YEDITEPE UNIVERSITY
FACULTY OF EDUCATION

ELEMENTARY MATHEMATICS TEACHING PROGRAM

Course Name	EDEM 102 Development of Mathematical Concepts
Course Type	Elective (Expertise Field Course)
Credit / ECTS	3 / 5
Prerequisites	None
Semester	Spring
Instructor	Assoc. Prof. Hulya Kilic

Learning Outcomes		**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
1	Explains concepts related to numbers, number systems, algebra and trigonometry.	1	1, 3	A, D, E
2	Solves problems and proves theorems about numbers.	1, 2, 3	1, 3, 7	A, E
3	Solves problems and proves theorems related to equations and inequalities.	1, 2, 3	1, 3, 7	A, E
4	Solves problems and proves theorems related to polynomials.	1, 2, 3	1, 3, 7	A, E
5	Solves problems and proves theorems related to trigonometry.	1, 2, 3	1, 3, 7	A, E

Teaching Methods:	1. Lecture 2. Case study 3. Discussion 4. Demonstration 5. Group work 6. Microteaching 7. Problem solving
Assessment Methods:	A. Supply type B. Multiple-choice test C. Incomplete D. True-False E. Oral exam F. Portfolio G. Performance type H. Report

1. Course Description:

The properties and concepts under numbers, algebra and trigonometry domains (natural numbers, operations with natural numbers, decimals, percent, factors and multiples, sets, integers, operations with integers, rational numbers, ratio and proportion, exponents, irrational numbers, algebraic expressions, equality and equations, linear and quadratic equations, algebraic expressions and identities, inequalities, systems of linear equations and inequalities, functions, polynomials, graphs of equations and inequalities, trigonometric ratios and identities); relationship between those concepts; proofs of related theorems.

2. Course Objectives:

The aim of this course is to discuss fundamental concepts and theorems of numbers, algebra and trigonometry covered in mathematics curriculum and the relationships between those concepts.

3. Contribution to Professional Development:

This course enables preservice teachers to remember fundamental concepts taught in schools and to understand mathematical structures and how those concepts are related to each other for teaching.

4. Reading Texts and Books:

- Smith, K. J. (2012). *The nature of mathematics (12th ed.).* United States: Brooks/Cole.
- Sultan, A., & Artzt, A. F. (2018). *The mathematics that every secondary school math teacher needs to know.* New York: Routledge.
- High schools (9-12) mathematics textbooks (in English). Karekök Yayıncılık.
- Other lecture notes will be available on YULEARN

5. Course Requirements:

Your participation in class discussions and activities is essential to improve your mathematical abilities as a prospective teacher. You have to attend at least 80% of the entire classes. If you miss more than 20% of the course you will not able you take final exam and fail the course with grade FA.

Please do not use email to ask questions on material that was covered when you miss a class. If that is the case, ask one of your classmates for the in-class lecture notes. It is your responsibility to keep fully informed about notes and class material discussed during your absence. If you require further assistance please visit me during my office hours.

6. Policies and Procedures:

Special Needs Statement: Students requiring classroom accommodations or modifications because of a disability should discuss this need with the instructor at the beginning of the semester.

Academic misconduct / Ethics: Strongly advised to follow an ethical code and not to get engaged in any form of unethical behavior like cheating in exams, plagiarism and signing up attendance sheet as present while one is absent in class. If you have an excuse to meet a requirement, be honest about it, do your best and consult with the instructor. *Possibility of gaining a couple points without effort is <u>not</u> worth ruining your personal reputation, risking clean academic records and suffering from disciplinary consequences.* Cheating in any form will not be tolerated. Any student who is caught cheating will get an F in the class and will be subjected to the University's disciplinary procedures. You are also expected to conform to the dressing code accepted at our universities and in any other place.

Communication: You can reach me via e-mail or office phone and you can also see me in person during my office hours, or else by appointment.

Integrity and Plagiarism*:* Yeditepe University has subscribed to **<u>Turnitin.com</u>** which allows faculty to compare student papers with extensive databases of billions of documents in order to detect and verify material that has been plagiarized. In this course, **<u>Turnitin.com</u>** is used to deter students from plagiarizing material. Please be aware that student papers will be examined from time to time. Students who plagiarize will be punished

7. Grading Policy:

In order to pass this course, a student must obtain a minimum grade of 50%. Final grades will be based on the following criteria:

Items	**Points**
Quizzes	30
Midterm	30
Final	40
Total	**100**

Scale:

90-100	AA
85-89	BA
80-84	BB
75-79	CB
70-74	CC
60-69	DC
50-59	DD
<49	F

8. Course Contribution to Program Outcomes:

No	Program outcomes	Level of contribution				
		1	2	3	4	5
1	Knows historical, cultural and scientific developments of the mathematical and geometrical concepts covered in elementary school mathematics curriculum.					X
2	Applies fundamental mathematical and geometric concepts into other disciplines and real life situations.					X
3	Applies mathematical processes (e.g. problem solving, proving theorems, etc.) into given cases accurately.					X
4	Plans for teaching mathematics in line with the elementary school mathematics curriculum's vision, philosophy and goals.	X				
5	Uses teaching strategies and techniques that are appropriate for students' age, grade level, individual differences and readiness level.	X				
6	Determines and applies appropriate strategies and materials to foster and evaluate students' mathematical thinking skills.		X			
7	Uses and develops appropriate resources and materials to teach mathematics.		X			
8	Monitors students' learning process, development and achievement and assesses them by using appropriate assessment tools.		X			
9	Improves professional knowledge by following recent issues in mathematics education.	X				
10	Contributes to the development of mathematics education by doing scientific research.	X				

9. Course Work Calendar:

Weeks	Course Topics	Reading/links	Assignment
1	Numbers and Number systems		
2	Real numbers		
3	Real numbers		
4	Equations and Inequalities		
5	Equations and Inequalities		Quiz 1
6	Polynomials		
7	Polynomials		
8	**Midterm**		
9	Systems of linear equations and inequalities		
10	Functions		
11	Functions		
12	Graphs of functions		Quiz 2
13	Trigonometry		
14	Trigonometry		
	FINAL EXAM		

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	***Quantity***	***Duration (Hour)***	***Total Workload (Hour)***
Course hours (including the exam week: 15 x total course)	15	3	45
Hours for off-the-classroom study (pre-study, practice)	15	3	45
Midterm	1	10	10
Quiz	2	5	10
Final	1	10	10
Total Workload			120
Total Workload / 25 (hours)			4.8
ECTS			5

YEDITEPE UNIVERSITY
FACULTY OF EDUCATION

ELEMENTARY MATHEMATICS TEACHING PROGRAM

Course Name	EDEM 205 Contemporary Trends in Teaching Mathematics
Course Type	Compulsory (Expertise Field Course)
Credit / ECTS	3 / 4
Prerequisites	None
Semester	4 (Spring)
Instructor	Assist. Prof. Dr. Oğuzhan Doğan

Learning Outcomes	**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
1) Use Dynamic Geometry Software in mathematics lessons	4, 7	4	G
2) Prepare math related spreadsheets to teach mathematics	7	4	G
3) Design visuals and posters for teaching mathematics	4	4	G
4) Use mobile apps and WWW applications to prepare math related activities	4, 5	4	G

Teaching Methods:	1. Lecture 2. Case study 3. Discussion 4. Demonstration 5. Group work 6. Microteaching 7. Problem solving
Assessment Methods:	A. Supply type B. Multiple-choice test C. Incomplete D. True-False E. Oral exam F. Portfolio G. Performance type H. Report

1. Course Description:

Technologies for mathematics education. Dynamic Geometry Software. Geogebra. Spreadsheets in math education. Mobil apps for math education. Poster and Visuals in mathematics.

2. Course Objectives:

The main objective of this course is to familiarize the student with using technology in teaching mathematics. We will examine a) how to use PowerPoint and Gimp (Photoshop) to prepare math related poster & presentations, b) how to use Excel to prepare math related spreadsheets and c) how to use Dynamic Geometry Software in mathematics lessons d) how to use applets and WWW applications to prepare math related activities. We will examine computer programs and applications specifically developed to learn and teach mathematics.

3. Contribution to Professional Development:

This course enables preservice teachers to learn about technological tools such as dynamic geometry software and spreadsheets that they can use through their teaching career.

4. Reading Texts and Books:

Lecture notes will be provided on YULEARN.

5. Course Requirements:

Your participation in class discussions and activities is essential to improve your mathematical abilities as a prospective teacher. You will be given some handouts involving tasks that you are expected to work during the lesson. You will be given assignments related to the issues covered in the class. You have to attend at least 80% of the entire classes.

6. Policies and Procedures

Special Needs Statement: Students requiring classroom accommodations or modifications because of a disability should discuss this need with the instructor at the beginning of the semester.

Academic misconduct / Ethics: Strongly advised to follow an ethical code and not to get engaged in any form of unethical behavior like cheating in exams, plagiarism and signing up attendance sheet as present while one is absent in class. If you have an excuse to meet a requirement, be honest about it, do your best and consult with the instructor. *Possibility of gaining a couple points without effort is not worth ruining your personal reputation, risking clean academic records and suffering from disciplinary consequences.* Cheating in any form will not be tolerated. Any student who is caught cheating will get an F in the class and will be subjected to the University's disciplinary procedures. You are also expected to conform to the dressing code accepted at our universities and in any other place.

Communication: You can reach me via e-mail or office phone and you can also see me in person during my office hours, or else by appointment.

Integrity and Plagiarism: Yeditepe University has subscribed to **Turnitin.com** which allows faculty to compare student papers with extensive databases of billions of documents in order to detect and verify material that has been plagiarized. In this course, **Turnitin.com** is used to deter students from plagiarizing material. Please be aware that student papers will be examined from time to time. Students who plagiarize will be punished.

