

GAZİ UNIVERSITY GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCE								
ECTS FORM								
Course Code and Title	KÇ 546 NUCLEAR ACCIDENTS							
Credits	3							
ECTS	7,5							
Name of Lecturer And e-mail address	Prof. Dr. İbrahim TÜKENMEZ ibrahim.tukenmez@gazi.edu.tr							
Department/Program	Environmental and Technical Research of Accidents							
Course Type	Selective							
Course Language	Turkish							
Course Semester	Fall							
Prerequisites	None							
Course Objectives	To give knowledge about the future of nuclear technology and prevention from accidents							
Course Contents	Nuclear reactions, Nuclear reactor technology and the types of nuclear power centrals, Nuclear safety and licensing, Principles of Nuclear Power Plant safety, Environmental effects of nuclear power plants,Dispersion of effluents from nuclear facilities, Reactor siting, Reactor accidents, Accident risk analysis, Environmental radiation doses							
Course Learning Outcomes	Nükleer reaktörler ve reaktör kazaları hakkında bilgi edinme Getting knowledge about nuclear reactors and reactor accidents							
References (References must be up to date)	Books	1. Samuel Glasstone, Nuclear Reactor Engineering, Krieger Publishing Company; ISBN: 0894645676; reprint edition, March 1991. 2. Samuel Glasstone, Alexander Sesonske (Editor), Nuclear Reactor Engineering: Reactor Systems Engineering, Chapman & Hall; ISBN: 0412985314; 4th edition, January 15, 1994. 3. Farmer F.R., Ed., Nuclear Reactor Safety, Academic Press,1977. 4. Lewis Elmer Eugene, Nuclear Power Reactor Safety , John Wiley & Sons; ASIN: 0471533351; June 1977. 5. Okrent, Nuclear Reactor Safety , University of Wisconsin Press, 1981.						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	Theoric	Practice	Lab.	Projects	Assign.	Other	Total	ECTS
	42	-	-	60	30	56	188	7,5
Assessment Methods and Criteria		Quantity (mark with "X")				Percentage (%)		
Midterm Exam		X				35		
Quiz								
Assignment								
Projects		X				25		

Laboratory		
Practice		
Other		
Final Exam	X	40
WEEKLY COURSE PLAN		
Week	Contents and topics	
1. Week	Nuclear reactions, Nuclear reactor technology and the types of nuclear power centrals, Nuclear safety and licensing,	
2. Week	Nuclear reactions, Nuclear reactor technology and the types of nuclear power centrals, Nuclear safety and licensing,	
3. Week	Nuclear reactions, Nuclear reactor technology and the types of nuclear power centrals, Nuclear safety and licensing,	
4. Week	Nuclear reactions, Nuclear reactor technology and the types of nuclear power centrals, Nuclear safety and licensing,	
5. Week	Principles of Nuclear Power Plant safety, Environmental effects of nuclear power plants,Dispersion of effluents from nuclear facilities, Reactor siting	
6. Week	Principles of Nuclear Power Plant safety, Environmental effects of nuclear power plants,Dispersion of effluents from nuclear facilities, Reactor siting	
7. Week	Principles of Nuclear Power Plant safety, Environmental effects of nuclear power plants,Dispersion of effluents from nuclear facilities, Reactor siting	
8. Week	Principles of Nuclear Power Plant safety, Environmental effects of nuclear power plants,Dispersion of effluents from nuclear facilities, Reactor siting	
9. Week	Principles of Nuclear Power Plant safety, Environmental effects of nuclear power plants,Dispersion of effluents from nuclear facilities, Reactor siting	
10. Week	Reactor accidents, Accident risk analysis, Environmental radiation doses	
11. Week	Reactor accidents, Accident risk analysis, Environmental radiation doses	
12. Week	Reactor accidents, Accident risk analysis, Environmental radiation doses	
13. Week	Reactor accidents, Accident risk analysis, Environmental radiation doses	
14. Week	Reactor accidents, Accident risk analysis, Environmental radiation doses	
15. Week	Reactor accidents, Accident risk analysis, Environmental radiation doses	

GAZİ UNIVERSITY GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCE								
ECTS FORM								
Course Code and Title	KÇ-.505 Advanced Mathematics - I							
Credits	3							
ECTS	7,5							
Name of Lecturer And e-mail address	Prof. Dr. Adnan SÖZEN/asozen@gazi.edu.tr							
Department/Program	Environmental and Technical Research on Accidents							
Course Type	Optional							
Course Language	Turkish							
Course Semester	2							
Prerequisites	-							
Course Objectives	In this lecture, Students gain engineering mathematical thinking ability and necessary mathematical background for using the other lecture and thesis.							
Course Contents	Vectoral space, minor space, Linear dependence and independence, Matrix algebra, Eigen value and eigen vector. Determinant properties. Linear algebraic equations, Vector algebra.							
Course Learning Outcomes	Improving mathematical thinking ability and main basis and methods of mathematics.							
References (References must be up to date)	Books	Jimmie Hinze. Construction Safety. Prentice Hall, 1997/ 0-13-377912-2 Richard Coble, Jimmie Hinze, Construction Safety and Health Management, 2001, 0-13-087173-7 / Prentice Hall						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	Theoric	Practice	Lab.	Projects	Assign.	Other	Total	ECTS
	42	0	0	0	0	146	188	7,5
Assessment Methods and Criteria	Quantity (mark with "X")				Percentage (%)			
Midterm Exam	x				20-20			
Quiz	-				-			
Assignment	x				10			
Projects	x				5			
Laboratory	-				-			
Practice	-				-			
Other	-				-			
Final Exam	x				45			
WEEKLY COURSE PLAN								
Week	Contents and topics							
1. Week	Vectoral space							
2. Week	Minor space							
3. Week	Linear dependence and independence							
4. Week	First Midterm							
5. Week	Matrix properties and calculations							

