TEACHING OF NUMBERS

1	Course Title:	TEACHING OF NUMBERS	
2	Course Code:	İMÖ3001	
3	Type of Course:	Compulsory	
4	Level of Course:	First Cycle	
5	Year of Study:	3	
6	Semester:	5	
7	ECTS Credits Allocated:	5.00	
8	Theoretical (hour/week):	3.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	0	
11	Prerequisites:		
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Prof. Dr. Dilek Sezgin Memnun	
15	Course Lecturers:	Prof.Dr. Dilek SEZGİN MEMNUN	
16	Contact information of the Course Coordinator:	Prof.Dr. Dilek Sezgin Memnun Adres: Bursa Uludağ Üniversitesi Eğitim Fakültesi, Matematik ve Fen Bilimleri Eğitimi Bölümü, Matematik Eğitimi Anabilim Dalı, 16059 Görükle / Bursa E-Mail:dsmemnun@uludag.edu.tr	
17	Website:		
18	Objective of the Course:	The aim of this course is to examine the basic number systems and their relationships in question, and to discuss current methods of teaching these subjects.	
19	Contribution of the Course to Professional Development:	Experience will be gained about in-class applications of basic number systems with different teaching methods.	
20	Learning Outcomes:		
		1	To be able to explain the basic number systems and the relationships among them.
		2	To be able to apply the concepts of divisibility rules, EKOK and EBOB.
		3	To be able to apply the concepts of ratio and proportion.
		4	To be able to prepare course content for teaching number systems.
		5	To be able to present course content for the teaching of number systems
		6	To be able to exemplify the daily life usage of number systems.
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		9	
		10	
21	Course Content:		
	Course Content:		
Week	Theoretical		Practice

1	Developing the concept of number and sense of number; The place and importance of number sense in Secondary School Mathematics Curriculum; The place and importance of number systems and the concept of operations in mathematics curriculum; The place and importance of four operations in natural/integer/rational numbers and natural/integer/rational numbers in mathematics teaching programs; Factors and multiples, divisibility rules, place and importance of EBOB and LCM in curriculum; The place and importance of ratio and proportional reasoning in mathematics programs; The place of the concept of real numbers and sets in mathematics programs.	
2	Importance of fractions, decimal notations and percentages in number sense. History of the concept of number and number systems, Brief history of arithmetic and symbols used in operations, Historical development of multipliers and multiples, and the concepts of EBOB and LCM, Historical development of the concept of fractions and operations in fractions, Historical development of natural numbers/integers/rational numbers and operations in these number sets, Decimal Brief history of operations with fractions and decimals, the place of ratio-proportion concepts in the history of mathematics, historical development of real numbers and exponents/radical expressions, history of sets. Importance of fractions, decimal notations and percentages in number sense. The relations of these concepts with daily life and lessons.	
3	Number systems and teaching. The relationship between number systems and the representation of numbers, Conversion between number systems and algorithmic approach, Number system and teaching numbers with different bases. Transaction concept. Points to be considered in teaching the concept of operation, Teaching four operations, Priority of operation.	
4	Natural numbers and their teaching. The concept of natural number and its importance, Place value and decimal counting system, Difficulties experienced by students regarding place value, Use of technology in teaching natural numbers. Four operations skills and teaching of natural numbers. Misconceptions and difficulties in teaching four operations, Mental calculation and estimation, Priority of operations.	
5	Doğal sayılar ve öğretimi. Doğal sayı kavramı ve önemi, Basamak değeri ve Onluk sayma sistemi, Öğrencilerin basamak değeri ile ilgili yaşadıkları zorluklar, Doğal sayıların öğretiminde teknoloji kullanımı. Doğal sayılarda dört işlem becerileri ve öğretimi. Dört işlem öğretimi konusundaki kavram yanılgıları ve zorluklar, Zihinden hesap yapma ve tahmin, İşlem önceliği.	