7. Duties and Assignments:

Lab Activities & Participation 1. Prepare a sample of Poster 2. Calculate and Grade exam scores using Excel 3. Integrating GeoGebra into a mathematics lesson	10 %
Poster Project/Integrated with Mobil App Preparing a Math-Related Poster	20 %
Excel Project Preparing a Dynamic Spreadsheet	20 %
Dynamic Geometry Software Project Preparing a lesson plan with GeoGebra	20 %
Final Exam Excel & Geogebra Application	30 %

8. Grading Policy

Items	Points
Participation and Weekly HW	10
Assignments	60
Final	30
Total	**100**

Scale:

90-100 AA
85-89 BA
80-84 BB
75-79 CB
70-74 CC
60-69 DC
50-59 DD
<49 FF

9. Course Contribution to Program Outcomes

No	Program outcomes	Level of contribution				
		1	2	3	4	5
1	Knows historical, cultural and scientific developments of the mathematical and geometrical concepts covered in elementary school mathematics curriculum.			X		
2	Applies fundamental mathematical and geometric concepts into other disciplines and real life situations.			X		
3	Applies mathematical processes (e.g. problem solving, proving theorems, etc.) into given cases accurately.				X	
4	Plans for teaching mathematics in line with the elementary school mathematics curriculum's vision, philosophy and goals.					X
5	Uses teaching strategies and techniques that are appropriate for students' age, grade level, individual differences and readiness level.					X
6	Determines and applies appropriate strategies and materials to foster and evaluate students' mathematical thinking skills.				X	
7	Uses and develops appropriate resources and materials to teach mathematics.					X
8	Monitors students' learning process, development and achievement and assesses them by using appropriate assessment tools.	X				
9	Improves professional knowledge by following recent issues in mathematics education.				X	
10	Contributes to the development of mathematics education by doing scientific research.	X				

10. Course Work Calendar

Week 1	Introduction
Week 2	**Dynamic Geometry Software** GeoGebra – Basic Tools
Week 3	**Dynamic Geometry Software** GeoGebra – Advance Tools
Week 4	**Dynamic Geometry Software** GeoGebra - Applications
Week 5	**Dynamic Geometry Software** Preparing a lesson plan with GeoGebra
Week 6	**Excel** Basic Tools, Formulas
Week 7	**Excel** Conditional Formatting
Week 8	**Excel** Preparing an educative spreadsheet
Week 9	**Web Tools** Webquests & Web Applets
Week 10	**Web Tools** Preparing a lesson plan with Web Applets
Week 11	**Mobile Tools** Explain Everything & Similar Mobile Apps
Week 12	**MS Office Tools** Word & PowerPoint & Publisher
Week 13	**Text & Photo & Audio Editing** Preparing a math related poster & ppt slides
Week 14	**Poster** Preparing a math related poster & ppt slides
Week 15	Reflections

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	***Quantity***	***Duration (Hour)***	***Total Workload (Hour)***
Course hours (including the exam week: 15 x total course)	15	3	45
Hours for off-the-classroom study (pre-study, practice)	15	2	30
Assignments	3	5	15
Final	1	10	10
Total Workload			100
Total Workload / 25 (hours)			4
ECTS			4

YEDITEPE UNIVERSITY
FACULTY OF EDUCATION

ELEMENTARY MATHEMATICS TEACHING PROGRAM

Course Name	EDEM 230 Algorithm and Programming
Course Type	Compulsory (Expertise Field Course)
Credit / ECTS	2 / 2
Prerequisites	None
Semester	3 (Fall 2022)
Instructor	İlknur Kuşbeyzi Aybar ikusbeyzi@yeditepe.edu.tr

Learning Outcomes		**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
1	Explains fundamental concepts of algorithm design.	2, 3	1, 7	A, E
2	Analytically approaches the issue of bringing algorithmic solutions to problems in mathematics education.	2, 3, 6	1, 4, 7	A, B
3	Develops appropriate algorithms using pseudo-code and/or flow charts regarding to the contents and objectives in terms of grade levels in recent and earlier elementary mathematics curricula.	2, 6	1, 4, 7	A, B
4	Uses block-based applications to develop instructional mathematical programs	5, 4, 6, 7	1, 4, 7	A, E, F
5	Implements algorithms by using variables, operators, loops and decisions with a programming language for educational purpose.	5, 4, 6, 7	1, 4, 7	A, E, F

Teaching Methods:	1. Lecture 2. Case study 3. Discussion 4. Demonstration 5. Group work 6. Microteaching 7. Problem solving
Assessment Methods:	A. Supply type B. Multiple-choice test C. Incomplete D. True-False E. Oral exam F. Portfolio G. Performance type H. Report

1. **Course Description:**

   Design of an algorithm; flow chart diagrams; concept of input-output; recursions; decision trees, decision making and developing appropriate algorithms for recursions; application of programs by representation of algorithm and flow charts (scratch, code.org, etc.); use of functions for solution algorithms; development of solution algorithms by using one and two dimensional arrays; coding of algorithm in computer algebra systems and such applications.

2. **Course Objectives:**

   The aim of this course is both to discuss and make practice about fundamental concepts of algorithm and programming.

3. **Contribution to Professional Development:**

   This course enables preservice teachers to design and develop educational technology tools and programs for teaching mathematics.

4. Reading Texts and Books:

- Sweigart, A. (2016). *Scratch Programming Playground: Learn to Program by Making Cool Games*, No Starch Press.
- Kong, Q., Siauw, T., Bayen, A.M. (2021). *Python Programming and Numerical Methods. A Guide for Engineers and Scientists*, Elsevier.
- Robotik ve Kodlama Eğitimi, Kodlama Eğitimi Temel Düzey, MEB Öğretmen Yetiştirme ve Geliştirme Genel Müdürlüğü, 2020.
- Python Eğitimi, Herkes İçin Python Programlama Dili, MEB Öğretmen Yetiştirme ve Geliştirme Genel Müdürlüğü, 2020.

5. Course requirements:

Your participation in class discussions and activities is essential to improve your analytical abilities as a prospective teacher. You have to attend at least 80% of the entire classes. You will be assigned a block-based application and a program, and you are expected to design algorithms and implement them in Python to use in teaching mathematics.

6. Policies and Procedures:

Special Needs Statement: Students requiring classroom accommodations or modifications because of a disability should discuss this need with the instructor at the beginning of the semester.

Academic misconduct / Ethics: Strongly advised to follow an ethical code and not to get engaged in any form of unethical behavior like cheating in exams, plagiarism and signing up attendance sheet as present while one is absent in class. If you have an excuse to meet a requirement, be honest about it, do your best and consult with the instructor. *Possibility of gaining a couple points without effort is not worth ruining your personal reputation, risking clean academic records and suffering from disciplinary consequences.* Cheating in any form will not be tolerated. Any student who is caught cheating will get an F in the class and will be subjected to the University's disciplinary procedures. You are also expected to conform to the dressing code accepted at our universities and in any other place.

Communication: You can reach me via e-mail or office phone and you can also see me in person during my office hours, or else by appointment. You can find all course material on our course's Yulearn website. It is your responsibility to keep fully informed about notes and class material discussed during your absence. Should you require further assistance please visit me during my office hours outlined above.

Integrity and Plagiarism: Students who plagiarize will be punished.

7. Grading Policy

In order to pass this course, a student must obtain a minimum grade of 50%. Final grades will be based on the following criteria:

Items	**Points**
Assignments	20
Midterm	40
Final	40
Total	**100**

Scale:

90-100	AA
85-89	BA
80-84	BB
75-79	CB
70-74	CC
60-69	DC
50-59	DD
<49	F

8. Course Contribution to Program Outcomes

No	Program outcomes	Level of contribution				
		1	2	3	4	5
1	Knows historical, cultural and scientific developments of the mathematical and geometrical concepts covered in elementary school mathematics curriculum.	X				
2	Applies fundamental mathematical and geometric concepts into other disciplines and real life situations.					X
3	Applies mathematical processes (e.g. problem solving, proving theorems, etc.) into given cases accurately.			X		
4	Plans for teaching mathematics in line with the elementary school mathematics curriculum's vision, philosophy and goals.	X				
5	Uses teaching strategies and techniques that are appropriate for students' age, grade level, individual differences and readiness level.				X	
6	Determines and applies appropriate strategies and materials to foster and evaluate students' mathematical thinking skills.					X
7	Uses and develops appropriate resources and materials to teach mathematics.					X
8	Monitors students' learning process, development and achievement and assesses them by using appropriate assessment tools.	X				
9	Improves professional knowledge by following recent issues in mathematics education.		X			
10	Contributes to the development of mathematics education by doing scientific research.		X			

9. Course Work Calendar

Weeks	Course Topics	Material	Assignment
1	Introduction to Programming	Lecture1.pdf	
2	Algorithms and Flowcharts	Lecture2.pdf	
3	Unplugged Coding	Lecture3.pdf	
4	Block-based Programming, Scratch Web, Scratch Offline Editor, Creating a New Project in Scratch	Lecture4.pdf	
5	Scratch Interface, Coding Blocks, Variables	Lecture5.pdf	**Assignment 1**
6	Problem Solving with Linear Logical Structures	Lecture6.pdf	
7	Midterm Exam		
8	Problem Solving with Loop Structures	Lecture7.pdf	
9	Problem Solving with Decision Structures	Lecture8.pdf	
10	Python Programming Language	Lecture9.pdf	
11	Variables, Data Types, Operators	Lecture10.pdf	
12	Fundamental Functions in Python	Lecture11.pdf	**Assignment 2**
13	Conditional and Logical Expressions	Lecture12.pdf	
14	Loop Structures (While)	Lecture13.pdf	
15	Loop Structures (For)	Lecture14.pdf	
	Final Exam		

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	***Quantity***	***Duration (Hour)***	***Total Workload (Hour)***
Course hours (including the exam week: 15 x total course)	15	2	30
Hours for off-the-classroom study (pre-study, practice)	15	2	30
Midterm	1	20	20
Assignments	2	10	20
Final	1	20	20
Total Workload			120
Total Workload / 25 (hours)			4.8
ECTS			5

YEDITEPE UNIVERSITY
FACULTY OF EDUCATION

ELEMENTARY MATHEMATICS TEACHING PROGRAM

Course Name	EDEM 240 Geometry for Teachers
Course Type	Compulsory (Expertise Field Course)
Credit / ECTS	3 / 5
Prerequisites	None
Semester	3 (Fall)
Instructor	Assoc. Prof. Hulya Kilic

Learning Outcomes		**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
1	Explains fundamental concepts of Euclidean geometry.	1, 2	1, 3, 7	A, E
2	Solves problems and proves theorems related to triangles.	1, 2, 3	1, 3, 7	A, E
3	Solves problems and proves theorems related to quadrilaterals.	1, 2, 3	1, 3, 7	A, E
4	Solves problems and proves theorems related to circles.	1, 2, 3	1, 3, 7	A, E
5	Solves problems and proves theorems related to geometric solids.	1, 2, 3	1, 3, 7	A, E

Teaching Methods:	1. Lecture 2. Case study 3. Discussion 4. Demonstration 5. Group work 6. Microteaching 7. Problem solving
Assessment Methods:	A. Supply type B. Multiple-choice test C. Incomplete D. True-False E. Oral exam F. Portfolio G. Performance type H. Report

1. Course Description:

The properties and concepts under geometry domain in the mathematics curriculum (fundamental geometric concepts and constructions, triangles and quadrilaterals, triangles, measurement of length, area, and volume, geometric solids, angles, lines and angles, circle, transformations, polygons, congruency and similarity); relationship between those concepts; discussion of mathematical concepts and use of multiple representations; proves of selected theorems.

2. Course Objectives:

The aim of this course is to discuss fundamental concepts and theorems of Euclidean geometry covered in mathematics curriculum and the relationships between those concepts.

3. Contribution to Professional Development:

This course enables preservice teachers to remember fundamental concepts of geometry and solve related problems.

4. Reading Texts and Books:

- Carter, J. A., Cuevas, G. J., Day, R., Malloy, C., & Cummins, J. (2012). *Geometry.* Columbus, OH: McGraw Hill.
- *Challenging geometry questions in Euclidean geometry for high school students*. Karekök Publishing.
- Other lecture notes will be available on YULEARN.

5. Course Requirements:

Your participation in class discussions and activities is essential to improve your mathematical abilities as a prospective teacher. You have to attend at least 80% of the entire classes. If you miss more than 20% of the course you will not able you take final exam and fail the course with grade FA.

Please do not use email to ask questions on material that was covered when you miss a class. If that is the case, ask one of your classmates for the in-class lecture notes. It is your responsibility to keep fully informed about notes and class material discussed during your absence. If you require further assistance please visit me during my office hours.

6. Policies and Procedures:

Special Needs Statement: Students requiring classroom accommodations or modifications because of a disability should discuss this need with the instructor at the beginning of the semester.