6. Week	Matrix algebra,
7. Week	Eigen value and eigen vector
8. Week	Determinant properties
9. Week	Linear algebraic equations
10. Week	Second Midterm
11. Week	Numerical Integration
12. Week	Numerical Differentiation
13. Week	Vector algebra
14. Week	Presentation of Term Project
15. Week	Final Exam

GAZİ UNIVERSITY GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCE								
ECTS FORM								
Course Code and Title	KÇ-.506 Computer Aided Optimisation Techniques							
Credits	3							
ECTS	7,5							
Name of Lecturer And e-mail address	Prof. Dr. Adnan SÖZEN/asozen@gazi.edu.tr							
Department/Program	Environmental and Technical Research on Accidents							
Course Type	Optional							
Course Language	Turkish							
Course Semester	2							
Prerequisites	-							
Course Objectives	Development of skill for finding the optimum value of a function of n real variables.							
Course Contents	Unconstrained optimization, functions of one variable: Fibonacci search, golden section search, functions of n variables: the method of hooke and Jeeves, Nelder and Mead's Method, Powell Method, Constained optimization : penalty functions							
Course Learning Outcomes	To applicate of this methods to Mechanical Engineering Problems							
References (References must be up to date)	Books	Basic Optimisation Methods, Brian D., BUNDAY, University of Bradford						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	Theoric	Practice	Lab.	Projects	Assign.	Other	Total	ECTS
	50	50	0	0	0	0	100	7,5
Assessment Methods and Criteria	Quantity (mark with "X")					Percentage (%)		
Midterm Exam	x					20		
Quiz	x					5		
Assignment	x					10		
Projects	x					5		
Laboratory	-					-		
Practice	-					-		
Other	-					-		
Final Exam	x					60		
WEEKLY COURSE PLAN								
Week	Contents and topics							
1. Week	Unconstrained optimization							
2. Week	functions of one variable: Fibonacci search							
3. Week	functions of one variable: Fibonacci search							
4. Week	golden section search							
5. Week	golden section search							
6. Week	Midterm							
7. Week	functions of n variables: the method of hooke and Jeeves, Nelder and Mead's Method, Powell Method,							

8. Week	functions of n variables: the method of hooke and Jeeves, Nelder and Mead's Method, Powell Method,
9. Week	functions of n variables: the method of hooke and Jeeves, Nelder and Mead's Method, Powell Method,
10. Week	functions of n variables: the method of hooke and Jeeves, Nelder and Mead's Method, Powell Method,
11. Week	Constained optimization : penalty functions
12. Week	Constained optimization : penalty functions
13. Week	Constained optimization : penalty functions
14. Week	Constained optimization : penalty functions
15. Week	Final Exam

GAZİ UNIVERSITY GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCE								
ECTS FORM								
Course Code and Title	KÇ-.507 OPERATIONS RESEARCH							
Credits	3							
ECTS	7,5							
Name of Lecturer And e-mail address	Prof. Dr. Orhan TÜRKBEY/turkbey@gazi.edu.tr							
Department/Program	Environmental and Technical Research on Accidents							
Course Type	Optional							
Course Language	Turkish							
Course Semester	2							
Prerequisites	-							
Course Objectives	Examination of concept, extend and properties of the models which are used in mathematical programming or in operations research in base of theory and application. Review of its applicability in terms of industrial productivity and rantability.							
Course Contents	The history and concept of Operations Research. The kinds and applications of mathematical models. The purpose and scope of mathematical programming. Variable concept and their usage in problems. System concept and its kinds. Optimization concept and its applications. Decision models and their applicabilities. Linear programming concept, and its applications and geometry. Specific linear programming models. The solution methods of linear programming. Games theory, and its applications. The modelling of transportation problems and its solution methods. Duality and sensitivity analysis. The modelling of assignment problem and its solution methods.							
Course Learning Outcomes	<ul style="list-style-type: none"> • Ensurance of application abilities of models which are used in mathematical programming in terms of industrial productivity and rantability. 							
References (References must be up to date)	Books		<ul style="list-style-type: none"> • Taha, Hamdy.A., (2002), Introduction to Operations Research (6th ed.), Prentice-Hall, Inc., NJ. (Textbook) • Winston, Wayne. L., (2004), Operations Research (4th ed.), Thomson Books/Cole, Australia. (Aux. book) 					
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	Theoric	Practice	Lab.	Projects	Assign.	Other	Total	ECTS
	42	0	0	0	0	146	188	7,5
Assessment Methods and Criteria		Quantity (mark with "X")				Percentage (%)		
Midterm Exam		x				15-15		
Quiz		-				-		
Assignment		x				5		
Projects		x				55		
Laboratory		-				-		

Practice	-	-
Other	-	-
Final Exam	x	60
WEEKLY COURSE PLAN		
Week	Contents and topics	
1. Week	The history and concept of Operations Research.	
2. Week	The kinds and applications of mathematical models.	
3. Week	The purpose and scope of mathematical programming.	
4. Week	Variable concept and their usage in problems.	
5. Week	System concept and its kinds.	
6. Week	Optimization concept and its applications.	
7. Week	Decision models and their applicabilities.	
8. Week	Linear programming concept, and its applications and geometry.	
9. Week	Specific linear programming models.	
10. Week	The solution methods of linear programming.	
11. Week	Games theory, and its applications.	
12. Week	The modelling of transportation problems and its solution methods	
13. Week	Duality and sensitivity analysis.	
14. Week	The modelling of assignment problem and its solution methods.	
15. Week	Final Exam	

