molding what they have learnt throughout the lesson.

<u>Portfolio Chapter (PC)</u>: Students are expected to prepare **5 portfolio chapters** about the next weeks' topic. These portfolio chapters include five main learning domains:

1. Number Concepts and Operations

¹Assignments that are late will automatically receive a ten percent grade reduction (one full grade lower).

- 2. Fractions
- 3. Measurement
- 4. Geometrical Thinking
- 5. Data Analysis

Each portfolio chapter has two phases.

- Before Phase: Teacher candidates are required to read the chapters which belongs to one of the learning domains given above and supposed to write a paper about their first impression related to the topic. The teacher candidates may produce a concept map which connects different terms and concepts related to the mathematics, may write something about an activity that takes place in the course book or internet. While writing, it is strongly recommended to use other online or hard copy sources, technologies or materials in order to improve the quality of knowledge related to the teaching and learning. For the discussion, the candidates are required to prepare two questions related to the topic they would like to discuss.
- After Phase: After the class you are required to develop your first writing by answering those questions, correcting your understandings, or adding some new ideas about mathematics teaching and learning.

While writing, portfolio chapters are expected to be written from different perspectives. Your experiences as a student and your observations about primary teachers during your primary years may have significant contribution on your portfolio chapters. Your selfexpectations and worries as a teacher candidate will form your current mathematics teaching knowledge. Please do not forget giving references according to the APA style (See APA, 2010)

The portfolio chapters will be computer typed with a format of 11 font size, 1,5 line space, Times New Roman font. It is a rule to upload the homework to TEDU Moodle platform in time with the document name yournamesurname_PC#_date.

Date	Торіс	Content	Next Lesson
Week 1-	Welcome to	-What does it mean	- Do some research about National and
Session I	Primary	to teach and learn in	International Standards for school mathematics
(27/09/20	Education	the 21 st century?	
16) Tue.	Program!	-What does this	
	Introduction	course aim to	
		develop?	
		-Why we teach	
		math? Why is it	
		important to teach	

Weekly Schedule

			math?	
			What is math really?	
Week 1- How can we		-International and	- Review the website	
Session II	tea	ach	National Standards	http://www.nctm.org/resources/elementary.
(28/09/20	ma	athematics?	-Manipulatives,	aspx
16) Wed.			Tools	-Read the PDF
			-Assessment	http://www.nctm.org/uploadedFiles/Math_St
				andards/12752_exec_pssm.pdf
				-Prepare a reflection about how you teach
				mathematics according to the what we discussed
				in the classroom
Week 2-		Investigatio	Overview of the	Read the PDF, page 7-59,
Session I		n of the	aims, goals and	http://ttkb.meb.gov.tr/program2.aspx
(4/10/2016)		NCTM	standards,	(Matematik dersi öğretim programı (1,2,3 ve 4.
Tue.		standards	principles and	Sınıflar)
			content strands)	
Week 2-		Investigatio	Overview of the	Investigate the PDF
Session II		n of	aims, goals and	http://www.corestandards.org/Math/
(5/10/2016)		National	standards,	
Wed.		Primary	principles, domain	
		Mathematic	and subdomains	
		S		
		Curriculum		
Week 3-		Investigatio	Overview of the	Read the pdf
Session I		n of CCSS	aims, goals and	https://www.moe.gov.sg/docs/default-
(11/10/2016	5)		standards,	source/document/education/syllabuses/science
Tue.			principles, domain	s/files/mathematics-syllabus-(primary-1-to-
			and subdomains	<u>4).pdf</u>
Week 3-		Investigatio	Overview of the	Read the article and write a reflection
Session II		n of	aims, goals and	Türk Çocuklarının Bilişsel Sayı Temsilinin Çinli,
(12/09/2016	5)	Singapore	standards,	Fransız, Japon, Koreli, İsveçli ve Amerikalı
Wed.		primary	principles, domain	Yaşıtlarıyla Karşılaştırılması. Ankara Üniversitesi
		mathematic	and subdomains	Eğitim Bilimleri Fakültesi Dergisi, 44(1), pp.79-
		s education		90 DOI: 10.1501/Egifak_0000001216
		standards		
Week 4-		Skills for	-Communications	Read Chapter 4
Session I		mathematic	-Representations	