Academic misconduct / Ethics: Strongly advised to follow an ethical code and not to get engaged in any form of unethical behavior like cheating in exams, plagiarism and signing up attendance sheet as present while one is absent in class. If you have an excuse to meet a requirement, be honest about it, do your best and consult with the instructor. *Possibility of gaining a couple points without effort is <u>not</u> worth ruining your personal reputation, risking clean academic records and suffering from disciplinary consequences.* Cheating in any form will not be tolerated. Any student who is caught cheating will get an F in the class and will be subjected to the University's disciplinary procedures. You are also expected to conform to the dressing code accepted at our universities and in any other place.

Communication: You can reach me via e-mail or office phone and you can also see me in person during my office hours, or else by appointment.

Integrity and Plagiarism*:* Yeditepe University has subscribed to **<u>Turnitin.com</u>** which allows faculty to compare student papers with extensive databases of billions of documents in order to detect and verify material that has been plagiarized. In this course, **<u>Turnitin.com</u>** is used to deter students from plagiarizing material. Please be aware that student papers will be examined from time to time. Students who plagiarize will be punished

7. Grading Policy:

In order to pass this course, a student must obtain a minimum grade of 50%. Final grades will be based on the following criteria:

Items	**Points**
Quizzes	30
Midterm	30
Final	40
Total	**100**

Scale:

90-100	AA
85-89	BA
80-84	BB
75-79	CB
70-74	CC
60-69	DC
50-59	DD
<49	F

8. Course Contribution to Program Outcomes:

No	Program outcomes	Level of contribution				
		1	2	3	4	5
1	Knows historical, cultural and scientific developments of the mathematical and geometrical concepts covered in elementary school mathematics curriculum.					X
2	Applies fundamental mathematical and geometric concepts into other disciplines and real life situations.					X
3	Applies mathematical processes (e.g. problem solving, proving theorems, etc.) into given cases accurately.					X
4	Plans for teaching mathematics in line with the elementary school mathematics curriculum's vision, philosophy and goals.	X				
5	Uses teaching strategies and techniques that are appropriate for students' age, grade level, individual differences and readiness level.	X				
6	Determines and applies appropriate strategies and materials to foster and evaluate students' mathematical thinking skills.		X			
7	Uses and develops appropriate resources and materials to teach mathematics.		X			
8	Monitors students' learning process, development and achievement and assesses them by using appropriate assessment tools.		X			
9	Improves professional knowledge by following recent issues in mathematics education.	X				
10	Contributes to the development of mathematics education by doing scientific research.	X				

9. Course Work Calendar:

Weeks	Course Topics	Reading/links	Assignment
1	Characteristics of Euclidean geometry		
2	Lines and angles		
3	Fundamental constructions in geometry		
4	Triangles		
5	Triangles		Quiz 1
6	Triangles		
7	Congruency		
8	**Midterm**		
9	Similarity		
10	Quadrilaterals		
11	Quadrilaterals		
12	Circle		Quiz 2
13	Circle		
14	Solids		
	FINAL EXAM		

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	***Quantity***	***Duration (Hour)***	***Total Workload (Hour)***
Course hours (including the exam week: 15 x total course)	15	3	45
Hours for off-the-classroom study (pre-study, practice)	15	3	45
Midterm	1	10	10
Quiz	2	5	10
Final	1	10	10
Total Workload			120
Total Workload / 25 (hours)			4.8
ECTS			5

YEDITEPE UNIVERSITY
FACULTY OF EDUCATION

ELEMENTARY MATHEMATICS TEACHING PROGRAM

Course Name	EDEM 325 Development of Thinking Skills
Course Type	Compulsory (Expertise Field Course)
Credit / ECTS	3 / 7
Prerequisites	None
Semester	5 (Fall)
Instructor	Assist. Prof. Dr. Oğuzhan Doğan

Learning Outcomes	Program Outcomes	Teaching Methods	Assessment Methods
1) Explains her/his ideas about critical thinking	4, 7	1, 3, 7	A
2) Explains the fundamental concepts related to critical thinking skills.	7	1, 3, 7	A, F
3) Explains the critical thinking processes.	4	1, 3, 5, 7	A
4) Uses critical thinking skills to solve problems.	4, 5	1, 3	A, F, G
5) Develops better problem solving and critical thinking skills in the context of mathematics education.	5, 7	3, 5, 6	E, G, F
6) Comprehend fundamental concepts of critical mathematics education	4	1, 3	A

Teaching Methods:	1. Lecture 2. Case study 3. Discussion 4. Demonstration 5. Group work 6. Microteaching 7. Problem solving
Assessment Methods:	A. Supply type B. Multiple-choice test C. Incomplete D. True-False E. Oral exam F. Portfolio G. Performance type H. Report

1. Course Description:

Thinking skills and developing thinking skills. Drawing deductively valid conclusions. Critical thinking skills. Critical Thinking and Turkish Education System. Critical Thinking and Mathematical Modelling. Critical Mathematics Education.

2. Course Objectives:

This course introduces the use of critical thinking skills. The emphasis will be placed on critical reading, writing, reflection, and problem solving, Upon completion, students should be able to demonstrate orally and in writing the use of critical thinking skills while analyzing the given texts and books.

3. Contribution to Professional Development:

This course enables preservice teachers to analyze their students' ability to think critically and to develop different strategies to enhance their students critical thinking.

4. Reading Texts and Books:

Halpern, D. (1997). Critical Thinking Across the Curriculum. A brief edition of thought and knowledge. Lawrence Erlbaum Associates. (Or Halpern, D. (2003). Thought and knowledge: An Introduction to Critical Thinking. Lawrence Erlbaum Associates)

Erbaş, A.K., Çetinkaya, B., Alacacı, C., Çakıroğlu, E. (2016). Günlük Hayattan Modelleme Soruları. Ankara: TÜBA.

Lecture notes will be provided on YULEARN.

5. Course Requirements:

Your participation in class discussions and activities is essential to improve your mathematical abilities as a prospective teacher. You will be given some handouts involving tasks that you are expected to work during the lesson. You will be given assignments related to the issues covered in the class. You have to attend at least 80% of the entire classes.

6. Policies and Procedures

Special Needs Statement: Students requiring classroom accommodations or modifications because of a disability should discuss this need with the instructor at the beginning of the semester.

Academic misconduct / Ethics: Strongly advised to follow an ethical code and not to get engaged in any form of unethical behavior like cheating in exams, plagiarism and signing up attendance sheet as present while one is absent in class. If you have an excuse to meet a requirement, be honest about it, do your best and consult with the instructor. *Possibility of gaining a couple points without effort is not worth ruining your personal reputation, risking clean academic records and suffering from disciplinary consequences.* Cheating in any form will not be tolerated. Any student who is caught cheating will get an F in the class and will be subjected to the University's disciplinary procedures. You are also expected to conform to the dressing code accepted at our universities and in any other place.

Communication: You can reach me via e-mail or office phone and you can also see me in person during my office hours, or else by appointment.

Integrity and Plagiarism: Yeditepe University has subscribed to **Turnitin.com** which allows faculty to compare student papers with extensive databases of billions of documents in order to detect and verify material that has been plagiarized. In this course, **Turnitin.com** is used to deter students from plagiarizing material. Please be aware that student papers will be examined from time to time. Students who plagiarize will be punished.

7. Duties and Assignments:

Reflection Papers: Reflection Paper is a relatively short written assignment (1-2 pages) intended to stimulate you to think and reason independently about key issues related to teaching and learning mathematics that arise from the assigned readings and classroom activities.

Presentations: You are expected to form a 3-persons group and make a 15-minutes presentation at specified weeks. Each Group should choose a subject related with critical thinking, search for articles about their subjects and prepare a 15-minutes presentation.

8. Grading Policy

Items	Points
Participation and Reflection Papers	10
Midterm	25
Presentation	25
Final	40
Total	**100**

Scale:

90-100 AA
85-89 BA
80-84 BB
75-79 CB
70-74 CC
60-69 DC
50-59 DD
<49 FF

9. Course Contribution to Program Outcomes

No	Program outcomes	Level of contribution				
		1	2	3	4	5
1	Knows historical, cultural and scientific developments of the mathematical and geometrical concepts covered in elementary school mathematics curriculum.		X			
2	Applies fundamental mathematical and geometric concepts into other disciplines and real life situations.			X		
3	Applies mathematical processes (e.g. problem solving, proving theorems, etc.) into given cases accurately.				X	
4	Plans for teaching mathematics in line with the elementary school mathematics curriculum's vision, philosophy and goals.					X
5	Uses teaching strategies and techniques that are appropriate for students' age, grade level, individual differences and readiness level.					X
6	Determines and applies appropriate strategies and materials to foster and evaluate students' mathematical thinking skills.			X		
7	Uses and develops appropriate resources and materials to teach mathematics.					X
8	Monitors students' learning process, development and achievement and assesses them by using appropriate assessment tools.		X			
9	Improves professional knowledge by following recent issues in mathematics education.			X		
10	Contributes to the development of mathematics education by doing scientific research.	X				

10. Course Work Calendar

Week 1	Introduction of the course
Week 2	Chapter 1-Thinking: An Introduction Modelling Activity 1: Hırsız Kim?
Week 3	Chapter 3-The relationship between thought and language Radical Constructivism and Social Constructivism
Week 4	Chapter 4-Reasoning: Drawing deductively valid conclusions
Week 5	Chapter 5- Analyzing Arguments
Week 6	Chapter 6- Thinking as Hypothesis Chapter 8- Decision Making
Week 7	Critical Thinking and Turkish Education System (ERG Report)
Week 8	Midterm I
Week 9	From Critical Thinking to Critical Pedagogy
Week 10	Critical Mathematics Education
Week 11	Critical Thinking and Mathematical Modelling
Week 12	Mathematical Modelling for Critical Pedagogy
Week 13	Presentations
Week 14	Presentations
Week 15	Reflections about Courses

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	***Quantity***	***Duration (Hour)***	***Total Workload (Hour)***
Course hours (including the exam week: 15 x total course)	15	3	45
Hours for off-the-classroom study (pre-study, practice)	15	5	75
Assignment	1	15	15
Midterm	1	20	20
Final	1	25	25
Total Workload			180
Total Workload / 25 (hours)			7,2
ECTS			7

YEDITEPE UNIVERSITY
FACULTY OF EDUCATION

ELEMENTARY MATHEMATICS TEACHING PROGRAM

Course Name	EDEM 346 Task-based Mathematics Instruction
Course Type	Compulsory (Expertise Field Course)
Credit / ECTS	3 / 7
Prerequisites	None
Semester	6 (Spring)
Instructor	Assoc. Prof. Hulya Kilic

Learning Outcomes		**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
1	Explains student-centered teaching strategies.	4, 6	1, 3	A, E
2	Describes tasks and elements of task design.	4, 6	1, 3, 4	A, E
3	Develops mathematical tasks to support students' mathematical understanding.	3, 4, 5, 6, 7	3, 5	E, G
4	Implements the tasks in a classroom setting.	5, 6, 7	5, 6	G
5	Evaluates task implementation process and revises the tasks to increase the effectiveness.	8	3	H

Teaching Methods:	1. Lecture 2. Case study 3. Discussion 4. Demonstration 5. Group work 6. Microteaching 7. Problem solving
Assessment Methods:	A. Supply type B. Multiple-choice test C. Incomplete D. True-False E. Oral exam F. Portfolio G. Performance type H. Report

1. **Course Description:**

   In this course, definition of a task and elements of task design will be discussed. The participants will be asked to develop and implement different mathematical tasks for middle school students. They will be also asked to evaluate the effectiveness of the task and make necessary modifications in their tasks.