GAZİ UNIVERSITY GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCE								
ECTS FORM								
Course Code and Title	KÇ-.516 Occupational Accidents and Occupational Safety							
Credits	3							
ECTS	7,5							
Name of Lecturer And e-mail address	Doç. Dr. Mustafa Necmi İLHAN/mnilhan@gazi.edu.tr							
Department/Program	Environmental and Technical Research on Accidents							
Course Type	Optional							
Course Language	Turkish							
Course Semester	2							
Prerequisites	-							
Course Objectives	Description and analysis of occupational accidents and medical and technical prevention							
Course Contents	Description of occupational accidents, measurement of occupational accidents, prevalence of occupational accidents in World and Turkey Risk factors in occupational accidents, risk assessment at work, Prevention methods for occupational accidents							
Course Learning Outcomes	Be able to define occupational accidents, be able to define world and Turkey occupational accident prevalence and risk factors, be able to know prevention of occupational accidents							
References (References must be up to date)	Books	Basic Optimisation Methods, Brian D., BUNDAY, University of Bradford						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	Theoric	Practice	Lab.	Projects	Assign.	Other	Total	ECTS
	42	0	0	10	10	62	100	7,5
Assessment Methods and Criteria	Quantity (mark with "X")					Percentage (%)		
Midterm Exam	-					-		
Quiz	-					-		
Assignment	x					20		
Projects	x					20		
Laboratory	-					-		
Practice	-					-		
Other	-					-		
Final Exam	x					60		
WEEKLY COURSE PLAN								
Week	Contents and topics							
1. Week	Philosophy of Occupational Health And Safety							
2. Week	Measurement of Occupational Accidents							
3. Week	Epidemiology of Occupational Accidents							
4. Week	Risk Factors in Occupational Accidents							
5. Week	Occupational Accidents and Safety at Mining Industry							
6. Week	Occupational Accidents and Safety at Construction Industry							
7. Week	Occupational Accidents and Safety at Metal Industry							

8. Week	Occupational Accidents and Safety at Mining Industry
9. Week	Occupational Accidents and Safety at Energy Industry
10. Week	Occupational Accidents and Safety at Forest and Agriculture Industry
11. Week	Occupational Accidents and Safety at Ship and Seaport Industry
12. Week	Occupational Accidents and Safety at Textile Industry
13. Week	Risk Assessment
14. Week	Risk Assessment
15. Week	Final Exam

GAZİ UNIVERSITY GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCE								
ECTS FORM								
Course Code and Title	KÇ-.524 Total Quality Management in The Prevention of Accidents							
Credits	3							
ECTS	7,5							
Name of Lecturer And e-mail address	Prof. Dr. Ayşe MUTARHAN/amurathan@gazi.edu.tr							
Department/Program	Environmental and Technical Research on Accidents							
Course Type	Optional							
Course Language	Turkish							
Course Semester	2							
Prerequisites	-							
Course Objectives	To give fundamentals of TQM, Comparison with other management systems, The important of TQM in the prevention of accidents, To describe of national and international important,							
Course Contents	Introduction, Quality term, Quality insurance, Total quality management and development, Flow sheets, Quality control circle efficiencies and the role in prevention of accidents, Quality control audit and the effects in the decreasing of accident risk, Statistical process control, The role in the decreasing of accident and environmental risks of TQM applications,							
Course Learning Outcomes	• -							
References (References must be up to date)	Books	Jimmie Hinze. Construction Safety. Prentice Hall, 1997/ 0-13-377912-2						
	Journals, Articles, Papers, Symposiums	Richard Coble, Jimmie Hinze, Construction Safety and Health Management, 2001, 0-13-087173-7 / Prentice Hall						
Planned learning activities and teaching methods	Theoric	Practice	Lab.	Projects	Assign.	Other	Total	ECTS
	42	0	0	60	30	56	188	7,5
Assessment Methods and Criteria	Quantity (mark with "X")				Percentage (%)			
Midterm Exam	x				25			
Quiz	-				-			
Assignment	-				-			
Projects	x				35			
Laboratory	-				-			
Practice	-				-			
Other	-				-			
Final Exam	x				40			
WEEKLY COURSE PLAN								
Week	Contents and topics							
1. Week	Introduction							
2. Week	Quality term							
3. Week	Quality insurance							

4. Week	Total quality management and development
5. Week	Total quality management and development
6. Week	Total quality management and development
7. Week	Midterm
8. Week	Flow sheets
9. Week	Flow sheets
10. Week	Quality control circle efficiencies and the role in prevention of accidents
11. Week	Quality control circle efficiencies and the role in prevention of accidents
12. Week	Statistical process control
13. Week	The role in the decreasing of accident and environmental risks of TQM applications
14. Week	The role in the decreasing of accident and environmental risks of TQM applications
15. Week	Final Exam

