DEPARTMENT of INDUSTRIAL ENGINEERING
COURSE CATALOGUE FORM

Course Code: INDE3001				**Course Title**: Operations Research III			
Semester	**L + R + L**	**Credits**	**AKTS**	**Language**	**Category**	**Instructional Methods**	**Prerequisites**
5	3 + 1 + 0	3	6	English	Required	Lecture + PS	MATH2201
Course Objectives			The aim of this course is to provide the students with the modelling and analysing abilities of the random events in manufacturing and service systems.				
Course Content			Joint probabilities. Conditional probabilities. Markov processes. Poisson processes. Continuous Time Markov Chains. Queuing Systems.				
Course Learning Outcomes			Students, who pass the course satisfactorily: 1. Compute complex probabilities and expectations. [1] 2. Develop, solve and analyze probabilistic models for discrete time systems. [2] 3. Develop, solve and analyze probabilistic models for continuous time systems. [2] 4. Compute the performance criteria such as average waiting time, average queue length in queuing systems. [2] [*Note: Numbers in brackets are indicating the related program outcomes*]				
ISCED Category of the course			52 Engineering				
Textbook			An Introduction to Stochastic Modeling, H. M. Taylor, S. Karlin, Academic Press.				
Supplementary Material			Introduction to Probability Models, S. M. Ross, Academic Press. Operations Research: Applications and Algorithms, Wayne L. Winston, Cengage Learning.				

COURSE PLAN

Week	Topics	Laboratory / Tutorial Work
1	Probability review	
2	Joint probability	
3	Conditional probability and expectation	
4	Conditional probability and expectation	
5	Conditional probability and expectation	Exercises
6	Discrete time Markov chains	
7	Discrete time Markov chains	
8	Discrete time Markov chains	
9	Poisson processes	Exercises
10	Continuous time Markov chains	
11	Continuous time Markov chains	
12	Birth and Death Processes	
13	Queuing Systems	
14	Waiting in line and queue analysis	Exercises

COURSE ASSESSMENT SYSTEM

	Activities	Contribution (%)
Semester Activities	**Semester Written Exams**	58
	Homework	-
	Reports	-
	Labs	-
	Seminars	-
	Presentations	-
	Term Project	-
	Other (attendance, field trip etc.)	7
FINAL EXAM		35
Total		100

CONTRIBUTION of the COURSE on INDUSTRIAL ENGINEERING PROGRAM OUTCOMES

	Program Outcomes	Low	High
1	Adequate knowledge in mathematics, science and subjects pertaining to Industrial Engineering; ability to use theoretical and applied knowledge in these areas in complex engineering problems.	X	
2	Ability to identify, formulate, and solve complex Industrial Engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.		X
3	Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern design methods for this purpose.		
4	Ability to devise, select, and use modern techniques and tools needed for analyzing and solving problems encountered in engineering practice; ability to employ information technologies effectively.		
5	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating complex engineering problems or discipline specific research questions.		
6	Ability to work efficiently individually and in intra-disciplinary / multi-disciplinary teams.		
7	Knowledge of Turkish and English languages; ability to communicate effectively orally, inscriptive and visually by using these languages (via business methods such as reports, presentations and instructions).		
8	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.		
9	Consciousness to behave according to ethical principles and professional and ethical responsibility; knowledge on standards used in engineering practice.		
10	Knowledge about business life practices (management activities such as project, risk, change and quality etc.); awareness in entrepreneurship, innovation; knowledge about sustainable development.		
11	Knowledge about the global and social effects of engineering practices on health, environment, economics and safety, and contemporary issues of the century reflected into the field of engineering; awareness of the legal consequences of engineering solutions.		

ECTS - WORK LOAD TABLE

COURSE ACTIVITIES	Quantity	Time (hr)	Work Load (hr)
Lectures	14	3	42
Final Exam (Preparation included)	1	30	30
Semester Written Exams (Preparation included)	2	20	40
Out of class study time	14	3	42
Homework			
Reports			
Labs			
Seminar			
Presentations			
Term Project			
Total Load (hr)			154
ECTS Credits of the course (Total Work Load / 25)			6

Revision / Date	Coordinator / Prepared By	Approved By
5/02/2020	Demet Özgür Ünlüakın	Çağlar Aksezer