2. **Course Objectives:**

   The aim of the course is to design mathematical tasks in line of task design approaches. The tasks will be implemented in an elementary school or as microteaching and then evaluated.

3. **Contribution to Professional Development:**

   This course enables preservice teachers to design appropriate mathematical tasks to contribute students' mathematical understanding and thinking.

4. Reading Texts and Books:

- Ministry of National Education (MEB) Mathematics Curricula for Grades 5-8.
- Stein, M. K., Smith, M. S., Henningsen, M. A., & Silver, E. A. (2000). *Implementing standards-based mathematics instruction.* Reston, VA. NCTM.
- Y. Dede, M. F. Doğan, & F. Aslan-Tutak (2020) *Matematik eğitiminde etkinlikler ve uygulamaları.* Ankara: Pegem Akademi
- Other readings will be available on YULEARN.

5. Course Requirements:

Your participation in class discussions and activities is essential to improve your professional knowledge and skills. You have to attend at least 80% of the entire classes. If you miss more than 20% of the course you will not able you take final exam and fail the course with grade FA. You will be assigned reading texts and you are expected to critically think about and discuss in the class.

Please do not use email to ask questions on material that was covered when you miss a class. If that is the case, ask one of your classmates for the in-class lecture notes. It is your responsibility to keep fully informed about notes and class material discussed during your absence. If you require further assistance please visit me during my office hours.

6. Policies and Procedures:

Special Needs Statement: Students requiring classroom accommodations or modifications because of a disability should discuss this need with the instructor at the beginning of the semester.

Academic misconduct / Ethics: Strongly advised to follow an ethical code and not to get engaged in any form of unethical behavior like cheating in exams, plagiarism and signing up attendance sheet as present while one is absent in class. If you have an excuse to meet a requirement, be honest about it, do your best and consult with the instructor. *Possibility of gaining a couple points without effort is <u>not</u> worth ruining your personal reputation, risking clean academic records and suffering from disciplinary consequences.* Cheating in any form will not be tolerated. Any student who is caught cheating will get an F in the class and will be subjected to the University's disciplinary procedures. You are also expected to conform to the dressing code accepted at our universities and in any other place.

Communication: You can reach me via e-mail or office phone and you can also see me in person during my office hours, or else by appointment.

Integrity and Plagiarism*:* Yeditepe University has subscribed to the online company, **Turnitin.com.** **<u>Turnitin.com</u>** allows faculty to compare student papers with extensive databases of billions of documents in order to detect and verify material that has been plagiarized. In this course, **<u>Turnitin.com</u>** is used to deter students from plagiarizing material. Please be aware that student papers will be examined from time to time. Students who plagiarize will be punished

7. Grading Policy:

In order to pass this course, a student must obtain a minimum grade of 50%. Final grades will be based on the following criteria:

Items	**Points**
Assignments	70
Final	30
Total	**100**

Scale:

90-100	AA
85-89	BA
80-84	BB
75-79	CB
70-74	CC
60-69	DC
50-59	DD
<49	F

8. Assignments:

Assignments 1-4 (Each assignment is 15%)

Write a mathematical task that be used in $5^{th}/6^{th}/7^{th}/8^{th}$ grade mathematics course, respectively.

- Your task should be developed around a meaningful real life context.
- You should give a title to your task (e.g. *Secret Numbers*, *Big Sale in Bookstore!!!*, etc.)
- For each task you prepare choose different content area. For instance, if you prepare a task for 5^{th} graders about "Numbers and Operations" prepare a task for 6^{th} graders on "Geometry", etc.
- There should be at least 4 sub-problems/questions related to the main problem.
- Prepare answer key for the questions on the task.
- Duration of your task should be between 20-30 minutes.
- Use the given format as an information sheet of your task.

Format for the tasks and Assessment criteria:

For the ones who will implement the task in the course the task will be evaluated out of 10 points and implementation will be evaluated out of 5 points. For others, it will be evaluated out of 15 points.

1 point	**Teacher's Name:**	Write your name
	Grade:	Write the grade level (5, 6, 7, 8^{th} grade)
	Time:	To achieve your goals you have to manage your time effectively. You may prepare a 20 min. or a 30 min. activity.
	Major subject:	Look at the curriculum to find the major subject of your content.
	Minor subject:	Look at the curriculum to find the minor subject (equations, triangles, etc.)
	Objectives:	Look at the curriculum for the objectives. What are the goals that your students will achieve at the end of the activity? (E.g., 1. Calculate the sum of the interior angles of a triangle)
2 points	**Teaching strategies / techniques:**	State what teaching methods, strategies or techniques you use in your activity. E.g., group work, questioning, guided discovery, discussion.
	Materials:	In addition to worksheet, if you want to show a webpage or use a software then write the link of webpage or the name of software here. Moreover, if you will use any concrete material such as geoboards, fraction tiles, then write such materials here.
	Prior knowledge:	For instance, if you teach solving equations you should ensure that your students know variables, integers and order of operations.
	Cognitive demand	Write about cognitive demand level of each sub-problem you used in your task.
4 points	**Description of the activity (procedures)**	**Give all details about your activity. The flow of actions should be coherent. You have to tell what you will do step by step manner. You can divide this part into three sub-sections.** **PART 1. Introduction (Review / Attention / Motivation)** Explain how you begin your activity. Here are some suggestions: You may begin your activity by reviewing previous material when you want to ensure that your students possess necessary prior knowledge. You may motivate your students by telling about the history of the concept that you will be dealing with or its real life applications or its applications in other disciplines. You may show some pictures or computer applications to attract their attentions. **PART 2. Development** You should describe the flow of activities (what you and your students will do) in detail. **PART 3. Conclusion** Explain how you end your activity. You may give a brief summary. You may highlight the main points.
8 points	**Worksheet**	You should illustrate the worksheet and answer key for your task. There should be at least 4-sub problems related to the main problem.

Assessment criteria:

13-15 points	Develops the task around a meaningful real life context and pays attention to all requirements of the assignment such that sub-problems are given, information sheet is well written, worksheet is well prepared and answer key is illustrated, all answers are accurate.
9-12 points	Develops the task around a meaningful real life context but there are missing parts in the sheet OR real life context is omitted but pays attention to other requirements of the assignment. Answer key is illustrated with accurate answers OR answer key is missing.
4-8 points	Neither task is developed around a meaningful real life context nor pays attention to all requirements written in the assignment. Information sheet OR worksheet is not submitted AND/OR very poor written and answer key is missing.

Implementation and Reflection (5%+5%)

You will implement one of your tasks in a real classroom setting. After implementation of your task you should write an individual reflection paper. In your reflection paper, mention about the following issues:

- Explain whether you were able to follow the flow of your task (introduction, development, conclusion) as you intended. Provide justifications for your explanations.
- Explain whether you have achieved your goal or not. Provide justifications by giving examples.
- What changes you make if you asked to revise your task. Explain clearly.

Final

Final exam consist of various items (short answer, matching, multiple-choice, etc.) that are related to the issues discussed in the class.

9. Course Contribution to Program Outcomes:

No	Program outcomes	Level of contribution				
		1	2	3	4	5
1	Knows historical, cultural and scientific developments of the mathematical and geometrical concepts covered in elementary school mathematics curriculum.				X	
2	Applies fundamental mathematical and geometric concepts into other disciplines and real life situations.				X	
3	Applies mathematical processes (e.g. problem solving, proving theorems, etc.) into given cases accurately.					X
4	Plans for teaching mathematics in line with the elementary school mathematics curriculum's vision, philosophy and goals.					X
5	Uses teaching strategies and techniques that are appropriate for students' age, grade level, individual differences and readiness level.					X
6	Determines and applies appropriate strategies and materials to foster and evaluate students' mathematical thinking skills.					X
7	Uses and develops appropriate resources and materials to teach mathematics.					X
8	Monitors students' learning process, development and achievement and assesses them by using appropriate assessment tools.					X
9	Improves professional knowledge by following recent issues in mathematics education.			X		
10	Contributes to the development of mathematics education by doing scientific research.	X				

10. Course Work Calendar:

Weeks	Course Topics	Reading/links	Assignment
1	Student-centered teaching strategies		
2	What is a task? Task design models		
3	Elements of task design		
4	Cognitive demand of tasks		
5	Sample tasks for the 5th grade mathematics courses		Assignment 1
6	Sample tasks for the 6th grade mathematics courses		
7	Sample tasks for the 7th grade mathematics courses		Assignment 2
8	Sample tasks for the 8th grade mathematics courses		
9	Implementation of self-developed tasks for 5th graders and discussion		Assignment 3
10	Implementation of self-developed tasks for 6th graders at school		
11	Implementation of self-developed tasks for 7th graders at school		Assignment 4
12	Implementation of self-developed tasks for 8th graders at school		
13	Evaluation of in-class implementations		Reflection paper
14	Course evaluation		
	FINAL EXAM		

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	***Quantity***	***Duration (Hour)***	***Total Workload (Hour)***
Course hours (including the exam week: 15 x total course)	15	3	45
Hours for off-the-classroom study (pre-study, practice)	15	2	30
Assignments	5	15	75
Final Exam	1	15	15
Total Workload			165
Total Workload / 25 (hours)			6.6
ECTS			7

YEDITEPE UNIVERSITY
FACULTY OF EDUCATION

ELEMENTARY MATHEMATICS TEACHING PROGRAM

Course Name	EDEM 401 Teaching Practice 1
Course Type	Compulsory (Expertise Field Course)
Credit / ECTS	5 / 10
Prerequisites	None
Semester	7 (Fall)
Instructor	Assoc. Prof. Hulya Kilic

Learning Outcomes		**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
1	Observes the basic steps (planning, application and assessment) of educational process.	4, 5, 6	2, 3	F, H
2	Evaluates and reflects on observations in terms of learning objectives, teaching strategies and materials, students' engagement, assessment tools and learning outcomes	4, 6, 7, 8	2, 3	F, H
3	Develops mathematical tasks and lesson plans to teach mathematics in middle school	1, 4, 5, 6, 7	2, 3, 4	F, H
4	Applies mathematical tasks and lesson plans in math classes	1, 2, 3, 4, 5, 6, 7	6	G, H
5	Develops and implements assessment tasks for math classes	6, 8, 9	2, 3, 6	F, G, H

Teaching Methods:	1. Lecture 2. Case study 3. Discussion 4. Demonstration 5. Group work 6. Microteaching 7. Problem solving
Assessment Methods:	A. Supply type B. Multiple-choice test C. Incomplete D. True-False E. Oral exam F. Portfolio G. Performance type H. Report

1. Course Description:

Observation of teaching methods and strategies used in teaching mathematics; micro-teaching practices with individuals or groups to apply methods and strategies used in teaching mathematics; task and material design for teaching mathematics; organization of learning environment, classroom management, measurement, assessment and reflection.

2. Course Objectives:

The aim of this course is to enable students to observe mathematics lessons taught in middle schools and reflect on these observations in terms of teaching strategies, students' engagement, classroom management and assessment of students' understanding. They are asked to make plans for teaching in different grade levels, implement their plans in the classes and reflect on their own teaching.