GAZİ UNIVERSITY GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCE								
ECTS FORM								
Course Code and Title	KÇ-.539 MARITIME TRANSPORT ACCIDENTS AND SAFETY MEASURES							
Credits	3							
ECTS	7,5							
Name of Lecturer And e-mail address	Prof. Dr. Can BALAS/cbalas@gazi.edu.tr							
Department/Program	Environmental and Technical Research on Accidents							
Course Type	Optional							
Course Language	Turkish							
Course Semester	2							
Prerequisites	-							
Course Objectives	Analysis of maritime transport and harbor accidents, precaution methods, determination of accident probabilities and risk analysis							
Course Contents	Maritime transport and accidents, maritime traffic safety systems, operational accidents in industrial harbors and safety precautions, occurrence causes and safety measures of maritime and tanker vessel accidents, environmental impact assessment of tanker vessel accidents, oil pollution transport, hydraulic calculations on pollutants, necessary precautions to decrease the environmental destruction of pollutants, human and environmental factors in the safety of maritime accidents, system safety and safety management, statistical analysis of accidents, determination of accident probabilities by Monte Carlo simulation, risk analysis.							
Course Learning Outcomes	Application of maritime accident prevention methods, risk analysis, development of safety and insurance phenomena and applications.							
References (References must be up to date)	Books	<ul style="list-style-type: none"> Y. Goda, 1985, Random Seas and Design of Maritime Structures, University of Tokyo Press, Japan. Y. Yüksel, 1998, Coastal Engineering, Chamber of Civil Engineers, Ankara 						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	Theoric	Practice	Lab.	Projects	Assign.	Other	Total	ECTS
	42	0	0	0	0	146	188	7,5
Assessment Methods and Criteria	Quantity (mark with "X")					Percentage (%)		
Midterm Exam	x					20-20		
Quiz	-					-		
Assignment	x					10		
Projects	x					5		
Laboratory	-					-		
Practice	-					-		
Other	-					-		
Final Exam	x					45		
WEEKLY COURSE PLAN								
Week	Contents and topics							

1. Week	Maritime transport and accidents
2. Week	Maritime traffic safety systems
3. Week	Operational accidents in industrial harbors and safety precautions
4. Week	Occurrence causes and safety measures of maritime and tanker vessel accidents
5. Week	First Midterm
6. Week	Environmental impact assessment of tanker vessel accidents,
7. Week	Hydraulic calculations on pollutants,
8. Week	Necessary precautions to decrease the environmental destruction of pollutants
9. Week	Human and environmental factors in the safety of maritime accidents
10. Week	Second Midterm
11. Week	System safety and safety management, statistical analysis of accidents,
12. Week	Determination of accident probabilities by Monte Carlo simulation,
13. Week	Risk analysis.
14. Week	Presentation of Term Project
15. Week	Final Exam

GAZİ UNIVERSITY GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCE ECTS FORM								
Course Code and Title	KÇ-.540 Construction Safety/Risk Management							
Credits	3							
ECTS	7,5							
Name of Lecturer And e-mail address								
Department/Program	Environmental and Technical Research on Accidents							
Course Type	Optional							
Course Language	Turkish							
Course Semester	2							
Prerequisites	-							
Course Objectives	The course is intended to present several subjects related to construction safety management, which will develop understanding of key concepts in this area.							
Course Contents	Construction safety and importance of safety in construction. Legal framework for safety. Turkish standards. Overview of safety program elements. Benefits of implementing a safety program. Role of safety professional. Proactive accident prevention. Human factors in construction safety. Claims due to accidents. Direct and indirect costs due to accidents.							
Course Learning Outcomes	<ul style="list-style-type: none"> Identify construction safety and importance of construction safety in construction Explain regulatory requirements associated with construction safety Relate the need for a safety program, and how this program can be implemented into construction Identify and describe safety program elements Identify major hazards found in the construction workplace and explain how construction workers can be protected. Quantify direct and indirect losses due to construction safety claims 							
References (References must be up to date)	Books	Jimmie Hinze. Construction Safety. Prentice Hall, 1997/ 0-13-377912-2 Richard Coble, Jimmie Hinze, Construction Safety and Health Management, 2001, 0-13-087173-7 / Prentice Hall						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	Theoric	Practice	Lab.	Projects	Assign.	Other	Total	ECTS
	12	30	100	0	0	46	188	7,5

Assessment Methods and Criteria	Quantity (mark with "X")	Percentage (%)
Midterm Exam	x	20
Quiz	-	-
Assignment	x	70
Projects	-	-
Laboratory	-	-
Practice	-	-
Other	x	10
Final Exam	-	-

WEEKLY COURSE PLAN

Week	Contents and topics
1. Week	An overview of construction safety and construction safety management
2. Week	Construction accidents and injuries
3. Week	Legal framework for safety
4. Week	Safety in construction contracts
5. Week	Safety meetings and incentives
6. Week	Overview of safety program elements.
7. Week	Benefits of implementing a safety program.
8. Week	Safety leadership and management
9. Week	Risk and hazard management in construction, job safety analysis
10. Week	Human factors in construction safety.
11. Week	The role of supervisors and managers
12. Week	Project coordination, subcontractors and safety practices
13. Week	Claims due to accidents
14. Week	Direct and indirect costs due to accidents.
15. Week	Direct and indirect costs due to accidents.

GAZİ UNIVERSITY GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCE								
ECTS FORM								
Course Code and Title	KÇ-.541 Management of Accidents and Crisis							
Credits	3							
ECTS	7,5							
Name of Lecturer And e-mail address								
Department/Program	Environmental and Technical Research on Accidents							
Course Type	Optional							
Course Language	Turkish							
Course Semester	2							
Prerequisites	-							
Course Objectives	In this context, discussing examples from other countries, what is going on in Turkey about prevention of accidents and activities that are required to realize after accidents is aimed to teach.							
Course Contents	The main topics are: accident management and crisis management. Accident management mainly deals with the prevention of accidents and -if cannot be prevented- with the management and organization of activities that have to be conducted after accidents. The course aims to examine the relevant agencies, organizations, coordination activities and problems experienced in accidents. In addition, all types of accidents are discussed from all aspects. The second part of the course consists of crisis management. etc. Then, the situation in Turkey is examined with reference to governmental, non-governmental, voluntary and private agencies and organizations, and legislative regulations. In the course, the students are required to present a topic per week and evaluation will be either preparing a paper or taking exam or both.							
Course Learning Outcomes	This course aims to teach the following topics on crisis management: types of crisis, reasons for crisis, the process in the crisis management, organizational issues in crisis							
References (References must be up to date)	Books	Council, F., Zaloshnja, E., Miller, T., Persaud, B., Crash Cost Estimates by Maximum Police-Reported Injury Severity Within Selected Crash Geometries, PUBLICATION NO. FHWA-HRT-05-051, US Department of Transportation Federal Highway Administration, 2005.						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	Theoric	Practice	Lab.	Projects	Assign.	Other	Total	ECTS
	12	30	0	100	0	46	188	7,5
Assessment Methods and Criteria	Quantity (mark with "X")					Percentage (%)		
Midterm Exam	x					40		
Quiz	-					-		
Assignment	x					10		