6	Kesirlerde işlemler ve öğretimi. Kesirlerde işlemlere yönelik kavram yanılgıları ve zorluklar. Tam sayı kavramı ve öğretimi. Tam sayı kavramı ile ilgili zorluklar ve kavram yanılgıları, Mutlak değer kavramı ve öğretimi, Tam sayıların karşılaştırılması ve öğretimi. Tam sayılarda işlemler ve öğretimi. Tam sayılarda işlemlerin temeli, Yönlü sayı modelleri ve nicelik modeller, Tam sayılarda işlem öğretimi, Tam sayılarda işlem öğretiminde karşılaşılan kavram yanılgıları ve zorluklar.	
7	The concept of decimal notation and its teaching, Reading decimal notations, Transition from fractions to decimal notations-Fractions in decimal notation, Decimal notation from digits, Ordering and comparison in decimal notation, Student errors in decimal notation. Operations with decimal fractions and its teaching, Student mistakes and misconceptions encountered in teaching operations with decimal fractions. Percentage representation and teaching. Relation of fraction, decimal and percent representations, Points to be considered in teaching percentages.	
8	The concept and teaching of rational numbers, the relationship of rational numbers with fractions, the different meanings of rational numbers, the density of rational numbers and their representation on the number line, the decimal representation of rational numbers and decimal expansion, the comparison and teaching of rational numbers, the difficulties encountered in teaching the concept of rational numbers. Operations with rational numbers and their teaching.	
9	Ratio-proportion concepts and proportional reasoning, Ratio-proportion concepts representation, Ratio concept and its teaching, Proportional reasoning, its levels and development, Proportional reasoning strategies, Proportion concept and teaching, Misconceptions and solution suggestions.	
10	Exponential expressions and their teaching. Exponential expression and its definition, Student difficulties and misconceptions in exponential expressions, Exponential expressions and their real life uses. Real number concept and teaching. Teaching radical expressions. Transition from rational numbers to real numbers, Different definitions of real numbers, Learning difficulties and misconceptions about real numbers and radical expressions. Sets and teaching basic concepts about sets. Set concept and elements, Display forms of sets	
11	Organizing the course content for the achievements in the fifth and sixth grade numbers learning area, using appropriate teaching materials and strategies.	
12	Organizing the course content for the achievements in the fifth and sixth grade numbers learning area, using appropriate teaching materials and strategies.	

13	Organizing the course content, using appropriate teaching materials and strategies for the achievements in the seventh and eighth grade numbers learning area.	
14	Organizing the course content, using appropriate teaching materials and strategies for the achievements in the seventh and eighth grade numbers learning area.	

22	Textbooks, References and/or Other Materials:	Ertekin,E. ve Ünlü, M. (2020).Kuramdan Uygulamaya Etkinlik Örnekleriyle Sayıların Öğretimi. Ankara: Pegem Akademi
23	Assesment	

TERM LEARNING ACTIVITIES	**NUMBER**	**WEIGHT**
Midterm Exam	1	40.00
Quiz	0	0.00
Home work-project	0	0.00
Final Exam	1	60.00
Total	2	100.00
Contribution of Term (Year) Learning Activities to Success Grade		40.00
Contribution of Final Exam to Success Grade		60.00
Total		100.00
Measurement and Evaluation Techniques Used in the Course		Preparing a lesson plan about number systems Applying the prepared lesson plan in the classroom

24 ECTS / WORK LOAD TABLE

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	0	0.00	0.00
Homeworks	6	7.00	42.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	15.00	15.00
Others	1	10.00	10.00
Final Exams	1	40.00	40.00
Total Work Load			149.00
Total work load/ 30 hr			4.97
ECTS Credit of the Course			5.00

25 CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS

	PQ1	**PQ2**	**PQ3**	**PQ4**	**PQ5**	**PQ6**	**PQ7**	**PQ8**	**PQ9**	**PQ10**	**PQ11**	**PQ12**	**PQ13**	**PQ14**	**PQ15**	**PQ16**
ÖK1	3	5	5	1	1	2	2	1	2	2	4	1	2	1	3	1
ÖK2	1	1	1	2	2	1	1	2	1	1	3	3	1	4	5	1
ÖK3	1	1	5	1	1	1	2	1	2	2	2	3	2	1	5	1

ÖK4	3	5	5	5	3	2	1	2	1	1	3	1	2	1	1	2
ÖK5	1	1	2	2	3	2	1	5	5	2	3	1	1	5	5	1
ÖK6	4	1	4	1	4	2	1	1	2	1	1	2	3	1	2	1

LO: Learning Objectives PQ: Program Qualifications

Contribution Level:	**1 very low**	**2 low**	**3 Medium**	**4 High**	**5 Very High**