3. Contribution to Professional Development:

This course enables preservice teachers to make practice in a school environment where they will articulate what they have learned so far in their pedagogy and methods courses.

4. Reading Texts and Books:

- Mathematics Curriculum for Grades 1-8 (2018). Ministry of National Education.
- Mathematics textbooks for Grades 5-8 (2018). Ministry of National Education.
- Lecture notes will be available on YULEARN.

5. Course Requirements:

Your participation in class discussions and activities is essential to improve your professional knowledge and skills. You have to attend at least 80% of the entire classes. If you miss more than 20% of the course you will fail the course with grade FA.

Please do not use email to ask questions on material that was covered when you miss a class. If that is the case, ask one of your classmates for the in-class lecture notes. It is your responsibility to keep fully informed about notes and class material discussed during your absence. If you require further assistance please visit me during my office hours.

In addition, you should pay attention to followings in this course:

- Each week you should observe at least 6 lessons.
- The minimum number of observations should be 72 hours. Otherwise, you will fail.
- You should submit **10 observation reports**. If the lesson you observe lasts 40 min. + 40 min. then you should write one report for that lesson combining all the things done in 80 minutes and it will be counted as one report.
- You will write your observation report in the format given below.
- Submit observation reports weekly.
- After each observation ask the teacher sign your attendance sheet.
- Pay attention to *the field experience requirements* given below:

✓ Follow the program that is done for you by the department head or your mentor teacher.
✓ Follow your mentor teacher's instructions and assignments.
✓ Arrive at the school at least 10 minutes before the lesson starts.
✓ Your communication with students and teachers should be kind and respectful.
✓ Your outfit should be clean and neat.

6. Policies and Procedures:

Special Needs Statement: Students requiring classroom accommodations or modifications because of a disability should discuss this need with the instructor at the beginning of the semester.

Academic misconduct / Ethics: Strongly advised to follow an ethical code and not to get engaged in any form of unethical behavior like cheating in exams, plagiarism and signing up attendance sheet as present while one is absent in class. If you have an excuse to meet a requirement, be honest about it, do your best and consult with the instructor. *Possibility of gaining a couple points without effort is <u>not</u> worth ruining your personal reputation, risking clean academic records and*

suffering from disciplinary consequences. Cheating in any form will not be tolerated. Any student who is caught cheating will get an F in the class and will be subjected to the University's disciplinary procedures. You are also expected to conform to the dressing code accepted at our universities and in any other place.

Communication: You can reach me via e-mail or office phone and you can also see me in person during my office hours, or else by appointment.

Integrity and Plagiarism*:* Yeditepe University has subscribed to the online company, **Turnitin.com.** **Turnitin.com** allows faculty to compare student papers with extensive databases of billions of documents in order to detect and verify material that has been plagiarized. In this course, **Turnitin.com** is used to deter students from plagiarizing material. Please be aware that student papers will be examined from time to time. Students who plagiarize will be punished

7. Grading Policy:

In order to pass this course, a student must complete 72 hours of field experience and obtain a minimum grade of 50%. Final grades will be based on the following criteria:

Items	**Points**
Observations	40
Lesson plans	30
Implementations	10
Reflections	10
Sample exam	10
Total	**100**

Scale:	
90-100	AA
85-89	BA
80-84	BB
75-79	CB
70-74	CC
60-69	DC
50-59	DD
<49	F

8. Assignments:

Observation reports (40%)

You will submit 10 comprehensive reports for the lessons you have observed throughout the semester. Format of the observation report is given on YULEARN. Your observation report should include but not limited to the followings:

- How was the flow of the lesson? (introduction / instruction / closing)
- Which teaching strategies were used? How did the teacher's choice of teaching strategy influence students' motivation and learning?
- Evaluate teachers' classroom management skills in terms of the way of communicating with students, handling misbehaviors, etc.
- Did the teacher change his/her practice time to time for slow learners or high achievers?
- Did you observe any instance that the students had difficulty to understand or misconception? What did the teacher do, then?
- Give some sample problems solved in the class.

Assessment criteria:

Each report will be evaluated out of 4 points.

4: Addresses all issues indicated in assignment

2-3: Addresses all issues indicated in assignment but does not explain them clearly

1: Only writes about teachers' actions as a the list

Lesson plans & Implementation & Reflection (15%+5%+5%)

You will prepare 2 lesson plans and implement them in your practicum school. Then you will write a reflection about each of your implementation.

Assessment criteria for lesson plan:

Lesson plan format is given on YULEARN.

	Criteria	**Points**
Part I	Includes all sub-parts and explanations are valid	2
	Includes all sub-parts but explanations are partially correct or Do not include all sub-parts but explanations are valid	1
	Do not include all sub-parts and explanations are partially correct	0
Part II	Includes all sub-parts, explanations are thorough, explicit, and valid	8-10
	Includes all sub-parts, explanations are valid but not thorough or explicit or Do not include all sub-parts but explanations are thorough, explicit, and valid	5-7
	Do or not include all sub-parts, explanations are thorough but partially correct	2-4
	Do or not include all sub-parts, explanations are partially correct and not thorough	0-1
Part III	Address to the criteria given, questions and answers are explicit and valid	3
	Partially address to the criteria given, the answers of the questions are not given or not complete	2-1
	Do not address to the criteria given	0
	Total	**15**

Assessment criteria for implementation:

Checklist for the implementation is given on YULEARN.

5: Satisfies almost all criteria successfully
4: Satisfies most of the criteria successfully
3: Satisfies most of the criteria at moderate level
1-2: Needs improvement in most of the criteria

Assessment criteria for reflection:

Format of reflection is given on YULEARN.

4-5: Pays attention to the requirements for reflection report by providing enough detail
3: Fails to address to some of the issues in reflection report clearly
1-2: Fails to address to most of the issues in reflection report

Sample exam (10%)

Prepare a quiz to assess learning objectives have been taught so far in one of the classes you are observing. Implement the quiz and evaluate the results.

- Determine the grade level and the learning objectives that you will assess
- Write at least three types of items (multiple choice, short-answer, matching, true-false, etc.).
- The number of the questions in the quiz may range between 6 through 10.
- Illustrate the answers of each item of the quiz.
- Illustrate the rubric for scoring each item of the quiz.
- Make statistical analysis (mean, max., min., standard deviation, etc.) of scores.

Assessment criteria:

8-10 points	Address to each issues identified above such that it a well-design quiz, answer key is accurate, rubric is clear and statistical analysis of scores are done.
5-7 points	Address to issues identified above however either answer key or rubric is not explicit and/or a few item is inappropriately constructed or marked or statistical analysis is missing.
3-4 points	Address some of the issues identified above such that answer key and rubric are not explicit or inappropriate or some of the items are inappropriately constructed or marked and statistical analysis is missing or incorrect.
1-2 points	Either answer key or rubric is missing; does not pay attention to number of items and their types; most of the items are inappropriately constructed or marked; statistical analysis is missing

9. Course Contribution to Program Outcomes:

No	Program outcomes	Level of contribution				
		1	2	3	4	5
1	Knows historical, cultural and scientific developments of the mathematical and geometrical concepts covered in elementary school mathematics curriculum.					X
2	Applies fundamental mathematical and geometric concepts into other disciplines and real life situations.					X
3	Applies mathematical processes (e.g. problem solving, proving theorems, etc.) into given cases accurately.					X
4	Plans for teaching mathematics in line with the elementary school mathematics curriculum's vision, philosophy and goals.					X
5	Uses teaching strategies and techniques that are appropriate for students' age, grade level, individual differences and readiness level.					X
6	Determines and applies appropriate strategies and materials to foster and evaluate students' mathematical thinking skills.					X
7	Uses and develops appropriate resources and materials to teach mathematics.					X
8	Monitors students' learning process, development and achievement and assesses them by using appropriate assessment tools.					X
9	Improves professional knowledge by following recent issues in mathematics education.					X
10	Contributes to the development of mathematics education by doing scientific research.				X	

10. Course Work Calendar:

Weeks	Course Topics	Assignment
1	Observation as a learning tool	
2	Teaching methods and strategies	
3	Teaching tools and materials	Observation report 1
4	Classroom management and communication	Observation report 2
5	Preparing tasks and lesson plans	Observation report 3
6	Preparing tasks and lesson plans	Observation report 4
7	Teaching Experience I Evaluation of the first teaching experience	Observation report 5
8	Teaching Experience I Evaluation of the first teaching experience	Lesson plan 1 & reflection report 1
9	Assessment and evaluation	Observation report 6
10	Preparing and applying an exam	Observation report 7
11	Meeting with an experienced teacher	Observation report 8
12	Teaching Experience II Evaluation of the second teaching experience	Sample exam & Evaluation
13	Teaching Experience II Evaluation of the second teaching experience	Observation report 9
14	Course Evaluation Reflections	Lesson plan 2 & reflection report 2 Observation report 10

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	***Quantity***	***Duration (Hour)***	***Total Workload (Hour)***
Course hours (including the exam week: 15 x total course)	15	2	30
Hours for off-the-classroom study (pre-study, practice)	15	12	180
Assignment	5	8	40
Total Workload			250
Total Workload / 25 (hours)			10
ECTS			10

YEDITEPE UNIVERSITY
FACULTY OF EDUCATION

ELEMENTARY MATHEMATICS TEACHING PROGRAM

Course Name	EDEM 402 Teaching Practice 2
Course Type	Compulsory (Expertise Field Course)
Credit / ECTS	5 / 10
Prerequisites	None
Semester	8 (Spring)
Instructor	Assoc. Prof. Hulya Kilic

Learning Outcomes		**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
1	Observes the basic steps (planning, application and assessment) of educational process.	4, 5, 6	2, 3	F, H
2	Evaluates and reflects on observations in terms of learning objectives, teaching strategies and materials, students' engagement, assessment tools and learning outcomes	4, 6, 7, 8	2, 3	F, H
3	Develops mathematical tasks and lesson plans to teach mathematics in middle school	1, 4, 5, 6, 7	2, 3, 4	F, H
4	Applies mathematical tasks and lesson plans in math classes	1, 2, 3, 4, 5, 6, 7	6	G, H
5	Develops a unit plan for teaching math in middle schools	4, 5, 7, 9	2, 3, 6	F, G, H

Teaching Methods:	1. Lecture 2. Case study 3. Discussion 4. Demonstration 5. Group work 6. Microteaching 7. Problem solving
Assessment Methods:	A. Supply type B. Multiple-choice test C. Incomplete D. True-False E. Oral exam F. Portfolio G. Performance type H. Report

1. Course Description:

Observation of teaching methods and strategies used in teaching mathematics; micro-teaching practices with individuals or groups to apply methods and strategies used in teaching mathematics; task and material design for teaching mathematics; planning a teaching unit, organization of learning environment, classroom management, measurement, assessment and reflection.

2. Course Objectives:

The aim of this course is to enable students to observe mathematics lessons taught in middle schools and reflect on these observations in terms of teaching strategies, students' engagement, classroom management and assessment of students' understanding. They are asked to make plans for teaching in different grade levels, implement their plans in the classes and reflect on their own

teaching.

3. **Contribution to Professional Development:**

   This course enables preservice teachers to make practice in a school environment where they will articulate what they have learned so far in their pedagogy and methods courses.