Projects	x	10
Laboratory	-	-
Practice	-	-
Other	-	-
Final Exam	x	40
WEEKLY COURSE PLAN		
Week	Contents and topics	
1. Week	Definition of Accident management	
2. Week	Accident Management Techniques	
3. Week	Prevention of accidents Management and organization of activities that have to be conducted after accidents	
4. Week	Prevention of accidents Management and organization of activities that have to be conducted after accidents	
5. Week	Prevention of accidents Management and organization of activities that have to be conducted after accidents	
6. Week	Coordination of Relevant agencies, organizations	
7. Week	Coordination activities	
8. Week	Midterm Examination 1	
9. Week	Problems experienced in accidents	
10. Week	Definition of Crisis management	
11. Week	Crisis Management Techniques	
12. Week	Situation in Turkey examined with reference to governmental, non-governmental, voluntary and private agencies and organizations	
13. Week	Situation in Turkey examined with reference to governmental, non-governmental, voluntary and private agencies and organizations	
14. Week	Legislative regulations	
15. Week	Midterm Examination 2	

GAZİ UNIVERSITY GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCE ECTS FORM	
Course Code and Title	KÇ-.542 Failure Analysis in Accidents
Credits	3
ECTS	7,5
Name of Lecturer And e-mail address	
Department/Program	Environmental and Technical Research on Accidents
Course Type	Optional
Course Language	Turkish
Course Semester	2
Prerequisites	-
Course Objectives	The objective of this course is to introduce the important aspects associated with the failure analysis of engineering broken components and to recommend solutions to the problems.
Course Contents	<p>Definition and clasification of materials, Causes of failures: Faulty design, improper material selection, faulty manufacturing, construction and assembly, weld defects, faulty heat treatment, residual stresses, hot and cold tearing, wearing of parts, overload or unforeseen loading conditions, inadequate maintenans or improper repair, abnormal operating temperatures, severe vibration, impact or unforeseen collisions, ablation and thermal shock,</p> <p>Mechanical behaviour of material and macroscopic fracture: principle stresses, stress concentration, triaxial stres and constraint, plane stres and plane strain, fracture of tensile samples, effects of strain rate and temperature, crack propagation, ductile and brittle fracture, fracture mechnics and failure, fatigue loading, creep deformation. Microfracture mechanisms: slip, cleavage, twinning, cleavage fracture topography, void coalescence, mixed mechanisms of fracture, tearing, intergranular separation, fatigue fracture topography, high temperature fracture topography, environmentally assisted fracture, wear, fracture in ceramics, fracture mechanisms in polymeric materials, examination of fracture surfaces, comparison of SEM and TEM fractographs.</p> <p>Fracture modes and macrofractographic features: tensile overload, torsion overload, bending overload, fatigue overload, correlation of micro and macrofractographic features. Oxidation and Corrosion: pitting corrosion, stress corrosion, corrosion fatigue, intergranular corrosion, transgranular corrosion, dezicification, grafitization of cast iron. Case Studies: broken automobile components, exploded pressure vessels, pipes and steam boilers, welded components, broken wire cutters, steel punch and turbine blade.</p>

Course Learning Outcomes	Students who complete this course will have basic informations about the types and mechanisms of failures of materials during accidents and they will get an ability in solving failure problems.	
References (References must be up to date)	Books	<ol style="list-style-type: none"> 1. Eryürek, I.B. “Hasar Analizi”, 1.Baskı, İTÜ Makine Fakültesi, Birsen Yayınevi, İstanbul, (1993). 2. Gürleyik M.Y., “Hasar Bilgisi” KTÜ Yayın no.3, Trabzon, (1976). 3. Charlie, R.B., Ashok Choudhury, “Failure Analysis of Engineering Materials” Mc Graw Hill, New York, (2002). 4. Norman E. Dowling, “Mechanical Behaviour of Materials” (Engineering Methods for Deformation, Fracture and Fatigue), second edition, Prentice Hall, New Jersey, (1999) 5. Lipson, C., “Basic Cours in Failure Analysis”, Machine Design, Jan 22, pp.154 (1970). 6. Metals Handbook, “Fractography and Atlas of Fractogarphs”, ASM, vol.9, (1974). 7. Metals Handbook, “Failure Analysis and Prevention”, ASM, vol.10, (1975). 8. Metals Handbook, “Failure Analysis and Prevention”, ASM, vol.11, (1986). 9. Askeland, D.R., “The Science and Engineering of Materials”, 4th edition, Thomson/brooks/cole, USA, (2003). 10. Pat, L. Mangonon, “The Principles of Materials Selection fo Engineering Design”, Prentice Hall, New Jersey, (1999). 11. Ashby, M.F., “Materials Selection in Mechanical Design”, Pergamon Press, (1992). 12. Flinn, R.A., “Engineering Materails and their Application”, 4th edition, Houghton Mifflin Company, Boston, (1994). 13. Onaran, K., “Malzeme Bilimi”, 4. baskı, Bilim Teknik Yayınevi, İstanbul, (1993). 14. Doruk, M., “Korozyon ve Önlenmesi”, ODTÜ yayın no.70, (1982). 15. Oğuz, B., “Ark Kaynağı”, Murat Matbaası”, İstanbul, (1975). 16. Oğuz, B., “Dökme Demir Kaynağı”, Murat Matbaası, İstanbul, (1974). 17. Erdoğan, T., “Metalik Malzemelerin Uygulamalı Optik Metalografisi”, Segem yayın no.98, Ankara, (1982). 18. Erdoğan, T., “Mühendisler için Malzeme