		1	
(18/10/2016)	al	-Connections	
Tue.	understandi	-Reasoning	
	ng		
Week 4-	Skills for	-Mathematical	Read Chapter 8, 11
Session II	mathematic	Problem Solving	Prepare PC1
(19/10/2016)	al		
Wed.	understandi		
	ng		
Week 5-	Introductio	- What is quantity?	
Session I	n to	- Subitizing, early	
(25/10/2016)	Number	number sense and	
Tue.	Concepts	its development	
		- Counting	
		- Number	
		Representation	
		- Relationships	
		between numbers	
Week 5-	Introductio	-The history of	Read Chapter 12, 10, 9
Session II	n to	number systems	
(26/10/2016)	Number	-Ways of expressing	
Wed.	Concepts	values of quantities:	
		Numerals and	
		numbers	
		-Place Value concept	
		-Bases other than	
		ten	
		-Operations in	
		different bases	
		-National Program	
Week 6-	Operations	-Student Invented	
Session I	(Addition,	Strategies	
(1/11/2016)	Subtraction	-Standard Algorithm	
Tue.)	-Modeling	
Week 6-	Operations	-Reasoning	Read Chapter 13,10,9
Session II	(Addition,	Strategies	
(2/11/2016)	Subtraction	-Problem Structures	
Wed.)	-National Program	

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Week 7-	Operations	-Student Invented	
Session I	(Multiplicati	Strategies	
(8/11/2016)	on,	-Standard Algorithm	
Tue.	Division)	-Modeling	
Week 7-	Operations	-Reasoning	Read Chapter 15, 16
Session II	(Multiplicati	Strategies	Prepare PC2
(9/11/2016)	on, Division	-Problem Structures	
Wed.)	-National Program	
Week 8-	Introductio	-Meanings of	
Session I	n to	fractions	
(15/11/2016)	fractions	-Models	
Tue.		-Equivalent	
		fractions	
		-Comparing	
		fractions	
Week 8-	Introductio	-Computing with	Read Chapter 17
Session II	n to	fractions	
(16/11/2016)	fractions	-National Program	
Wed.			
Week 9-	Developing	-Extending place	
Session I	concepts of	value: Base-ten	
(22/11/2016)	decimals	fractions	
Tue	and percent	-Computation with	
		decimals	
Week 9-	Developing	-Percent	Read Chapter 18
Session II	concepts of	-National Program	
(23/11/2016)	decimals		
Wed.	and percent		
Week 10-	Proportiona	-Ratios	
Session I	l Reasoning	-Multiplicative	
(29/11/2016)		reasoning	
Tue.		-Multiplicative	
		comparisons	
		-Proportional	
		reasoning	
Week 10-	Proportiona	-Comparing Ratios	Read Chapter 19
Session II	l Reasoning	-Percent in	Prepare PC3
(30/11/2016)		Comparisons	

Wed.		-National Program	
Week 11-	Measureme	-Length	
Session I	nt	-Area	
(6/12/2016)		-Volume-Capacity	
Tue.			
Week 11-	Measureme	-Weight and mass	Read Chapter 20
Session II	nt	-Angles	Prepare PC4
(7/12/2016)		-Time	
Wed.		-Money	
		-National Program	
Week 12-	Geometric	-Van Hiele	Read the article
Session I	thinking	geometric thinking	Teacher Questioning with an Appropriate
(13/12/2016)	and	levels	Manipulative May
Tue.	geometric	-Shapes and	Make a Big Difference
	concepts	properties	Prepare a reflection
		-Transformations	
Week 12-	Geometric	-Location	Read Chapter 21
Session II	thinking	-Visualization	Prepare PC5
(14/12/2016)	and	-Dynamic Geometry	
Wed.	geometric	Software: Geogebra	
	concepts	-National Program	
Week 13-	Data	-Representation of	
Session I	Analysis	the data	
(20/12/2016)		-Interpretation of	
Tue.		the data	
Week 13-	Data	-Data Collection	Essay on evaluation of three different programs
Session II	representati	-National Program	
(21/12/2016)	ons		
Wed.			
Week 14-	Share		
Session I	Presentatio		
(27/12/2016)	n week		
Tue.			
Week 14-	Summary		
Session II			
(28/12/2016)			
Wed.			