4. **Reading Texts and Books:**

   - Mathematics Curriculum for Grades 1-8 (2018). Ministry of National Education.
   - Mathematics textbooks for Grades 5-8 (2018). Ministry of National Education.
   - Lecture notes will be available on YULEARN.

5. **Course Requirements:**

   Your participation in class discussions and activities is essential to improve your professional knowledge and skills. You have to attend at least 80% of the entire classes. If you miss more than 20% of the course you will fail the course with grade FA.

   Please do not use email to ask questions on material that was covered when you miss a class. If that is the case, ask one of your classmates for the in-class lecture notes. It is your responsibility to keep fully informed about notes and class material discussed during your absence. If you require further assistance please visit me during my office hours.

   In addition, you should pay attention to followings in this course:

   - Each week you should observe at least 6 lessons.
   - The minimum number of observations should be 72 hours. Otherwise, you will fail.
   - You should submit **5 observation reports**. If the lesson you observe lasts 40 min. + 40 min. then you should write one report for that lesson combining all the things done in 80 minutes and it will be counted as one report.
   - You will write your observation report in the format given below.
   - Submit observation reports weekly.
   - After each observation ask the teacher sign your attendance sheet.
   - Pay attention to *the field experience requirements* given below:

   ✓ Follow the program that is done for you by the department head or your mentor teacher.
   ✓ Follow your mentor teacher's instructions and assignments.
   ✓ Arrive at the school at least 10 minutes before the lesson starts.
   ✓ Your communication with students and teachers should be kind and respectful.
   ✓ Your outfit should be clean and neat.

6. **Policies and Procedures:**

   Special Needs Statement: Students requiring classroom accommodations or modifications because of a disability should discuss this need with the instructor at the beginning of the semester.

   Academic misconduct / Ethics: Strongly advised to follow an ethical code and not to get engaged in any form of unethical behavior like cheating in exams, plagiarism and signing up attendance sheet as present while one is absent in class. If you have an excuse to meet a requirement, be honest about it, do your best and consult with the instructor. *Possibility of gaining a couple points without effort is <u>not</u> worth ruining your personal reputation, risking clean academic records and suffering from disciplinary consequences.* Cheating in any form will not be tolerated. Any student who is caught cheating will get an F in the class and will be subjected to the University's disciplinary procedures. You are also expected to conform to the dressing code accepted at our universities and in any other place.

Communication: You can reach me via e-mail or office phone and you can also see me in person during my office hours, or else by appointment.

Integrity and Plagiarism*:* Yeditepe University has subscribed to the online company, **Turnitin.com.** **Turnitin.com** allows faculty to compare student papers with extensive databases of billions of documents in order to detect and verify material that has been plagiarized. In this course, **Turnitin.com** is used to deter students from plagiarizing material. Please be aware that student papers will be examined from time to time. Students who plagiarize will be punished

7. Grading Policy:

In order to pass this course, a student must complete 72 hours of field experience and obtain a minimum grade of 50%. Final grades will be based on the following criteria:

Items	**Points**
Observation Reports	15
Assignments	35
Lesson plans	30
Implementations	10
Reflections	10
Total	**100**

Scale:	
90-100	AA
85-89	BA
80-84	BB
75-79	CB
70-74	CC
60-69	DC
50-59	DD
<49	F

8. Assignments:

Observation reports (15%)

You will submit 5 comprehensive reports for the lessons you have observed throughout the semester. Format of the observation report is given on YULEARN. Your observation report should include but not limited to the followings:

- How was the flow of the lesson? (introduction / instruction / closing)
- Which teaching strategies were used? How did the teacher's choice of teaching strategy influence students' motivation and learning?
- Evaluate teachers' classroom management skills in terms of the way of communicating with students, handling misbehaviors, etc.
- Did the teacher change his/her practice time to time for slow learners or high achievers?
- Did you observe any instance that the students had difficulty to understand or misconception? What did the teacher do, then?
- Give some sample problems solved in the class.

Assessment criteria:

Each report will be evaluated out of 3 points.

3: Addresses all issues indicated in assignment

2: Addresses all issues indicated in assignment but does not explain them clearly

1: Only writes about teachers' actions as a the list

Assignment 1 (10%)

You will be assigned a topic under each domain (*Numbers*, *Algebra, Geometry* and *Data Processing*) in the curriculum. The list of the topics will be given on YULEARN. For each topic:

- Write **5** different type of problems.
- Solve the problems accurately and clearly.

Assessment criteria:

For each problem:
1 point: Clearly written and different type of problem
1.5 point: Accurate and appropriate solution of the problem

Assignment 2 (10%)

Prepare a powerpoint presentation that you can use to make an introduction to a topic that you will teach. Pay attention to followings:

- Topic should be different from the topic that you have already taught or will teach.
- Write the topic and the objective clearly.
- It should be an original piece of work.
- You should use **animation tool** and if necessary other tools, appropriately.
- You may embed excel or word or geogebra or a short video into presentation.
- Use texts, mathematical symbols, pictures, etc. appropriately and cautiously.
- The number of slides may vary between **6** and **10** (except title slide).

Assessment criteria:

8-10 points	Address to each issues identified above such that it is a well-design presentation, tools are used appropriately, and explanations are accurate.
5-7 points	Address to issues identified above however either explanations not explicit and/or a tools or symbols, pictures etc. used inappropriately.
3-4 points	Address some of the issues identified above such that explanations are not explicit or incorrect or some of the tools are not used appropriately and some of the parts are not original or number of slides does not fit with the requirement.
1-2 points	Does not pay attention to most of the issue identified above and it is not an original work

Assignment 3 (15%)

Determine one of the topics in middle school math curriculum that is different from your other assignments and lesson plans. Prepare a unit plan to teach that topic. Use the format given on YULEARN. Pay attention to followings:

- Write all objectives of the unit.
- List all terms and symbols related to that unit and give the definitions of the terms.
- Illustrate sample tasks to address given objectives.
- Illustrate sample assessment items for given objectives.

Assessment criteria:

13-15 points	Addresses to the given requirements. All terms and symbols are written, definitions are accurate, sample tasks are appropriate and assessment items are illustrated and appropriate.
10-12 points	Attempts to address the requirements however, there exists a few missing or inappropriate parts in terms, definitions, sample tasks or assessment items.
6-9 points	Attempts to address the requirements however, there exists some missing or inappropriate parts in terms, definitions, sample tasks and/or assessment items.
1-5 points	Fails to address most of the given requirements.

Lesson plans & Implementation & Reflection (15%+5%+5%)

You will prepare 2 lesson plans and implement them in your practicum school. Then you will write a reflection about each of your implementation.

Assessment criteria for lesson plan:

Lesson plan format is given on YULEARN.

	Criteria	**Points**
Part I	Includes all sub-parts and explanations are valid	2
	Includes all sub-parts but explanations are partially correct or Do not include all sub-parts but explanations are valid	1
	Do not include all sub-parts and explanations are partially correct	0
Part II	Includes all sub-parts, explanations are thorough, explicit, and valid	8-10
	Includes all sub-parts, explanations are valid but not thorough or explicit or Do not include all sub-parts but explanations are thorough, explicit, and valid	5-7
	Do or not include all sub-parts, explanations are thorough but partially correct	2-4
	Do or not include all sub-parts, explanations are partially correct and not thorough	0-1
Part III	Address to the criteria given, questions and answers are explicit and valid	3
	Partially address to the criteria given, the answers of the questions are not given or not complete	2-1
	Do not address to the criteria given	0
	Total	**15**

Assessment criteria for implementation:

Checklist for the implementation is given on YULEARN.

5: Satisfies almost all criteria successfully
4: Satisfies most of the criteria successfully
3: Satisfies most of the criteria at moderate level
1-2: Needs improvement in most of the criteria

Assessment criteria for reflection:

Format of reflection is given on YULEARN.

4-5: Pays attention to the requirements for reflection report by providing enough detail
3: Fails to address to some of the issues in reflection report clearly
1-2: Fails to address to most of the issues in reflection report

9. Course Contribution to Program Outcomes:

No	Program outcomes	Level of contribution				
		1	2	3	4	5
1	Knows historical, cultural and scientific developments of the mathematical and geometrical concepts covered in elementary school mathematics curriculum.					X
2	Applies fundamental mathematical and geometric concepts into other disciplines and real life situations.					X
3	Applies mathematical processes (e.g. problem solving, proving theorems, etc.) into given cases accurately.					X
4	Plans for teaching mathematics in line with the elementary school mathematics curriculum's vision, philosophy and goals.					X
5	Uses teaching strategies and techniques that are appropriate for students' age, grade level, individual differences and readiness level.					X
6	Determines and applies appropriate strategies and materials to foster and evaluate students' mathematical thinking skills.					X
7	Uses and develops appropriate resources and materials to teach mathematics.					X
8	Monitors students' learning process, development and achievement and assesses them by using appropriate assessment tools.					X
9	Improves professional knowledge by following recent issues in mathematics education.					X
10	Contributes to the development of mathematics education by doing scientific research.				X	

10. Course Work Calendar:

Weeks	Course Topics	Assignment
1	Teaching methods and strategies	
2	Teaching tools and materials	
3	Teaching tools and materials	Assignment 1
4	Classroom management and communication	Observation Report 1
5	Preparing tasks and lesson plans	Observation Report 2
6	Preparing tasks and lesson plans	Assignment 2
7	Teaching Experience I Evaluation of the first teaching experience	Observation Report 3
8	Teaching Experience I Evaluation of the first teaching experience	Lesson Plan 1 Reflection 1
9	Preparing unit plans	Observation Report 4
10	Assessment and evaluation	Observation Report 5
11	Meeting with an experienced teacher	
12	Teaching Experience II Evaluation of the second teaching experience	Assignment 3
13	Teaching Experience II Evaluation of the second teaching experience	Lesson Plan 2 Reflection 2
14	Course Evaluation Reflections	

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	***Quantity***	***Duration (Hour)***	***Total Workload (Hour)***
Course hours (including the exam week: 15 x total course)	15	2	30
Hours for off-the-classroom study (pre-study, practice)	15	10	150
Assignment	7	9	63
Total Workload			243
Total Workload / 25 (hours)			9.7
ECTS			10

YEDITEPE UNIVERSITY
FACULTY OF EDUCATION

ELEMENTARY MATHEMATICS TEACHING PROGRAM

Course Name	EDEM 427 – Teaching Methods in Elementary mathematics I
Course Type	Compulsory (Expertise Field Course)
Credit / ECTS	3 / 6
Prerequisites	None
Semester	7 (Fall)
Instructor	Asst. Prof. Oğuzhan Doğan

Learning Outcomes	**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
1) Explains learning theories.	5, 6	1, 3	A
2) Gives examples about how to implement learning theories in math classes.	3, 5	1, 3	A
3) Explains teaching methods, strategies and techniques.	5, 6	1, 3	A
4) Gives examples about how to implement teaching methods, strategies and techniques in math classes.	5, 6	1, 3	A
5) Develops learning tasks or activities that are aligned with elementary math curriculum.	3, 7	3, 5, 6	E, G
6) Implements self-developed activities in the class (microteaching).	6, 7	6	G

Teaching Methods:	1. Lecture 2. Case study 3. Discussion 4. Demonstration 5. Group work 6. Microteaching 7. Problem solving
Assessment Methods:	A. Supply type B. Multiple-choice test C. Incomplete D. True-False E. Oral exam F. Portfolio G. Performance type H. Report

1. **Course Description:**

   The content of the course will be composed of overview of teaching and learning methods and strategies, planning learning tasks, and implication of teaching strategies and methods in the class.