		Seçimi”, TMMOB yayın no.119, Ankara, (1986).						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	Theoric	Practice	Lab.	Projects	Assign.	Other	Total	ECTS
	42	25	35	45	0	41	188	7,5
Assessment Methods and Criteria		Quantity (mark with “X”)				Percentage (%)		
Midterm Exam		x				40		
Quiz		-				-		
Assignment		-				-		
Projects		-				-		
Laboratory		x				10		
Practice		-				-		
Other		-				-		
Final Exam		x				50		
WEEKLY COURSE PLAN								
Week	Contents and topics							
1. Week	Definition and clasification of materials, Causes of failures: Faulty design,improper material selection,faulty manufacturing, construction and assembly; weld defects, faulty heat treatment, residual stresses, hot and cold tearing, wearing of parts.							
2. Week	overload or unforeseen loading conditions, inadequate maintenans or improper repair, abnormal operating temperatures, severe vibration, impact or unforeseen collisions, ablation and thermal shock,							
3. Week	Mechanical behaviour of material and macroscopic fracture: principle stresses, stress concentration, triaxial stres and conrstraint, plane stres and plane strain.							
4. Week	fracture of tensile samples, effects of strain rate and temperature, crack propagation, ductile and brittle fracture.							
5. Week	fracture mechnics and failure, fatigue loading, creep deformation.							
6. Week	First Midterm							
7. Week	Microfracture mechanisms: slip, cleavage, twinning, cleavage fracture topography, void coalescence, mixed mechanisms of fracture, tearing,							
8. Week	intergranular separation, fatigue fracture topography, high temperature fracture topography, environmentally assisted fracture, wear,							
9. Week	fracture in ceramics, fracture mechanisms in polymeric materials, examination of fracture surfaces, comparison of SEM and TEM fractographs.							
10. Week	Fracture modes and macrofractographic features: tensile overload,torsion overload, bending overload, fatigue overload, correlation of micro and macrofractographic features.							
11. Week	Oxidation and Corrosion: pitting corrosion, stress corrosion, corrosion fatigue, intergranular corrosion, transgranular corrosion, dezicification, grafitization of cast iron.							
12. Week	Situation in Turkey examined with reference to governmental, non-governmental, voluntary and private agencies and organizations							
13. Week	pipes and steam boilers, welded components, broken wire cutters, steel punch and turbine blade.							

14. Week	pipes and steam boilers, welded components, broken wire cutters, steel punch and turbine blade.
15. Week	Second Midterm

GAZİ UNIVERSITY GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCE								
ECTS FORM								
Course Code and Title	KÇ-.543 Analytical Methods on Accident Analysis							
Credits	3							
ECTS	7,5							
Name of Lecturer And e-mail address								
Department/Program	Environmental and Technical Research on Accidents							
Course Type	Optional							
Course Language	Turkish							
Course Semester	2							
Prerequisites	-							
Course Objectives	In this lecture, Students gain engineering mathematical thinking ability and necessary mathematical background for using the other lecture and thesis.							
Course Contents	Vectoral space, minor space, Linear dependence and independence, Matrix algebra, Eigen value and eigen vector. Determinant properties. Linear algebraic equations, Vector algebra.							
Course Learning Outcomes	Improving mathematical thinking ability and main basis and methods of mathematics.							
References (References must be up to date)	Books	<ul style="list-style-type: none"> • Calculus With Analytic Geometry (Hardcover) by Ron Larson, Robert P. Hostetler, Bruce H. Edwards • Calculus With Analytic Geometry, Seventh Edition (Hardcover) by Ron Larson • Advanced Mathematics: Precalculus With Discrete Mathematics and Data Analysis by Richard G. Brown (Hardcover - 1997) • Advanced Engineering Mathematics by Erwin Kreyszig • Schaum's Outline of Advanced Mathematics for Engineers and Scientists by Murray R Spiegel 						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	Theoric	Practice	Lab.	Projects	Assign.	Other	Total	ECTS
	42	30	0	70	0	46	188	7,5
Assessment Methods and Criteria		Quantity (mark with "X")				Percentage (%)		
Midterm Exam		x				40		
Quiz		-				-		
Assignment		x				10		
Projects		x				5		
Laboratory		-				-		
Practice		-				-		
Other		-				-		

Final Exam	x	45
WEEKLY COURSE PLAN		
Week	Contents and topics	
1. Week	Vectoral space	
2. Week	Minor space	
3. Week	Linear dependence and independence	
4. Week	First Midterm	
5. Week	Matrix properties and calculations	
6. Week	Matrix algebra,	
7. Week	Eigen value and eigen vector	
8. Week	Determinant properties	
9. Week	Linear algebraic equations	
10. Week	Second Midterm	
11. Week	Numerical Integration	
12. Week	Nemerial Diferentation	
13. Week	Vector algebra	
14. Week	Presentation of Term Project	
15. Week	Presentation of Term Project	

