T.C.

ESKİŞEHİR OSMANGAZİ ÜNİVERSİTY

FACULTY OF SCIENCES

MATHEMATİCS AND COMPUTER SCIENCES DEPARTMENT

COURSE INFORMATION FORM

Course Name	Course Code
Category Theory and Computer Science	

Semester	Number of Course Hours per Week		Credit	ECTS
	Theory	**Practice**		
6	3	0	-	5

Course Category (Credit)				
Basic Sciences	**Engineering Sciences**	**Design**	**General Education**	**Social**
x				

Course Language	Course Level	Course Type
Turkish	Undergraduate	Compulsory

Prerequisite(s) if any	
Objectives of the Course	Recognizing Category Theory and using this algebraic structure on other disciplines.
Short Course Content	Categories, Small categories, Generating new categories from a given category, Functional Programming Language (FPL), Special objects and special morphisms, Monomorphism and Epimorphism, Relationships between morphisms with FPL, Functors, Natural transformations, Equivalences between categories, Relationships between functors and natural transformations with FPL, Product and coproduct objects, Relationships between special objects and FPL, Limit and colimit

	Learning Outcomes of the Course	**Contributed PO(s)**	**Teaching Methods ***	**Measuring Methods ****
1	Acquires sufficient knowledge in category theory topics.	1,2	1,2	A
2	Develop the ability to create algorithms to solve problems by using theoretical and practical knowledge.	1,2	1,2	A
3	Develops ability to analyze and solve problems encountered.	3,4,5,9	2,10	A
4	Analytical thinking skills develop and the ability to make individual and independent decisions develops.	3,4,5,9	10,11	A
5	The ability to analyze and interpret data, apply interpretation to other data, and apply this information in a computer environment develops.	13	10,11	A
6				
7				
8				

*Teaching Methods 1:Expression, **2:**Discussion, **3:**Experiment, **4:**Simulation, **5:**Question-Answer, **6:**Tutorial, **7:**Observation, **8:**Case Study, **9:**Technical Visit, **10:**Trouble/Problem Solving, **11:**Induvidual Work, **12:**Team/Group Work, **13:**Brain Storm, **14:**Project Design / Management, **15:**Report Preparation and/or Presentation

Measuring Methods A:Exam, **B:Quiz, **C:**Oral Exam, **D:**Homework, **E:**Report, **F:**Article Examination, **G:**Presentation, **I:**Experimental Skill, **J:**Project Observation, **K:**Class Attendance; **L:**Jury Exam

Main Textbook	Barr, M. and C. Wells (1999). Category Theory for Computing Science, third edition. Les publications Centre de recherches math´ematiques.
Supporting References	1. Borceux, F. (1994). Handbook of Categorical Algebra I, II and III. Cambridge University Press. 2. Gray, J. W. and A. Scedrov (1989). Categories in Computer Science and Logic, volume 92 of Contemporary Mathematics. American Mathematical Society. 3. Mac Lane, S. (1971). Categories for the Working Mathematician, volume 5 of Graduate Texts in Mathematics. Springer-Verlag. 4. Moggi, E. and G. Rosolini, editors (1997). Category Theory and Computer Science, 7th International Conference Springer-Verlag. 5. Pierce, B. (1991). Basic Category Theory for Computer Scientists. The MIT Press. 6. Walters, R. F. C. (1991). Categories and Computer Science. Cambridge University Press. 7. David I. Spivak, Category Theory for the Sciences, The MIT Press Cambridge, Massachusetts London, England.

Course Schedule	
1	Categories
2	Small categories
3	Generating new categories from a given category
4	Functional Programming Language (FPL)
5	Special objects and special morphisms
6	Monomorphism and Epimorphism
7	Relationships between morphisms with FPL
8	Mid-Term Exam
9	Functors
10	Natural transformations
11	Equivalences between categories
12	Relationships between functors and natural transformations with FPL
13	Product and coproduct objects
14	Relationships between special objects and FPL
15	Limit and colimit
16,17	Final Exam

Calculation of Course Workload			
Activities	Number	Time (Hour)	Total Workload (Hour)
Course Time (number of course hours per week)	14	3	42
Classroom Studying Time (review, reinforcing, prestudy,….)	14	3	42
Homework	2	1	2
Report (Preparation and presentation time included)			
Project (Preparation and presentation time included)			
Presentation (Preparation time included)			
Mid-Term Exam	1	2	2
Studying for Mid-Term Exam	1	30	30
Final Exam	1	2	2
Studying for Final Exam	1	30	30
		Total workload	150
		Total workload / 30	5
		Course ECTS Credit	5

Evaluation	
Activity Type	**%**
Mid-term	50
Quiz	
Homework	
Bir öğe seçin.	
Bir öğe seçin.	
Final Exam	50
Total	100

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (PO) (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)		
NO	**PROGRAM OUTCOME**	**Contribution**
1	The ability to apply knowledges of Mathematics and Computer Sciences,	5
2	To have sufficient theoretical and practical knowledge of Mathematics at international level,	5
3	The ability of describing, modelling and solving of mathematical problems at Mathematics and related subjects,	5
4	The skill to solve and design a problem process in accordance with a defined target,	5
5	Skills to analyze data, interpret and apply to other datum and using these data on computer,	4
6	The skill to use the modern techniques and computational tools needed for mathematical applications,	3
7	The skill to make team work within the discipline and interdisciplinary,	2
8	The ability to improve oneself by following the developments on other modern, scientific and technological subjects as well as Mathematics and Computer Sciences,	2
9	The skill to communicate orally and in written way, in a clear and concise manner by having individual work skills and ability to independently decide and analytical thinking,	4
10	The skill to have professional and ethical responsibility,	2
11	The skill to have consciousness for quality issues and scientific research,	2
12	The skill to be sensitive to environmental issues related with problems and development of living area and consistent in the social relations,	1
13	Ability to solve problems in the working life faced to find an appropriate algoritms via mathematical modeling and to write computer programs,	4
14	The skill to developed design of software systems at different complex levels,	1
15	The credence of necessity of life-long learning and ability to apply the formation long-life learning.	1

LECTUTER(S)				
Prepared by	Prof. Dr. Zekeriya ARVASİ			
Signature(s)				

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