2. **Course Objectives:**

   The aim of the course is to learn about and practice with teaching strategies and methods that are used to teach elementary mathematics.

3. Contribution to Professional Development:

This course enables preservice teachers to learn about a variety of teaching methods that can be implemented in an elementary mathematics classroom and make practice about how to implement these methods in a real classroom setting.

4. Reading Texts and Books:

Burns, M. (2007). About teaching mathematics: A K-8 resource. Sausalito, CA: Math Solutions Publications.

Van de Walle, J.A., Karp, K.S., & Bay Williams, J.M. (2013). Elementary and middle school mathematics: Teaching developmentally. 8th Edition. Boston: Pearson.

Ministry of Education (MEB) Mathematics and Geometry Curricula For Grades 5-8.

National Council of Teachers of Mathematics (NCTM). (2000). Principles and Standards for School Mathematics

Supplementary Books

Baki, A. (2014). Kuramdan Uygulamaya Matematik Eğitimi. Harf Yayınları

Olkun, S. & Uçar, Z. T. (2014). İlköğretimde Etkinlik Temelli Matematik Öğretimi. Ankara: Eğiten Kitap.

Özmantar, M. F., & Bingölbalı, E. (2009). Etkinlik tasarımı ve temel tasarım prensipleri. E. Bingölbalı, & M. F. Özmantar (Eds.). İlköğretimde karşılaşılan matematiksel zorluklar ve çözüm önerileri. Ankara: Pegem Akademi.

Stein, M. K., Smith, M. S., Henningsen, M. A., & Silver, E. A. (2000). Implementing standards-based mathematics instruction. Reston, VA: NCTM.

5. Course Requirements:

Your participation in class discussions and activities is essential to improve your mathematical abilities as a prospective teacher. You have to attend at least 80% of the entire classes. You will be assigned reading texts and you are expected to critically think about and discuss in the class.

6. Policies and Procedures

Special Needs Statement: Students requiring classroom accommodations or modifications because of a disability should discuss this need with the instructor at the beginning of the semester.

Academic misconduct / Ethics: Strongly advised to follow an ethical code and not to get engaged in any form of unethical behavior like cheating in exams, plagiarism and signing up attendance sheet as present while one is absent in class. If you have an excuse to meet a requirement, be honest about it, do your best and consult with the instructor. *Possibility of gaining a couple points without effort is not worth ruining your personal reputation, risking clean academic records and suffering from disciplinary consequences.* Cheating in any form will not be tolerated. Any student who is caught cheating will get an F in the class and will be subjected to the University's disciplinary procedures. You are also expected to conform to the dressing code accepted at our universities and in any other place.

Communication: You can reach me via e-mail or office phone and you can also see me in person during my office hours, or else by appointment.

Integrity and Plagiarism: Yeditepe University has subscribed to **Turnitin.com** which allows faculty to compare student papers with extensive databases of billions of documents in order to detect and verify material that has been plagiarized. In this course, **Turnitin.com** is used to deter students from plagiarizing material. Please be aware that student papers will be examined from time to time. Students who plagiarize will be punished.

Note: Do not use email to ask questions on material that was covered when you miss a class. If that is the case, ask one of your classmates for the lecture notes. It is your responsibility to keep fully informed about notes and class material discussed during your absence. Should you require further assistance please visit me during my office hours outlined above.

7. Assignments

Lesson Plans

Prepare 4 lesson plans for specific teaching methods to teach one of the elementary mathematics topics covered in mathematics curriculum.

Student Presentations

You are expected to make a 30-minutes presentation at specified weeks. Each presentation you should choose an elementary mathematics subject, prepare a comprehensive lesson plan and make a 30-minutes presentation.

Final

Final exam consists of open-ended questions that are related to the issues discussed in the class.

8. Grading Policy:

In order to pass this course, a student must obtain a minimum grade of 50%. Final grades will be based on the following criteria

Items	**Points**
Lesson Plans	40
Micro Teaching	20
Final	40
Total	**100**

Scale:

90-100	AA
85-89	BA
80-84	BB
75-79	CB
70-74	CC
60-69	DC
50-59	DD
<49	F

9. Course Contribution to Program Outcomes

No	Program outcomes	Level of contribution

		1	2	3	4	5
1	Knows historical, cultural and scientific developments of the mathematical and geometrical concepts covered in elementary school mathematics curriculum.				**X**	
2	Applies fundamental mathematical and geometric concepts into other disciplines and real life situations.					**X**
3	Applies mathematical processes (e.g. problem solving, proving theorems, etc.) into given cases accurately.					**X**
4	Plans for teaching mathematics in line with the elementary school mathematics curriculum's vision, philosophy and goals.					**X**
5	Uses teaching strategies and techniques that are appropriate for students' age, grade level, individual differences and readiness level.					**X**
6	Determines and applies appropriate strategies and materials to foster and evaluate students' mathematical thinking skills.					**X**
7	Uses and develops appropriate resources and materials to teach mathematics.					**X**
8	Monitors students' learning process, development and achievement and assesses them by using appropriate assessment tools.				**X**	
9	Improves professional knowledge by following recent issues in mathematics education.			**X**		
10	Contributes to the development of mathematics education by doing scientific research.	**X**				

10. Course Work Calendar

Week 1	Introduction
Week 2	Curriculur Materials MoNE Elementary Mathematics Curriculum NCTM Standarts
Week 3	Learning Theories (Behaviorism, Cognitive Theories) Learning Theories (Constructivism)
Week 4	Teaching Methods (Exposition) Teaching Methods (Guided discovery, Investigation)
Week 5	Design of Instructional Tasks Planning Assignment 1. Lesson Plan
Week 6	Teaching Strategies (Problem solving, Group work, etc.)
Week 7	Teaching Strategies (Teaching station, Demonstration, etc.) Assignment 2. Lesson Plan
Week 8	Design of Instructional Tasks Implementing
Week 9	Using technology in teaching mathematics Assignment 3. Lesson Plan
Week 10	Critical Evaluation of Lesson Plans
Week 11	Students' Difficulties and Misconceptions Assignment 4. Lesson Plan
Week 12	Design of Instructional Tasks Assessment
Week 13	Assignment 5. Microteachings
Week 14	Assignment 5. Microteachings
Week 15	Evaluation of the Course

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	***Quantity***	***Duration (Hour)***	***Total Workload (Hour)***

Course hours (including the exam week: 15 x total course)	15	4	60
Hours for off-the-classroom study (pre-study, practice)	15	3	45
Assignments	5	5	25
Final	1	20	20
Total Workload			150
Total Workload / 25 (hours)			6
ECTS			6

YEDITEPE UNIVERSITY
FACULTY OF EDUCATION

ELEMENTARY MATHEMATICS TEACHING PROGRAM

Course Name	EDEM 428 – Teaching Methods in Elementary mathematics II
Course Type	Compulsory (Expertise Field Course)
Credit / ECTS	3 / 6
Prerequisites	None
Semester	8 (Spring)
Instructor	Asst. Prof. Oğuzhan Doğan

Learning Outcomes	**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
1) Explains learning theories.	5, 6	1, 3	A
2) Gives examples about how to implement learning theories in math classes.	3, 5	1, 3	A
3) Explains teaching methods, strategies and techniques.	5, 6	1, 3	A
4) Gives examples about how to implement teaching methods, strategies and techniques in math classes.	5, 6	1, 3	A
5) Develops learning tasks or activities that are aligned with elementary math curriculum.	3, 7	3, 5, 6	E, G
6) Implements self-developed activities in the class (microteaching).	6, 7	6	G

Teaching Methods:	1. Lecture 2. Case study 3. Discussion 4. Demonstration 5. Group work 6. Microteaching 7. Problem solving
Assessment Methods:	A. Supply type B. Multiple-choice test C. Incomplete D. True-False E. Oral exam F. Portfolio G. Performance type H. Report

1. **Course Description:**

   Teaching methods in mathematics, Teaching Numbers, Teaching Algebraic Thinking, Teaching Fractions, Decimals and Percentages, Preparing Lesson Plans, Implementing Lesson Plans

2. **Course Objectives:**

   The aim of the course is to learn about and practice with teaching strategies and methods that are used to teach elementary mathematics. The content of the course will be composed of overview of teaching and

learning methods and strategies, planning learning tasks, and Implication of teaching strategies and methods in the class.

3. Contribution to Professional Development:

This course enables preservice teachers to learn about implementing different teaching methods (such as direct instruction, guided discovery, problem solving, project-based learning and etc.) and teaching strategies in teaching elementary mathematics topics (such as numbers, algebra, geometry and statistics).

4. Reading Texts and Books:

Van de Walle, J.A., Karp, K.S., & Bay Williams, J.M. (2013). Elementary and middle school mathematics: Teaching developmentally. 8th Edition. Boston: Pearson.

Ministry of Education (MEB) Mathematics and Geometry Curricula For Grades 5-8.

National Council of Teachers of Mathematics (NCTM). (2000). Principles and Standards for School Mathematics

Supplementary Books

Baki, A. (2014). Kuramdan Uygulamaya Matematik Eğitimi. Harf Yayınları

Burns, M. (2007). About teaching mathematics: A K-8 resource. Sausalito, CA: Math Solutions Publications.

Olkun, S. & Uçar, Z. T. (2014). İlköğretimde Etkinlik Temelli Matematik Öğretimi. Ankara: Eğiten Kitap.

Özmantar, M. F., & Bingölbalı, E. (2009). Etkinlik tasarımı ve temel tasarım prensipleri. E. Bingölbalı, & M. F. Özmantar (Eds.). İlköğretimde karşılaşılan matematiksel zorluklar ve çözüm önerileri. Ankara: Pegem Akademi.

Stein, M. K., Smith, M. S., Henningsen, M. A., & Silver, E. A. (2000). Implementing standards-based mathematics instruction. Reston, VA: NCTM.

5. Course Requirements:

Your participation in class discussions and activities is essential to improve your mathematical abilities as a prospective teacher. You have to attend at least 80% of the entire classes. You will be assigned reading texts and you are expected to critically think about and discuss in the class.

6. Policies and Procedures

Special Needs Statement: Students requiring classroom accommodations or modifications because of a disability should discuss this need with the instructor at the beginning of the semester.

Academic misconduct / Ethics: Strongly advised to follow an ethical code and not to get engaged in any form of unethical behavior like cheating in exams, plagiarism and signing up attendance sheet as present while one is absent in class. If you have an excuse to meet a requirement, be honest about it, do your best and consult with the instructor. *Possibility of gaining a couple points without effort is not worth ruining your personal reputation, risking clean academic records and suffering from disciplinary consequences.* Cheating in any form will not be tolerated. Any student who is caught cheating will get an F in the class and will be subjected to the University's disciplinary procedures. You are also expected to conform to the dressing code accepted at our universities and in any other place.

Communication: You can reach me via e-mail or office phone and you can also see me in person during my office hours, or else by appointment.

Integrity and Plagiarism: Yeditepe University has subscribed to **Turnitin.com** which allows faculty to compare student papers with extensive databases of billions of documents in order to detect and verify material that has

been plagiarized. In this course, **Turnitin.com** is used to deter students from plagiarizing material. Please be aware that student papers will be examined from time to time. Students who plagiarize will be punished.