GAZİ UNIVERSITY GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCE ECTS FORM								
Course Code and Title	KÇ-.547 FIRE AND EXPLOSION							
Credits	3							
ECTS	7,5							
Name of Lecturer And e-mail address	Prof. Dr. Ayşe MURATHAN/amurathan@gazi.edu.tr							
Department/Program	Environmental and Technical Research on Accidents							
Course Type	Optional							
Course Language	Turkish							
Course Semester	2							
Prerequisites	-							
Course Objectives	Importance of engineering studies in fire and explosion							
Course Contents	Nature and development of fire; fire extinguisher substances, fire extinguisher equipments and usage techniques; fireman materials used in the place of employments; hazardous points in fire area(fire enlargement velocity, high temperature, the effects to spread of fire compouds, hazardous in fire phases: breath compulsory which form of toxic gases, explosion,collapsing,electrical,chemical); fire safety preventions in the place of employments (rules, laws and standards, active and passive preventions); fire safety organizations in the place of employments.							
Course Learning Outcomes	<ul style="list-style-type: none"> Approach to fire engineering 							
References (References must be up to date)	Books		Dennis P.Nolan, Handbook of fire and explosion protection engineering, principles of oil, gas, chemicals and related facilities, 1996, Noyes Pub.,New Jersey. .Shell Int.Petroleum Com.Ltd.,The Petroleum Handbook,Elsevier Science Pub.Co.Inc. Amsterdam,The Netherlands, 1983. .Environmental Protection Agency(EPA), US Regulation 40 CFR part 68”Proposed Rule, Risk Management Programs for Chemical Accidental Release Prevention”,EPA,Washington DC.,1983.					
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	Theoric	Practice	Lab.	Projects	Assign.	Other	Total	ECTS
	42	0	0	60	30	56	188	7,5
Assessment Methods and Criteria		Quantity (mark with “X”)				Percentage (%)		
Midterm Exam		x				25		

Quiz	-	-
Assignment	x	35
Projects	-	-
Laboratory	-	-
Practice	-	-
Other	-	-
Final Exam	x	40

WEEKLY COURSE PLAN

Week	Contents and topics
1. Week	Nature and development of fire
2. Week	fire extinguisher substances, fire extinguisher equipments and usage techniques
3. Week	fireman materials used in the place of employments
4. Week	hazardous points in fire area(fire enlargement velocity, high temperature, the effects to spread of fire compounds, hazardous in fire phases: breath compulsory which form of toxic gases, explosion,collapsing,electrical,chemical)
5. Week	hazardous points in fire area(fire enlargement velocity, high temperature, the effects to spread of fire compounds, hazardous in fire phases: breath compulsory which form of toxic gases, explosion,collapsing,electrical,chemical)
6. Week	Midterm
7. Week	fire safety preventions in the place of employments (rules, laws and standards, active and passive preventions)
8. Week	fire safety preventions in the place of employments (rules, laws and standards, active and passive preventions)
9. Week	fire safety preventions in the place of employments (rules, laws and standards, active and passive preventions)
10. Week	fire safety preventions in the place of employments (rules, laws and standards, active and passive preventions)
11. Week	fire safety preventions in the place of employments (rules, laws and standards, active and passive preventions)
12. Week	fire safety organizations in the place of employments.
13. Week	fire safety organizations in the place of employments.
14. Week	fire safety organizations in the place of employments.
15. Week	Final Exam

GAZİ UNIVERSITY GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCE ECTS FORM								
Course Code and Title	KÇ-.548 INDUSTRIAL ACCIDENTS							
Credits	3							
ECTS	7,5							
Name of Lecturer And e-mail address	Prof. Dr. Atilla MURATHAN/murathan@gazi.edu.tr							
Department/Program	Environmental and Technical Research on Accidents							
Course Type	Optional							
Course Language	Turkish							
Course Semester	2							
Prerequisites	-							
Course Objectives	Importance of engineering in industrial accidents							
Course Contents	Combustion and compounds, types of reaction, important parameters in pressured vessels and boiler explosion, boiler water conditioning, chemical risk analysis, nuclear safety, effects of radiation, safety and accident risk analysis, poisoning and first-aid, physical, chemical, biological and electromagnetical factors, corrosion and prevention, heat, sound and electromagnetic isolation in industrial places							
Course Learning Outcomes	<ul style="list-style-type: none"> To give knowledge about the scope of industrial accidents and prevention from accidents 							
References (References must be up to date)	Books	<ul style="list-style-type: none"> ✓ Campbell, G.L., Industrial Accidents and their Compensation, Bibliobazaar Publishing, 2009. ✓ Rostamzadeh B., Lönn H., Snedsbøl R., Torin J., A Distributed Computer Architecture for Safety-Critical Control Applications, New York, DACAPO 1999. ✓ Özkılıç, Ö. İş Sağlığı ve Güvenliği Yönetim Sistemleri ve Risk Değerlendirme Metodolojileri; TISK, Ankara 2005 ✓ Özkılıç, Ö. İş Sağlığı ve Güvenliği ve Çevresel Etki Risk Değerlendirmesi, MESS, İstanbul, 2007 						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	Theoric	Practice	Lab.	Projects	Assign.	Other	Total	ECTS
	42	0	0	60	30	56	188	7,5
Assessment Methods and Criteria	Quantity (mark with "X")					Percentage (%)		
Midterm Exam	x					35		
Quiz	-					-		
Assignment	-					-		
Projects	x					25		
Laboratory	-					-		
Practice	-					-		
Other	x					40		

Final Exam	-	-
WEEKLY COURSE PLAN		
Week	Contents and topics	
1. Week	Combustion and compounds	
2. Week	types of reaction	
3. Week	important parameters in pressured vessels and boiler explosion	
4. Week	boiler water conditioning	
5. Week	chemical risk analysis	
6. Week	Midterm	
7. Week	nuclear safety	
8. Week	effects of radiation	
9. Week	safety and accident risk analysis	
10. Week	poisoning and first-aid, physical	
11. Week	chemical, biological and electromagnetic factors	
12. Week	corrosion and prevention	
13. Week	heat, sound and electromagnetic isolation in industrial places	
14. Week	heat, sound and electromagnetic isolation in industrial places	
15. Week	Final exam	