Note: Do not use email to ask questions on material that was covered when you miss a class. If that is the case, ask one of your classmates for the lecture notes. It is your responsibility to keep fully informed about notes and class material discussed during your absence. Should you require further assistance please visit me during my office hours outlined above.

7. Assignments

Lesson Plans

Prepare 4 lesson plans for specific teaching methods to teach one of the elementary mathematics topics covered in mathematics curriculum.

Student Presentations

You are expected to make a 30-minutes presentation at specified weeks. Each presentation you should choose an elementary mathematics subject, prepare a comprehensive lesson plan and make a 30-minutes presentation.

Final

Final exam consists of open-ended questions that are related to the issues discussed in the class.

8. Grading Policy:

In order to pass this course, a student must obtain a minimum grade of 50%. Final grades will be based on the following criteria

Items	Points
Lesson Plans	40
Micro Teaching	20
Final	40
Total	**100**

Scale:

90-100	AA
85-89	BA
80-84	BB
75-79	CB
70-74	CC
60-69	DC
50-59	DD
<49	F

9. Course Contribution to Program Outcomes

No	Program outcomes	Level of contribution				
		1	2	3	4	5
1	Knows historical, cultural and scientific developments of the mathematical and geometrical concepts covered in elementary school mathematics curriculum.				X	
2	Applies fundamental mathematical and geometric concepts into other disciplines and real life situations.					X
3	Applies mathematical processes (e.g. problem solving, proving theorems, etc.) into given cases accurately.					X
4	Plans for teaching mathematics in line with the elementary school mathematics curriculum's vision, philosophy and goals.					X
5	Uses teaching strategies and techniques that are appropriate for students' age, grade level, individual differences and readiness level.					X
6	Determines and applies appropriate strategies and materials to foster and evaluate students' mathematical thinking skills.					X
7	Uses and develops appropriate resources and materials to teach mathematics.					X
8	Monitors students' learning process, development and achievement and assesses them by using appropriate assessment tools.				X	
9	Improves professional knowledge by following recent issues in mathematics education.			X		
10	Contributes to the development of mathematics education by doing scientific research.	X				

10. Course Work Calendar

Week 1	Introduction
Week 2	Curriculur Materials MoNE Elementary Mathematics Curriculum NCTM Standarts
Week 3	Learning Theories & Teaching Mathematics
Week 4	Developing Early Number Concepts and Number Sense Chapter 8 (Van de Walle, 2013)
Week 5	Developing Meanings for the Operations Chapter 9 (Van de Walle, 2013)
Week 6	Algebraic Thinking: Generalizations, Patterns, and Functions Chapter 14 (Van de Walle, 2013)
Week 7	Developing Fraction Concepts Chapter 15 (Van de Walle, 2013)
Week 8	Developing Concepts of Decimals and Percent Chapter 17 (Van de Walle, 2013)
Week 9	Proportional Reasoning Chapter 18 (Van de Walle, 2013)
Week 10	Developing Measurement Concepts Chapter 19 (Van de Walle, 2013)
Week 11	Geometric Thinking and Geometric Concepts Chapter 20 (Van de Walle, 2013)
Week 12	Developing Concepts of Data Analysis Chapter 21 (Van de Walle, 2013)
Week 13	Exploring Concepts of Probability Chapter 22 (Van de Walle, 2013)
Week 14	Developing Concepts of Exponents, Integers, and Real Numbers

	Chapter 23 (Van de Walle, 2013)
Week 15	Evaluation of the Course

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	***Quantity***	***Duration (Hour)***	***Total Workload (Hour)***
Course hours (including the exam week: 15 x total course)	15	4	60
Hours for off-the-classroom study (pre-study, practice)	15	3	45
Assignments	5	5	25
Final	1	20	20
Total Workload			150
Total Workload / 25 (hours)			6
ECTS			6

YEDITEPE UNIVERSITY
FACULTY OF EDUCATION

ELEMENTARY MATHEMATICS TEACHING PROGRAM

Course Name	EDEM 456 Material Development in Elementary Mathematics
Course Type	Compulsory (Expertise Field Course)
Credit / ECTS	3 / 7
Prerequisites	None
Semester	6 (Spring)
Instructor	Assist. Prof. Dr. Oğuzhan Doğan

Learning Outcomes	**Program Outcomes**	**Teaching Methods**	**Assessment Methods**
Explain the importance of using materials to state meaningful learning	5, 8	1, 4, 5	G, H
Exemplify educational materials related with learning fields; according to the teaching-learning theories	6, 8	4, 5, 6	G, H
Evaluate the effectiveness of educational materials for teaching mathematics	8, 9	1, 4, 5	G, H
Develops educational materials for mathematical modeling of daily-life experiences.	3, 4, 7, 8	1, 4, 5	G, H
Use manipulatives in mathematics teaching	6, 8	6	G

Teaching Methods:	1. Lecture 2. Case study 3. Discussion 4. Demonstration 5. Group work 6. Microteaching 7. Problem solving
Assessment Methods:	A. Supply type B. Multiple-choice test C. Incomplete D. True-False E. Oral exam F. Portfolio G. Performance type H. Report

1. Course Description:

Hands on materials for mathematics education. Including lectures (theoretical) and workshops. The lectures are about the basic concepts and applications of educational technology, quality and the use of educational materials and manipulatives. The workshops are designed on modelling: "how to use manipulatives for mathematical modelling, and how to develop technological/non-technological materials as teaching supplements".

2. Course Objectives:

The main objective of this course is to familiarize the student with using hands on materials in teaching mathematics. We will examine different manipulatives specifically developed to learn and teach mathematics. Students will develop authentic manipulatives for specific mathematics topics.

3. Contribution to Professional Development:

This course enables preservice teachers to learn about manipulatives such as geoboard, algebra tiles and etc. that they can use through their teaching career.

4. Reading Texts and Books:

Heinich, R., Molenda, M., Russell, J.D., and Smaldino, S.E. (2002). Instructional Media and Technologies for Learning. Prentice Hall.

Van de Walle, J.A., Karp, K.S., & Bay Williams, J.M. (2013). Elementary and middle school mathematics: Teaching developmentally. 8th Edition. Boston: Pearson.

Lecture notes will be provided on YULEARN.

5. Course Requirements:

Your participation in class discussions and activities is essential to improve your mathematical abilities as a prospective teacher. You will be given some handouts involving tasks that you are expected to work during the lesson. You will be given assignments related to the issues covered in the class. You have to attend at least 80% of the entire classes.

6. Policies and Procedures

Special Needs Statement: Students requiring classroom accommodations or modifications because of a disability should discuss this need with the instructor at the beginning of the semester.

Academic misconduct / Ethics: Strongly advised to follow an ethical code and not to get engaged in any form of unethical behavior like cheating in exams, plagiarism and signing up attendance sheet as present while one is absent in class. If you have an excuse to meet a requirement, be honest about it, do your best and consult with the instructor. *Possibility of gaining a couple points without effort is not worth ruining your personal reputation, risking clean academic records and suffering from disciplinary consequences.* Cheating in any form will not be tolerated. Any student who is caught cheating will get an F in the class and will be subjected to the University's disciplinary procedures. You are also expected to conform to the dressing code accepted at our universities and in any other place.

Communication: You can reach me via e-mail or office phone and you can also see me in person during my office hours, or else by appointment.

Integrity and Plagiarism: Yeditepe University has subscribed to **Turnitin.com** which allows faculty to compare student papers with extensive databases of billions of documents in order to detect and verify material that has been plagiarized. In this course, **Turnitin.com** is used to deter students from plagiarizing material. Please be aware that student papers will be examined from time to time. Students who plagiarize will be punished.

7. Duties and Assignments:

Classroom Activities & Participation	10 %
Assignment 1. Evaluating and planning activities with a manipulative	20 %
Assignment 2. Developing an authentic manipulative	20 %
Assignment 3. Micro Teaching with Manipulatives	20 %
Final Exam	30 %

Assignment 1. Evaluating and planning activities with a manipulative: Each student will select a well-known manipulatives for teaching mathematics and prepare alternative activities by using this manipulatives. Students will critically evaluate usefulness of this manipulative.

Assignment 2. Developing an authentic manipulative: Each student will develop a authentic manipulative for teaching a specific mathematics topic.

Assignment 3. Micro Teaching with Manipulatives: Students will prepare a lesson plan in which they exemplify meaningful usage of specific manipulative.

Students are expected to select different content areas (Numbers, Algebra, Geometry, Statistics & Probability) for each assignment.

8. Grading Policy

Items	**Points**
Participation and Weekly HW	10
Assignments	60
Final	30
Total	**100**

Scale:

90-100	AA
85-89	BA
80-84	BB
75-79	CB
70-74	CC
60-69	DC
50-59	DD
<49	FF

9. Course Contribution to Program Outcomes

No	**Program outcomes**	**Level of contribution**				
		1	2	3	4	5
1	Knows historical, cultural and scientific developments of the mathematical and geometrical concepts covered in elementary school mathematics curriculum.			X		
2	Applies fundamental mathematical and geometric concepts into other disciplines and real life situations.				X	
3	Applies mathematical processes (e.g. problem solving, proving theorems, etc.) into given cases accurately.			X		
4	Plans for teaching mathematics in line with the elementary school mathematics curriculum's vision, philosophy and goals.					X
5	Uses teaching strategies and techniques that are appropriate for students' age, grade level, individual differences and readiness level.					X

6	Determines and applies appropriate strategies and materials to foster and evaluate students' mathematical thinking skills.				X	
7	Uses and develops appropriate resources and materials to teach mathematics.					X
8	Monitors students' learning process, development and achievement and assesses them by using appropriate assessment tools.		X			
9	Improves professional knowledge by following recent issues in mathematics education.				X	
10	Contributes to the development of mathematics education by doing scientific research.	X				

10. Course Work Calendar

Week 1	Introduction
Week 2	Basic Concepts: Education, Technology, Educational Technology
Week 3	Types of Educational Materials Manipulatives for teaching mathematics
Week 4	Assignment 1.Examples and Evaluation of Use of Educational Materials Pattern Blocks
Week 5	Assignment 1.Examples and Evaluation of Use of Educational Materials Fraction Cards
Week 6	Assignment 1.Examples and Evaluation of Use of Educational Materials Geoboard
Week 7	Assignment 1.Examples and Evaluation of Use of Educational Materials 3-D Shapes & Conic Sections & Fractals
Week 8	Assignment 1.Examples and Evaluation of Use of Educational Materials Algebra Tiles
Week 9	Assignment 1.Examples and Evaluation of Use of Educational Materials Manipulatives for Probability
Week 10	Assignment 2. Presentation of own manipulatives
Week 11	Technology in Math Teaching
Week 12	Virtual Manipulatives
Week 13	Assignment 3. Micro Teachings with using manipulatives
Week 14	Assignment 3. Micro Teachings with using manipulatives
Week 15	Reflections

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	***Quantity***	***Duration (Hour)***	***Total Workload (Hour)***
Course hours (including the exam week: 15 x total course)	15	4	60
Hours for off-the-classroom study (pre-study, practice)	15	4	60
Assignments	3	10	30
Final	1	25	25
Total Workload			175
Total Workload / 25 (hours)			7
ECTS			7