GAZİ UNIVERSITY GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCE								
ECTS FORM								
Course Code and Title	KÇ-.549AIR TRANSPORT ACCIDENTS AND SAFETY SYSTEMS							
Credits	3							
ECTS	7,5							
Name of Lecturer And e-mail address								
Department/Program	Environmental and Technical Research on Accidents							
Course Type	Optional							
Course Language	Turkish							
Course Semester	2							
Prerequisites	-							
Course Objectives	Airline accidents analysis, especially accidents that may occur during aircraft approach and landing, prevention methods, and analysis of risk factors.							
Course Contents	Air transportation and accidents, airline traffic safety systems, essential systems for the use of aircraft at airports, navigation facilities, air traffic services, communication and language proficiency, additional safety measures to prevent accidents in the design of aircraft, necessary precautions to decrease the operational and handling procedures damages, The role of security in terms of environmental and human factors in airline accidents and the importance of flight crew training, system security and security management, statistical assessments and risk analysis of accidents.							
Course Learning Outcomes	implementation methods to prevent of airline accidents, application of developed check, risk analysis, training and infrastructure							
References (References must be up to date)	Books	<ul style="list-style-type: none"> • ICAO Annex (2,3,10,11,13,14) • Oxford Aviation Training Theoretical Knowledge manuals (010,020,030,040,050,060,090) • Jeppesen Training Manuals • Local Area DGPS Precision Approach and Post Process application (M.Sc. Thesis, R.F. Özenç) • Documents and Procedures of Turkish Airlines 						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	Theoric	Practice	Lab.	Projects	Assign.	Other	Total	ECTS
	42	0	0	50	96	0	188	7,5
Assessment Methods and Criteria	Quantity (mark with "X")					Percentage (%)		
Midterm Exam	x					30		
Quiz	-					-		

Assignment	x	20
Projects	-	-
Laboratory	-	-
Practice	-	-
Other	-	-
Final Exam	x	50

WEEKLY COURSE PLAN

Week	Contents and topics
1. Week	Human Performance in aviation
2. Week	Airport and Ground Environment
3. Week	Air Traffic Service
4. Week	Language Proficiency and Communication
5. Week	Mid term Exam
6. Week	Aircraft Design and operation
7. Week	Navigation Facilities
8. Week	Flight Security
9. Week	Meteorology
10. Week	Accident analysis and prevention
11. Week	Aircrew Training
12. Week	Presentation of Term Project
13. Week	Presentation of Term Project
14. Week	Presentation of Term Project
15. Week	Final Exam

GAZİ UNIVERSITY GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCE								
ECTS FORM								
Course Code and Title	KÇ-.552 Active and Passive Safety Systems Used in Vehicles							
Credits	3							
ECTS	7,5							
Name of Lecturer And e-mail address	Asist. Prof. Dr. Mesut DÜZGÜN/mduzgun@gazi.edu.tr							
Department/Program	Environmental and Technical Research on Accidents							
Course Type	Optional							
Course Language	Turkish							
Course Semester	2							
Prerequisites	-							
Course Objectives	Active and passive safety systems used in vehicles in terms of traffic safety to learn.							
Course Contents	Vehicle Dynamics basics; driving systems, chassis (suspension) systems, brake systems, powertraining (driveline) systems and this systems parts. Other ancillary systems that vehicle driving safety. Safety systems used in vehicles. The effects of active and passive safety system, vehicle movement.							
Course Learning Outcomes	<ol style="list-style-type: none"> 1. Learn the vehicle and vehicle dynamics. 2. Learn the vehicle safety systems. 3. Learn the effect of vehicle driving factors. 4. Develop active and passive safety approach. 							
References (References must be up to date)	Books	<ul style="list-style-type: none"> • Advanced vehicle technology, H. Heinzler • Tyre and Vehicle Dynamics, Hans B. Pacejka • Fundamentals of Vehicle Dynamics, Thomas Gillespie • Driving-safety systems, Bosch • Brake Technology Handbook, Bert Breuer and Karlheinz H. Bill • Brake systems (in Turkish), Duran Altıparmak • Vehicle Mechanism (in Turkish), Selim Çetinkaya 						
	Journals, Articles, Papers, Symposiums							
Planned learning activities and teaching methods	Theoric	Practice	Lab.	Projects	Assign.	Other	Total	ECTS
	42	0	0	0	0	146	188	7,5
Assessment Methods and Criteria	Quantity (mark with "X")					Percentage (%)		
Midterm Exam	x					30		

Quiz	-	-
Assignment	-	-
Projects	x	20
Laboratory	-	-
Practice	-	-
Other	-	-
Final Exam	x	50

WEEKLY COURSE PLAN

Week	Contents and topics
1. Week	Types of vehicles.
2. Week	Vehicle basics; Driving systems and motion control systems in vehicle.
3. Week	Driveline, brake, steering and chassis (suspension).
4. Week	Front geometry and driving stability.
5. Week	Balancing and Wheel systems.
6. Week	Vehicle dynamics and mechanism (basic)
7. Week	Vehicle safety and automatic vehicle control systems.
8. Week	Midterm.
9. Week	Active safety systems and vehicle electronic control systems.
10. Week	Electronically controlled braking systems in vehicle (ABS, EBD).
11. Week	Vehicle dynamic control systems (ASR, VSC).
12. Week	Traction control systems (ASR, TCS).
13. Week	Adaptive speed control systems and cruise controllers (CC, ACC).
14. Week	Passive safety systems (Seat belt, air bag).
15. Week	Final Exam